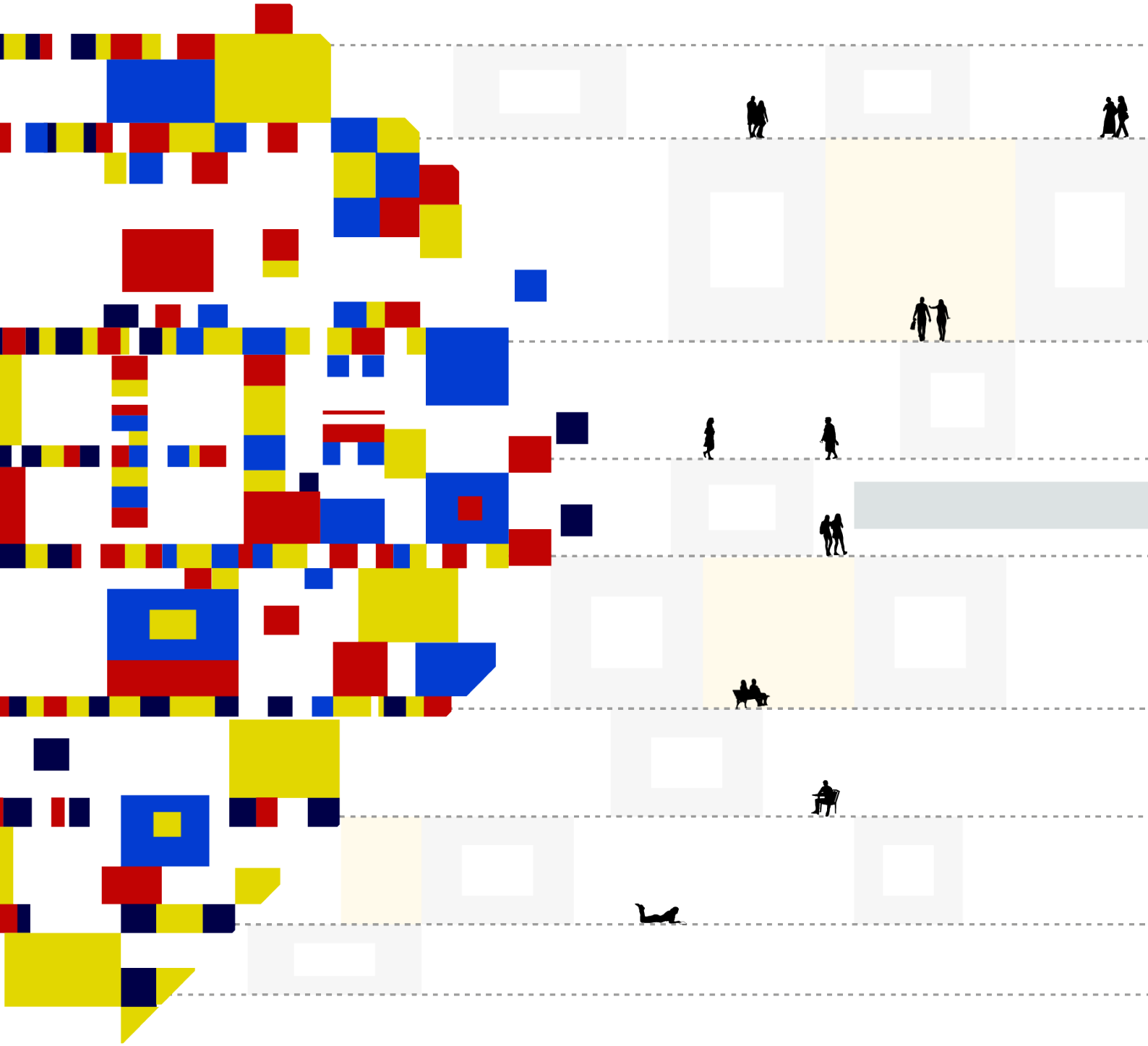

VICTORY COMPACT CITY

Fostering urban life in the compact city to optimize high density urban living

FINAL REPORT

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Victory compact city

Subtitle:
Fostering urban life in the compact city to optimize high density urban living

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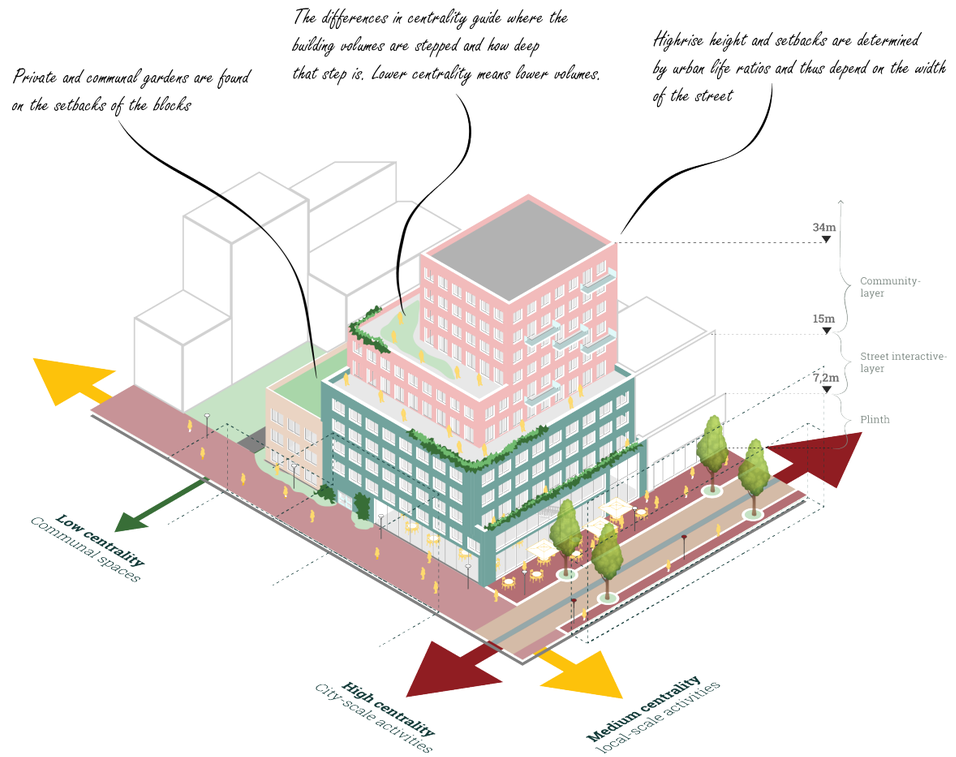
Date:
June 2020

“First life, then spaces, then buildings –
the other way around never works.”

Jan Gehl

urban life theorist and practitioner



F1 - Conclusive illustration of transferable design principles

Abstract

This research focuses on the relation between the compact city and urban life. Literature suggests that a holistic approach to further compacting a city means also integrating urban life qualities. This is currently lacking in Western European practice due to pragmatism, decentralisation and neo-liberal plot-led development. This while both concepts are crucial for sustainable cities. Therefore an optimization of their relation is needed in order to make better choices regarding densification.

The result is a research-by-design that researches three distinct themes that are related to incorporating urban life. These are urban volumes, urban network and urban quality. The Dutch densification site ‘Central Innovation District’ in the Hague is used as a case study for applying the found design principles. In order to measure and predict the character of spaces, modern modes of measuring the city are used. Most prominently are the methods of space syntax angular integration, betweenness shortest path algorithms and the spacematrix GSI/FSI density ratios. Moreover, because of its focus on the human scale, 3D modelling is a crucial part of the research.

The research concludes that the compact city and urban life can be integrated with eachother by following a set of principles for volumes, slow traffic networks and urban quality. What is needed is a broader overview of what attractors and pedestrian flows will emerge in a plan area. The associated centralities can then be used to shape the volumetric properties in such a way that significant densification can be achieved while urban life values like human scale stay assured.

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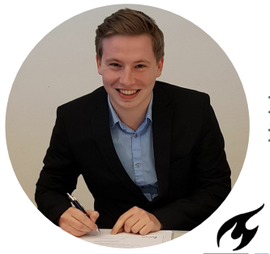
Three perspectives



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Urban Design Intern at plein06

Preface

This thesis is the result of a year-long graduation project for the Master of Science in Architecture, Urbanism and Building Sciences (track: urbanism) at the Technical University of Delft. At the same time, it is an overview of themes that attracted my specific interest in this time of my career.

These themes are a product of mainly three personal perspectives on urbanism: my education in bachelor and master at the TU Delft, my work as a student assistant and editor at the chair of Area Development and my interning experience as an urban designer at plein06.

'always approach urban design challenges in a broad multiscalar way'

My education created the foundation of a broad range of knowledge on building in general and urbanism in particular. The integrated approach of the TU Delft regarding planning, design, landscape architecture, engineering and urban processes taught me to always approach urban design challenges in a broad multi-scalar way.

My work as a student assistant sparked my interest in area development. Speaking with actual actors in the field and experiencing/writing about actual challenges of developing in a complex inner-city context, gave me insight into feasibility and the practice of urban development. Moreover, writing this often about urban development taught me to quickly synthesize the essence of stories and best practices on projects.

The internship of six months at plein06 taught me the role of urban designers in complex inner-city developments. Moreover, practical skills in parcelling, feasibility, landscape architecture and especially processes influenced my thinking of what urban design should strive for. This was especially caused by the outspoken profile of plein06 in combining human architecture, landscape/nature and urbanity in an integral approach leading to projects with a sensible human scale.

'designing for the human scale with creativity and modern but realistic approaches, shapes this thesis.'

Combining these three experiences and adding my own interest of designing for the human scale with creativity and modern but realistic approaches, shapes this thesis. The choice of the Hague CID as a complex inner-city context that focuses on the very realistic issue of housing shortages and densification, together with this interest of the human scale and a sustainable form of urban design is therefore a well-assessed one. These subjects are what I want to research at this point in my career and how I want to profile myself as an urban designer stepping into practice.

Please enjoy learning about my interests and visions on urban design. Do not hesitate to contact me if you want to learn more or have any questions.

Sebastien Reinink

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1 CONTEXT

Contents

Site context

General context

Problem field

Problem analysis

Problem statement

Aim

This chapter will describe and analyse the context of this Master Thesis. It will use empirical and theoretical methods to state the problem field, problem statement and the research aim. The purpose of this chapter is to set the scene of the thesis and introduce the location for the design.

Setting the scene

The city of the Hague has a particular history of evolving its urban fabric. In many ways the city is unique in its urban morphology, typology and configuration as it is a city built without walls and moats. Starting out as a small estate established by 'Graaf' Floris IV, it has now grown into a city with a great global importance. It is in this context where new choices on the development of the urban fabric in the coming 30 years will have to be made.

In order to set the scene, this short text will briefly summarize the context of the assessed site of this thesis. More elaborated analysis and explanations can be found further on in this thesis.

A city of international importance

As stated, the city started out as a palace founded by count Floris the fourth around the year 1230 AD. This palace is now known as the 'Binnenhof'. Found in this spot because of a natural fresh water well coming from the dunes (the Hofvijver) and its location between two important cities: Gouda and Leiden.

Around 1500, the city grew towards 5000 inhabitants in order to support the courtship of the palace. During the eighty-years war, the city impoverishes and Delft becomes the new centre of power. Luckily, after the war, the Hague regains its status as centre of the Dutch government.

After the flourishing 17th century golden ages the Hague grows into an international city. In the following centuries this status keeps the Hague growing as the big group of prominent international organisations and workers creates jobs and prosperity for the local inhabitants.

After the second world war, this international identity is underlined, as in 1948 a convention of 26 European countries lay the foundation for the European Union.

Today around 160 international organisations have their headquarters in the Hague. It is an international symbol for peace and justice.

Recent planning history

While modernism leaves it traces in the Dutch rebuilding of cities and its centres after the second world war, the citycentre of the Hague changes its vision in the 1980's. Using a new urbanist plan by architect Carel Weeber, the inner-city between the main train station and the Spui is filled with big buildings like the Zwarte Madonna by Carel Weeber, the Ministry of housing and spatial planning (VROM) by Jan Hoogstad and the new town hall by Richard Meier.

Gradually, the focus of the city centre shifts from a modernist standpoint towards a semi-traditional and historising atmosphere. This materializes in the 'de Resident' building blocks, master-planned by Rob Krier. This project also kicks off a new city tradition of high-rise development.

"from a modernist standpoint towards a semi-traditional and historising atmosphere."

In the following years new high-rise clusters like the Beatrixkwartier, Laakkwartier around station Holland Spoor and further high-rise developments in the city centre (see Figure 2), materializes the Hague's ambition to become a city with a distinct skyline.

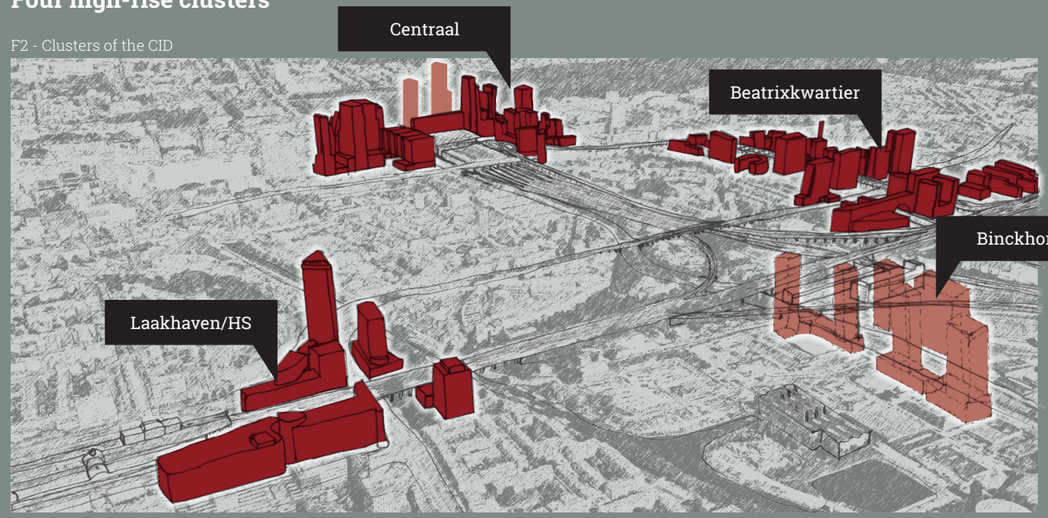
In recent times, this ambition gains traction as housing shortages, neo-liberal planning approaches and a shortage of space caused by municipal borders and conservatist approaches to existing neighbourhoods, asks for a comprehensive densification. High rise development on the Binckhorst, an industrial site, and the aforementioned high-rise clusters is deemed to be the answer to this densification challenge. The municipality formulates this ambition as the 'Central Innovation District'.

However, an unprecedented amount of rail- and road infrastructure is located in precisely this area of 375 hectares. What will this densification mean for the area in particular and the city in general?

Sources: merkdenhaag.nl
Den Haag ArchiGuides - draaiboek

Four high-rise clusters

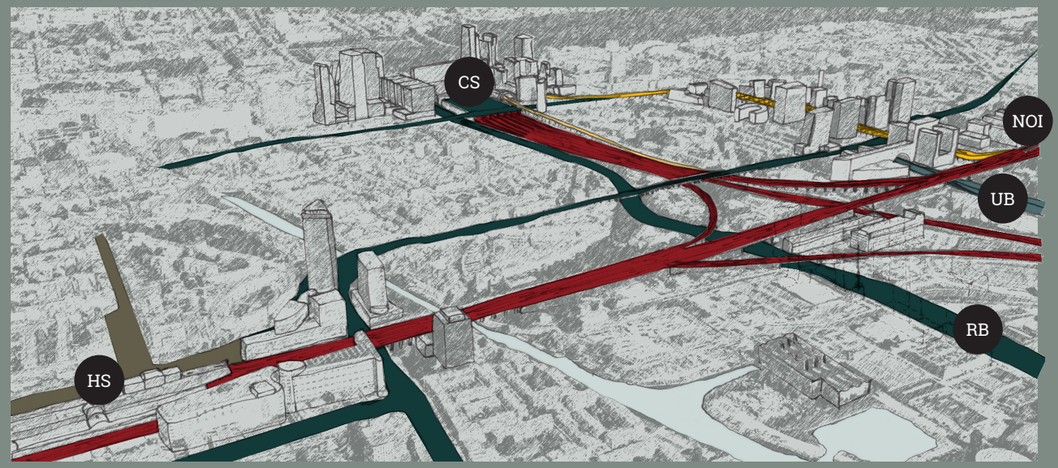
F2 - Clusters of the CID



The Central Innovation District consists of four high-rise areas clustered around big transport infrastructure. Laakhaven/HS is located in the south, the cluster Centraal to the west, Beatrixkwartier to the North and the Binckhorst to the south.

Transport infrastructure separates these areas. Most notably, the railway spaghetti that connects Den Haag Centraal Station, the only terminal-station in the Netherlands, to the rest of the country. Visible is the clustering around transportation nodes. Laakhaven/HS around station Holland Spoor, Beatrixkwartier near Laan van NOI and Utrechtsebaan, Centraal around Centraal Station and the Binckhorst around the Rotterdamsebaan.

F3 - Infrastructure in the CID



Railways · Pedestrian zone · Light rail · Roads

Source: Google maps

Housing market

The planning and housing tradition of the Netherlands has a longstanding and famed history. Currently, the housing market is dealing with a multitude of challenges, affecting the accessibility and the health of the housing market.

Before 2013, the economic crisis caused a crash in the housing market. This led to negative price movements of up to 20% (Nijskens, Lohuis, 2019). During the crisis there were voices in planning debates that stated that the Netherlands was 'completed' in terms of spatial planning and housing. Coincidentally (or not), during this time the Ministry for housing, spatial planning and environment (VROM) was abolished. This signified a trend of leaving the spatial planning more to local authorities rather than top-down government planning.

During 2013, a total recovery of the housing market can be noticed. In the next 5 years, average housing prices in the biggest four cities bounced back to the record-high 2008 levels (Nijskens, Lohuis, 2019). Suddenly, it became clear that there was a tremendous need for housing in the big cities. Instigated by trends leading to for example more single-person households or immigration and the effects of national policies, makes the housing market in the four biggest cities overheated (Nijskens, Lohuis, 2019). This leads to a new perspective on what is needed in the near 2040 future: 1 million homes extra.

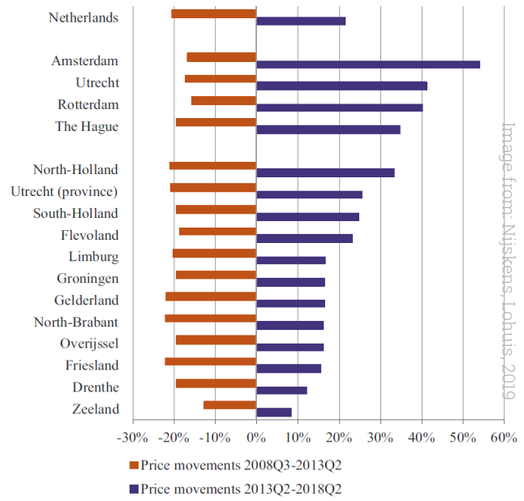


Image from: Nijskens, Lohuis, 2019

F5 - Price movements before and after crisis

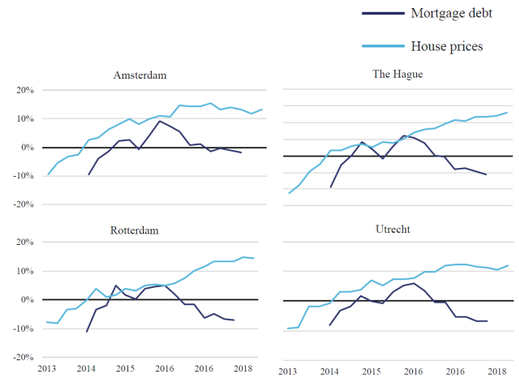


Image from: Nijskens, Lohuis, 2019

F4 - Rise of housing prices in the four big cities

This quantity will have an significant impact on existing urban fabric. The cities where most of these homes will have to be built, in the Randstad conurbation, are impeded by their location on the coast or near green belts that are shielded by national nature-preservation- and zoning policies (Nijskens, Lohuis, 2019). This makes the compact city model where compact urban forms and a reutilization of industrial areas are propagated (Deilmann et al., 2018), the only option.

Ambitions are high for this quantitative housing challenge. Most policymakers strive for multifunctionality by including other challenges in the subjects of mobility, sustainability and social questions.

The current planning situation however, leads to difficult public-private power-dynamics. Nijskens and Lohuis (2019) describe that municipalities currently lack effective incentives for developing private rental housing, partly because they depend on the revenues gained from these land developments. This makes them reluctant to grant building permits for land they do not own. In the current system, land prices are determined on their residual value: the difference between construction costs and sales proceed (Nijskens, Lohuis, 2019). This makes inner-city development difficult to be interesting for private parties. New governance instruments might be needed to realize the high ambitions and supply enough new homes.



Source: College Rijksadviseurs CRa

F6 - Dashboard verstedelijking

In 'Metro mix design guidelines' (CRa, 2019) the CRa builds further upon the transformation component of the dashboard verstedelijking. In this publication they describe ways to succesfully transform existing inner-city areas. Important are three zones: Rust, Ruis and Reuring, indicating the amount of noise and fuss allowed in certain zones. This allows for multiple uses to co-exist in the same place, while minimizing the negative externalities.

Other recommendations are for example to overcome infrastructural barriers, improve the regional economy, incorporate the existing situation and good public spaces.

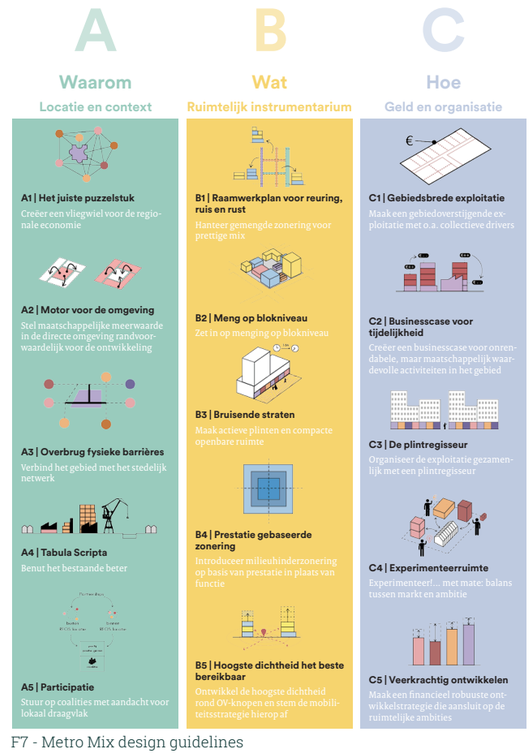
Most of these recommendations stem from the 'urban life' movement's urban design theories. The publication can therefore be seen as a way to bring knowledge about these urban life principles to market-parties like developers and private-parties like municipalities.

Compacting trends in the Netherlands

Compacting strategies in the Netherlands have in the last few years gained traction. The College van Rijksadviseurs (CRa) advises various scales of governments on spatial questions. Two recent influential publications show their advise for an integrated compact urban development of Dutch big cities. The project site of this thesis very much plays a role in this context. This makes the advises of the College also applicable in the assessed context.

In 'Dashboard Verstedelijking' they imply measures to integrate all urgent transitions within a compact city approach to new developments. Transit oriented development and proximity to greenery/amenities are widely propagated as well as re-utilization of existing built areas.

These measures are summarized in 14 indicators seen on the left.



Source College Rijksadviseurs CRa

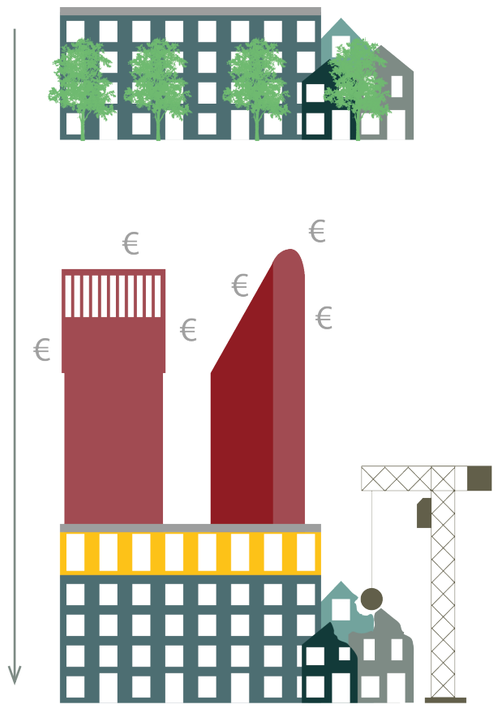
F7 - Metro Mix design guidelines

The human perspective in a neo-liberal compact city

Effects of the compact city

Due to rising housing demands in the European big cities and simultaneous restrictive regional planning laws regarding urban sprawl, municipalities and developers have chosen to densify their inner-cities. This promotion of compact urban development and urban densification/reutilization is widely accepted in policymaking (Deilmann et al., 2018). In the inner-cities this leads to a shift in housing typologies from ground based dwellings or few-storeys apartments towards mixed-use high-rises with apartments.

This idea of the compact city has implications for the use of public (green) space and the way of living in inner-cities (Neuman, 2005). Research shows that especially social (networks and interaction) and environmental (urban green space) aspects currently clash with the compact city approach (Artmann et al., 2019: 3). At the same time, the increasing density causes more users of public transport, cars, bicycle- and footpaths. This mostly has to fit in the existing transport infrastructure. This leads to congestion and in turn a city with less perceived spatial quality (Neuman, 2005). In academic discourse, this is discussed as the "compact city paradox" (De Roo, 2000; Neuman, 2005).



F8 - Towards neo-liberal densification

"downsides seem to cluster in the micro-level of the compact city"

A comprehensive study from the intergovernmental Organisation for Economic Co-operation and Development (OECD) assessed over 300 academic papers that studied the effects of compact urban form (OECD, 2018a). While 69% of the reviewed papers find mostly positive effects associated with compact urban form, the study also showed downsides. These downsides seem to cluster in the micro-level of the compact city. The paper names the factors of traffic congestion, personal health, and personal well-being as most pressing ánd costly issues in a compact city (OECD, 2018a: 4).



F9 - Usage of a single city street

Source: Author

Mitigating the negative effects

The aforementioned negative effects seem to correspond with what a group of influential researchers and practitioners try to mitigate by introducing 'urban life'. This group of scholars originated as an anti-movement to the then dominant paradigm of modernism, but through the years gained wide acclaim in urban design education and practice. This group consists predominantly of Jane Jacobs (1961), Kevin Lynch (1984), John Montgomery (1998) and more recently Jan Gehl (2011; 2013).

"the concept of urban life is subject to debate."

However, neo liberal planning policies as seen in Western European cities, seem to be predominantly focused on efficiency and economic drivers (Sager, 2011: 179). Moreover, the factor of personal well-being as stated by the OECD (2018a: 4) is hard to measure. Therefore, the concept of urban life is subject to debate. Marshall (2012) even describes the early discourse on this subject as 'pseudo-science', as it is not measurable.

In order to mitigate the negative effects of the compact city approach in a neo-liberal context, research is needed on how the conflicting ambitions of compact urban form and personal- health and wellbeing can be assessed.



Jane Jacobs



Jan Gehl

Source: Google doodle
Adapted by author

The Hague's 'Central Innovation District'



F10 - Sattelite overview of CID area

General overview

The project site spans a gross surface area of 375 hectares. It is an area with many different spatial attributes. On the satellite imagery the difference in urban grains is clearly visible. The existing residential neighbourhoods show a fine grain, while the Binckhorst industrial area in the South shows big buildings with more coarse grains. Notable are the big open spots in this industrial site, as well as its location in the middle of finer grained neighbourhoods.

Visible in the minimap of the municipality of the Hague is the remarkable location of the Central Innovation District. Right at the municipal border between Voorburg and the Hague

Source: PDOK

Infrastructure heavy

Rail, car-clogged roads, barriers



F11 - Big infrastructure in CID area

Forms of barriers

Reducing the site to just building grains and big infrastructure lines, the fragmentation of the area is clear. Railways, highways and canals create impenetrable barriers for pedestrians and cyclists. Moreover, the big building grains create a harsh environment for the human scale. While mobility is cared for, sustainable forms of the first and last mile lack. If the city of the Hague wants to densify this area, challenges on crossing infrastructure and mitigating negative effects of cars have to be high on the agenda.

Source: PDOK

Technocratic eye-level

Walkability under severe pressure



The geographical centre of the Central Innovation District



Entering the Centraal cluster



Crossing 100 meters of train tracks by bike or on foot



Walking/biking from the Binckhorst cluster towards the Centraal cluster

F12 - Human perspective images of project area

Source: Google Streetview

Regional importance

Crucial regional housing location



F13 - Regional 'verstedelijkingsalliantie' densification strategy

The CID is a regional answer

The province of South Holland wants to solve 80% of the housing shortage in South Holland along the line Leiden-Den Haag-Delft-Rotterdam-Dordrecht (MRDH, 2017). This means 250.000 new homes have to be created, of which 170.000 within existing urban environments. The Metropolitan region of Rotterdam and Den Haag (MRDH) assesses the Central Innovation District and the Binckhorst as crucial for the solving of housing shortages.

When reflecting on the regional strategy for mobility (MIRT), it is clear that on a macro scale, public transport will be the main focus of the new housing areas. The report further names biking and walking as important mobility strategies for both the meso- and micro scale. In mobility terms the micro and meso scales are often described as first and last mile.

The project site of this thesis therefore has a great potential to influence the approach to other sites of densification along the line that often are similar in spatial attributes and contexts.

Source: MRDH (2017), BBG2012

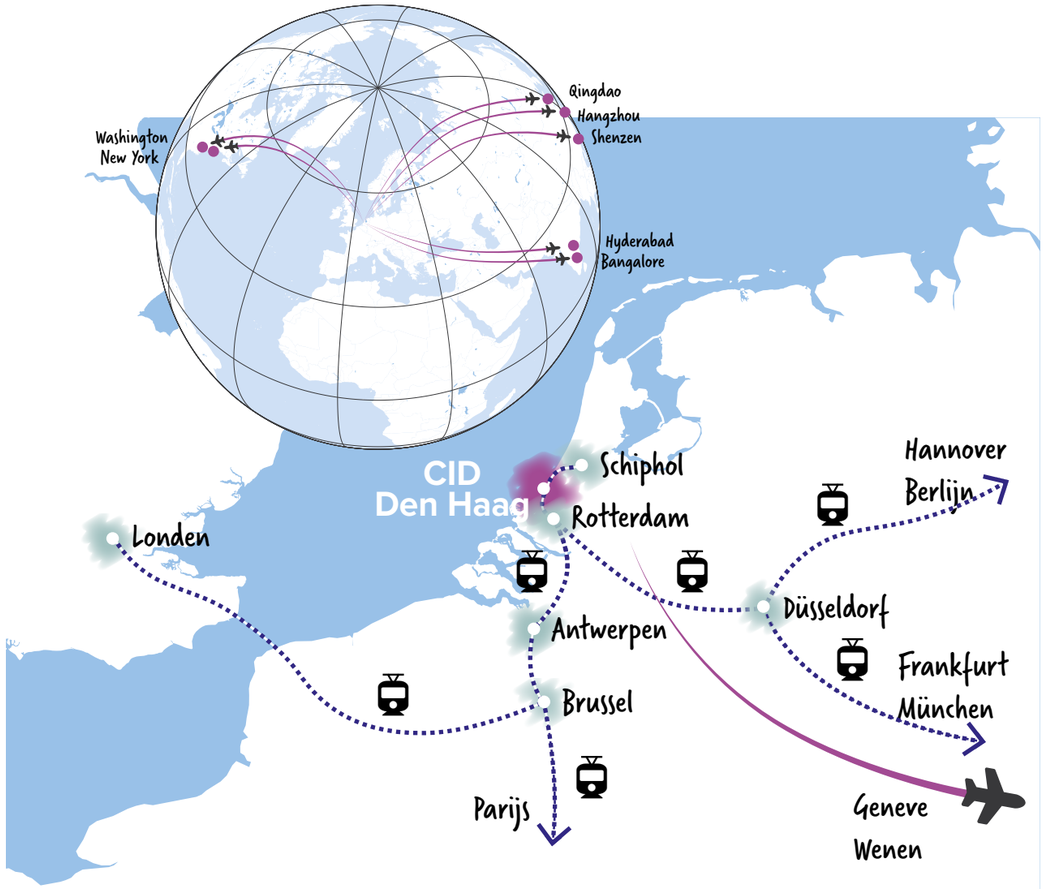
(Inter)national importance

Even on a national and international level the CID has ambitions

The CID aims in the Agenda CID 2040 (Gemeente Den Haag, 2019a) to be an international hub for knowledge, government and work. This because of its unique position in the international city of the Hague and its close proximity to the government centres of the Netherlands.

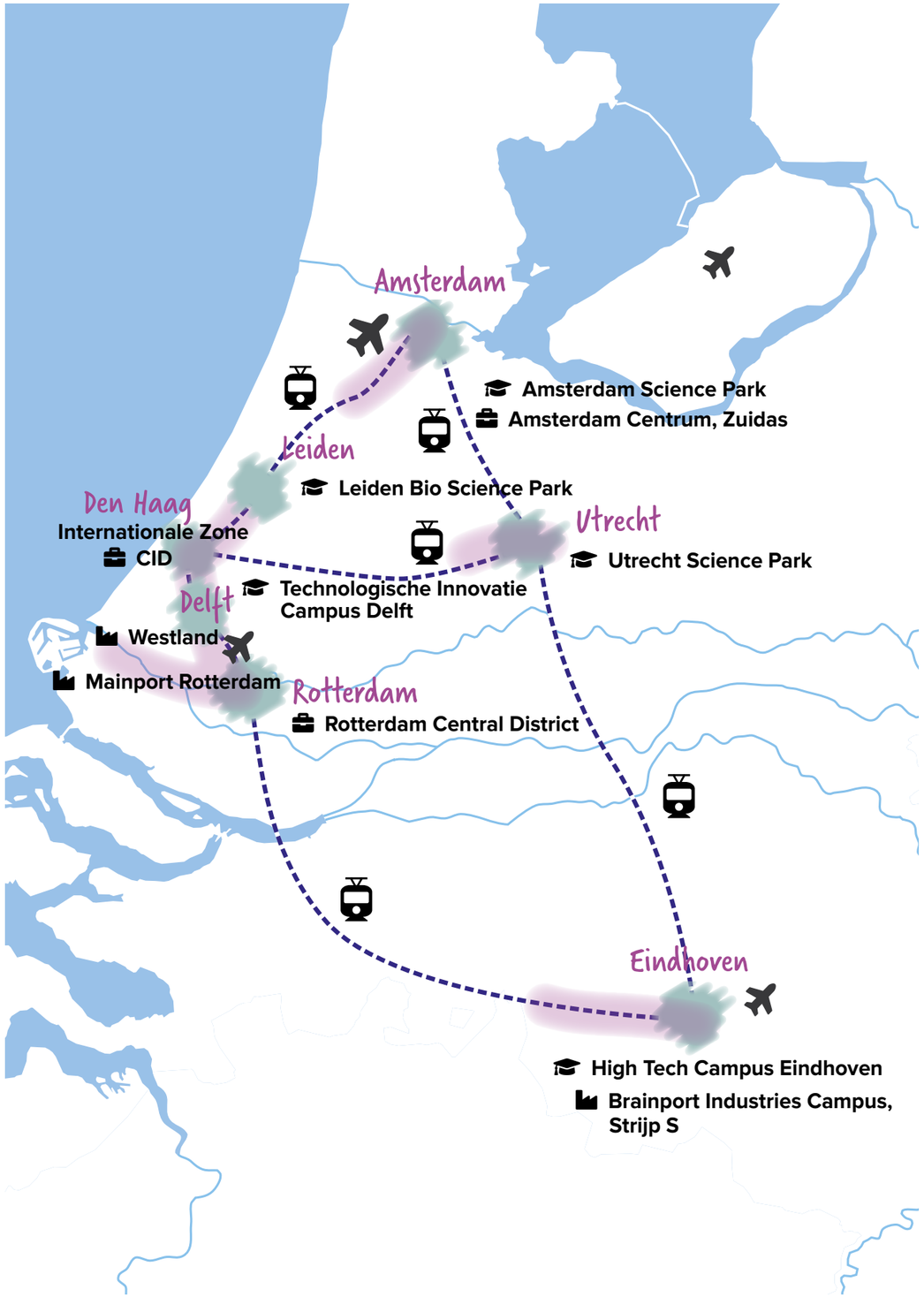
To profit from this unique position, interaction between the knowledge, workplaces and the government is an important value for the CID. The CID therefore explicitly positions itself as one of the most important economic places in the Netherlands, competing with knowledge clusters in Amsterdam, Rotterdam and Eindhoven. These high ambitions make the area very important in the national scale. However, it also means it has to compete with already established knowledge clusters.

The maps on these pages indicate these ambitions. A big focus can be seen on rail and plane connections to other destinations, indicating again its mobility principle of mostly transit oriented development around station nodes.



F14 - International connections and ambitions

Source: Gemeente Den Haag (2019a)



F15 - Competing in a national context

Source: Gemeente Den Haag (2019a)

CID development towards 2040

As proposed by Gemeente Den Haag (2019a; 2019b)

2018 situation



45.000 inhabitants





26.000 households





90.000 jobs





200.000 commuters







Gross average of 12.000 inh/km²

2040 ambition



96.000 inhabitants



50.000 households



125.000 jobs



400.000 commuters



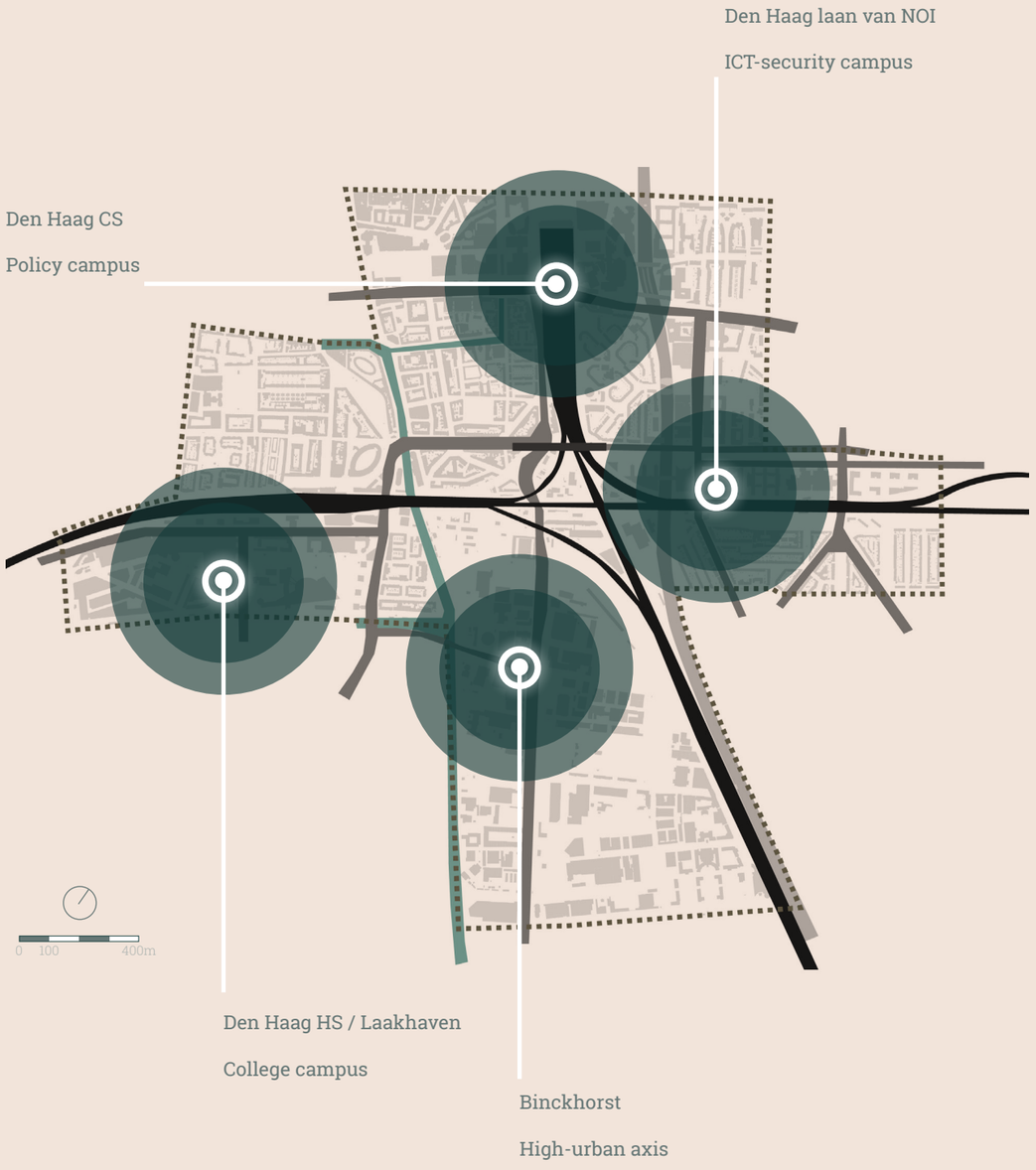
Gross average of 25.600 inh/km²

F16 - Factsheet CID

adaption by author
Source: Gemeente Den Haag (2019a; 2019b)

Factsheet CID

As proposed by Gemeente Den Haag (2019a; 2019b)

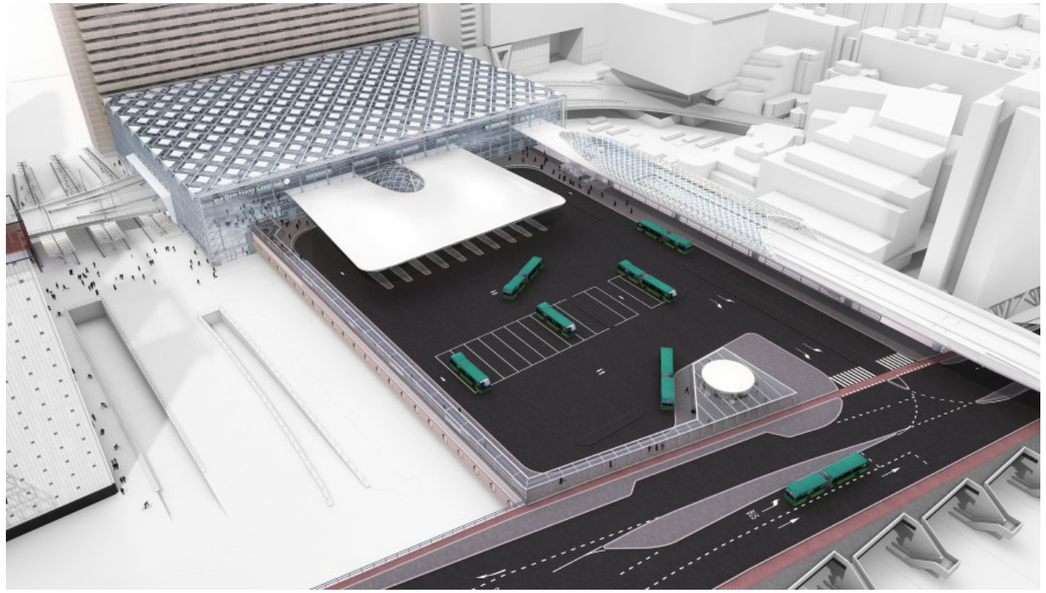


F17 - Factsheet municipal vision for CID

Source: BAG, BGT, Open street Map

Ambitions

Visions for 'deelgebieden' of the CID



F18 - New Den Haag Centraal

Source: Benthem Crouwel Architects

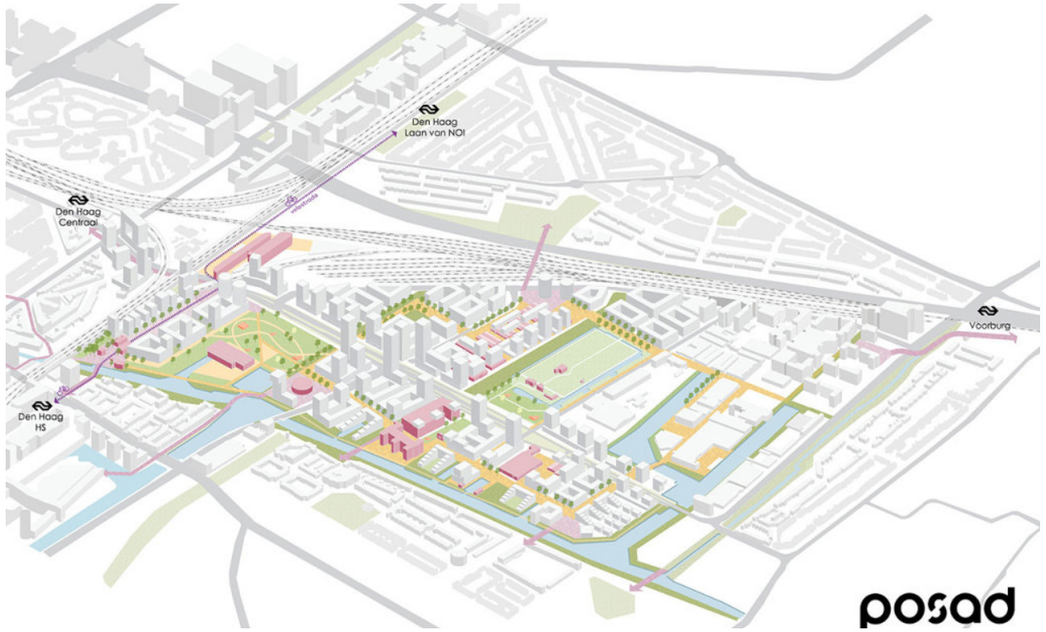
Maybe the new Den Haag Centraal works too well: it is already reaching its max capacity.



F19 - Vision for towercluster around Holland Spoor

Source: KCAP

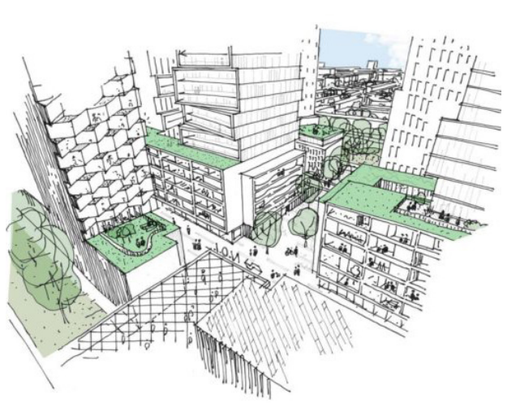
Big, high and cities on itself. The proposed towers around HS show the ambitions of the city.



F20 - Development vision for Binckhorst

Source: POSADMAXWAN

A long broad avenue where traffic from the Rotterdamsebaan and a new HOV connection drives into the centre, greeted by highrise needles on a pedestal.





F21 - Vision for station Laan van NOI

Source: Rijnboutt

High-rises around a redeveloped laan van NOI station

PROBLEM STATEMENT

The human perspective in the CID

Because of an increasing housing shortage (Nijskens, Lohuis, 2019), a conservatist policy regarding existing low-rise residential neighbourhoods (Gemeente Den Haag, 2019b) and limiting municipal borders, the Dutch city of the Hague has to densify its inner-city.

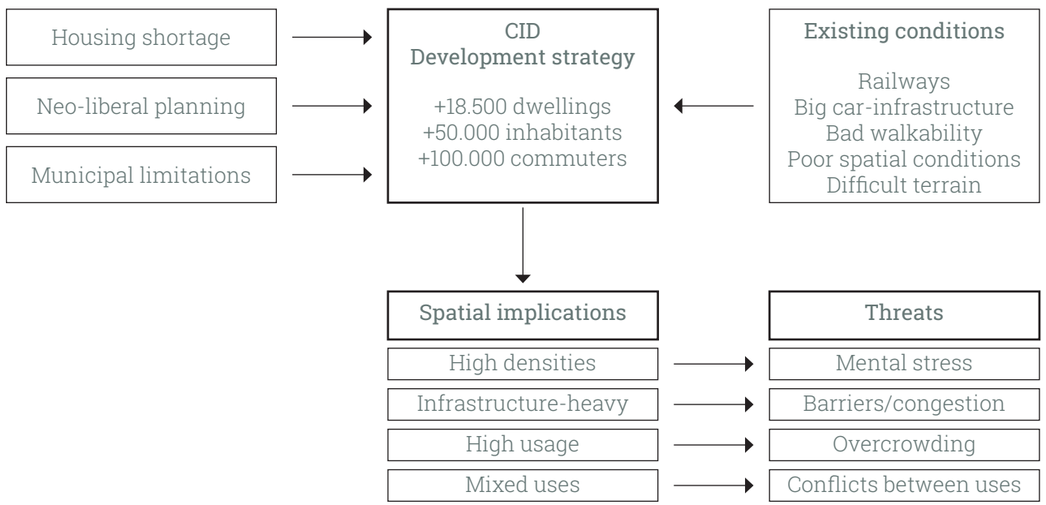
As a result of neo-liberal planning policies, the housing-market has become increasingly market-driven (Sager, 2011). This means the municipality has fewer control on development. Moreover, because of the existing urban fabric, multiple stakeholders have to be accounted for.

To be able to battle the housing shortage and satisfy existing stakeholders, the municipality has chosen to strive for a compact city where uses are mixed.

The municipality therefore aims to create a 'Central Innovation District (CID)' that consists of four main clusters of intense densification located around transportation nodes: Den Haag Centraal, HS-kwartier/Laakhaven, Beatrixkwartier and the Binckhorst industrial area (Gemeente Den Haag, 2019b). This district with a total area of 375 hectares will aim for at least 18.500 extra dwellings, 50.000 extra inhabitants (towards 96.000 total) and a total of 125.000 jobs in 2040 (Gemeente Den Haag, 2019a: 19).

Big bundles of infrastructure are however separating these clusters. These infrastructures are expected to double in usage from 200.000 to 400.000 commuters in 2040 (Gemeente Den Haag, 2019a: 19). Without a clear and defined design policy that aims on good walkability and a well-designed city at eye level, these barriers will become increasingly impenetrable for humans and discourage active modes of transportation. Moreover, the chosen form of densification, being towers, may prove hard to integrate in the current daily urban systems.

While the CID development strategy states clear ambitions regarding economic goals, social and environmental aspects remain vague (Gemeente Den Haag, 2019a: 55). Especially a focus on how urban life is achieved and how the clusters will be spatially and integrally connected on the eye level seems to lack.



F22 - Scheme of problem statement
Source: Author

AIM

Research aims

This thesis aims to identify the effects of the Hague's 'central innovation district' development vision on the city at eye level. Moreover, it will aim to propose design scenarios where a human-minded densification is explored in terms of walkability and experience at eye level. What does 18.500 new extra dwellings implicate for the usage of public space in the Dutch context and is this realistic when assessed using a human-minded, sustainable approach to urban design?

The result will be multiple design scenarios of the public space and buildings (urban fabric) in the Hague Central Innovation District in which elaborated effects of the proposed density will be assessed on its effect on a human-minded city at eye level urban design approach. This eventually will lead to an integral design that combines the lessons learned from these scenarios. Design choices will be made based on:

» The multi-scalar context of the Hague and its spatial attributes (analytical framework)
» Comparative analysis regarding other cities already using the assessed densities (case-studies)
» Literature including, but not limited to, the city at eye level, human-minded densification and public space design (theoretical framework)
» Qualitative and quantitative methods to assess the design scenarios (methodological framework)

2 THEORY

Contents

Theoretical proposition

Literature review

Theoretical framework

The theory chapter will review the current academic discourse and synthesize a theoretical framework for this thesis. It will do this by first stating the theoretical proposition. After this a broad literature review of theories on both the compact city and urban life will be conducted to test the theoretical proposition. The synthesis of this review is a theoretical framework in which the relation between the compact city and urban life is interpreted and shown in a scheme. This scheme in turn is used to guide the methodology of this thesis.

Summary and introduction of theory

This subchapter will review influential and/or recent literature on the compact city and relate this to literature on the concept of urban life in order to gain a better understanding of their relation. Hereby assessing these relations in the context of the high-urban European inner-city. The review will try to highlight what the introduction of urban life principles can positively add to the compact city and what conditions are needed for beneficial relations to emerge.

The goal of this review is two-fold. The first goal is to synthesize recommendations for the urban design of the specific high-urban area in the densifying Dutch city of the Hague. The second goal is to add to the academic discourse by researching and reviewing the relation between the compact city and urban life that informs a more generic high-urban European context.

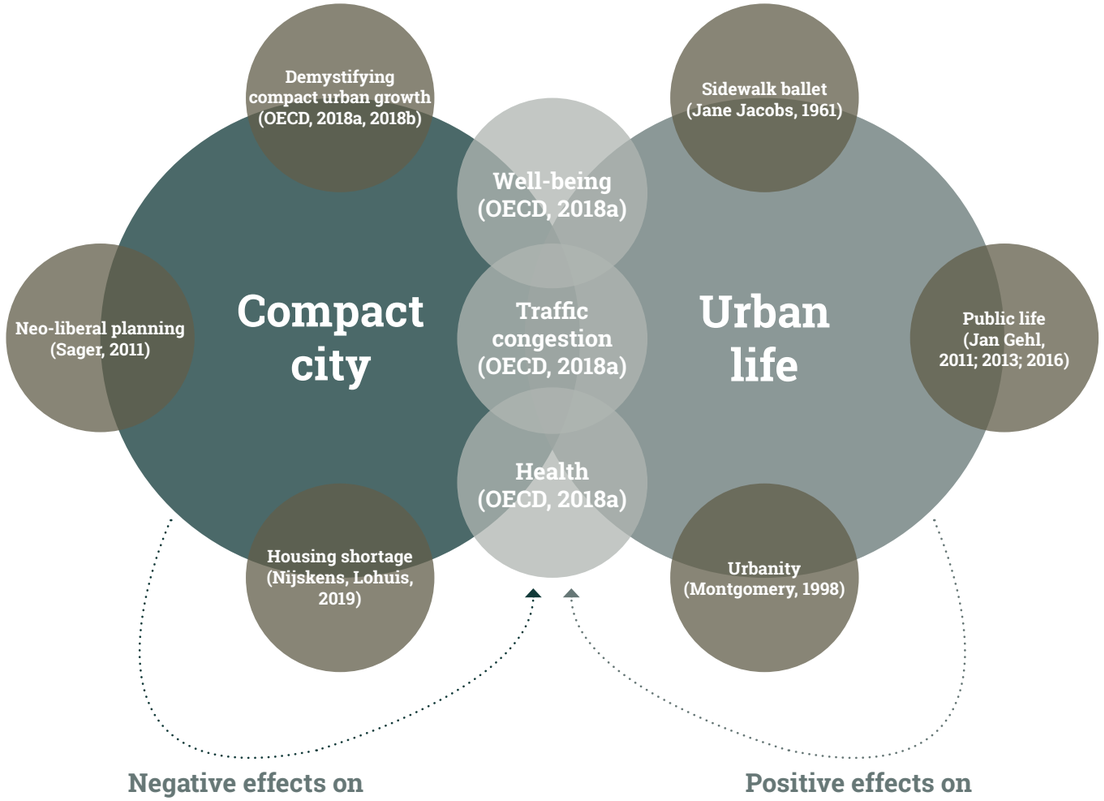
Summary of the theoretical proposition in the context chapter

In the previous chapter is stated that due to rising housing demands in the European big cities and simultaneous restrictive regional planning laws regarding urban sprawl, municipalities and developers have chosen to densify their inner-cities. This promotion of compact urban development and urban densification/reutilization is widely accepted in policymaking (Deilmann et al., 2018).

This idea of the compact city has implications for the use of public (green) space and the way of living in inner-cities (Neuman, 2005). Research shows that especially social (networks and interaction) and environmental (urban green space) aspects currently clash with the compact city approach (Artmann et al., 2019: 3). At the same time, the increasing density causes more users of public transport, cars, bicycle- and footpaths. This mostly has to fit in the existing transport infrastructure. This leads to congestion and in turn a city with less perceived spatial quality (Neuman, 2005). In academic discourse, this is even discussed as the "compact city paradox" (De Roo, 2000; Neuman, 2005).

To gain a better understanding of the current academic stance towards compact urban form, a comprehensive study conducted by Gabriel Ahlfeldt and Elisabetta Pietrostefani from the intergovernmental Organisation for Economic Co-operation and Development (OECD) assessed over 300 academic papers that studied the effects of the compact urban form as proposed by the compact city paradigm (OECD, 2018a). While 69% of the reviewed papers find mostly positive effects associated with compact urban form, the study also showed downsides. These downsides seem to cluster in the micro-level of the compact city. The paper names the factors of traffic congestion, personal health, and personal well-being as most pressing and costly issues in a compact city (OECD, 2018a: 4).
These negative effects correspond with what a group of influential researchers and practitioners try to mitigate by introducing 'urban life'. This group consists predominantly of Jane Jacobs (1961), Kevin Lynch (1984), John Montgomery (1998) and more recently Jan Gehl (2011; 2013). Unclear in academic discourse is if and how the introduction of urban life principles can redeem the negative effects associated with compact urban form.

The theoretical proposition of this thesis



F23 - Diagram of theoretical proposition

Theoretical proposition

In the theoretical proposition a selection of literature is made to show the broad line of reasoning. It stems from briefly reviewing the academic discourse on both the compact city and urban life in the previous chapters. Hereby relating these two concepts and highlighting what conditions are needed for them to positively influence one-another.

The main line of reasoning follows from the comprehensive work by the OECD (2018a) to assess over 300 studies on compact urban form. While 69% of the papers attribute mostly positive effects to the compact city, three assessed effects were affected negatively. These were personal well-being, traffic congestion and personal health.
As stated in the problem field, these three factors seem to correspond with what the 'urban life' movement tries to mitigate.

This theoretical proposition lays the foundation for the literature review. In the literature review the specific relation between the compact city and urban life in the European context, will be researched. This will lead to a definitive theoretical framework that elaborates on the theoretical proposition.

Compact city

The paradigm of the compact city is initially concerned with reducing the negative spatial impacts that are commonly related to urban sprawl (Artmann et al., 2019: 3). Artmann et al. (2019: 3) name for example longer commuting times, loss of fertile soils and a reduction or loss of ecosystem services. The compact city approach tries to mitigate these negative spatial effects with the introduction of compact urban form. This however leads to a decrease in open spaces and green spaces due to the implied densification and intensification of inner-city spaces. De Roo (2000) and Neuman (2005) discuss this as the 'compact city paradox'. Neuman (2005) highlights that the urban planning profession's modern origins actually stem from responses to this overcrowding. He points out that the modernism catchphrase of light, air and space was a counter-reaction to compact urban form. He concludes that this paradox remains unresolved even when incorporating recent smart growth, healthy community and new urbanist efforts (Neuman, 2005).

A remarkably strong focus in recent academic literature on the compact city is found in the relation between compact urban forms and urban green space. Literature is plentiful (e.g. Russo, Cirella, 2018; Morancho, 2003; McPhearson et al., 2016a, 2016b; Hansen et al., 2019; Vich et al., 2019). A review paper from Haaland and van den Bosch (2015) describes some of these studies and concludes:

"There is a need to enhance the multiple functions and services supplied by urban green spaces in compact cities. This implies going beyond beautification and economic benefits, in particular when space is scarce." (Haaland, Van den Bosch, 2015)

A research gap is found in how the loss of green space quantity can be offset by an increased green space quality (Haaland, van den Bosch, 2015). More recent literature on urban green space and its relation to the compact city has been described by Artmann et al. (2019). They also conclude that further research on how trade-offs between urban green space and densification can be dealt with is needed (Artmann et al., 2019: 7). However, there seems to be a persisting knowledge gap in the body of knowledge on this trade-off between urban green space and densification.

This focus can be explained by the recent efforts to incorporate ecosystem services and greenery in the urban fabric in order to mitigate negative effects of compact urban form. These urban green spaces aim to foster multifunctionality in terms of personal health, well-being, economic goals (Artmann et al., 2019: 5) and climate change adaptation/mitigation.

'urban green spaces aim to foster multifunctionality in terms of personal health, well-being, economic goals and climate change adaptation/mitigation.'

Personal health seems to be another key topic in the discourse on the compact city. Stevenson et al. (2016) conducted an extensive research into the health effects of a compact city. They state that if government policies actively pursue a compact city model that support a modal shift away from private motor vehicles towards walking, cycling, and low-emission public transport, personal health problems and costs associated with chronic diseases, that could be caused by urban sprawl (also see: Lopez, 2004), like diabetes and obesity will go down (Stevenson et al., 2016). Remarkably, some of the aforementioned papers on urban green space assess the compact urban development as negative on personal health (Artmann et al., 2019). This indicates that there is a debate on the actual effects on health when using the compact city model.

While the aforementioned papers assess general aspects of the compact city, a paper of Daneshpour and Shakibamanes (2011) pleads for a more tailored approach to the compact city. In their paper 'Compact city: does it create an obligatory context for urban sustainability?' they state:

"each country should adapted [SIC] the compact city considerations that best suits the local conditions and makes the best contribution to urban sustainability in a way that is both acceptable and feasible in their local environments" (Daneshpour, Shakibamanes, 2011).

This underlines the importance of identifying the local aspects of compact city theory in order to determine the best approach to the processes, functions and design of the city and how this contributes to sustainability. Moreover, they state that a bigger focus on the micro scale level of urban design can help mitigate negative effects of the compact city (Daneshpour, Shakibamanes, 2011).

'a bigger focus on the micro scale level of urban design can help mitigate negative effects of the compact city'

The assessed papers overall paint a very broad image of the aspects that are related to compact city theory and practice. The broad scope in the academic discourse, does not help synthesize recommendations. In the relative short length of this chapter, a comprehensive overview is not possible. However, that the compact city model plays a crucial role in future sustainable urban development is evident.

The intergovernmental Organisation for Economic Co-operation and Development (OECD) tries to synthesize these recommendations too as they state that an integrative planning of compact and green cities is urgently needed to cope with the increasing environmental, social and economic challenges posed by urban development (OECD, 2018b). In order to start this integrative framework they assessed over 300 academic papers that studied the effects of compact urban form (OECD, 2018a).

The research stated three characteristics of compactness: economic density, morphological density and mixed land use (OECD, 2018a: 3). While 69% of the reviewed papers find mostly positive effects associated with compact urban form, the study also showed downsides. These downsides seem to cluster in the micro-level of the compact city. The paper names the factors of open space preservation, traffic congestion, personal health, and personal subjective well-being as most pressing and costly issues in a compact city (OECD, 2018a: 4). The paper therefore suggest to focus on housing and public transport in order to accentuate the good parts of compact urban form (OECD, 2018a: 4). The least controversial positive aspects were innovation and productivity, while some consensus was found on an association of compact urban form with sustainable transport modes (non-automobile), improved services access (including consumption amenities), lower crime rates, social equity, higher value of space, shorter trip lengths, lower energy consumption, and more efficient provision of local public services (OECD, 2018a: 31).

This paper (OECD, 2018a) can be regarded as a first try in recent times to comprehensively describe and measure aspects of the compact city. But, as the paper correctly states in its discussion, the researches on compact cities have a high grade of location-specificity and heterogeneity (OECD, 2018a: 31). This makes recommendations from a quantitative review hard to generalize. However, one can also argue that these conclusions do carry weight, as the research methods were correct and thorough. Moreover, it seems to align with most of the previously assessed papers on the compact city.

LITERATURE REVIEW

Urban life

Urban life is not a keyword that is widely used in the academic discourse. Nonetheless, in this thesis it describes a range of keywords that all correspond with or are at least related to 'urban life'. Jacobs (1961) uses the term sidewalk ballet, Lynch (1984) describes it as imageability, Montgomery (1998) as urban vitality and Gehl (2011, 2013) describes the term urban life as public life. More recent academic discourse introduced the term 'Quality of Urban Life (QOUL)' (Lopes, Camanho, 2012; Marans, Stimson, 2011). What unites these terms is that they propose key aspects of a liveable, human-minded city where urban life has a high grade of success in terms of for example health, social connections and overall subjective well-being. Each of these key authors describe certain indicators of urban life, as they tried to describe what is needed in urban planning and design to foster this urban life. This subchapter will assess the most impactful pieces and distil their indicators for urban life.

'they propose key aspects of a liveable, human-minded city where urban life has a high grade of success in terms of for example health, social connections and overall subjective well-being.'

Jane Jacobs and her book *'the death and life of great American cities*' (1961) is probably the most well-known and assessed work on urban life. Her approach has recently gained traction again as cities strive to more compact urban forms that focus on the pedestrian, away from modernist paradigms. Especially empirical testing of her theories has recently been carried out in academic discourse on existing urban fabrics. These studies are trying to foster indicators for successful urban (re)development.

A notable empirical study in this light is the assessment of Barcelona using 6 specific indicators from Jacobs' book. The paper by Delclòs-Alió and Miralles-Guasch (2018) uses these six indicators:

1. *a sufficient mix of primary uses: As a result, people will be there for many different purposes and at different times throughout the day. This would lead not only to a more vibrant economic activity, but also to a higher degree of social interaction.*
2. *the urban fabric mostly has to consist of small blocks that can guarantee a certain degree of contact opportunity.*
3. *mixture between buildings of different characteristics and ages: if a certain mix of new and aged buildings is maintained, diversity both from a land-use and social perspective will be enhanced*
4. *a sufficiently dense concentration of people, which will be a result not only of residents, but also of people that are there for other purposes. She argued that if this is to be achieved, not only a considerable density of residences is needed, but also a high net building density in general is to be aimed for*
5. *a high degree of accessibility both on foot and on a higher investment on public transportation*
6. *negative effects that large infrastructure and single-use buildings or public spaces could have on urban buoyancy. This type of urban element were seen by her as border vacuums, as these could suck out the life of the streets by creating artificial impermeable borders* (Delclòs-Alió, Miralles-Guasch, 2018: 506)

While the study concludes that especially the historic parts of Barcelona score high on these indicators as they are, dense, mixed and walking-oriented, newer peripheral neighbourhoods also achieve a relative high score. They conclude:
"not only historical or traditional urban cores can foster urban vibrancy, but also new developments, if these are properly designed, can do so with a high success rate" (Delclòs-Alió, Miralles-Guasch, 2018: 515)
Furthermore, they reflect that while Jacobs's conceptual body is still largely valid, it would, without a doubt, be strengthened by being re-contextualized to present-day urban landscapes (Delclòs-Alió, Miralles-Guasch, 2018: 516). This implies that in order to relate urban life to the current compact city context, external factors have to be incorporated.

More recent and even-so crucial works in the urban life discourse are the books 'life between buildings' and 'cities for people' by Jan Gehl (2011; 2013). In these books practitioner Gehl describes how urban life can be achieved. He bases his conclusions on on-street observations of the behaviour of people. The books are a good way to understand the contemporary notion of urban life in present-day urban landscapes. The book cities for people (Gehl, 2013) is the most useful for this paper, as it predominantly highlights the public space design. This is important, because the quality of urban life mostly is created in the public spaces (Lopes, Camanho, 2012: 752).

'in recent years the focus in urban design shifted from the interrelations and common spaces towards individual buildings that have become increasingly introvert and dismissive'

In this book a long list of measures to create urban life are propagated by Gehl. He starts with his observation that in recent years the focus in urban design shifted from the interrelations and common spaces towards individual buildings that have become increasingly introvert and dismissive (Gehl, 2013: 3). On top of this, the car focused modernism paradigm has created cities that are increasingly un-walkable.
To condense his recommendations for urban design, his most important lessons that are relevant for the compact city will be briefly listed:

» Building extra roads leads to more drivers and cars, while improving the conditions and space for walking and cycling leads to more pedestrian traffic and city life (Gehl, 2013: 12)
» When conditions for bicyclists improve, new bicycle culture will emerge leading to cheaper transport options, good environment and personal health (2013: 11).
» If better city space is created, use will increase. Whether people want to stay in a city space is a question of working carefully with the human dimension (2013: 17)
» Unpredictability and unplanned, spontaneous actions makes city spaces an attraction (2013: 20)
» City spaces need space for both necessary and optional activities. This in turn leads to social activities that includes all types of communication between people. Watching people is the most spread social activity and sidewalk café 's support this activity (2013: 22).
» Shrinking households increase the need for social contacts outside the home and thus, social interaction. There is a steadily growing interest in strengthening contacts to the civil society at large (2013: 27).
» When watching people, the social fields of 100 meters (see motion) and 25 meters (decode facial expression) are important (2013: 35).
» Good human scale must be a natural part of the urban fabric in order to invite people to walk and cycle (2013: 59)
» It is widely believed that cities need high building density and large concentrations of dwellings and workplaces. But what the lively city really needs is a combination of good inviting city space and a certain critical mass of people who want to use it. There are countless examples of places with high building density and poor city spaces that do not work at all (2013: 68).
» New urban areas are often dense and fully developed, but their city spaces are too numerous, too big and too impoverished to inspire anyone to venture into them (2013: 68).
» Urban life requires compact city structure, reasonable population density, acceptable walking and biking distances and good quality city space (2013: 69)
» City space needs active, open and lively edges. When the rhythms of the city's buildings produce short units, many doors and carefully designed details at ground-floor level, they support life in the city and near buildings (2013: 88).

The recommendations of Gehl are mostly concerned with the quality of design of the public space and directly adjacent facades. Jacobs mostly describes conditions for the volumes and functions of the urban fabric to create urban life. The only aspect that seem to be missing to properly describe the city conditions, is the network component.

The importance of this network component is described by Lynch (1960, 1984). In his book 'the image of the city' he describes five main

urban elements: paths, edges, districts, nodes and landmarks. These elements organize the urban network and determine where urban life can thrive and where urban life will be hard to implement. Paths are for example roads and create a relation arrangement between the other elements. Edges create boundaries (E.G: railways) and in that way also organize the network. Districts are groups of urban landscapes that have a similar character. Here observers could mentally experience being inside of. Lastly, nodes are intersections between paths and landmarks are points of reference within the network.

Raman (2010) builds further on this network component of urban life. He states that the social interaction, that is a precondition for urban life (Gehl, 2013), is positively enhanced by living in locations that are spatially well integrated with the rest of the neighbourhood (Raman, 2010: 77). Spatial centrality and accessibility of communal spaces are therefore very important to enable social interaction. Moreover, in high density developments these communal spaces play an even more important role in reducing the distance between neighbours as the layouts can be very complex (Raman, 2010: 77).

These descriptions of the urban network have relations to the other descriptions of urban life. The edges of Lynch (1960) can for example be related to the border vacuums of Jacobs (1961). The social interaction propagated by Raman (2010) is related to the theories about public life by Jan Gehl (2013). This indicates the necessity of incorporating the actual urban network in order to create urban life.

Relation of the compact city and urban life

Summarizing the assessed compact city literature, it can be stated that the European compact city is related to compactness, compact urban form, morphological density, mixed-use, economic density, scarce open spaces, active transport modalities, transit oriented development, high densities and limited spaces for urban green space. The compact city model is seen as the only option for future sustainable urban growth. Negative effects of the compact city were found in (A) personal well-being, (B) traffic congestion and (C) personal health (OECD, 2018a). These negative effects are mostly found in the micro-scale of the city.

Summarizing the assessed urban life literature, it becomes clear that in order to create urban life, measures have to be taken in three categories: (1) urban volumes, (2) urban network and (3) urban design quality. Each of these categories has a set list of recommendations from urban researchers and practitioners (see chapter 2.1.2 for these recommendations). Implementing these recommendations, will create urban life.

Urban life measures seem to implement factors that are associated to positive effects on personal well-being, personal health and traffic congestion. More social interaction by improving urban volumes and qualitative engaging public spaces can for example lead to a greater sense of belonging and inclusion, leading to a better feeling of (A) personal well-being. Designing attractive and walkable environments within a well-functioning transit oriented urban network can lead to more usage of active modes and less usage of cars. This leads to less congestion (B) and better personal health (C).

The relation between the compact city and urban life can therefore be stated as beneficial. Introducing urban life principles can mitigate the negative effects of the compact city. At the same time, compact urban forms contribute to urban life aspects, as a critical mass of people and walkable compact environments favour urban life. This means combining compact city with urban life principles, creates a sustainable model of urban growth for European cities with a high-urban context.

Conditions for realising urban life in the compact city

While the beneficial relation can be established easily, actual implementation of urban life aspects in a compacting European city often lacks. Apparently, in order for urban life to be properly and widely introduced, certain conditions have to be met.

Firstly, Ann Forsyth (2015) states that the term walkability that is often used in urban life approaches, is used to refer to several different kind of phenomena. She mainly distinguishes three forms of walkability:

1. *Focusing on the means or conditions by which walking is enabled, including areas being traversable, compact, physically enticing, or safe.*
2. *The outcomes or performance of such walkable environments, such as making places lively and sociable, enhancing transportation options, or inducing exercise.*
3. *The term walkability as a proxy for better urban places.*

(Forsyth, 2015: 274)

This can lead to confusion in discussions on walkability, leading to conflicting solutions (Forsyth, 2015: 275). She proposes the inclusive term 'holistic walkability' meaning: *"an indicator of better urban areas that attract redevelopment, population increase and have high liveability"* (Forsyth, 201: 285). However, she states, critics might say it is overly broad and avoids incompatible outcomes like walkable environments having higher housing costs and, in turn, leading to less urban vibrancy. A well-elaborated (and measurable) goal for walkability is therefore a precondition for urban life in compact cities.

Secondly, European cities have in recent times (from approx.. 1990) made a switch from government-led planning towards neo-liberal planning policies. This means more focus on efficiency and economic drivers. Sager (2011) describes this phenomenon in his paper 'Neo-liberal urban planning policies: A literature survey 1990–2010'. These policies lead to a more serving role for the government. Leaving the actual development of the city to market-parties. These parties most often engage in short-term for profit plot-led development, leading to less coherence in urban design and minimal building code qualities of buildings. Redevelopment of existing urban fabric often reaches suboptimal middle-grounds results due to its democratic multi-stakeholder character. The impact of these practices widely varies from European city to city, as governance instruments and land ownership models determine the power of local government to mitigate these negative impacts (Sager, 2011). Strong governance instruments that empower urban life propagators therefore is beneficial for the implementation of urban life. New private concepts like place-led development, where the public realm is central to the development, can also contribute to a higher degree of urban life in new private compacting (re)developments, while also ensuring profit.

Lastly, there is a lot of misunderstanding of two essential terms that are related to urban life in compact cities. These are density and compactness (Lehmann, 2016). In his review paper 'Sustainable urbanism: towards a framework for quality and optimal density?', Lehmann states that the two terms are closely related but different criteria. He further states that while a high degree of compactness is desirable, too much density can be detrimental to liveability, health and urban well-being (Lehmann, 2016: 1). In this paper he searches for an optimal density and concludes that the best option to achieve a compact, green, mixed-use and walkable city is the compact infill developments of 4- to 8-storey perimeter blocks (Lehmann, 2016: 10). Furthermore, the specific context of the development is the most important factor for determining an optimal density (Lehmann, 2016: 12). Therefore, a place-specific contextualized approach to optimal density is needed for urban life to be implemented in the compact city.

Conclusion

The relation between the compact city and urban life turned out to be beneficial. However, certain conditions have to be met to successfully implement urban life in the high-urban compacting European city.

When assessing the reviewed body of work on the compact city, especially the research by the OECD (2018a) states clear effects of the compact city on numerous measurable aspects. While most turned out to be positive, three negatives were identified: personal health, personal well-being and traffic congestion. These aspects were identified to mostly act on the micro-scale of the city.

Reviewing the body of work on urban life resulted in three aspects to ensure the creation of urban life in contemporary compact city environments:

1. Urban volumes
2. Urban network
3. Urban design quality

For each of these three aspects, the various urban life propagators suggest measures. Jacobs (1961) and Delclòs-Alió, Miralles-Guasch (2018) propose guidelines for urban volumes and functions. Lynch (1960; 1984) and Raman (2010) propose integrating these urban life aspects using the specific urban network, leading to more social interaction and urban centrality. Lastly, Gehl (2013) proposes urban design quality measures for the public spaces and facades to facilitate urban life.

Relating these three aspects to the negative effects of the compact city, uncovers the beneficial relation. More social interaction by improving centrality, urban volumes and qualitative engaging public spaces can for example lead to a greater sense of belonging and inclusion, leading to a better feeling of personal well-being. Designing attractive and walkable environments within a well-functioning transit oriented urban network can lead to more usage of active modes and less usage of cars. This leads to less congestion and better personal health.

Conversely, compact urban forms contribute to urban life aspects, as a critical mass of people and walkable compact environments favour urban life. This means combining compact city with urban life principles, creates a sustainable model of urban growth for European cities with a high-urban compacting context.

However, the review also uncovered that certain conditions have to be met in order for urban life to be successfully implemented. While there might be more implicit conditions, the assessed preconditions are:

1. A well-elaborated (and measurable) goal for walkability (Forsyth, 2015)
2. Strong governance instruments that empower urban life aspects in a difficult multi-stakeholder neo-liberal planning context (Sager, 2011)
3. A place-specific optimal density that ensures the good effects of compactness (Lehmann, 2016)

For future research this review implicates that a sustainable model of urban growth can very well be achieved using the compact city method when urban life aspects are integrated. What is needed to reach this model are new and strong governance instruments, a move away from the neo-liberal planning practices towards new forms of planning, ways to incorporate participation during densification and lastly, ways to ensure urban design quality is achieved.

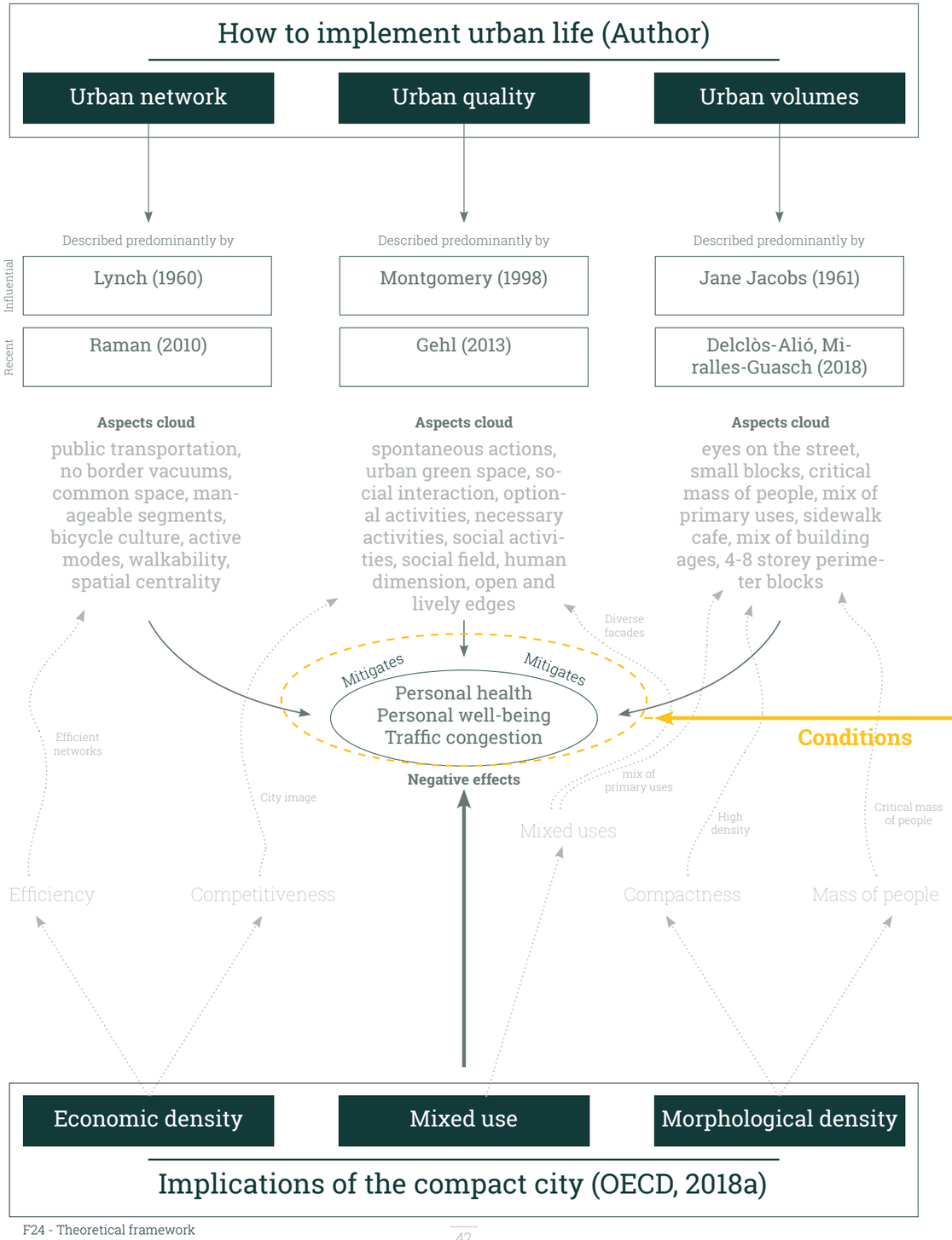
Discussion

The vast amount of literature on the compact city and all its related aspects like urban green space, density, compactness, morphology, social sustainability and others, makes it difficult to grasp. Moreover, the place-specific character of urban design makes it difficult to generalize observations. However, the OECD working paper ‘Demystifying urban growth’ (2018a) does a well elaborated try to quantify the existing body of work on the compact city and its effects on multiple criteria. While they warn that the body of knowledge is very heterogeneous, their thorough methodology gives some very insightful conclusions that have a good chance of being valid to some point. These conclusions therefore served as the basis of the compact city part of this paper.

Urban life is another broad term that encompasses quite an extensive body of work. However, the knowledge is less heterogeneous as the basis, human behaviour, does not differ all that much around the world and especially not in just an European context. Urban life theories have however suffered scrutiny. Most notably by Marshall (2012), as he suggests that urban life theories can be construed as pseudoscience. This because they have not been empirically tested. This however is a problem with design research in general. It is often an implicit process that does not always follow scientific standards.

The conditions needed for urban life to be implemented are not researched enough. This can also differ from city to city, following the heterogeneous nature of contexts in compact urban forms. More research is needed to uncover the explicit external conditions.

The scope of this literature review is limited to the European context and some factors assessed are even limited to specific cities. Urban life can mean different things around the world, however as stated earlier human behaviour stays more or less the same. The conclusions of this review can therefore be seen in a wider worldwide debate on compacting cities.



F24 - Theoretical framework

Conditions

Other currently implicit conditions

A well-elaborated (and measurable) goal for walkability

Forsyth, 2015

Strong governance instruments that empower urban life aspects in a difficult multi-stakeholder neo-liberal planning context

Sager, 2011

A place-specific optimal density that ensures the good effects of compactness

Lehmann, 2016

Theoretical framework

The theoretical framework shows the found relations in literature between the compact city and urban life. The literature review showed that introducing urban life aspects can mitigate the negative effects of the compact city. However, conditions apply to be able to implement urban life measures.

Assessing the urban life literature, author subtracted three aspects that are needed for urban life to be successfully implemented: urban network, urban quality and urban volumes. Positioning these three aspects against the three characteristics of the compact city, being economic density, mixed use and morphological density (OECD, 2018a), uncovers the relation between the compact city and urban life. Economic density for example leads to competitiveness between cities, resulting in more budget for design quality and liveability measures. Mixed uses help in creating urban life conditions for the urban volumes and as a last example, morphological density leads to the compactness and critical mass of people needed for urban life environments to facilitate social interaction.

The conditions found in literature for the implementation of urban life in a compact city are a clear and measurable goal for walkability, strong governance and a place-specific optimal density. Other conditions might very well arise during the further research of this thesis. Therefore, some reservation is applicable.

3 METHODOLOGY

Contents

Conceptual framework

Design framework

Research framework

Research questions

Methods

Methodological framework

Measuring urban life

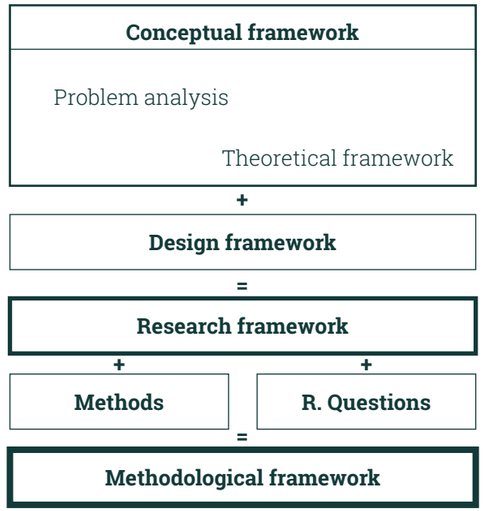
Urban life

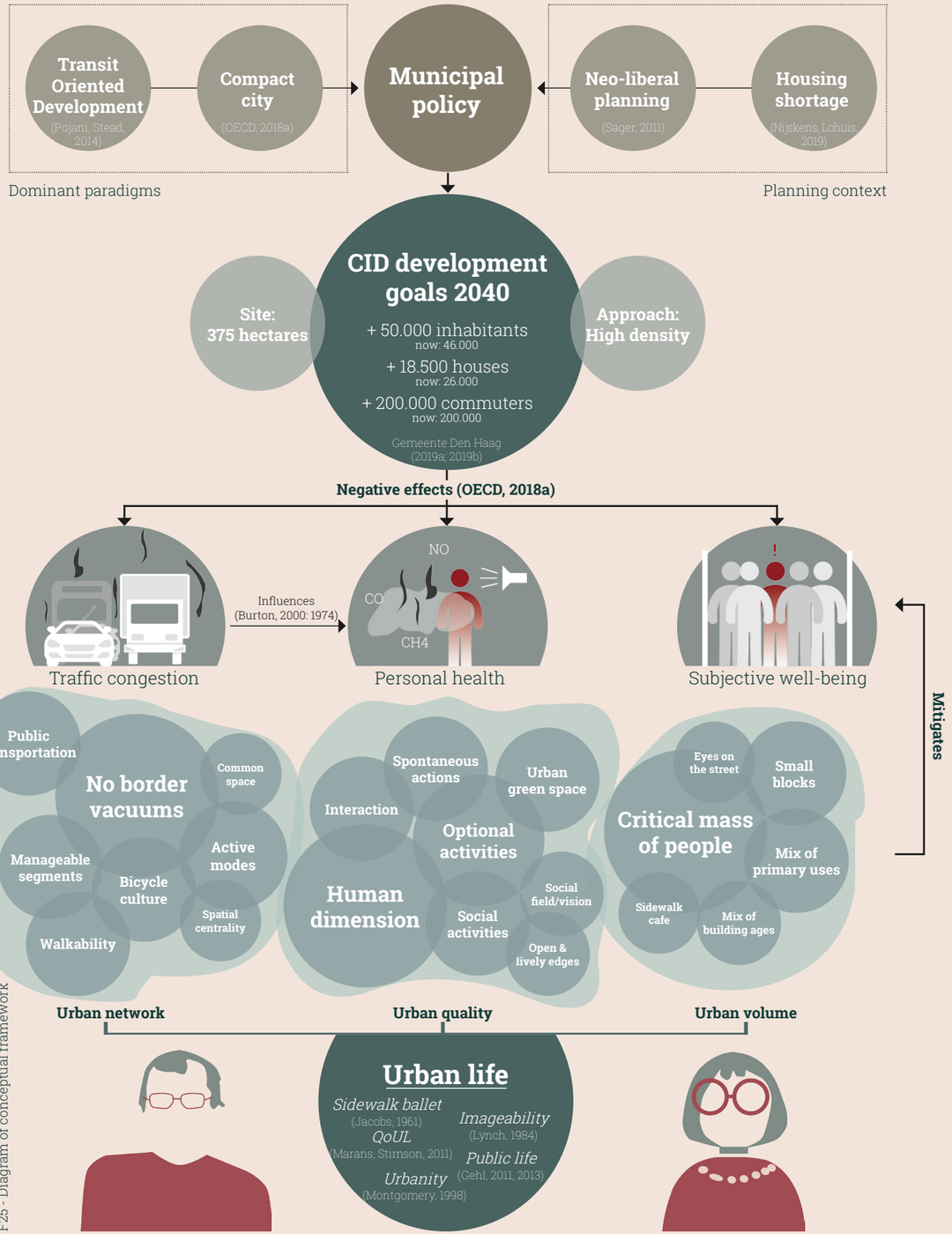
Time planning

Conclusion and discussion

The methodology chapter extensively researches and describes the 'design of the graduation'. Through four frameworks that clarify the contextual and theoretical research results and their links, a final methodological framework will be created. In this scheme the research questions and methods used in the further graduation process are made explicit. It helps to navigate and understand the research process while also giving the thesis rigidity and validity.

Alignment:





F25 - Diagram of conceptual framework

The overall concept of this thesis

Making the conceptual framework explicit

Building upon the previous chapters that stated problem analysis and the theoretical underpinning, the conceptual framework shows the synthesis of both the deductive (theory as shown in the theoretical framework) and inductive (spatial analysis as shown in the problem analysis) conclusions.

The aim of this framework is to map the actions required in the course of the study given the previous knowledge on other researchers' point of view and the observations of the CID site. From this framework a design framework will emerge that in turn will prescribe the main research question.

On the top half of the conceptual framework is conceptualised how the CID development goals formulated by the Gemeente Den Haag (2019a, 2019b) are established and influenced. The problem analysis and theoretical framework concluded that the municipal policy is both informed by its planning context and the current dominant paradigms.

The planning context is mainly concerned with the urgent housing shortage in the Dutch Randstad region (Nijskens, Lohuis, 2019) and the emergence of neo-liberal planning policies as observed by Sager (2011). These neo-liberal planning policies are predominantly focused on efficiency and economic drivers (Sager, 2011: 179) and empower market actors like private developers, while limiting the power of public bodies. This in turn leads to a more pragmatic government as they want to quickly and efficiently battle the housing shortage while needing private-parties to actually wage this battle.

The dominant paradigms that influence the current municipal policy can be condensed to Transit Oriented Development (TOD) and the compact city. This can more specifically be derived from policy documents (Gemeente Den Haag, 2019a; MRDH, 2017) and more generally from the impressive amount of output in recent academic discourse on urban design (E.G: Artmann et al, 2019; Gehl, 2013; Haaland, van den Bosch, 2015; Nieuwenhuijsen, 2018; OECD 2018a, 2018b), where most times a combination of TOD and compact urban forms are propagated as most sustainable forms of urban development.

Due to the high amount of dwellings that are needed and the pragmatic stance of the municipality towards private parties, ambitions are high for the CID. Stating a minimum number of 18.500, with other sources naming even 26.000, extra dwellings (Gemeente Den Haag 2019a), the approach will be the creation of a high density, mixed use area focused on economic power and reachability.

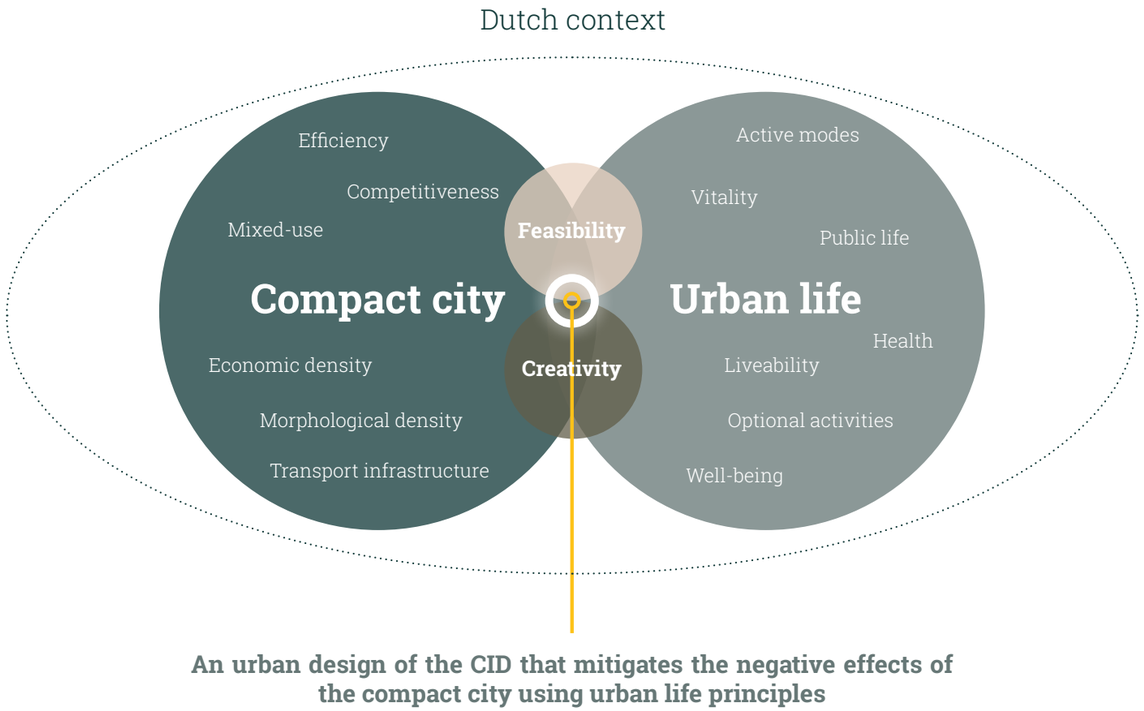
Spatial analysis by author, broad literature review and a comprehensive quantitative theoretical review by specifically the OECD (2018a), showed three negatively affected aspects of these ambitions: traffic congestion, personal health and subjective well-being. The traffic congestion being caused by an existing infrastructure that currently cannot handle a doubling of users, personal health being negatively affected by emissions from this increased usage and lastly subjective well-being experiencing negative consequences from uses that do not mix particularly well, higher amounts of users in smaller spaces and an overall intensification of the environment.

'This hypothetical positive relation is the core of this thesis and will be researched using urban design methodologies'

The theoretical proposition that urban life can mitigate these negative effects is, again, the basis of this thesis. The ideas of 'urban life' practitioners and researchers are displayed in the lower half of the conceptual framework. This theoretical positive relation will be researched in practice using urban design methodologies.

The greater hypothesis that will be tested is: **'Urban life principles can be implemented in the CID context and consequently have a mitigating effect on the negative effects of the compact city strategies, while reaching the stated goals for housing and other program.'**

DESIGN FRAMEWORK



F26 - Diagram of design framework

Design framework

The design framework graphically illustrates the relation of four pillars in the design. These pillars are mostly related to the conceptual framework, showing the hypothesized overlap between urban life and the compact city.

However, two extra aspects have been added to also explicitly show the more intuitive side of urban design. As stated in the preface of this thesis, personal perspectives on urban design have an influence on what the result of this thesis will be. As design is not an inherently measurable or scientific principle, some aspects cannot be derived from either empirical study or theoretical assessment.

As such, the two aspects 'feasibility' and 'creativity' are also taken into account in the design. While one could argue that feasibility actually is very measurable, it is not where the focus of this thesis will be on. Therefore, initially, the aspect of feasibility will be taken into account in a more intuitive manner. This means that while proposed design solutions will not be thoroughly calculated, solutions have to show a certain basis of realism. This could for example very well be just reference projects.

The aspect 'creativity' highlights the intangible, implicit design process that undoubtedly will play a role in coming up with design solutions. It is however informed by evidence from theory and empiricism.

Lastly, by drawing the bigger circle of the Dutch context, the scope of empirical data is manageable. However, while the design is situated in this context, theory showed that the (Western) European context is very much applicable as a reference.

RESEARCH FRAMEWORK



F27 - Diagram of research framework

Research framework

The research framework explains how the Main Research Question (MRQ) can be answered and what the actual main research question should answer to according to five distinctive conditions derived from the other frameworks.

The conceptual framework states that in order to come up with fitting design solutions, the research should answer how to densify the CID, how to interconnect the clusters and how urban life can be implemented.

The design framework implies that in order to come up with an actual design, the aspects of creativity and feasibility have to be incorporated.

To answer the main research question, four subquestions are used to structure the research and answer to subthemes that in the end together will form an answer to the main research question.

The first subquestion will research how the CID can be densified and interconnected. The second subquestion will research how this interconnection can happen using urban life principles. The third subquestion will look into how urban life principles can shape the design and lastly, the fourth subquestion will combine these findings to come up with feasible design scenarios/solutions that respond to the design conditions as stated by the first three.

Conclusively, a main research question that combines all five aspects will be answered with a spatially explicit design within the Central Innovation District in the Hague.

RESEARCH QUESTIONS

Main research question:
How can the clusters of the Central Innovation District be interconnected and densified in an urban design that uses urban life principles to to optimize high density living and mitigate the negative effects of the compact city?

The main research questions combines all aspects from the conceptual- and design framework. It is the result of eight methods guided by four subquestions.

Subquestions:

- **SQ1:** What could the proposed densification of 18.500 dwellings and 500.000 extra m² of office space look like in terms of urban typology, configuration and morphology?

  As this question is mostly a quantitative question, it will use the inductive methods of configuration analysis, 3D study and typo-morphological analysis. This will help show what the densification could spatially look like.

  M1 M2 M8

  Aspect: urban volumes

- **SQ2:** In what way are the current CID-clusters disconnected and what is needed to improve and maintain the interconnectivity?

  This question is both qualitative and quantitative, it will use the inductive methods of cartographic analysis, fieldwork analysis and test by design. This way, the question can be answered in a spatially explicit way.

  M3 M4 M7

  Aspect: urban network

- **SQ3:** What are the indicators of urban life and how do they translate to practical design solutions in the CID context?

  Again, this question is both qualitative and quantitative. However, because of the theoretical research that first looks at a more general context, this question is deductive. It will help set indicators and make the design verfiable according to (semi) quantifiable research. The deductive methods are case studies and theoretical research.

  M5 M6

  Aspect: urban quality

- **SQ4:** Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?

  This question will look to combine the conditions formulated in the previous three subquestions and give a qualitative result. The methods are both inductive and deductive as design scenarios use both to be able to test and verify results. The methods primarily used are test by design and 3D study.

  M7 M8

  Aspect: creativity and feasibility

METHODS

Configuration analysis M1

policy analysis
GIS data modelling

This analysis will assess the specific attributes that create an urban network pattern. This is needed to understand and evaluate how the networks of the city work and where it can be improved.

Risks: top down perspective, incorrect or inaccessible data, incorrect conclusions

Typo-morphological analysis M2

analytical drawings
GIS data modelling
GSI/FSI

Typo-morphological analysis are very common in urban design practice. They are used to asses the properties and quality of the urban fabric. It gives an overview of possible spatial conflicts/opportunities.

Risks: normative, comparability, generalizing

Cartographic analysis M3

space syntax
GIS data modelling

These kinds of analyses map and combine specific datasets in order to synthesize new information. It is useful to spot and underpin spatial challenges that are not directly visible.

Risks: complexity, unclear conclusions, false combinations

Fieldwork analysis M4

empirical measuring
personal experience

Fieldwork is especially useful to gain an understanding of the actual usage of spaces. It shows intangible aspects like human psychology and movement patterns.

Risks: weather-bias, sample size, subjective interpretation

Theoretical research M5

scientific literature
design publications

Theoretical research helps locate bigger discussions and relevant concepts. It lays the foundation of sensible design choices that others might have proven wrong/right.

Risks: context not generalizable, closed-minded, hidden agenda, loss of focus

Case studies M6

best practices
reference projects

Case studies help test design options and gives an idea how feasible scenarios are. They also can give new ways of looking at urban challenges and contribute to a more practical body of knowledge.

Risks: differing contexts, unfitting properties

Test by design M7

design options
maps/sections
principles

Tests by design help putting ideas into context. This will test the idea using several set indicators and conditions. It can be done using multiple urban design tools like sections, maps and principles.

Risks: feasibility, too complex conditions, knowledge gap

3D study M8

policy analysis
3D modelling / VR testing
physical model

Modelling designs and scenarios in 3D helps to understand the scale and implications of the design for the eye level. It can be used to test scenarios and force you to be explicit.

Risks: time-consuming, adaptability

METHODOLOGICAL FRAMEWORK

Main research question: How can the clusters of the Central Innovation District be interconnected and densified in an urban design that uses urban life principles to optimize high density living and mitigate the negative effects of the compact city?

Conclusion/answer

Elaborate

Yes

Re-iterate

Unsure

Does it answer the main question?

Expert assessment

Personal reflection

Volume-study

SQ1: What could the proposed densification of 18.500 dwellings and 500.000 extra m² of office space look like in terms of urban typology, configuration and morphology?

Quantitative

Methods:
Inductive

- Configuration analysis (policy analysis, GIS data modelling)
- \+ 3D study (policy analysis, 3D modelling / VR testing, physical model)
- \+ Typo-morphological analysis (analytical drawings, Space matrix, MXI)

Network-study

SQ2: In what way are the current CID-clusters disconnected and what is needed to improve and maintain the interconnectivity?

Quantitative

Methods:
Inductive

- Cartographic analysis (space syntax, GIS data modelling)
- \+ Fieldwork analysis (empirical measuring, personal experience)
- \+ Test by design (sections, principles)

Quality-study

SQ3: What are the indicators of urban life and how do they translate to practical design solutions in the CID context?

Qualitative

Methods:
Deductive

- Case studies (best practices, reference projects)
- \+ Theoretical research (scientific literature, design publications)

Integrated scenarios

SQ4: Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?

Qualitative

Methods:
Inductive & deductive

- Test by design (design options, maps/sections, principles)
- \+ 3D study (3D modelling / VR testing, physical model, Isometric schemes)

Results

Answers to:
What does the addition of 18.500 dwellings mean spatially?

Can the current urban fabric handle this?

Product: three scenarios

\+

Answers to:
How are the clusters disconnected?

What is needed to reach interconnectivity?

Product: conclusive datamap

\+

Answers to:
What is human-minded urban design?

What are its indicators?

Product: design indicators scheme

= design conditions

Spatial testing

Test by design

Urban design solutions

Does it respond to the proposed densification of 18.500 dwellings as stated in subquestion 1?

Does it improve the interconnectivity of the clusters as stated in subquestion 2?

Does it correspond to indicators stated by subquestion 3?

the concept of this thesis is to mitigate the main negative effects of the compact city by introducing urban life principles. This will aim to decrease traffic congestion, increase good personal health and increase the personal subjective well-being of the users. At the same time it optimizes high density living.

F28 - Diagram of methodological framework

Methodology to test scenarios

In order to measure the current situation and new scenarios to the urban life requirements, it is interesting to make use of state-of-the-art methods in urban design to get objective measurable results. This helps inform the design choices and makes the actual design process explicit.

In literature, 5 relative innovative methods are found that will help shape the design process for urban life. Below each of these five methods are shortly introduced. What is interesting to note, is that the first three methods have been applied in an integrative GIS-model to measure urban form extensively. This means these methods can be mathematically interconnected and are in some way related. See the figure by Ye and van Nes (2014) for clarification.

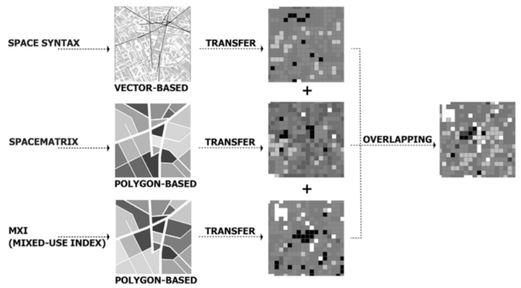


Image by: Ye, van Nes, 2014

F29 - Overlapping of space syntax, spacematrix and MXI in GIS

1. Spacematrix
The spacematrix method offers a clear definition of density. Moreover it can be related to urban form. Spacematrix defines density as a multi variable phenomenon and uses the following measures: floor space index (FSI), ground space index (GSI), and network density (N) (van Nes, Berghauser Pont, Mashhoodi, 2012). This method can be used to determine the success of ***urban volumes*** according to the urban life measures as stated in the theoretical framework.

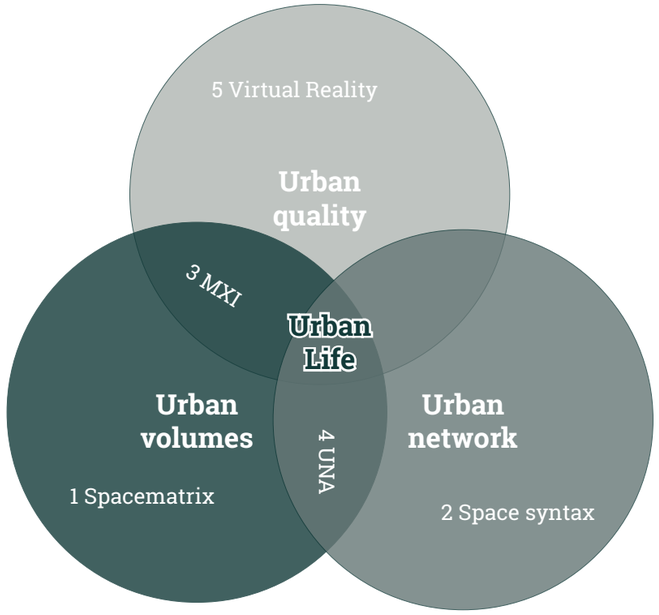
2. Space syntax
The space syntax method calculates the degree of integration of the mobility network in terms of geometrical distance combined with metrical radiuses. Especially in angular analyses a correlation between human movement and spatial configuration can be found (van Nes, Berghauser Pont, Mashhoodi, 2012). This method can give a first diagnosis of where urban centrality can be found in the urban network. Moreover, it can test how design options can improve the ***urban network***.

3. Mixed-use Index (MXI)
The MXI handles building blocks in a quantitative way. By looking at the different square meters of functions other than residential and calculating that as an percentage, it can determine the extent of mixed usage of a building block (van Nes, Berghauser Pont, Mashhoodi, 2012). This model helps in determining where adding new functions can significantly improve the ***urban volumes***. It can also be used to test new design scenarios on their ***urban life qualities***, as mixed use signifies a good chance of attractive facades and urban vitality (Gehl, 2013; Montgomery, 1998).

4. Urban Network Analysis tool (UNA)
This tool from the City Form Lab of the MIT is a state of the art technology that combines ***urban volumes*** with ***urban network***. It does this by adding next to the two network elements (nodes and edges), a third element: buildings. These are used as spatial units of analysis for all measures. Moreover, the buildings can be given weight in order to yield more accurate results. This method will aid in a more deeper understanding of the urban network and the total coherence of volumes, network and quality.

5. Virtual Reality (VR)
The last of three aspects for urban life, ***urban quality***, is hard to objectively measure. A new and promising technology is virtual reality. This technology can be used to let a representable group of people judge the design on the urban quality aspects. However, because of the limited time for this thesis, a comprehensive research will be hard to carry out. Other methods for objectively measuring urban quality are still hard to implement in urban design practice. Case studies and observations like Gehl (2013) are, for now, the most realisable ways to test urban quality. This method however, has to be noted as promising for this aspect.

	Urban volume	Urban network	Urban quality
Chapter:	**Volume-study**	**Network-study**	**Quality-study**
Propagator:	Jacobs	Lynch	Gehl
Strive for:	Urban block vitality	Urban centrality	Public life
Subquestion:	SQ1	SQ2	SQ3
Measurable in:	Spacematrix Mixed-use index	Space syntax Urban Network Analysis	Virtual Reality Mixed-use index



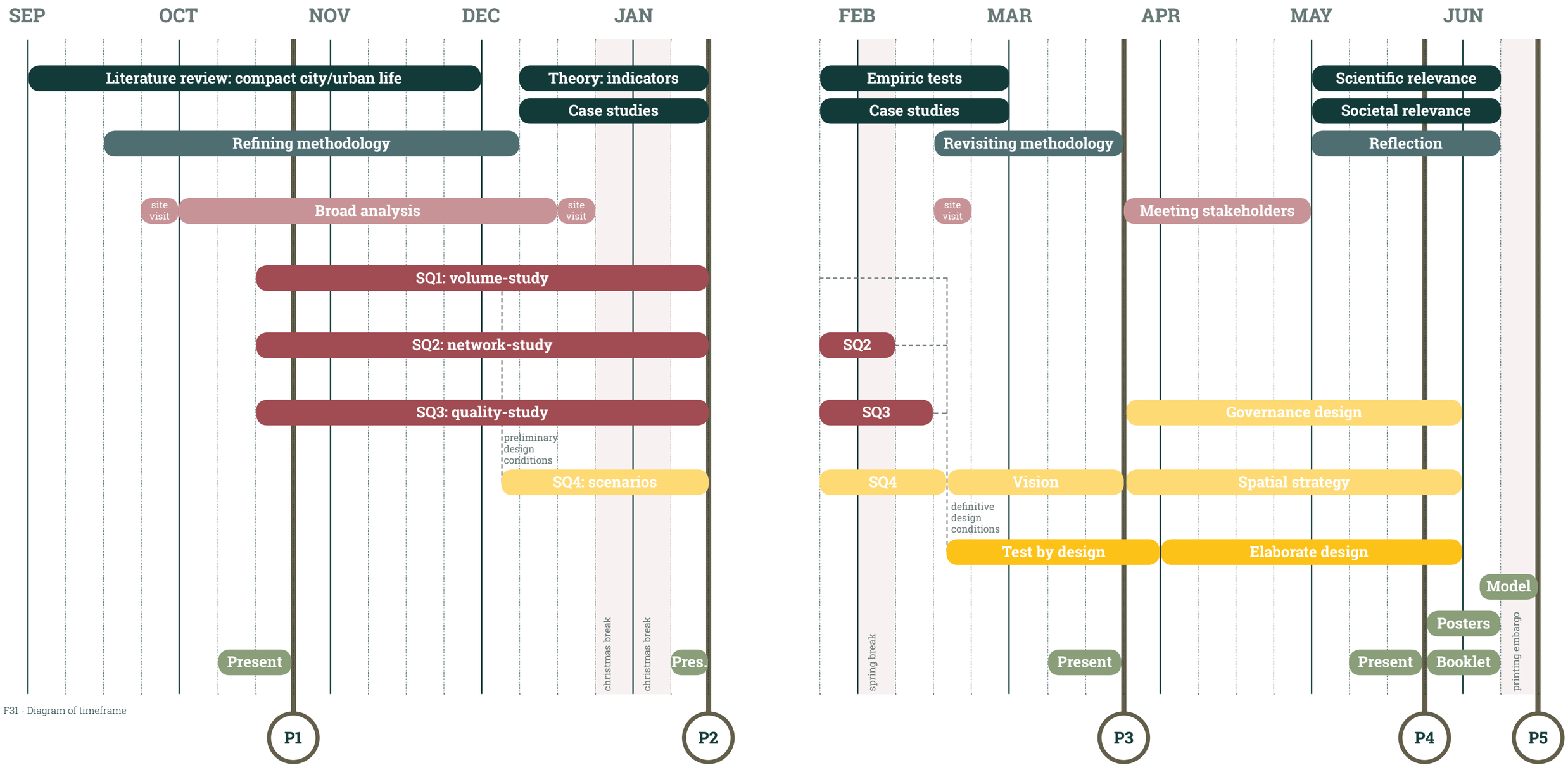
F30 - Scheme how measuring methods are related

Extracting measurable design conditions

In these schemes the way to extract design conditions that are measurable for the scenariomaking, are made explicit. As can be seen in the figure on the left, each urban life aspect has its own measurable method to inform the design. However, only two of the three have an overlapping method. The urban quality aspect has no known urban network related method. This is because a good urban network does not automatically lead to good urban quality. It is only one of the preconditions.

These measurable ways ensure that existing challenges can be located and proposed scenarios can be tested on their effectiveness. This does not in any way disqualify more traditional methods. As design is not a strict scientific discipline, the other methods described in the methodological framework will help strengthen the scenarios.

TIME PLANNING



F31 - Diagram of timeframe

Conclusion

The methodology chapter aimed to 'design the research' of this Master Thesis. The outcome is five distinctive frameworks that are linked to each-other and each builds upon the other to eventually synthesize the methodology in the methodological framework. It aimed to give this thesis rigidity and validity in its research methods and outcomes.

It does this by first deducting general methodologies, ideas and paradigms from a broad range of theories in the theory chapter. In this **theoretical framework** the relation between the compact city and urban life according to academic discourse, becomes clear.

Mixing the results of the problem analysis in the context chapter with the results from theory, creates the **conceptual framework**. Using this framework the relation between the negative effects of the compact city (being traffic congestion, personal health and subjective well-being) and urban life principles to mitigate these negative effects were made explicit.

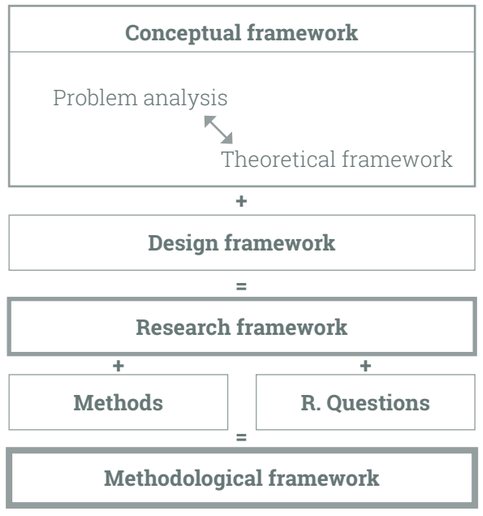
By formulating separate more intangible goals for the urban design, a **design framework** was created. This framework shows how the conceptual framework and design aspects like creativity and feasibility are related and on what aspects the actual design will be based on. This is an important framework for a thesis in a design-oriented subject as design is not an inherently objective endeavour.

Combining these frameworks in turn led to the formulation of research questions that each answer two of five key aspects: urban volumes, urban network, urban quality, creativity and feasibility. This is made explicit in the **research framework**.

Lastly, combining the formulated research questions with robust and proven methods of urban analysis/design resulted in the **methodological framework**. In this framework all relations between the research questions and underlying methods are shown. Moreover, this framework shows how the results relate to each-other and how this will ultimately lead to an urban design that answers the main research question:
'How can the clusters of the Central Innovation District be interconnected and densified in an urban design that uses urban life principles to to optimize high density living and mitigate the negative effects of the compact city?'

Future steps in the development of this research framework will emerge when the methodology is put into practice in further chapters of this thesis. This will prove to be crucial in assessing if the proposed methods are sufficient to foster a well elaborated design for the Hague CID that answers the main research question.

Alignment:



F32 - Methodology alignment scheme
Source: Author

Discussion

Designing a methodology for a research that has yet to take place, is inherently based on assumptions. It does however at least give an idea of the validity of a research and how that can be tested using rigid and robust methods.

The aligment of the separate frameworks as designed by author in the methodology alignment scheme, is an interpretation of what each framework contributes towards the end-result of the methodological framework. Working with this scheme helped in aligning and structuring the methodology. However, if these five frameworks provide enough rigidity to the thesis is to be evaluated at the end.

A big limitation of this approach is that in order for the frameworks to function, the aspects of the design have to be concise and condensed. This leads to only five aspects that structure the research questions. This in turn leads to a limited scope of the design, as undoubtedly more aspects play a role for designing in this context. As this research is to be conducted in more or less 9 months, the limited timeframe justifies limiting the scope of the research.

Research philosophy

As research is not neutral, it will reflect a range of my own personal interests, values and ambitions. To answer the question of 'What research philosophies are you going to include, for what and why?' I first have to consider what my personal stance towards the two main research philosophies is.

The two philosophies are:

» Positivist: positivism has come to mean objective inquiry based on measurable variables and provable propositions.

» Phenomenologist: This perspective assumes that people will often influence events and act in unpredictable ways that upset any constructed rules or identifiable norms – they are often 'actors' on a human stage and shape their 'performance' according to a wide range of variables.

Considering the aforementioned research approach regarding the stated main research question and its subquestions, it becomes clear that the two philosophies really mix in the project. The project will consider positivist approaches like literature research and verifiable indicators that will guide the design process and subconclusions. However, I think that designing itself is inherently a phenomenological process: it starts with a context that is always interpreted in how we see rather than how it verifiably is. The design itself can never be purely positivist, as there is always an element of the designer that is not verifiable, predicted beforehand or value neutral. Most often, it is a normative take on a current paradigm in urban design.

4 SPATIAL ANALYSIS

Contents

City analysis

Project area analysis

In this chapter the spatial context of the project area will be extensively analysed. Visible and invisible aspects of the built fabric help recognize underlying conflicts or opportunities. This will serve to reach valid conclusions before conducting the actual research into volumes, network and quality of possible new developments. That way the existing context is not forgotten and new design will help strengthen or mitigate existing properties.

Greenery and water



F33 - Greenery and water inventory map

Source: Open Street Map, BGT

0 1 2 km

1:100000

- Sports grounds
- Grassland
- Forest
- Farmland
- Beach
- Water

The greenery and water map shows that the CID (orange) contains little green. However, big areas of qualitative greenery can be found relatively closeby in the Haagse Bos and the Landgoederenzone. Strengthening the connection might offer the chance to bring more qualitative greenery into the CID.

Zoning



F34 - Zoning inventory map

Source: Open Street Map, BGT

0 1 2 km

1:100000

- Allotments
- Residential
- Industrial
- Commercial
- Retail

Dividing the city in rough zoning, shows the arbitrary side of zone-mapping. While it is correct that in the city centre most commercial services are located, mixed uses are not visible on this map. However, this map helps to get an idea how a city is structured and where the uses are mostly located. In this regard the map shows the super mixed-use character of the project site mixing commercial services, industrial, residential and retail.

Road network



F35 - Road network inventory map

Source: Open Street Map, BGT

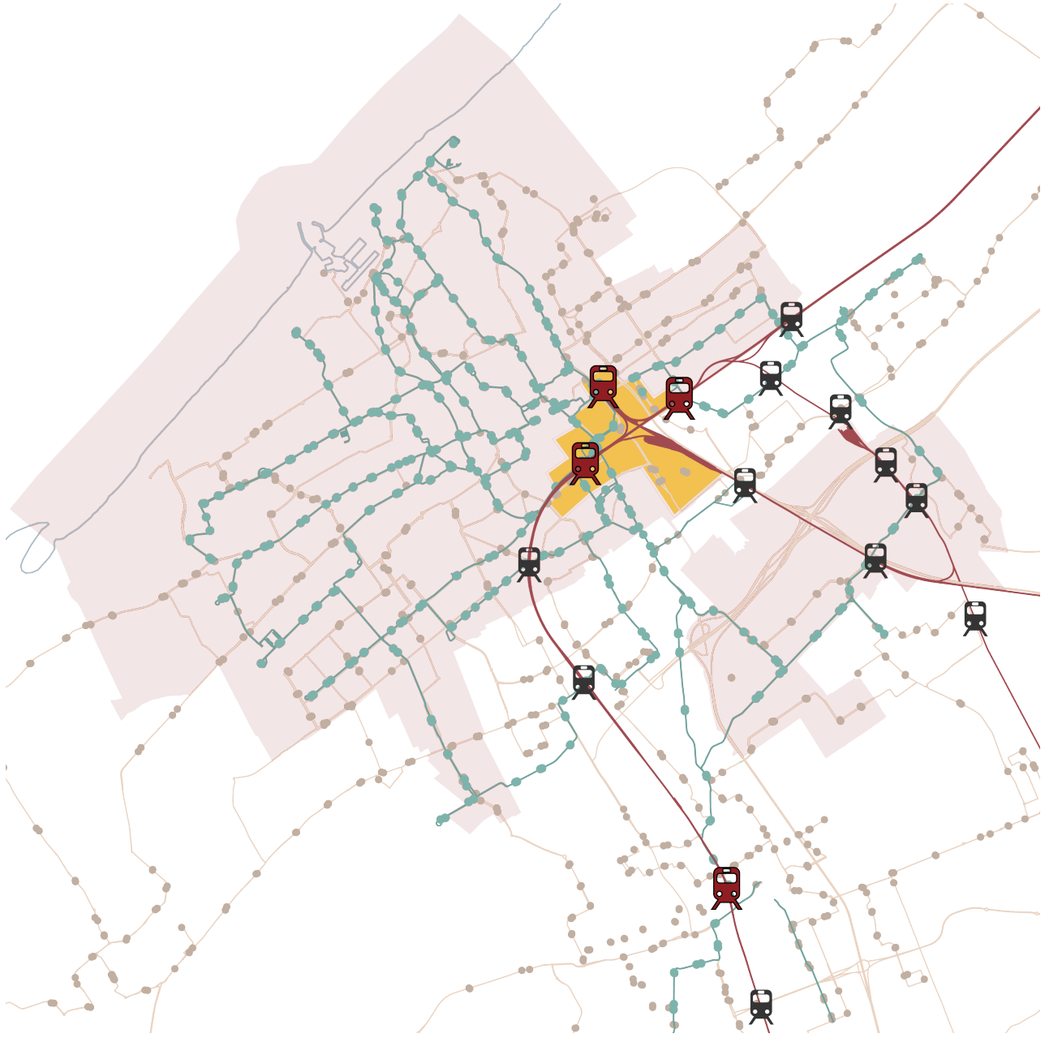
0 1 2 km

1:100000

- Highway
- Rotterdamsebaan trajectory
- Primary streets
- Secondary streets
- Tertiary streets
- Residential streets

The road infrastructure barriers as stated in the problem analysis, are made explicit here. The Central ringroad S100 goes right through the centre of the CID. Moreover, the new Rotterdamsebaan will connect through a tunnel right in the centre of the CID. Making the CID very well connected in both rail- and road connections. However, car infrastructure seems to be very dominant and pose problems in the future if a more urban life approach is chosen.

Public Transport



F36 - Public transport inventory map

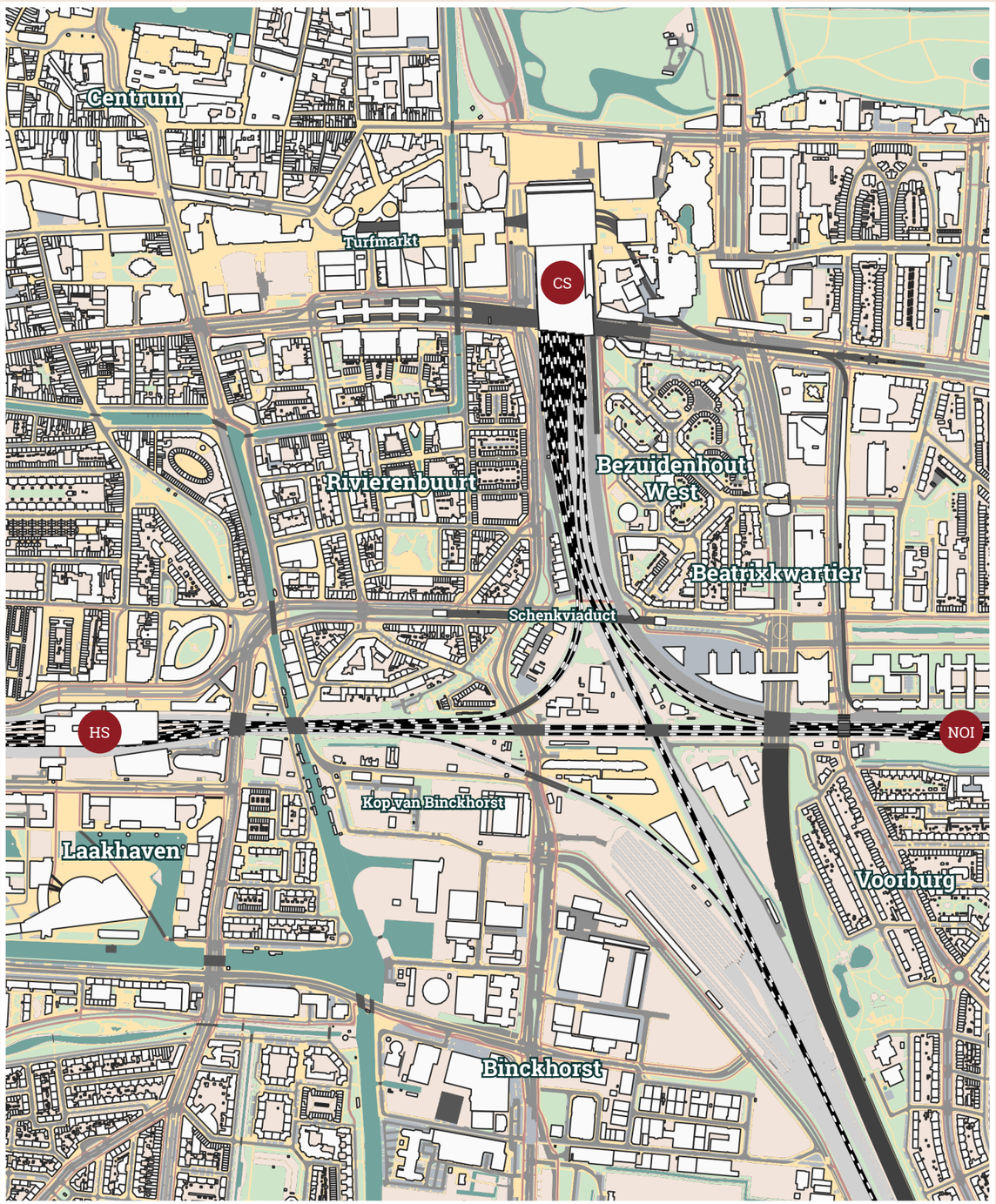
Source: Open Street Map, BGT

0 1 2 km

1:100000

- Intercity station
- Railway station
- Railway lines
- Tramlines/stops
- Buslines/stops

Mapping all public transport stops in the Hague and its immediate region, shows the thorough system of buses, trams, lightrail and most importantly, rail. The unique spot of the CID is underlined by the three intercity stations. However, it also becomes clear that the CID itself is not well connected everywhere to public transport. Most notably, the Binckhorst shows a lack of options in public transit.



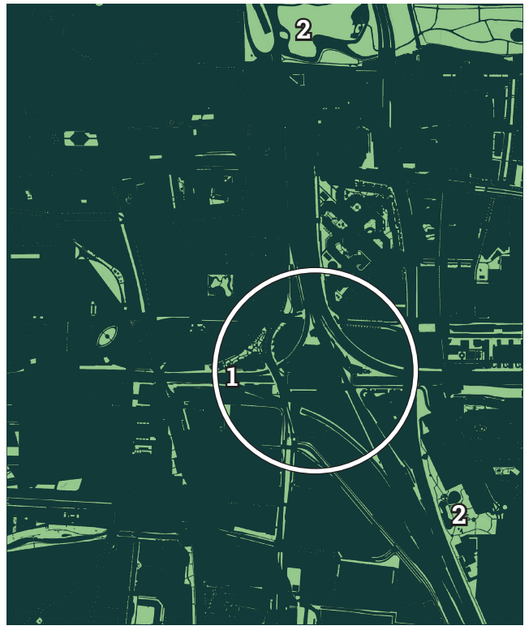
F37 - Map of project area

Source: BAG/BGT

1:10000

0 100 200 m

PROJECT AREA ANALYSIS



F38 - Greenery x-ray

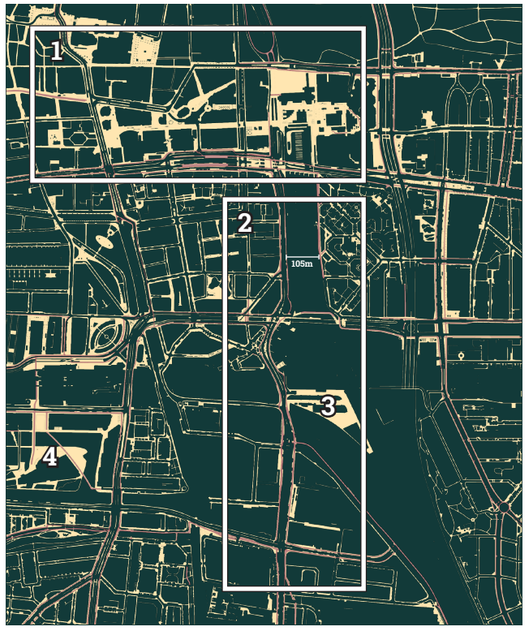
0 100 200 m

Fragmented greenery

On this x-ray the fragmented greenery around infrastructure is clearly visible. By being this fragmented, the green spots are of low quality and hard to reach. This makes it not usable as actual urban green space.

Most notable are the green lines and spots around the railway corridors (focus 1). These hardly contribute to the urban life around, as they are unreachable or have a low quality.

Comparing this to robust green parks (2) like the Koekamp near the centre and the Corbulopark in Voorburg, clearly shows the difference in scale and coherence.



F39 - Footpaths x-ray

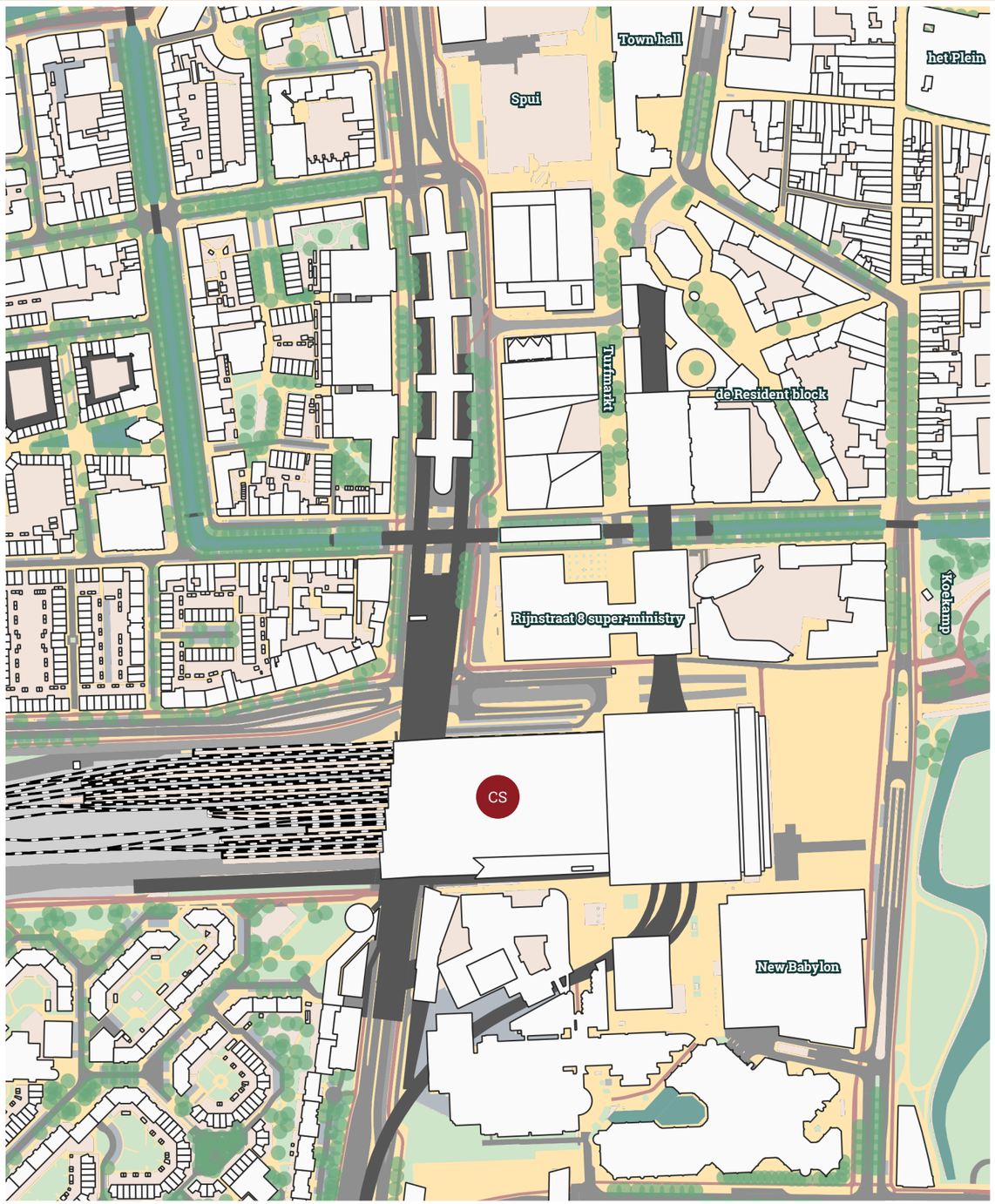
0 100 200 m

The human city and the technocratic city

This x-ray shows the enormous difference between human-minded design and infrastructure-minded design. The medieval/19th century city centre (focus 1) is focused on walkability and human scale. The industrial area Binckhorst (focus 2) is focused on efficiency with broad avenues and big dark spots indicating the railway tracks.

Developing housing in this area will have to incorporate extensive measures to improve walkability and especially liveability. Forcing all mobility towards the centre along one main boulevard leads to conflicts and an inhumane scale.

Notable are the effects of newer developments that do focus on the human scale more. Clearly visible are the creative HUB Bink36 (3) and the student campus around Laakhaven (4).



F40 - Centraal station and Turfmarkt area

Note: orientation has turned 90 degrees for presentation purposes

Source: BAG/BGT/Gemeente Den Haag

1:4000



0 40 80 m

Den Haag Centraal / Turfmarkt

Revitalized cascade of scales



F41 - Nollimap of the Turfmarkt and Centraal Station area

Source: BAG/BGT
Adaptation by author

The human realm

What distinguishes the Hague's city centre from other centres, are both the morphology and the mix of uses. Because of its national and international significance, big ministries are located in the centre around the Turfmarkt. This results in big blocks of government buildings (yellow) mixed with commercial uses and offices.

Walking from the Centraal Station towards the historic centre, a cascade of scales from bigger grains towards finer historic grains composes the city centre. As seen in the Nolli Map, the focus on broad spaces for pedestrians and the well defined network of public spaces helps create a human-scale public realm.

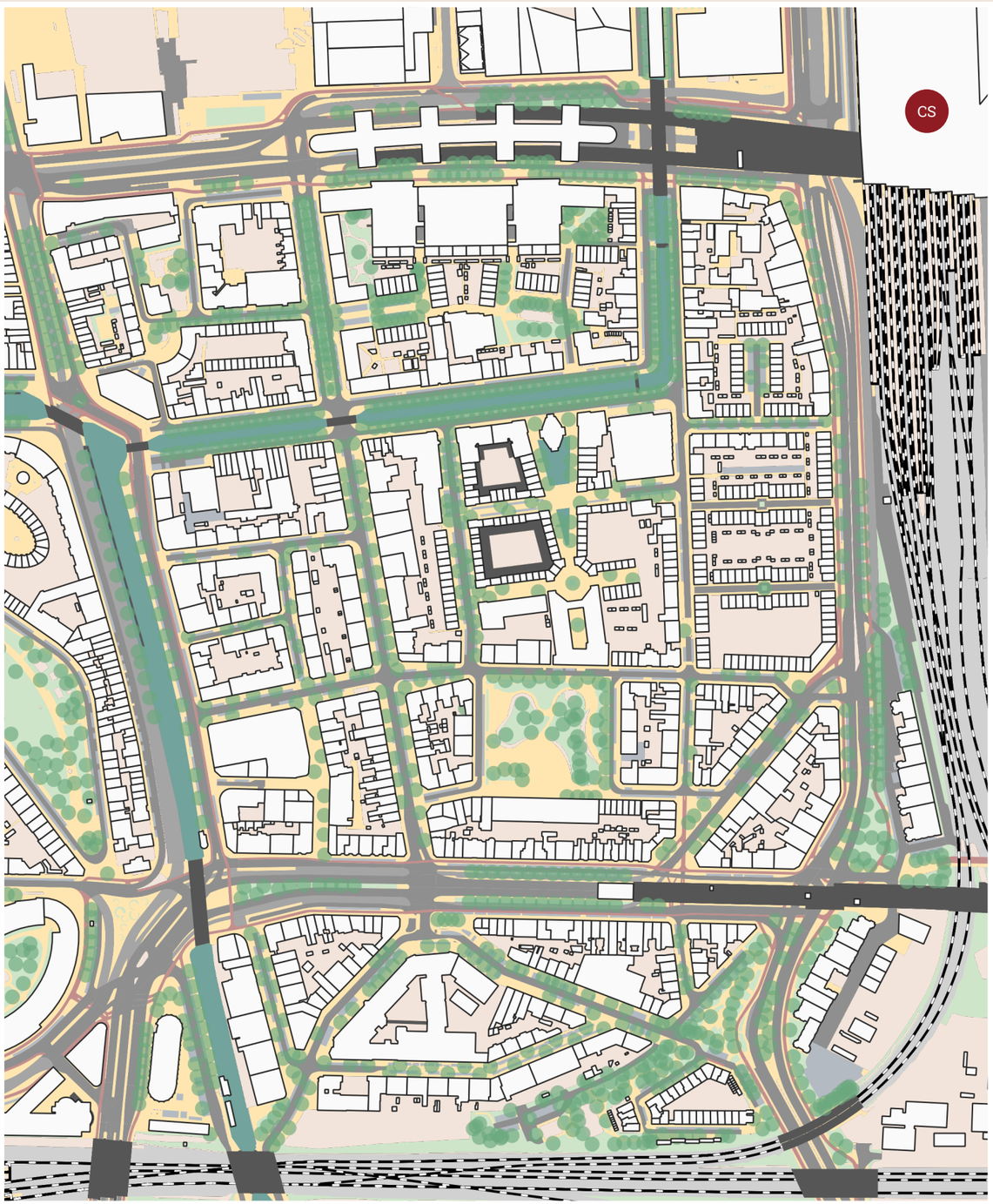
Striking of the Turfmarkt area is the public space that continues in the buildings. In this regard, the university Leiden is publicly accessible, as well as the atriums of the ministries and the town hall.



F42 - Turfmarkt area uses

Source: BAG
Adaptation by author

- Housing
- Commercial/retail
- Government/public
- Hotel
- Office
- Train station
- University
- Multiple uses



F43 - Rivierenbuurt map

Source: BAG/BGT/Gemeente Den Haag

1:4000

0 40 80 m

Rivierenbuurt

Restructuring a neighbourhood with low densities



F44 - Year of construction inventory map

0 40 80 m

Year of construction

Assessing the years of construction in the Rivierenbuurt shows the already ongoing restructuring of the area. As this 1920's neighbourhood is located very centrally in the CID, it can play a crucial role in the densification of the area.

The morphology and configuration of the building blocks uncovers a human-minded scale, as found often in neighbourhoods from the 1920's. Walkability was important and the car was not yet an established phenomenon.

The restructured new building blocks (yellow) seem to keep this character and fit in well within the existing fabric in terms of scale and configuration.

- < 1919
- 1919 - 1927
- 1927 - 1965
- 1965 - 1984
- 1984 - 2000
- 2000 - 2015



F45 - Height in meters inventory map

0 40 80 m

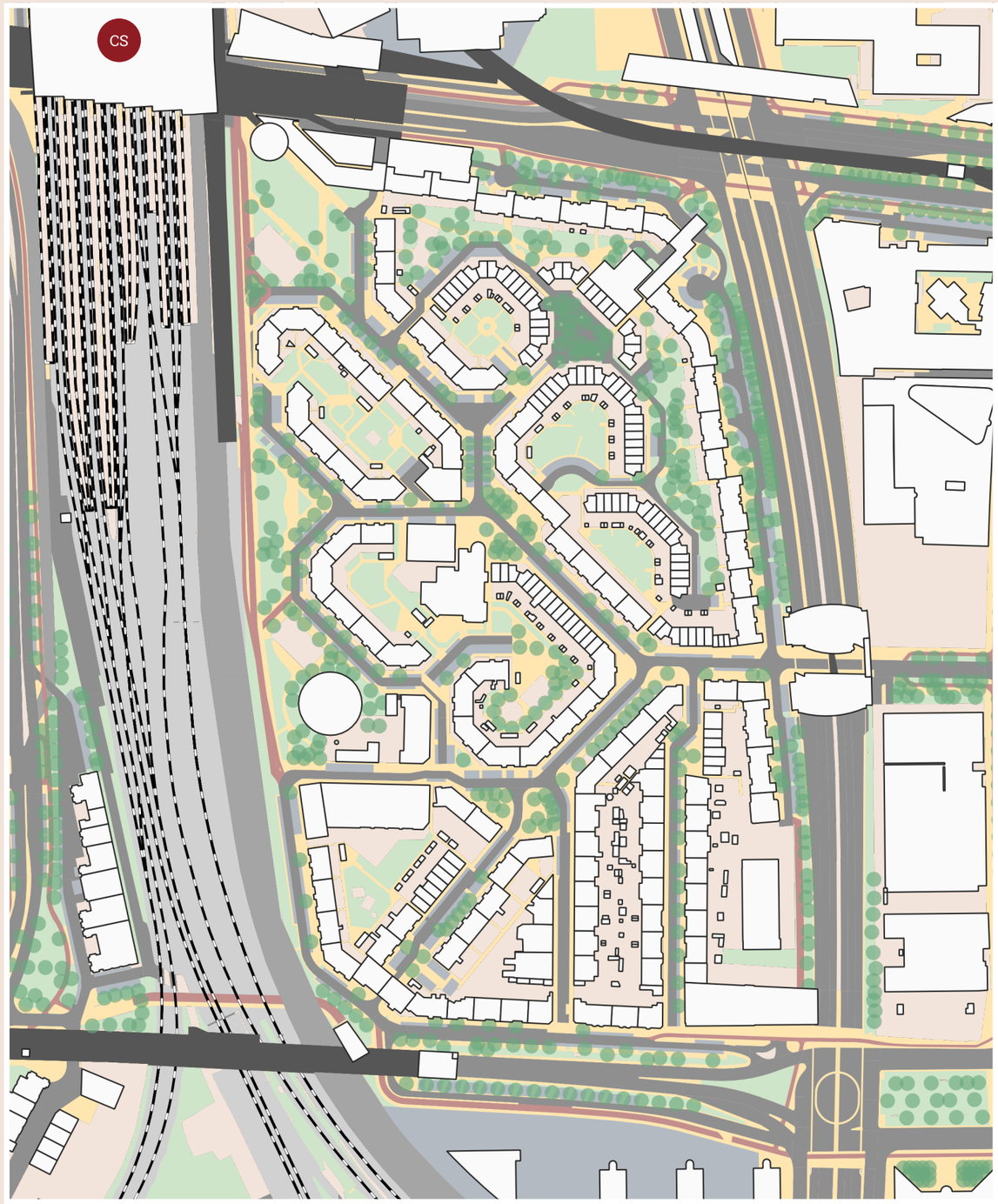
Height in meters

Assessing the height of the area at first corresponds with what can be expected of a 1920's neighbourhood. Houses of 2-4 storeys with a fine grain.

However, what is particularly noticeable, is the very limited height of the new developments, especially on the east side. Moreover, assessing the urban fabric of the new developments uncovers an actual less dense environment than other blocks. Instead of densification, a less dense environment has been created in this crucially central part of the CID.

- 0,0 - 5,0m
- 5,0 - 9,1m
- 9,1 - 12,7m
- 12,7 - 19,4m
- 19,4 - 30,0m
- 30,0 - 45,8m
- 45,8 - 79,7m
- 79,7 - 120,8m
- 120,8 - 146,9m

Source: BAG



F46 - Bezuidenhout-west map

Source: BAG/BGT/Gemeente Den Haag

1:3000

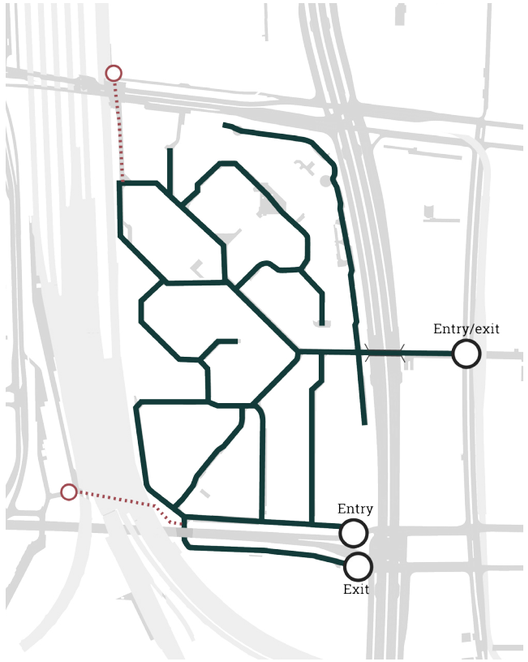


0 30 60 m

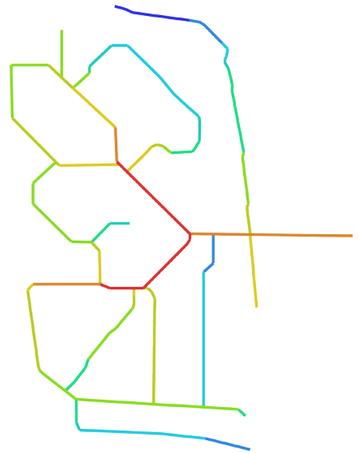
Bezuidenhout West

Enclave of suburban living in a very high dense environment

F47 - Barely reachable and locked in by infrastructural barriers



F48 - Internal integration Space Syntax (R=200m)



Badly connected and hidden

This neighbourhood of the CID is hidden behind big motorways and the train emplacement leading to Den Haag Centraal. As the map above shows, entrance to the neighbourhood can only be achieved on very limited spots. Moreover, sketchy tunnels and walkways guide bikers and pedestrians to the other centres.

When modelling the space syntax integration with a radius of 200 meter, the internal street hierarchy becomes clear, showing a centric nucleus network.

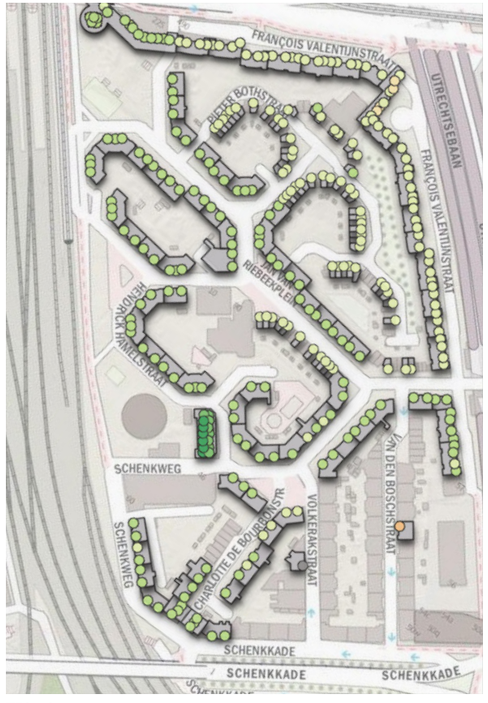
Looking at the FSI of the area, it is in clear contrast with the immediate surroundings. This makes it a suburban enclave within an high density environment.

When assessing the imminent densification of the CID, this residential area might prove crucial if well connected to the immediate friendlier urban fabrics.

F49 - Density (FSI) around Bezuidenhout West



Source: PBL, BAG, OpenStreetMap



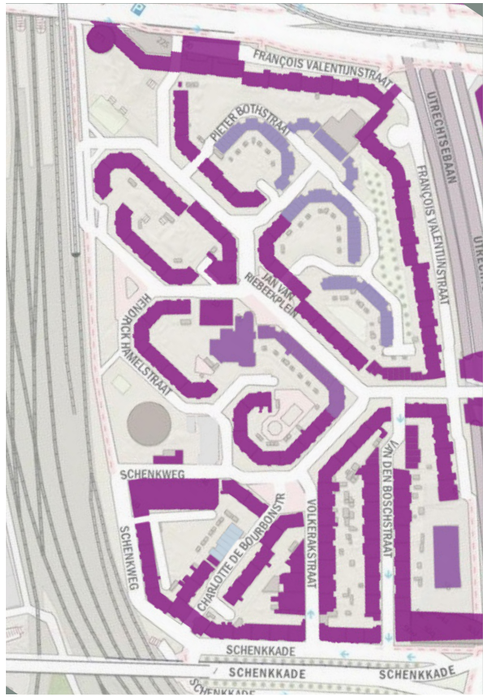
F50 - Corporation ownership Source: PICO by GEODAN

Corporation ownership and energylabel

Bezuidenhout-West is for the most part owned by a housing corporation. This is resembled in the character of the neighbourhood, where a dominance of social rental housing attracts lower income households.

At the same time, the energy transition will have a significant impact on the area, as most houses are labeled either C, D or E.

- Label A
- Label B
- Label C
- Label D
- Label E
- Label F
- Label G
- Geen label
- Corporatie gebouwen
- Corporatie gebieden



F51 - Cost of transformation Source: PICO by GEODAN

Costs of transformation to label A+

The costs of the renovation towards energy label A+, as propagated by the government in light of the energy transition, will be more than 20.000 euros per house in most of the cases. This operation will therefore prove to be expensive.

The now isolated location of Bezuidenhout-West might justify this costly upgrade of the neighbourhood. However, if the chosen development strategy of the CID decides to strive for a more monocentric model, the neighbourhood gets a very different urban centrality within the CID. This may cause land values to rise and subsequently make a more intensive redevelopment more feasible.

- Onbekend
- 0 - 7500 euro/pand
- 7500 - 10000 euro/pand
- 10000 - 15000 euro/pand
- 15000 - 20000 euro/pand
- > 20000 euro/pand

5 VOLUME STUDY

Contents

Space Matrix

Volumes and density

Urban Life volumes

Scale study

Conclusion

This chapter will research the urban volumes that correspond with urban life properties. Moreover, it will classify existing volumes with the space matrix methodology and perform a scale study on the project site.

Related subquestion:

SQ1: What could the proposed densification of 18.500 dwellings and 500.000 extra m² of office space look like in terms of urban typology, configuration and morphology?



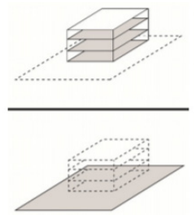
F52 - FSI: darker spots mean higher densities of floorspace

Floor Space Index (FSI)

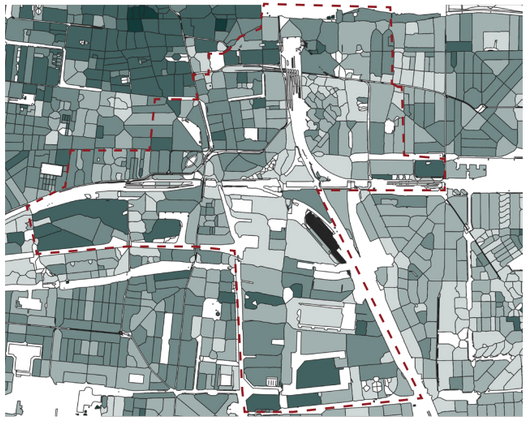
- 0 - 0.64
- 0.64 - 2.48
- 2.48 - 10.69
- 10.69 - 21.78
- 21.78 - 64.98
- 64.98 - 387.88

0 150 300 m

FSI is the ratio between total floor surface and total block surface. Multiple floors makes this value able to go higher than 1.



Source: PBL RUDIFUN 2019



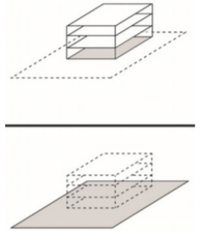
F53 - GSI: Darker spots mean less open spaces around/in buildings

Ground Space Index (GSI)

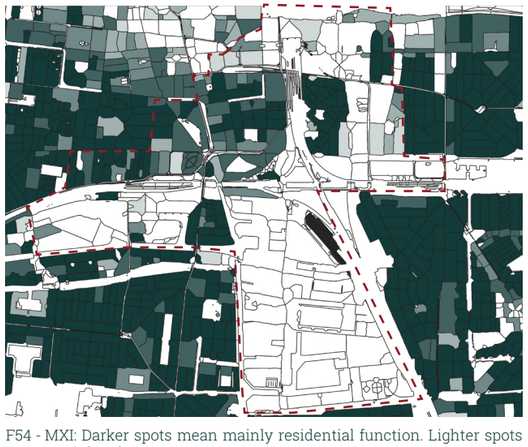
- 0 - 0.10
- 0.10 - 0.26
- 0.26 - 0.36
- 0.36 - 0.48
- 0.48 - 0.74
- 0.74 - 1.00

0 150 300 m

GSI is the ratio between building footprint and total block surface. This cannot be higher than 1.



Source: PBL RUDIFUN 2019



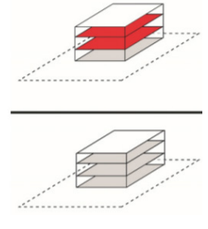
F54 - MXI: Darker spots mean mainly residential function. Lighter spots mean mainly other uses

Mixed Use Index (MXI)

- 0 - 0.17
- 0.17 - 0.33
- 0.33 - 0.50
- 0.50 - 0.67
- 0.67 - 0.83
- 0.83 - 1.00

0 150 300 m

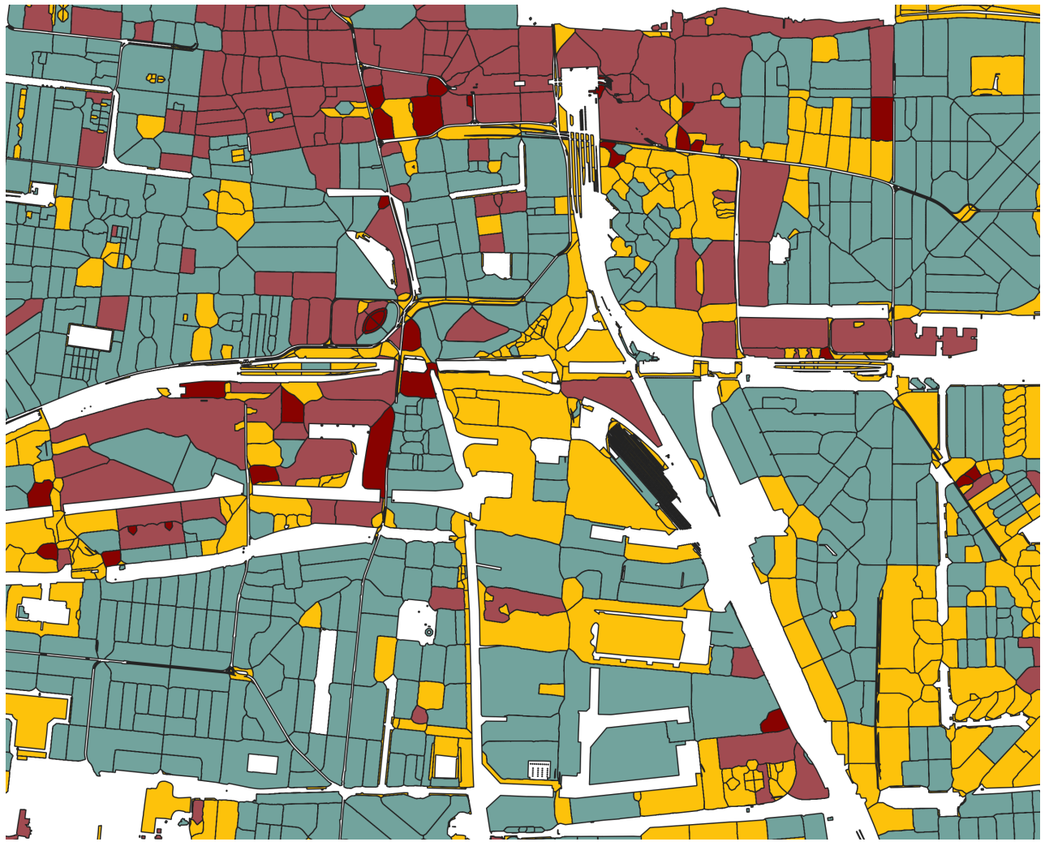
MXI is the ratio between square meter floorspace with a residential function as opposed to the total floorspace of the block.



Source: PBL RUDIFUN 2019

Data: PBL Ruimtelijke Dichtheden en Functiemenging Nederland 2019

Bivariate analysis of GSI/FSI



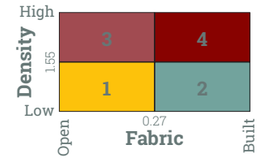
F55 - Bivariate analysis of GSI/FSI

Measuring urban form in the CID

Space Matrix is a method developed by Pont and Haupt (2010) that describes a way to objectively measure the performance of urban form. This may sound scary, as there is no formula for the best form of city. However, this method helps measure urban form and gives a clear definition for **density.**

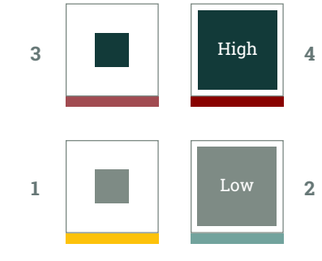
The definition is that density is a multi variable phenomenon. Space Matrix therefore makes a correlation between density and the built mass. The three main measures are FSI, GSI and Network Density.

Using the RUDIFUN dataset from the PBL, one can model the CID according to this space matrix method. This gives an objective measure of the performance of the urban form of the CID.



0 150 300 m

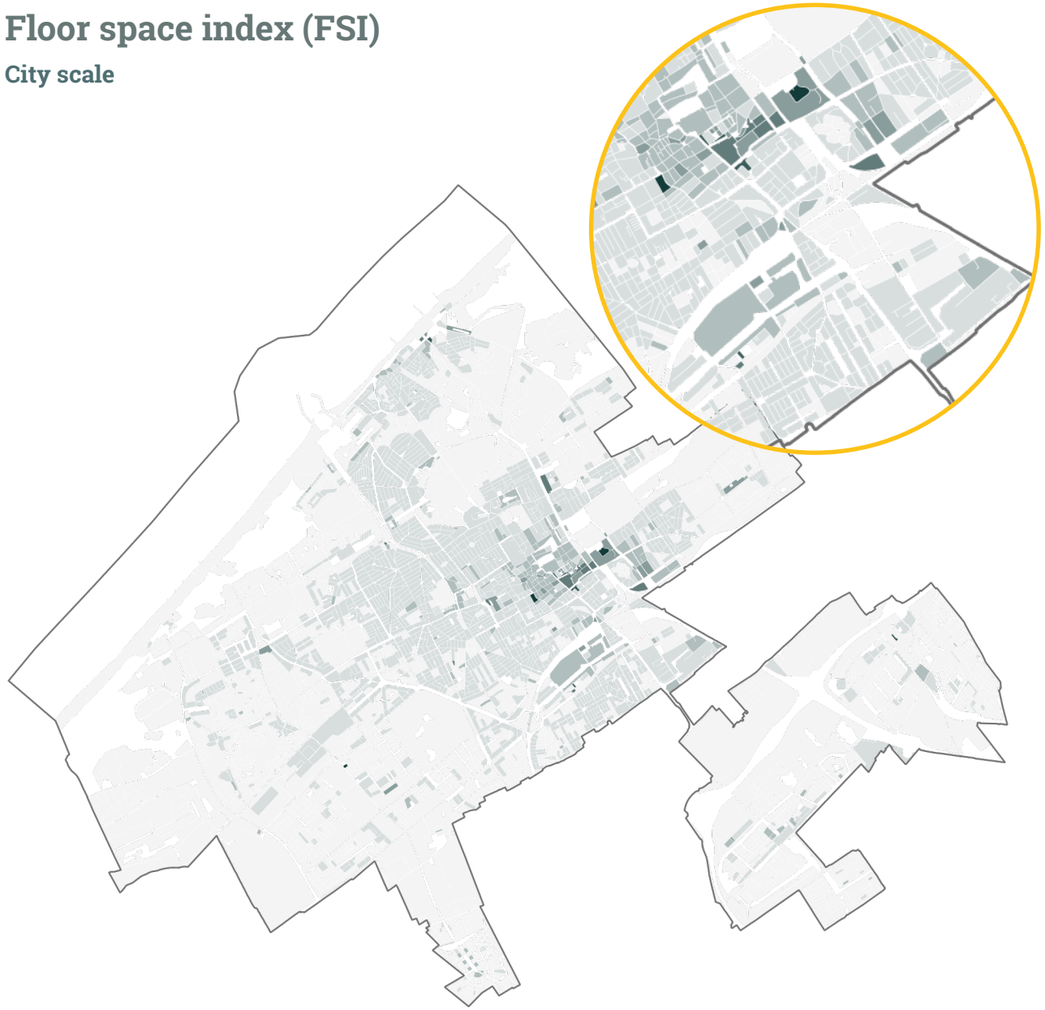
Urban form:



Data: PBL Ruimtelijke Dichtheden en Functiemenging Nederland 2019

Floor space index (FSI)

City scale



F56 - Floor Space Index inventory map

Source: Open Street Map, BGT

0 1 2 km

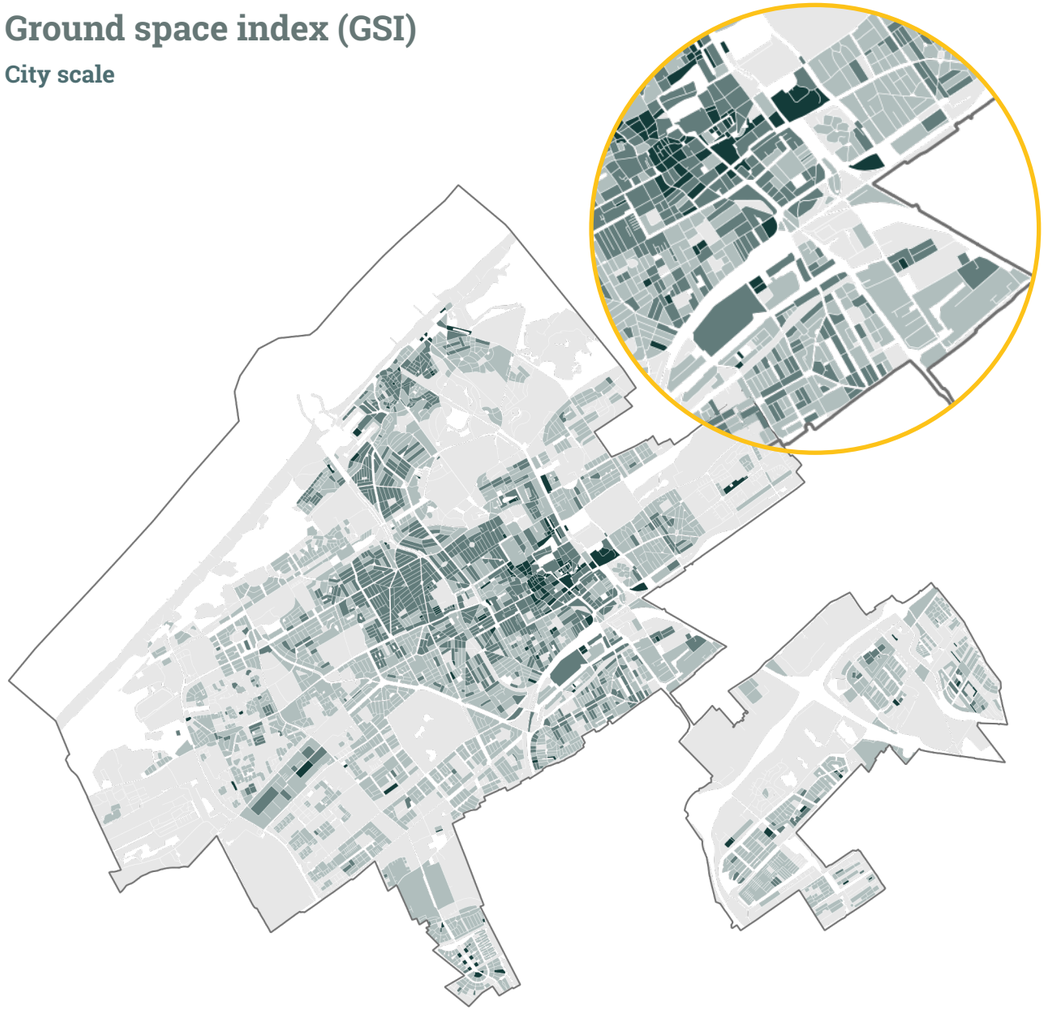
1:100000

- 0,00 - 1,51
- 1,51 - 3,67
- 3,67 - 9,26
- 9,26 - 18,82
- 18,82 - 40,15
- 40,15 - 84,51
- 84,51 - 153,74

The FSI shows the homogenous and flat character of the city. Only in the city centre and around the stations noticeable FSI variations are present. The Turfmarkt area and the Den Haag centraal cluster have the highest values, while the Binckhorst displays its rather low floor space numbers.

Ground space index (GSI)

City scale



F57 - Ground Space Index inventory map

Source: Open Street Map, BGT

0 1 2 km

1:100000

- 0,00 - 0,25
- 0,25 - 0,50
- 0,50 - 0,75
- 0,75 - 1,00

The GSI city inventory map displays the amount of open space in the Hague. Visible is the dense environments of the city centre and the centraal cluster. Local centres also are visible in more dark areas. Areas with a bigger amount of open space are the kop van Binckhorst and low rise peripheral neighbourhoods.

Density types

City scale



F58 - Density types inventory map

0 1 2 km

1:100000

- Density type 1
- Density type 2
- Density type 3
- Density type 4
- Density type 5
- Density type 6

Using SPSS Statistics, the GSI and FSI dataset can be grouped with a Schwarz's Bayesian criterion two step cluster classification into 6 groups. This identifies the most common GSI/FSI combinations and their location. This is an experimental method to classify typo-morphological characteristics.

The results are displayed on the right side of this spread. The volumes are computer generated by making an 8x8=64 grid and calculating the amount of boxes needed. For type 1 this means there are 0.12x64=7 open squares according to GSI and 7.88x64=500 boxes needed according to the FSI. Size and form of the block will make the volumes differ in the real situation, but using a perfect grid of 64 squares gives an spatial illustration of the six groups.

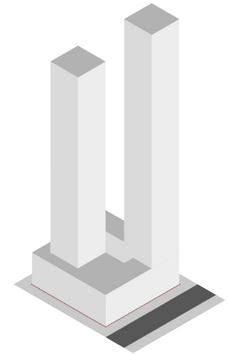
Two-step cluster density statistical classification

Type 1: compact urban highrises

1

Average FSI: 7,88
Average GSI: 0,88
Part of total: 4,9% (163)

This type is mostly found in the historic dense city centre and the highrise clusters. Together with type 2 and 3 it describes the most central parts of the city. It has a high density and compactness and allows for a high degree of supporting shops and amenities.



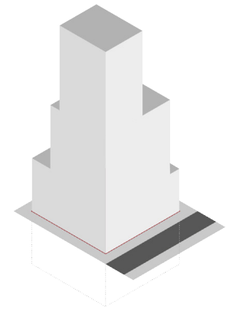
Computer generated: 500 blocks, 7 open

Type 2: ultra-compact volumes

2

Average FSI: 13,18
Average GSI: 1,00
Part of total: 0,2% (8)

This type consists of blocks with a very high density. This can be caused by underground structures or very small block sizes with a high-rise located there. Only 8 blocks exist in the Hague, most are found in the highrise areas.



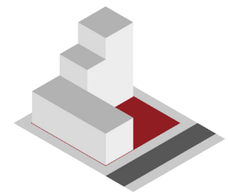
Computer generated: 844 blocks, 0 open

Type 3: mid-rise compact blocks

3

Average FSI: 2,58
Average GSI: 0,59
Part of total: 21,1% (707)

This type is the most common type in central areas. Moreover, some denser neighbourhoods directly bordering the city centre also corresponds with this type. These are mostly half open or closed urban blocks with still quite some open space.



Computer generated: 166 blocks, 25 open

Type 4: open spaces

4

Average FSI: 0,24
Average GSI: 0,05
Part of total: 9,3% (313)

Blocks with this type are mostly parks and other open green spaces. Only 5% of block areas are built on average. There might be a tower located in this type or various small volumes scattered in the open space.



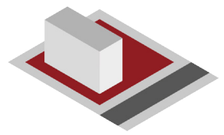
Computer generated: 15 blocks, 60 open

Type 5: mid-rise spacious strips

5

Average FSI: 1,12
Average GSI: 0,26
Part of total: 25,3% (847)

This type is mostly found in modernist neighbourhoods with their famed slab volumes in open space. Rowhouses of 2 to 3 storey's also mostly fall in this type. These neighbourhoods are furthest from the city centre and can be regarded as car-centric.



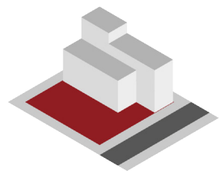
Computer generated: 72 blocks, 47 open

Type 6: Low-rise residential blocks

6

Average FSI: 1,65
Average GSI: 0,43
Part of total: 39,2% (1315)

This type is the most common typology in the Hague. It consists of 3-4 storey's with a small to medium size backgarden. It is both found in the suburbs as close to the city centre. This give the Hague its typical low-rise spread-out orthogonal character.



Computer generated: 106 blocks, 36 open

Volumes according to different planning paradigms

A lot of recent debate, both in academia and practice, is found in the search for what volumetric properties the compact city should strive for. There is a tension between urban form, compactness and liveability (Lehmann, 2016). Lehmann researches in his paper 'Sustainable urbanism: towards a framework for quality and optimal density?' (2016) the question of what is optimal density and what sort of urban form and process correspond to this.

Using a case-study methodology, Lehmann assesses both older and newer forms of building developments that address the issue of optimal density. He concludes that most recent tries where rather a result of market forces in an overheated housing market, than developments regulated by urbanists striving for an optimal density (Lehmann, 2016: 8). This inhibits the actual search for an optimal density. Good practices were found in Vancouver regarding participatory planning of density.

This observation aligns with Sager (2011), that states cities are now engaged in neo-liberal planning practices where the main focus is on efficiency and economic drivers. This seems detrimental for the search on optimal density.

After assessing the case-studies and reflecting on earlier work in academic discourse, Lehmann concludes with a list of recommendations for designing the optimal density (Lehmann, 2016: 10).

The list of recommendations for an optimal density regarding urban form, compactness and liveability:

» Work with the **specific context** of the city. What is an optimal density in Barcelona, is not optimal in Hong Kong or The Hague.

» *a strong **alignment of land use** and mobility*

» *connectivity, proximity and 'nearness' to amenities and facilities within **walking distance***

» *to keep cities cool, the integration of **urban greenery and green roofs** needs to go hand-in-hand with densification: the green city*

» *high-quality architectural and urban design with more **diversity** and better examples of residential infill through **4- to 8-storey** projects: the mixed-use vibrant compact city*

» *Both the skill and urban **imagination** of architects/planners and the experiences and concerns of the public/community must be taken into account.*

» *new compact urban blocks are the next evolutionary step in the **perimeter block typology**, to create better options for inner-city living and working. If done well, higher density does not have to come at the price of loss of privacy or liveability.*

(Quoted and parafrased from Lehmann, 2016: 10).

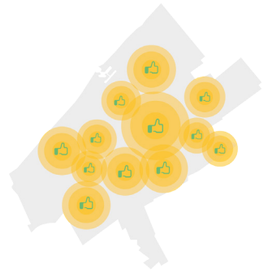
More on compact urban forms and its relation to quality/urban life in the quality chapter.



F59 - Different ways that 75 dwellings per hectare can be realized, from rows of terrace houses (left), to a perimeter block (centre), or a single high-rise tower (right). Planners and architects need a better understanding of the impact of their design decisions on the overall performance of the urban precinct system (Lehmann, 2016)

Lessons for the Hague

Applying the lessons from Lehmann (2016) in the context of this thesis, means volumes have to be assessed using indicators for an optimal density.



1. Specific context
To gain an understanding of the specific the Hague context for blocks/volumes that have an optimal density, one has to assess the current context. Data can identify blocks that correspond to these properties and help in making the densification indigenous, by using already existing practices in the Hague's urbanism.



2. Alignment of land-use and mobility
By analysing the network of the Hague next to the volume-study, this alignment can be achieved. Smart densification differences regarding stations/periphery will align the land use and mobility policy.



3. Green city
When designing and envisioning the densification strategy of the Hague CID, an integral approach to greenery will help make good spaces and strong walkable networks.



4. Mixed use and vibrant
The volumetric densification will have to be around 4-8 storeys with a diverse mixed program. By designing with these characteristics in mind, an optimal density for the new parts of the CID can be achieved.

F60 - Lessons for the Hague from Lehmann (2016)

Source: Noun project, Author

IDENTIFYING THE URBAN LIFE VOLUME

Using data to identify building volumes that correspond to urban life



F61 - Blocks that are mixed use (0.2-0.8 MXI) and 3 to 9 building layers (3-9 L)

Source: PBL

Using the Space Matrix method and the RUDIFUN dataset, it is possible to identify building blocks that correspond to optimal density indicators stated by Lehmann (2016). This data can then be used to test volume scenarios where an indigenous densification of the CID according to urban life principles is realised.

In order to identify these blocks, the dataset is filtered using these conditions:

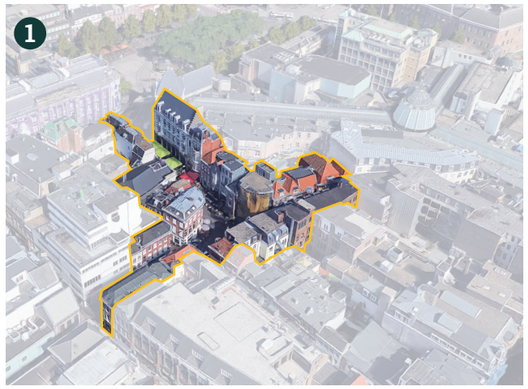
- The block has to have a minimum of 0.2 MXI in order to ensure it has at least 20% of residential function
- The maximum MXI is 0.8 to ensure blocks with a too dominant monofunctionality are left out
- The amount of floors are between 3-9 to ensure human scale and urban life properties

Mixing these characteristics gives an overview of blocks that perform well in terms of urban life indicators as described by Lehmann (2016).

Unsurprisingly, the historic city centre has a big percentage of blocks with urban life characteristics. This area (1) corresponds with the typology of the western European historic inner-city, often times being famed in urban life literature for its good characteristics.

More surprising, are the newer developments in the Rivierenbuurt (2) lighting up. This indicates a well thought out restructuring of the neighbourhood with higher densities and mixed uses. At least, considering these specific developments. In the spatial analysis chapter other new developments in the Rivierenbuurt were spotted as being monofunctional and an actual decrease in density.

Other spots in the CID (3) where author anticipated urban life blocks, do not light up. The reason for this mostly being a very monofunctional (residential) character or dwellings having 2 floors. Opportunities in these areas are in both densifying and diversifying the building blocks.



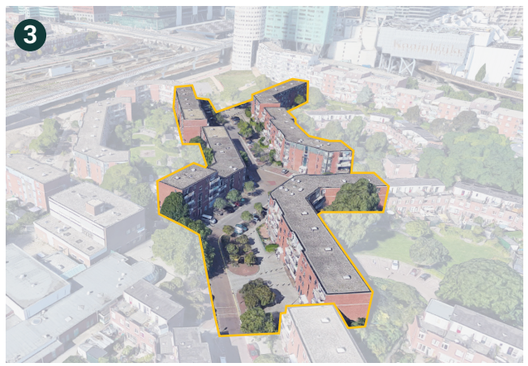
This block is found in the historic inner-city. It corresponds well to the indicators stated by Lehmann (2010), as it has a high density, while having a mixed use, relative low building height and a fine grain.

50 adresses (BAG)
4-6 storeys
0.36 hectares
138 dwellings/hectare



This block is a newer development (ca. 2006) that corresponds to indicators as posed by Lehmann (2016). It has mixed uses, 5-7 storeys, and a high density. Moreover, it contains a collective garden and small building grains, fostering a well-designed human scale.

54 adresses (BAG) (18 in front apartments)
5-7 storeys
0.38 hectares
142 dwellings/hectare



The locations of three do not light up. This either means they have a too monofunctional character or are lower than 3 floors/higher than 9 floors. In this case the housing blocks are too monofunctional. In the neighbourhood there is a lack of mixed uses, disqualifying the typology for urban life characteristics.

107 adresses (BAG)
3-4 storeys
0.93 hectares
117 dwellings/hectare

F62 - Found typologies

Source: Google Streetview

SCALE STUDY

Stamping urban form

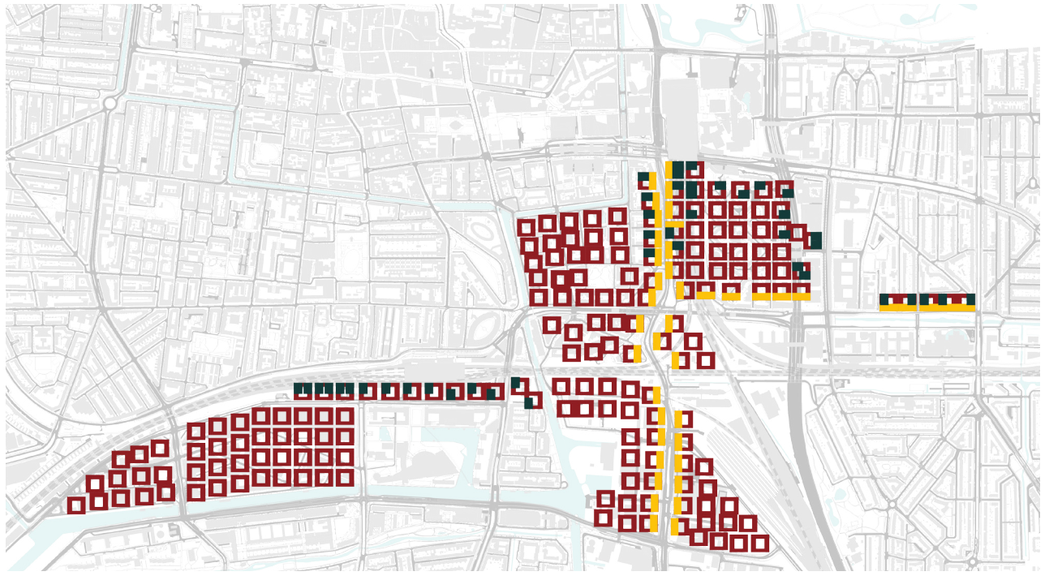
Using the identified building blocks, a quick study where the building blocks are stamped and configured on the existing situation can be carried out. This helps in gaining an understanding of what the proposed program, in terms of office-spaces and dwellings, spatially means when different urban forms are used.

This very loose method is to get first ideas on the volumetric intensity of the densification. As liveability, compactness and urban form have a tense relation (Lehmann, 2016), stamping volumes with different properties regarding form, compactness and attributed liveability features helps making the program explicit.

By using stamps of local developments, the study ensures an indigenous approach of the Hague to urban form and building tradition. When case-studies are used, the properties will have to be alike to the Western European context, in order for the values in densities, urban form and what liveability means, to be the same. This is researched in a 1:5000 scale precedent study for four projects author deems qualitative.

Quickscan: volumetric densification scenarios

Scenario 1: Full focus on urban life



Legend

- offices: 44 x 10 floors of 1200m² | total: 528.000m²
- Dwelling-tower: 42 x 150 units | total: 6.600 units
- Dwelling-block: 187 x 70 units | total: 13.090 units

Pros:
Ensures human scale
Promotes urban life
Family-friendly
Relative low building costs
Razes infrastructural barriers
Creates a coherent heart of the city

Cons:
Hard to achieve critical mass of people
Restructuring needed of complete neighbourhoods
Consumes lots of space
Expensive in areas with high land values

Stamps



F63 - Office tower

This tower of approx. 10 floors functions as a quick reference of an office block on top of a residential base. Mixing the volumes leading to other typologies is however entirely possible.



F64 - Dwelling tower

The Turfmarkt tower is a recent and well-liked dwelling tower in the Hague. It is composed of approx. 150 units (BAG). It ensures density along corridors and does not have an inhumane scale.

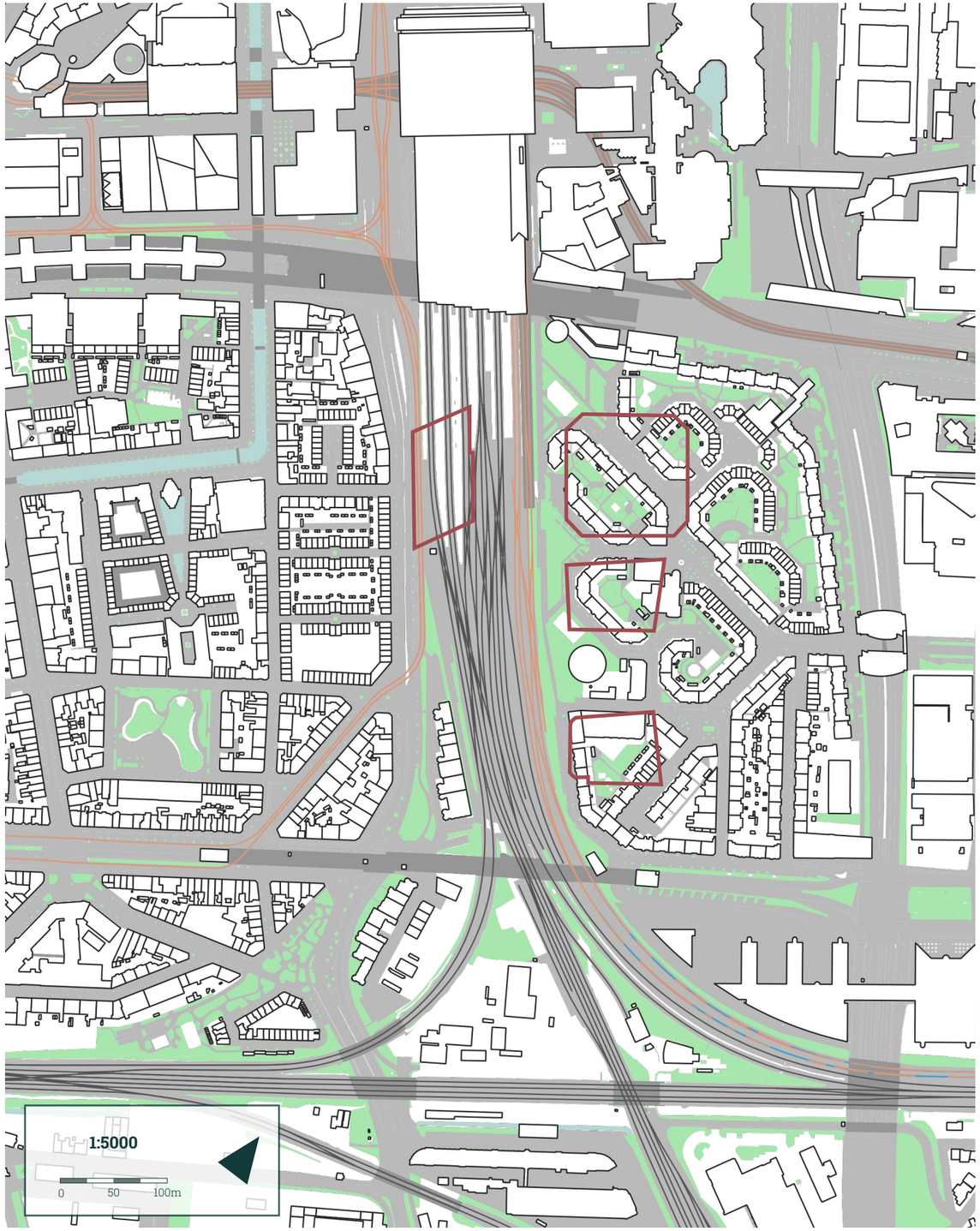


F65 - Dwelling block

According to the RUDIFUN data, this new block has good characteristics of an block fostering urban life: mixed use and 4-9 floors high. It can contain 70 units (BAG).

Source: Google Maps

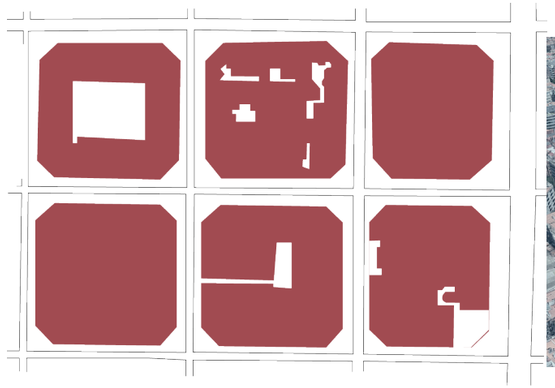
Precedent scale study 1:5000



F66 - Project area inventory map

Source: BAG, BGT

Eixample, Barcelona





Source: Google Maps

230 dwellings/hectare

Sainte Avoye, Paris

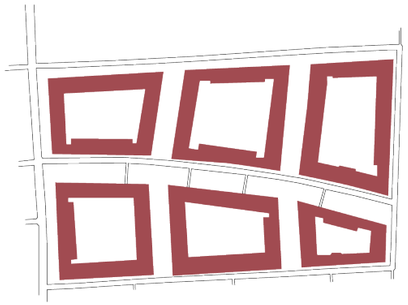




Source: Google Maps

195 dwellings/hectare

Sluseholmen, Copenhagen

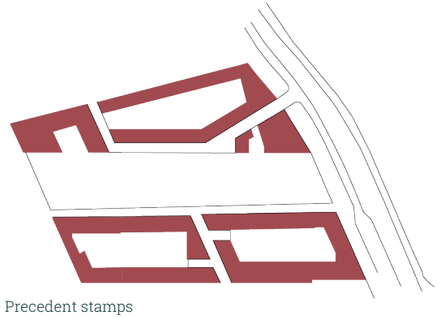




Source: Google Maps

110 dwellings/hectare

Nieuw Delft, Delft





Source: Nieuw Delft

Approx. 95 dwellings/hectare

F67 - Precedent stamps

Quickscan: volumetric densification scenarios

Scenario 2: Ultra-intensive highrises on select locations



F68 - Stamping study 2

Legend

Residential focus: 800 dwellings, 10.000m² functions
x20 = 16.000 dwellings

Office focus (New Babylon numbers): 55.000m² offices
330 dwellings, 15.000m² functions
x9 = 495.000m² office, 2970 dwellings

Pros:
Little space usage
Critical mass of people
Collective amenities
Energy-saving
Transit oriented development

Cons:
No street life
Introverted
Mobility needs
Re-purposing of towers is hard
Expensive to build
High apartment prices due to building costs

Stamps

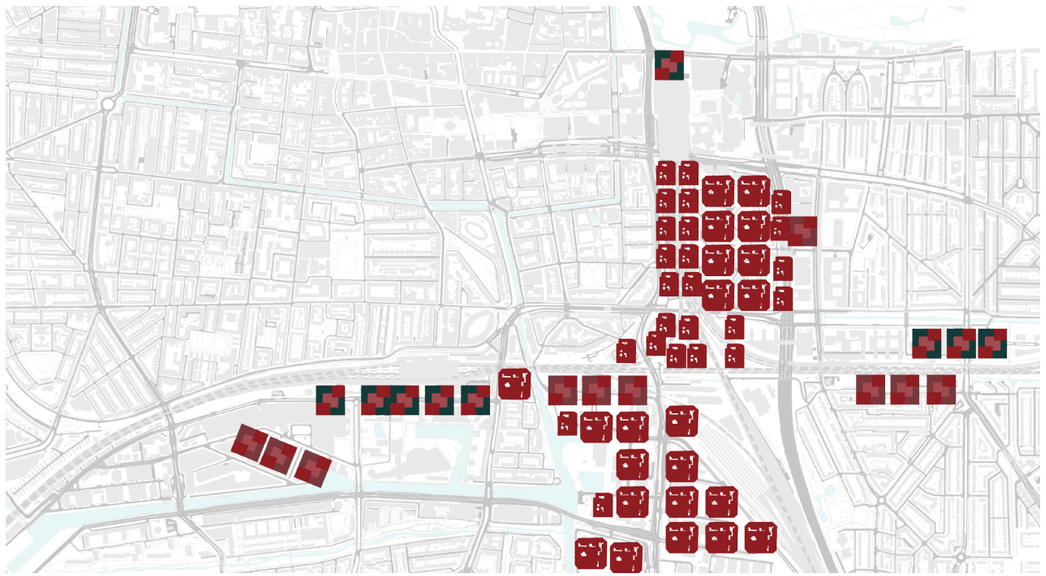


F69 - New Babylon Complex

Using the New Babylon complex in this quickscan gives a quick idea of the spatial implications of building in this intensity. With a maximum of 44 floors and a very broad mixed use program, it corresponds to the ambitions of the Gemeente Den Haag for the Binckhorst.

Source: Google Maps

Scenario 3: Select highrise clusters connected through mid-rise urban life volumes



F70 - Stamping study 3

Legend

Residential focus: 800 dwellings, 10.000m² functions
x7 = 5.600 dwellings

Office focus (New Babylon numbers): 55.000m² offices
330 dwellings, 15.000m² functions
x9 = 495.000m² office, 2.970 dwellings

Barcelona block: 300 dwellings, 2000m² functions
x22 = 6.600 dwellings

Paris block: 132 dwellings, 500m² functions
x24 = 3.168 dwellings

Pros:
Wide range of different living environments
Medium-rise that fosters urban life
Infrastructural barriers overbuilt
Street life and possibilities of good mixed uses
Human scale
Promotes interaction

Cons:
Towerclusters needed to reach capacity
High space usage, less space for parks
Expensive measures needed to overcome barriers
Transformation of Bezuidenhout West needed

Stamps



F71 - Paris urban block

With a maximum of 7 floors, the Paris urban blocks are a good example of high densities in middle height volumes. With an average density of 195dw/ha this block of 0.68 ha contains 132 dwellings.



F72 - Barcelona Eixample urban block

The Eixample urban expansion in Barcelona is the archetype of the urban perimeter block. This big scale and small apartments make a density of 230 dw/ha possible.

Source: Google Maps

CONCLUSION

Volume study

SQ1: What could the proposed densification of 18.500 dwellings and 500.000 extra m² of office space look like in terms of urban typology, configuration and morphology?

This chapter identified and described the urban life volume, as posed by various urban life authors. Most agree that there are certain requirements for urban blocks in order to foster urban life and mitigate the negative effects of density.

These requirements were found to be:

1. Blocks have to ideally be 4-8 storeys high
2. Mixed uses and amenities in plinths that are programmed during various times (OMA-plinths)
3. Vertical rhytms in facades
4. New developments have to look at what works in the specific context. Optimal urban life volumes are different from city to city

Using these requirements, the urban life volume in the Hague was mapped and evaluated. These volumes were subsequently used in stamping studies on the project site, to gain an idea what the requirements of 18.500 homes and 500.000m² of office space would mean. Moreover, volumes from tested western European case studies regarding urban life, were also assessed and stamped.

The outcome of the stamping studies was that using solely urban blocks that comply to the requirements, will mean an extensive overhaul of a big area of existing urban fabric to foster enough groundspace. Higher densities are therefore needed to be able to fit enough of the program in the area. This is deemed as very controversial, considering the complex inner-city context and the conservatist policy regarding the existing neighbourhoods. Using high mixed dwelling/office towers turned out to fit easily. However, the urban life component seriously lacked. A promising scenario was found in a mix of select towerclusters around station nodes to reach the high densities, while medium density urban life volumes connected these clusters on a human scale. This option will result in a big range of different living environments and an interconnected CID across infrastructure barriers.

However, it has to be noted that with the stated amount of dwellings and office space that the municipality wants to add, the optimal density as described by Lehmann (2016) can **not** be achieved. The program is simply too heavy for such a complex in-use site as the CID. The consequence of this conclusion is that the goal of this thesis will not be to fit in the program stated by the municipality, but rather test what kind of high density still corresponds to the optimal density, while adding a significant amount of dwellings and officespace to the site.

Therefore the answer on subquestion 1 is that ***the stated numbers are too high to realistically create a density that still corresponds to urban life volumetric properties. In order to research the best possible outcome where the stated program and urban life requirements are met, the proposed densification will have a mixed urban typology of both highrises and medium density urban blocks that connect these clusters. The configuration will consist of urban blocks structured along properties of the urban centrality. The morphology will have a wide range of scales, but mostly focus on the human scale and urban life.***

Conclusion SQ1

6 NETWORK STUDY

Contents

Space syntax: Streets

Network and Amenities

Space syntax: Footpaths

Synthesis

Network scenarios

Conclusion

The network study will analyse the existing urban network using the space syntax methodology. On top of this, volumetric properties of potential new developments will be taken into account using the UNA methodology. This serves as a way to test new scenarios and improve the current urban network effectively. As centrality is regarded as a vital element of urban life, this study will research those implications of transformations to the network.

Related subquestion:

SQ2: In what way are the current CID-clusters disconnected and what is needed to improve and maintain the interconnectivity?

CID context: hierarchy of local network

Integration radius = 2000m



F73 - Street integration R=2000

To gain a better understanding of the existing network, a space syntax integration study helps in determining how the network functions. A high metrical radius highlights the main routes through and between urban areas (Ye, van Nes, 2014). Doing this for the Hague produces the above map.

Clearly visible is the important connection the Schenkviaduct makes in the broader local urban network. Also noticeable is the current irrelevance of the Binckhorst. This will change notably when the Rotterdamsebaan (dotted line) connects through a tunnel to the S100 ring. Due to the tunnel this effect will not be visual in the current metrical radius, but has to then be shown in a map with a higher metrical radius (>5000m).

Integration radius = 400m

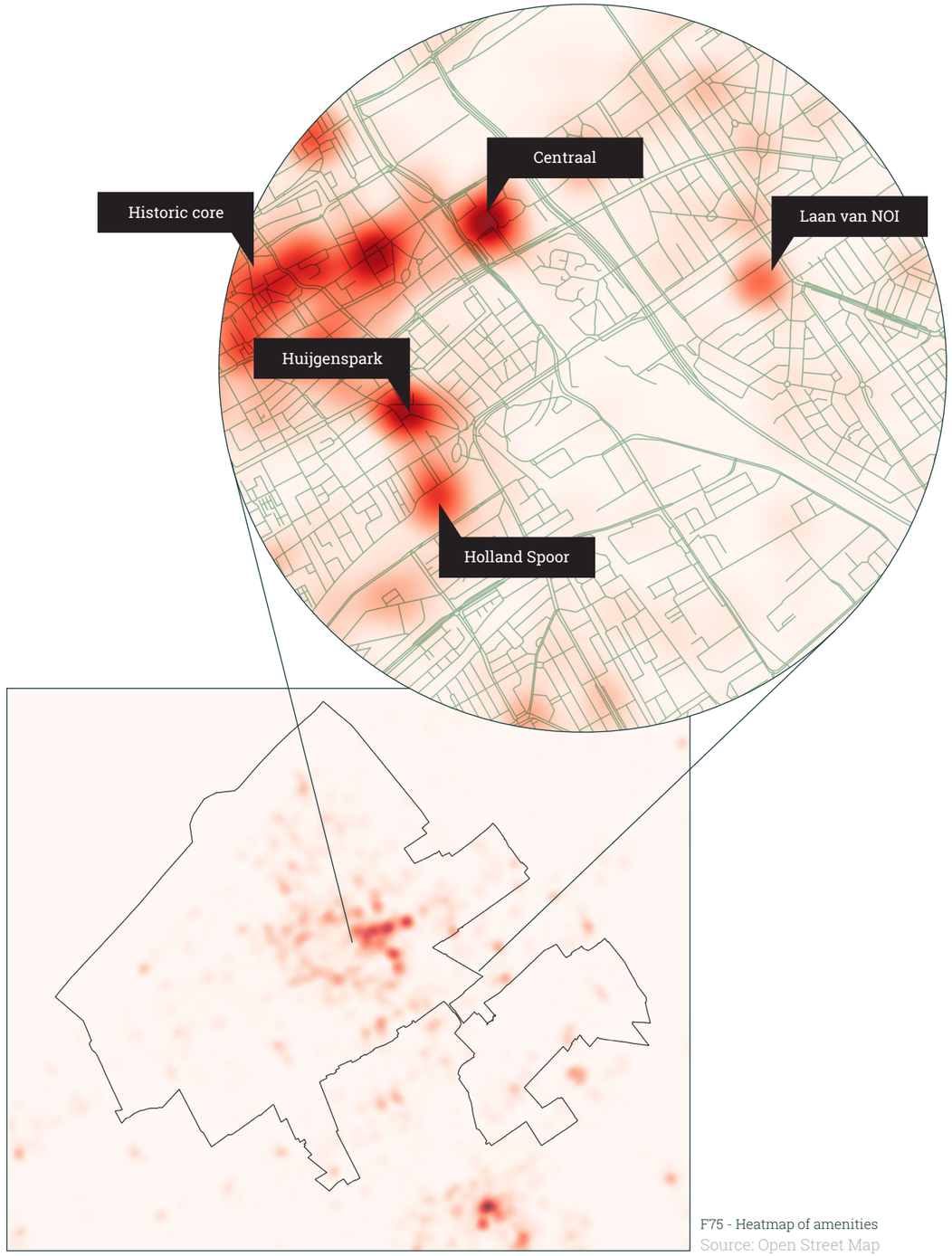


F74 - Street integration R=400

In the above map, the same area is analysed but with a smaller metrical radius. With a low metrical radius one can highlight the local centres in a built environment (Ye, van Nes, 2014). Typically, the historical centres tend to be highlighted due to its high integration properties.

This is also visible for the Hague, where the historical centre is measured as having a high integration value. Also visible are the various central streets in the urban network, displaying a greenish colour. The chosen radius of 400 meters focuses more on the walkability of the street network. Visible again is the isolation of the Binckhorst in the network. Most noticeably is the stark contrast of the Schenkviaduct as opposed to the other map. This means an interesting walkable connection between the west and east side, is lacking.

Heatmap of shops/amenities



F75 - Heatmap of amenities
Source: Open Street Map



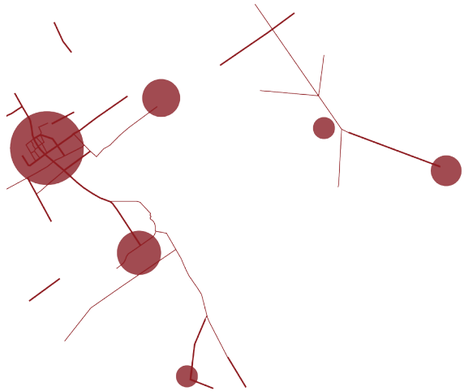
F76 - Heatmap of amenities
Source: Open Street Map

Inventory: Heatmap of all amenities/shops

This heatmap combines all shop and leisure locations located in and around the project area. It signifies the most important places for inhabitant's everyday lives. Therefore, it gives insight to which places are highly used and how these places relate to eachother within the urban network.

The historic centre is clearly highlighted, while also neighbourhood centres have a clear presence. In the current situation, the Binckhorst shows a clear lack of amenities.

Surprisingly, the Beatrixkwartier has a total lack of amenities or shops.

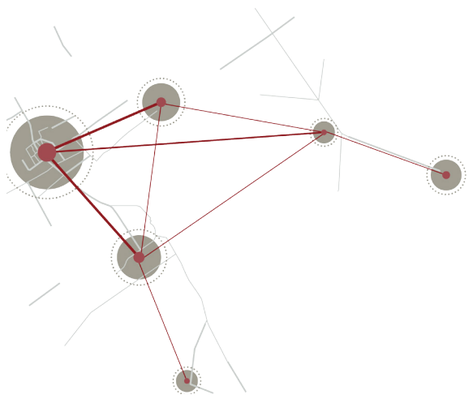


F77 - Reduction of amenities

Reduction: Clear 'amenity'streets

Reducing the heatmap to the most important streets and clusters of amenities, shows that most shops and amenities are located along specific 'amenity'streets. Each of these streets are connected to certain clusters where a significant culmination of shops and amenities is present. These clusters mostly consist out of the three main stations , the historic centre and local neighbourhood centres. Each of the clusters have a different weight depending on the amount of amenities/shops.

The streets highlighted here can be regarded as central in inhabitant's daily urban life. Moreover, most of the streets are pedestrian focused with attractive storefronts and public spaces.



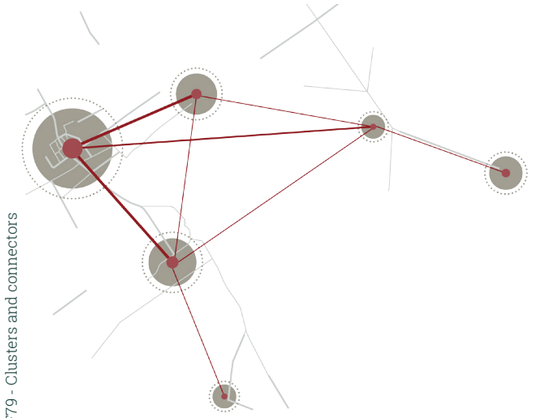
F78 - Synthesis of amenities

Synthesis: Missing links

There are clear missing connections in the main amenitystreets network. Moreover, due to the Binckhorst development plans, amenities and shops will also have to be located there.

A chance is located in interconnecting the streets in a walkable network that at the same time razes infrastructural barriers. Drawing these missing links on top of existing car arteries uncovers the potential of where the Central Innovation District should focus on to make the urban network more walkable and introduce urban life.

Towards a walkable network of places

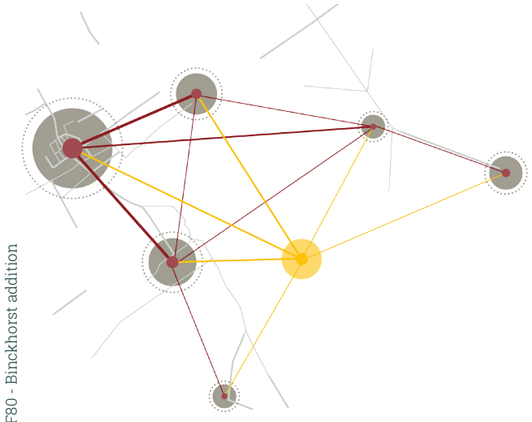


F79 - Clusters and connectors

How are clusters and lines weighted?

Basing the identified cluster sizes on its amounts of amenities/shops and importance within the Hague, the lines and clusters get each a different weight. The city centre with all its shops and important amenities, of which some are only located in the city centre, is the most important attractor. The centraal and Holland Spoor clusters will especially in the near future gain importance as centres. Laan van NOI and smaller subcentres have a way smaller impact. Connections are scaled on their importance of travel between the clusters.

This tells what clusters and connections are expected to gain importance in the future CID network.

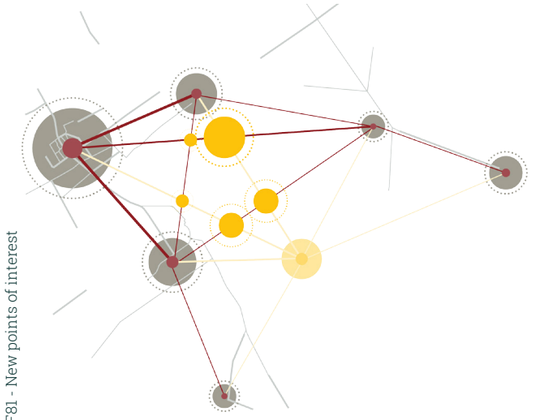


F80 - Binckhorst addition

How will Binckhorst residents move?

Adding the future Binckhorst cluster to the network, displays the future user flows of the network. These other clusters are important as research to usage of local facilities concluded that:
"resident engagement with, and movement to, the wider urban environment is very varied and driven by personal needs. Neighbourhoods in this sense are far more fluid and variable than those defined by Transit Oriented Development walking catchments." (Allen, Haarhoff, & Beattie, 2018).

This implies a stronger relation with for example the city centre for residents of each of the densification clusters.



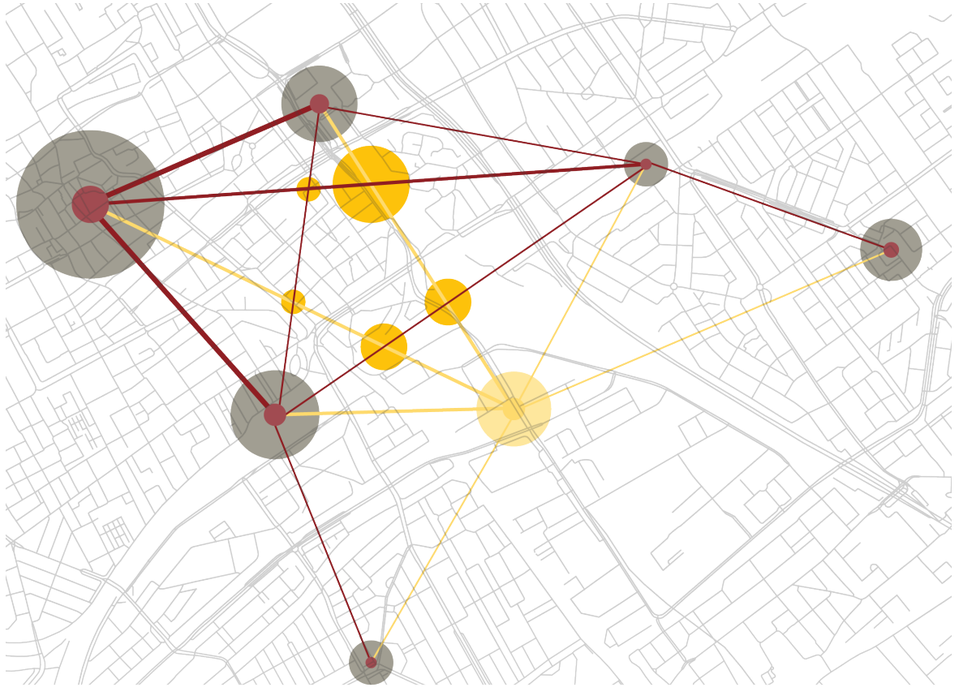
F81 - New points of interest

Which are the most important crossroads?

Using the weighted lines and clusters, the crossroads of these direct lines show ideal places for new clusters. By introducing this finer and denser network of interesting places, the network becomes more walkable.

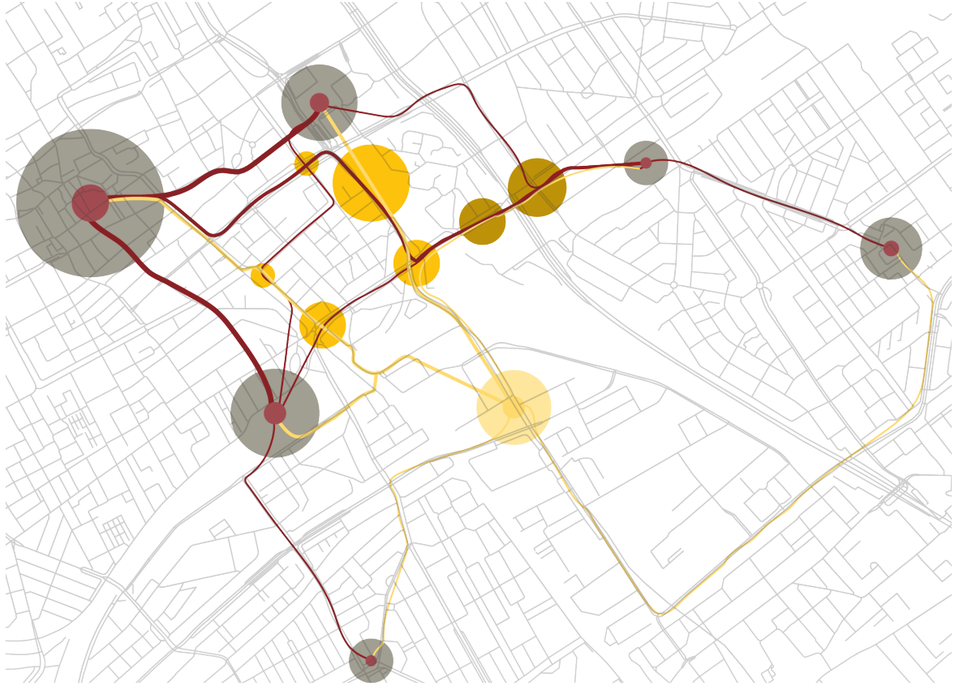
By drawing straight lines, the distance between the clusters is shortest. On the right page the actual urban network is incorporated and a shortest path analysis that also prioritises the aforementioned main amenity streets, results in the ideal places on the existing network. Clear is the crucial importance of the S100 line. Moreover, if the Laan van NOI cluster want to be fully incorporated in the CID, brand new clusters have to be created.

Where within the actual network?



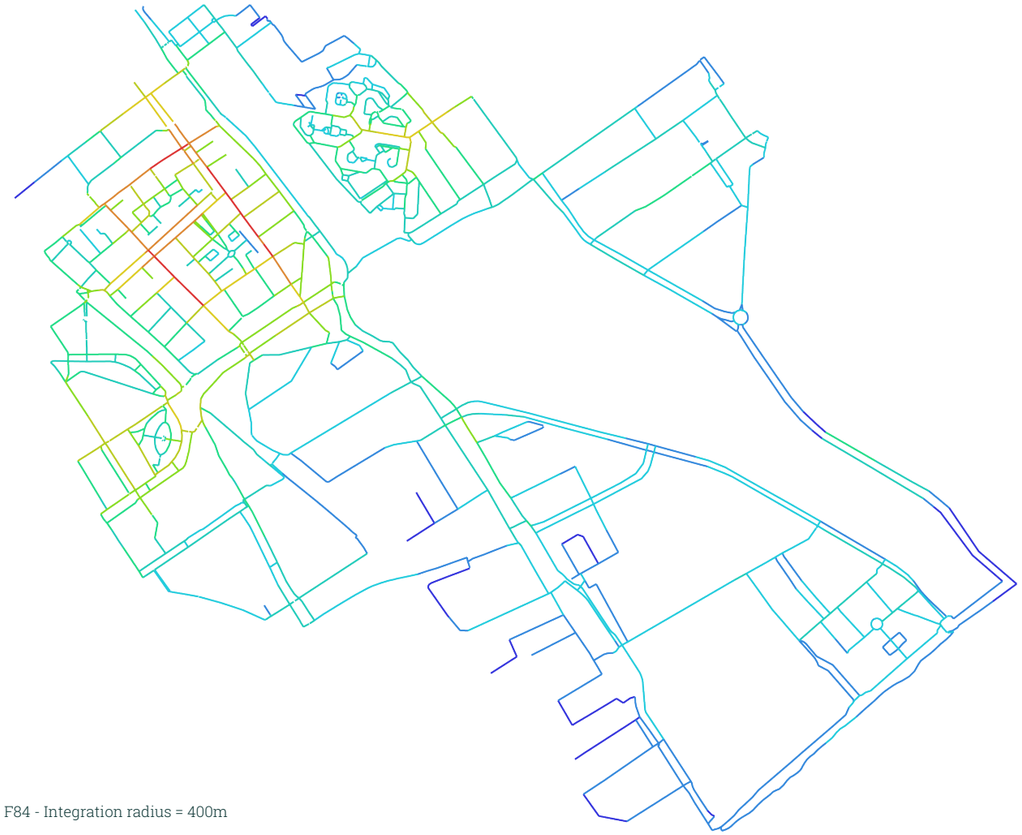
F82 - New points of interest on actual network

Ideal places on existing network (shortest path and along amenity-streets)



F83 - Ideal activation spots in current network

SPACE SYNTAX INTEGRATION: FOOTPATHS



F84 - Integration radius = 400m

Analysing the current pedestrian network

Mapping the pedestrian network in the CID and analysing this using a space syntax angular integration analysis, results in the above map. Striking is the lack of pedestrian connections between the east and west side of the Hague, across the railway emplacement. The Rivierenbuurt seems to have a well integrated pedestrian network, while the Bezuidenhout West area has its own hierarchical system of pedestrian pathways and roads.

What this map does not show is the quality of the connections. A pedestrianised street has the same weight as a small sidewalk along a car-focused traffic artery. Moreover, what is located along these lines and how this influences the urban network is also hard to tell. This method is therefore only suitable for this thesis if other information is integrated. It does however show the integration of the current network and can give a broad idea where connections have to be added in order to increase urban centrality. The first steps of this integration is done on the right page.



F85 - Network distance to station

Network distance to station per function

Point-data from the BAG for addresses in the CID project area, can through betweenness analysis be connected to the pedestrian network. This shows which addresses have a short (red) or a long (lightblue) network distance to the nearest station.

Notable is again the isolation of the Binckhorst to the three main stations. Holland Spoor is for example not very far in absolute distance. However, when mapping the network, the Schie canal works as a barrier. The same is notable for Bezuidenhout West. Its isolated location in terms of infrastructure makes the network distance further than the absolute distance.



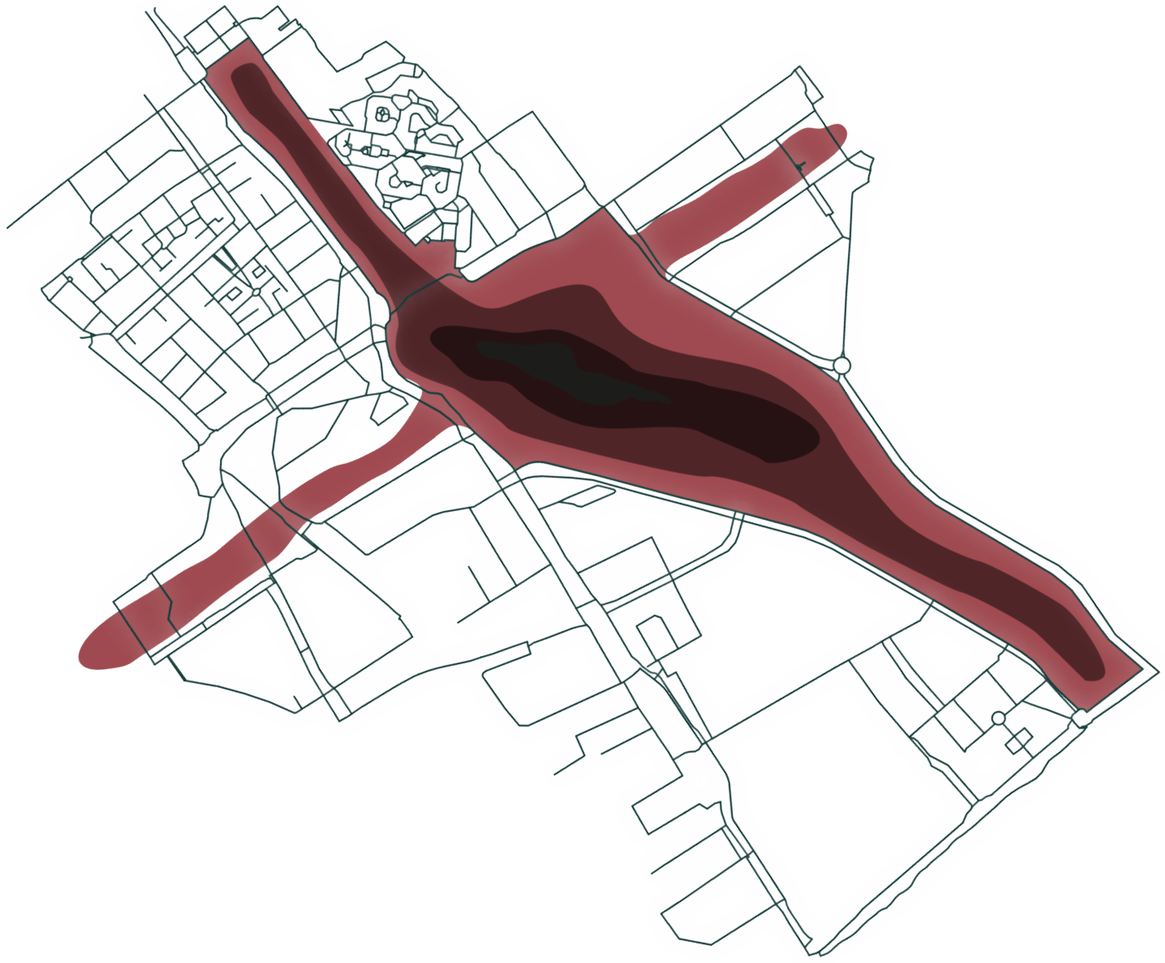
F86 - Pathway usage to station

Pathway-usage to nearest station

This map shows the usage of the network if each of the addresses have the same weight and walks towards the nearest station. During this walk a maximum detour of 10% of the total network distance is allowed. This map therefore shows the most intensively used streets when inhabitants would all walk to the nearest station.

This map can be used to determine which streets have a high significance for the pedestrian network. However, to be able to draw valid conclusions about the current situation, functions and weights have to be added to the point data. This map is therefore to illustrate what in the ideal situation would be the streets with importance for the pedestrian.

Grand canyon of the CID

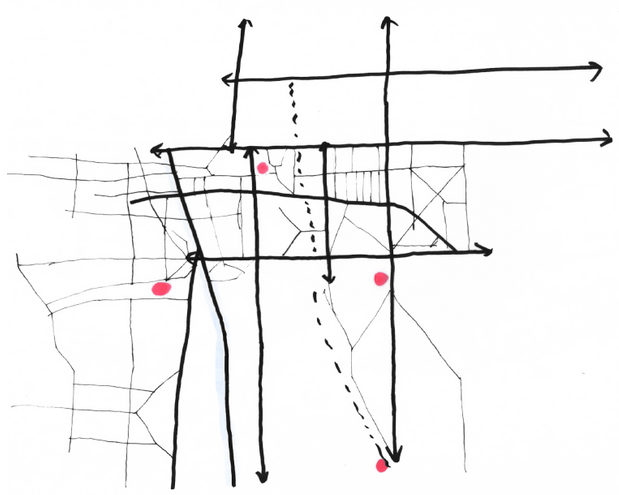


F87 - Synthesis of pedestrian network

As seen in the pedestrian network maps, there is a very broad area with no pedestrian connection at all, except for a long dark tunnel. Drawing this space without pedestrian connections results in the above map. The gap can be regarded as a grand canyon that is uncrossable for humans. However, this is not an inherently bad thing as on the east side of this gap is the municipality Voorburg, which might profit from this distance to the big metropolis of the Hague, fostering more quiet environments and less through traffic.

The gap however also split the Hague in a west and east part. This has proven to be detrimental to many of the central streets in terms of urban centrality and the creation of border vacuums.

Characteristics of the road network

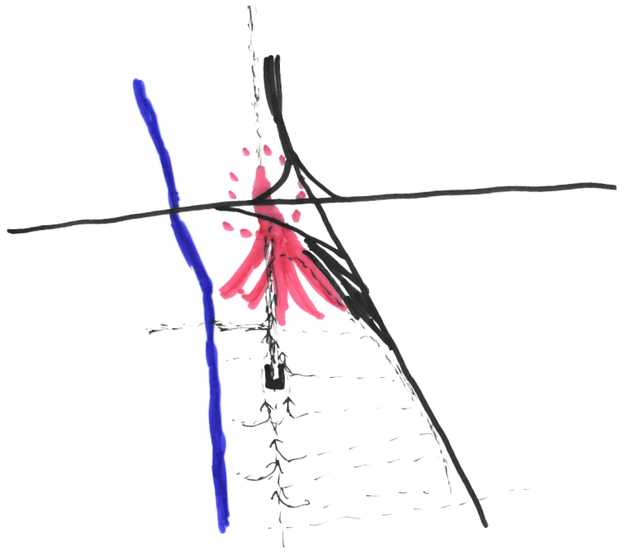


F88 - Orthogonal characteristic

The orthogonal network

The urban network is best described as an orthogonal network of long lines and straight roads. This provides hierarchy and clarity in the Hague's transport system.

It is on this network that new developments can be built on. Extending lines or completing missing connections help greatly in improving the urban centrality and walkability of the network.



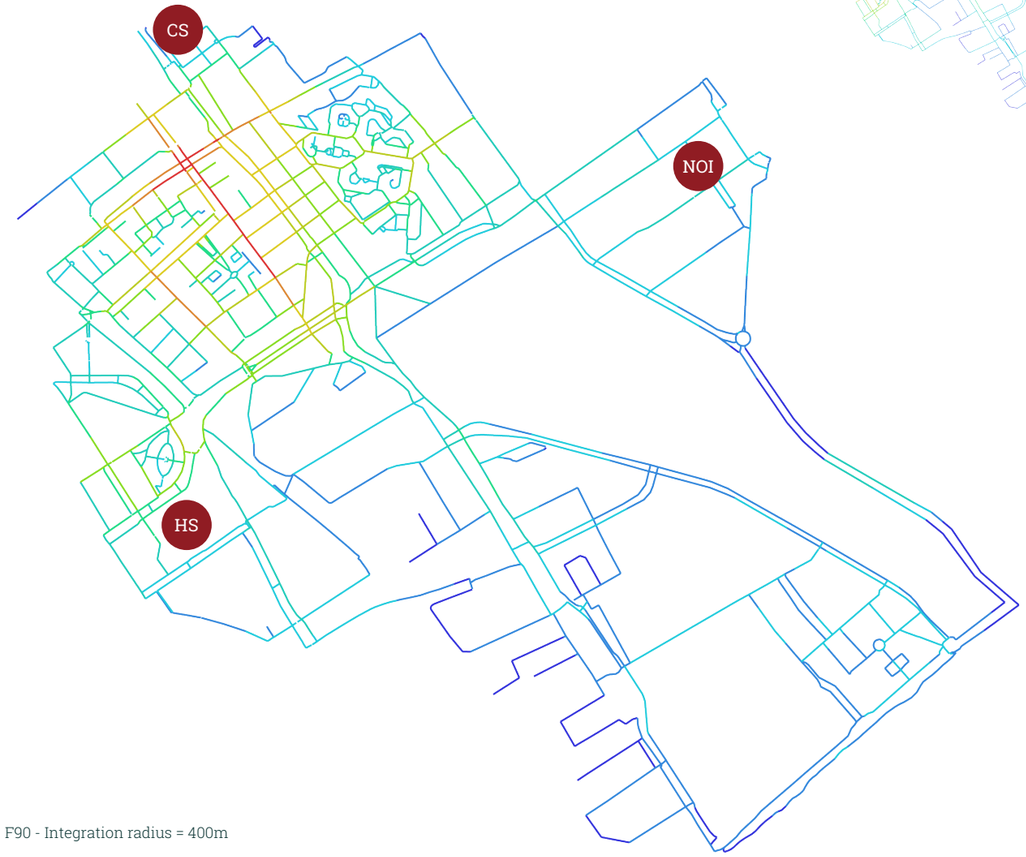
F89 - Possible bottleneck

Bottleneck

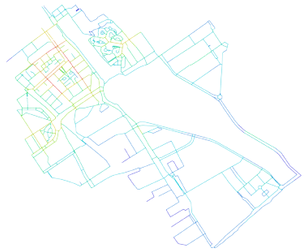
Both in the pedestrian as in the car netwerk, a bottleneck arises where the Binckhorstlaan crosses the train tracks. Because of the Rotterdamsebaan and the new residential development in the Binckhorst, higher volumes will all have to use the same tunnels under the railway tracks.

This results in clashes between transport modes and an unattractive technocratic environment with conflicting scales.

NETWORK SCENARIOS



F90 - Integration radius = 400m

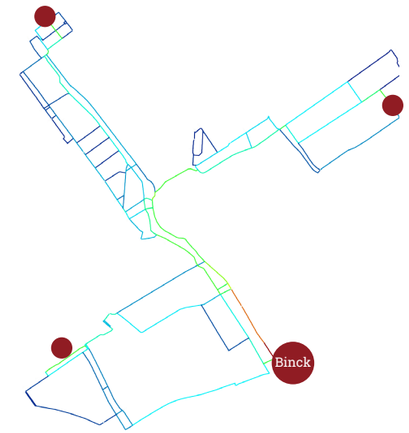


F91 - Current situation

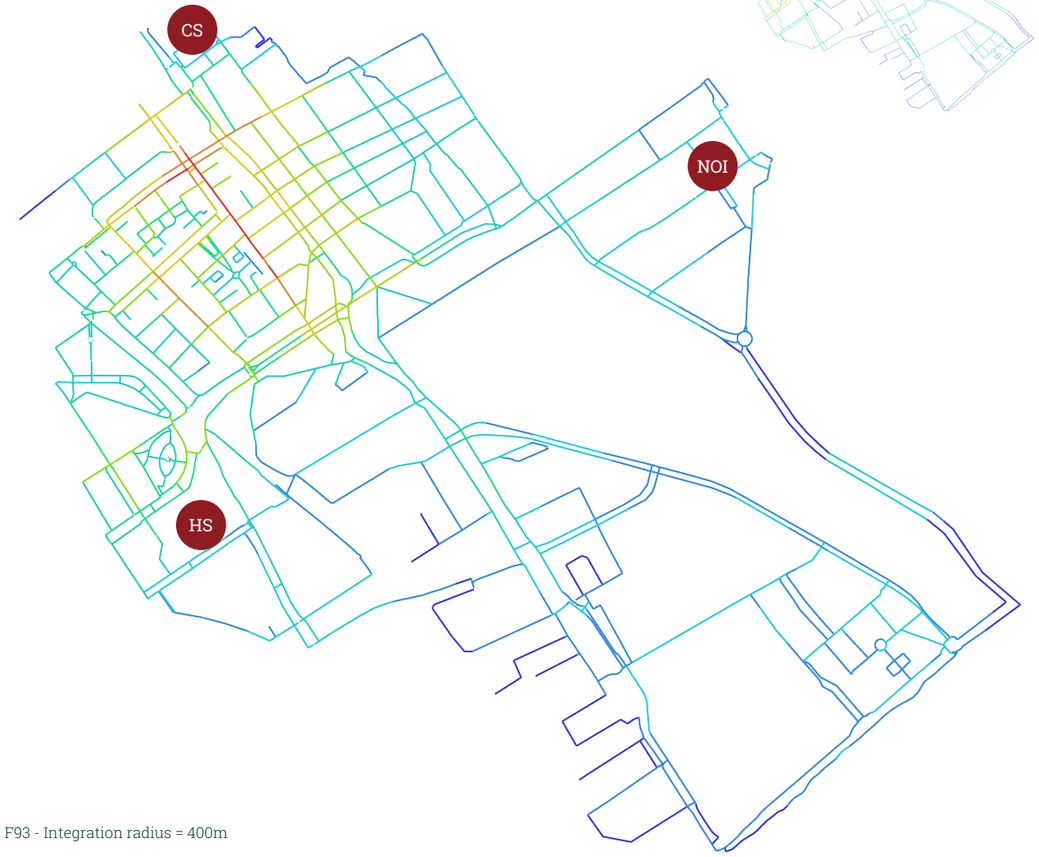
Improvement A: overbuilding the railways

If the current urban network would be extended by using urban development to overcome infrastructural barriers, walkability and urban centrality would be greatly improved.

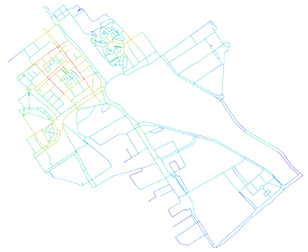
As seen in the above map, adding a deck over the railway emplacement near Den Haag Centraal would significantly improve the urban centrality, give alternative routes to residents from the Binckhorst developments and connect the east and west parts of the Hague. By building onto the existing orthogonal lines, the routes become walkable and acceptable. This will alleviate the current situation as seen on the right, where pedestrians from the Binckhorst residential cluster will have limited and unattractive routing options.



F92 - Usage of paths from Binckhorst to Intercity station
Current situation



F93 - Integration radius = 400m

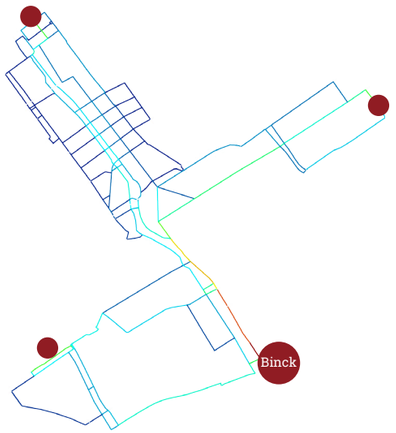


F94 - Current situation

Improvement B: total integration and overcoming of infrastructural barriers

If the tracks are overbuilt, the neighbourhood Bezuidenhout West will become a focus point in the Central Innovation District. Here a big opportunity for transformation and densification arises. By extending the orthogonal lines towards the Beatrixkwartier highrise cluster, the urban centrality improves. Even more, the Utrechtsebaan can be overbuilt and make the Central Innovation District an integral, walkable district that is well interconnected with active centres.

The active modes from the Binckhorst residential developments will also get a great impulse, as seen on the right. Safe and attractive alternatives for walking and cycling routes will arise.



F95 - Usage of paths from Binckhorst to Intercity stations
All improvements

Network study

SQ2: In what way are the current CID-clusters disconnected and what is needed to improve and maintain the interconnectivity?

This chapter built forward on the previous volume study chapter. The volume study concluded that for middle-height urban blocks to reach the asked capacity, infrastructural barriers had to be overbuilt and towerclusters with high densities will still be needed. The network study tested this scenario and also modelled how the pedestrian network to the intercity trainstations could work, incorporating the expected residential developments and the car influx from the Rotterdamsebaan in the Binckhorst.

The conclusion of the network study is that with select improvements in the pedestrian network, the urban centrality and walkability of the CID can be greatly improved. What is needed is new attractive active modes routes from the Binckhorst towards the other CID clusters. Moreover, new emerging barriers have to be countered with urban life focused measures like tunneling and overbuilding.

The space syntax analysis also showed the importance of the existing viaducts that connect the east and west side of the CID. Moreover, the S100 ring road cannot be diverted, as it plays a vital role in the current traffic system of the Hague.

The answer to the subquestion 'In what way are the current CID-clusters disconnected and what is needed to improve and maintain the interconnectivity?' is that ***the current CID clusters are disconnected on walkability and cycling attractiveness. Attractive routes and connecting the east and west side of the railway emplacement is desperately needed to stimulate active modes and mitigate the negative effects of the compact city. To improve and maintain the interconnectivity, infrastructural barriers have to be razed by overbuilding or tunnelling the infrastructure with attractive new urban life areas. Moreover, new places of interest have to be created in between the clusters as the distance between points of interest are now too big. This has to be done in such a way the urban centrality improves and the current network profits from the new development.***

Conclusion SQ2

7 QUALITY STUDY

Contents

Urban life theory

Case studies on urban quality

Urban quality patterns

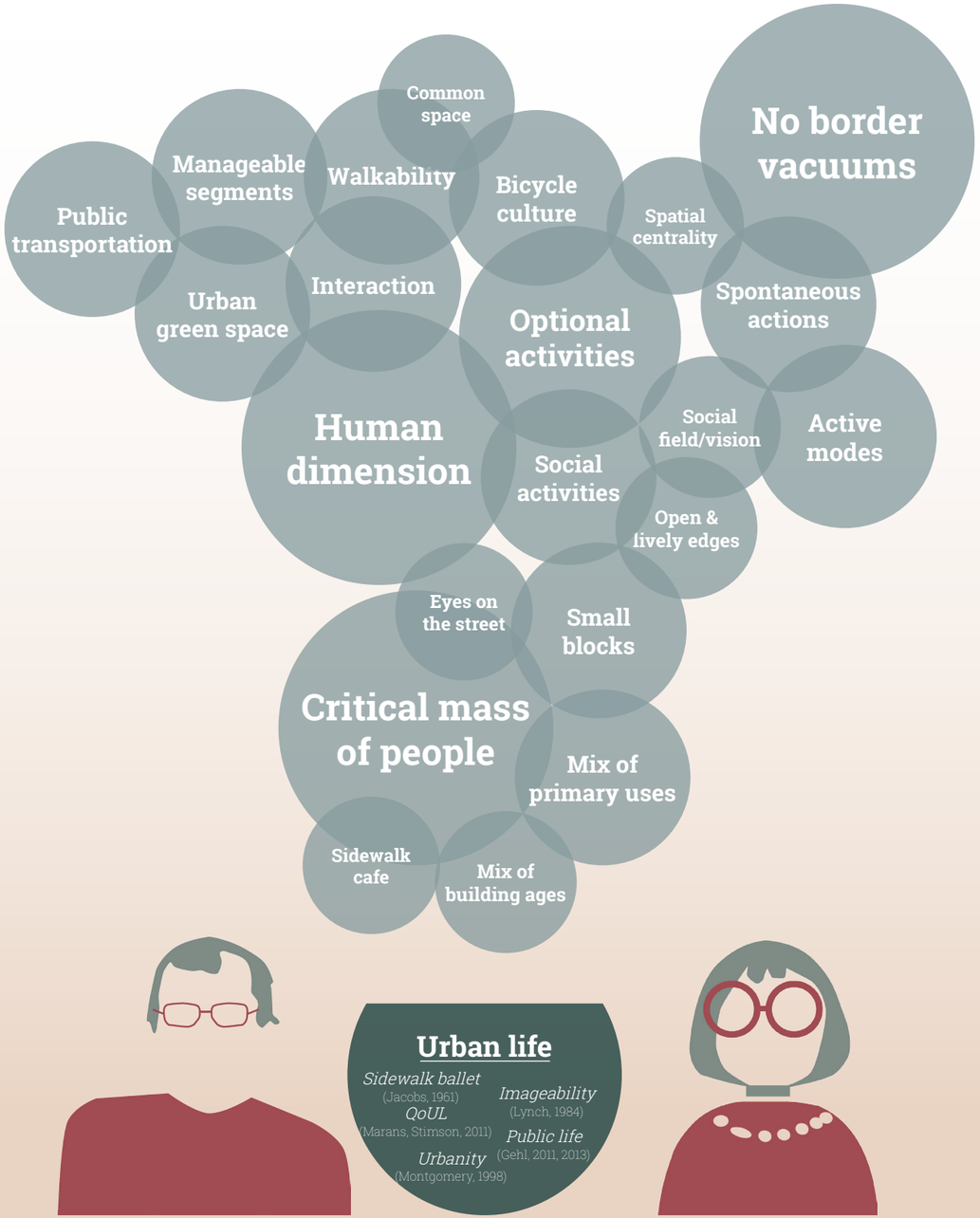
Conclusion

The quality study will spatialize the 20 qualities that help create urban life according to theory. Hereafter case studies and the pattern methodology from Alexander et al. (1977) will help implement these qualities in the actual design of the project site.

Related subquestion:

SQ3: What are the indicators of urban life and how do they translate to practical design solutions in the CID context?

Urban life qualities according to theory



F96 - Urban life concepts

URBAN LIFE THEORY

The wordcloud on the right displays the core values of the various urban life authors. Translating these values into practical design rules helps in determining how the urban quality aspect of urban life can be achieved. Moreover, this helps to identify possible conflicts and possible synergies.

To do this, each value will be displayed in a quick scheme that shows the spatial implication of the value. This will lead to a toolbox of indicators that can be used to evaluate the actual design for the project area. Moreover, the result will be transferable to a wider context than just this thesis.

Small blocks

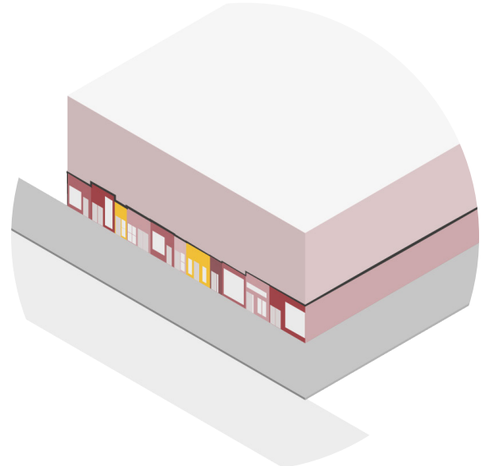
A



The urban fabric mostly has to consist of small blocks that can guarantee a certain degree of contact opportunity **(Jacobs, 1961).**

Open and lively edges

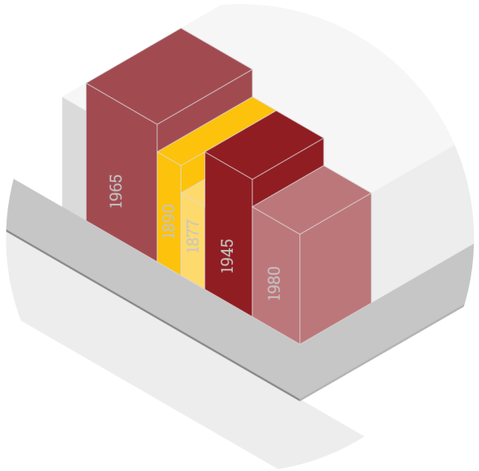
B



City space needs active, open and lively edges. When the rhythms of the city's buildings produce short units, many doors and carefully designed details at ground-floor level, they support life in the city **(Gehl, 2013: 88).**

Mix of building ages

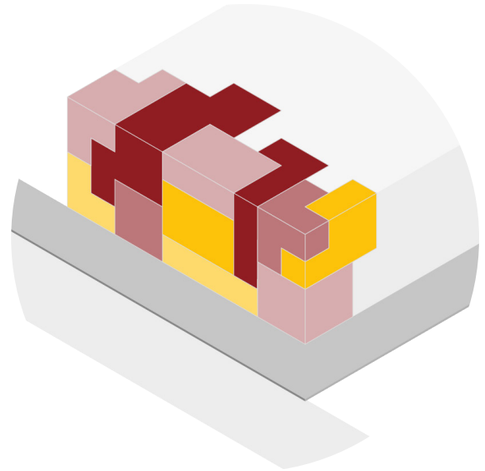
C



If a certain mix of new and aged buildings is maintained, diversity both from a land-use and social perspective will be enhanced **(Jacobs, 1961).**

Mix of primary uses

D

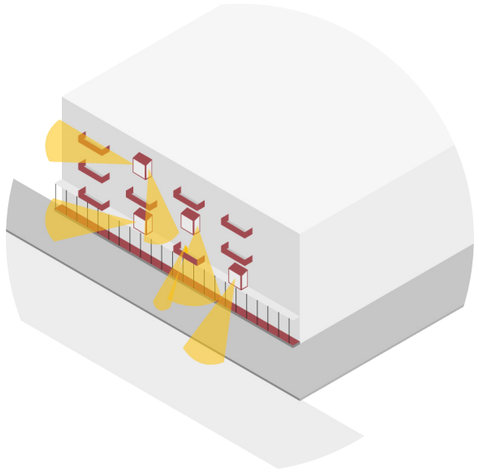


By mixing primary uses, people will be there for many different purposes and at different times throughout the day. This would lead not only to a more vibrant economic activity, but also to a higher degree of social interaction. **(Jacobs, 1961).**

Urban life theory spatialized

Eyes on the street

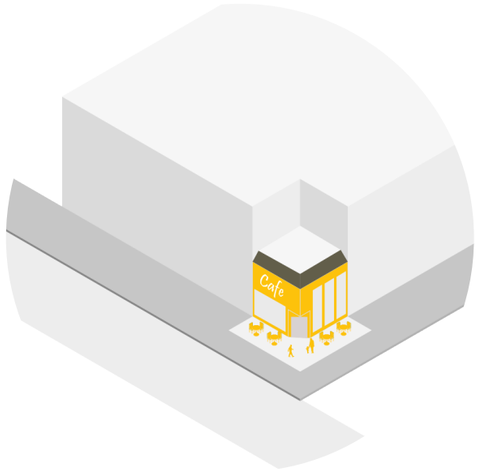
E



There must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street. The buildings on a street equipped to handle strangers and to insure the safety of both residents and strangers, must be oriented to the street. **(Jacobs, 1961).**

Sidewalk cafe

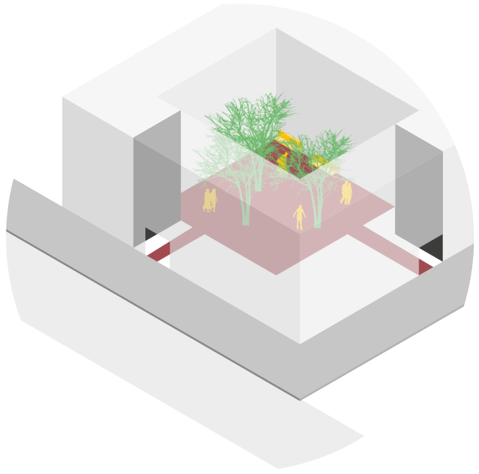
F



Since sidewalks represent a huge fraction of the city's public spaces, they are the very reason for creating sidewalk cafes. **(Gehl, 2013: 22).**

Common space

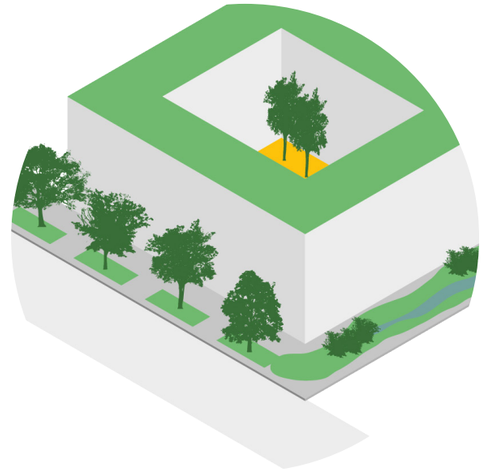
I



in high density developments communal spaces play an important role in reducing the distance between neighbours as the layouts can be very complex **(Raman, 2010: 77).**

Urban green space

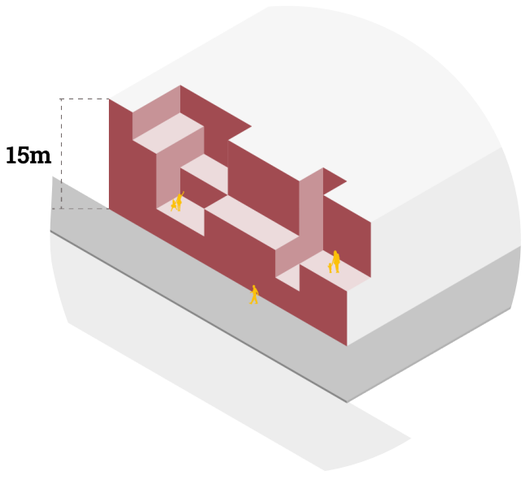
J



There is a need to enhance the multiple functions and services supplied by urban green spaces in compact cities. This implies going beyond beautification and economic benefits, in particular when space is scarce. **(Haaland, Van den Bosch, 2015)**

Human dimension

G

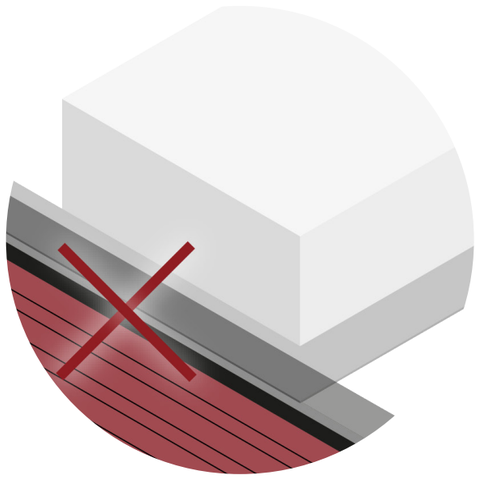


If better city space is created, use will increase. Whether people want to stay in a city space is a question of working carefully with the human dimension **(Gehl, 2013: 17).**

Good human scale must be a natural part of the urban fabric in order to invite people to walk and cycle.
(Gehl, 2013: 59)

No border vacuums

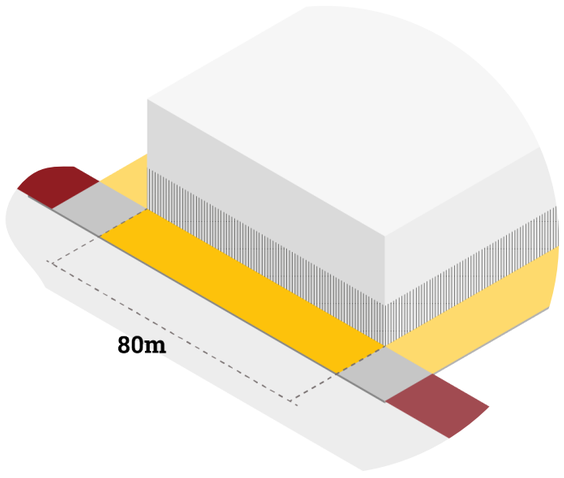
H



Border vacuums are negative effects that large infrastructure and single-use buildings or public spaces could have on urban buoyancy. This type of urban element are described as border vacuums, as these could suck out the life of the streets by creating artificial impermeable borders **(Jacobs, 1961).**

Manageable segments

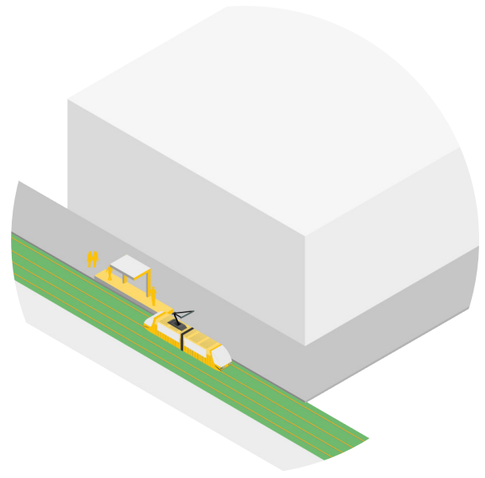
K



A route can be divided into manageable segments, where people stroll along a street that winds enticingly, inviting the pedestrian from one section to the next. A winding street does not have to twist much to prevent the walker seeing very far down the street, but is constantly walking towards corners and twists, where new vistas open.
(Gehl, 2013: 127)

Public transportation

L

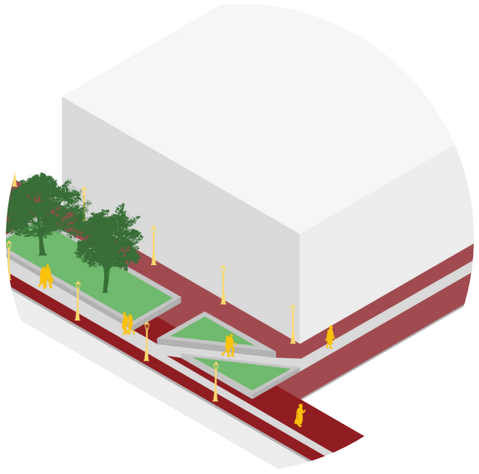


The compact city – with development grouped around public transport, walking, and cycling – is the only environmentally sustainable form of city. However, for population densities to increase and for walking and cycling to be widespread, a city must increase the quantity and quality of well planned beautiful public spaces that are human in scale, sustainable, healthy, safe, and lively.
Gehl, 2013: IX)

Urban life theory spatialized

Walkability

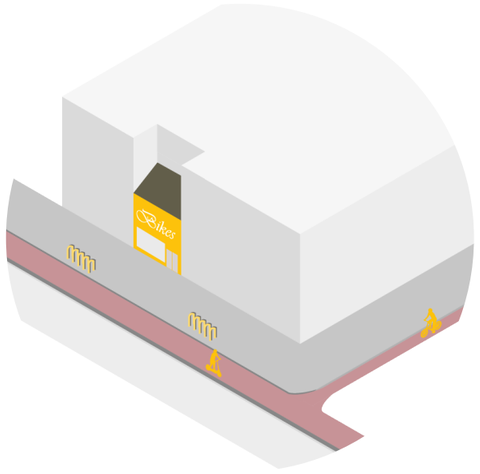
M



the term is used to refer to several quite different kinds of phenomena: 1; areas being traversable, compact, physically enticing, or safe. 2; making places lively and sociable, enhancing transportation options, or inducing exercise. 3; as a proxy for better urban places **(Forsyth, 2015: 274).**

Bicycle culture

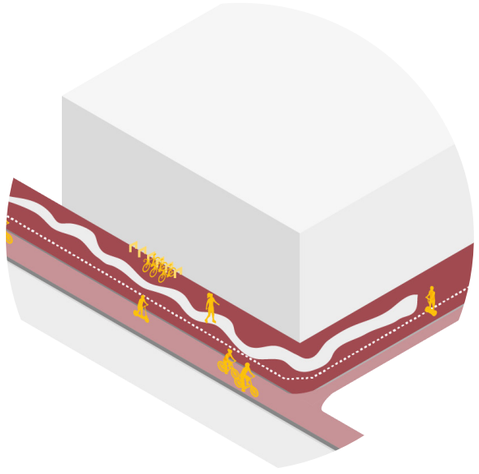
N



When conditions for bicyclists improve, new bicycle culture will emerge leading to cheaper transport options, good environment and personal health **(Gehl, 2013: 11).**

Active modes

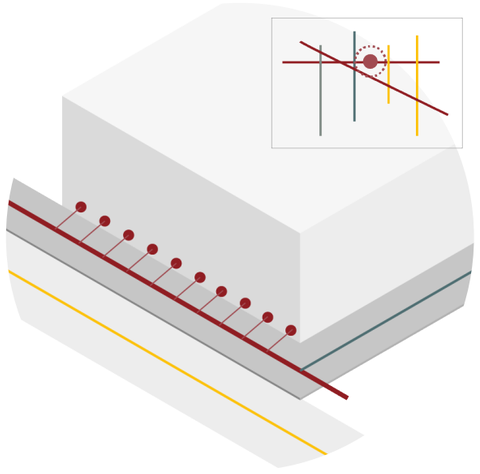
O



Active modes like walking and cycling are promoted when lessening the amount and the density of car traffic, diminishing the movement of heavy vehicles in local streets, reducing the conflict points with the density of intersections, and intervening on crash frequency and severity **(Kaplan et al., 2016).**

Spatial centrality

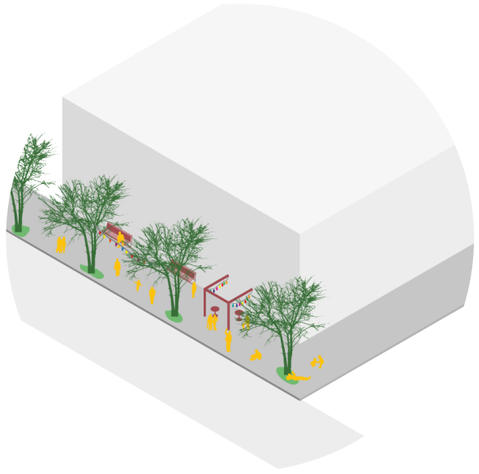
P



Social interaction is positively enhanced by living in locations that are spatially well integrated with the rest of the neighbourhood. Spatial centrality and accessibility of communal spaces are crucial to a neighbourhood's success as an enabler of social activities **(Raman, 2010: 77).**

Social interaction

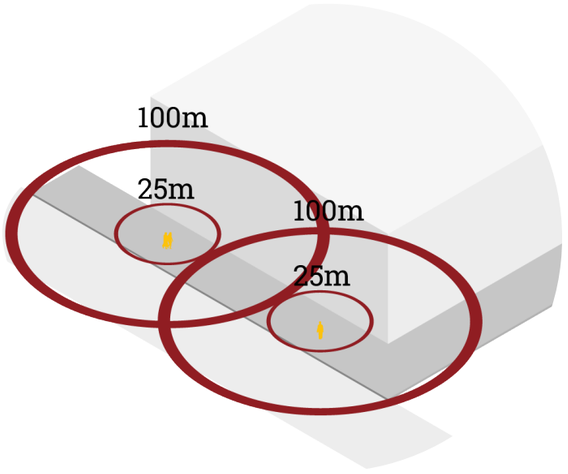
Q



Shrinking households increase the need for social contacts outside the home and thus, social interaction. There is a steadily growing interest in strengthening contacts to the civil society at large **(Gehl, 2013: 27).**

Social field/vision

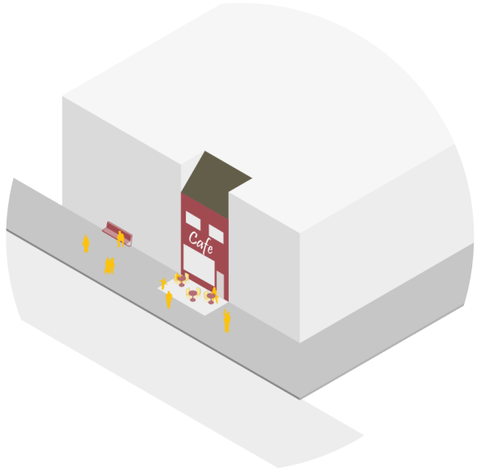
R



When watching people, the social fields of 100 meters (see motion) and 25 meters (decode facial expression) are important **(Gehl, 2013: 35).**

Social activities

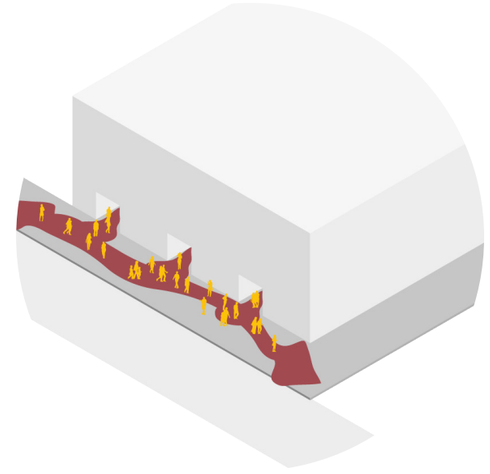
S



City spaces need space for both necessary and optional activities. This in turn leads to social activities that includes all types of communication between people. Watching people is the most spread social activity and sidewalk café 's support this activity **(Gehl, 2013: 22).**

Critical mass of people

T



It is widely believed that the lively city needs high building density and large concentrations of dwellings and workplaces. But what the lively city really needs is a combination of good inviting city space and a certain critical mass of people who want to use it. **(Gehl, 2013: 68).**

Pattern selection from ‘A pattern language’ (1977)

59 QUIET BACKS*



Everyone needs to be able to pause in a quiet environment
(Alexander et al., 1977: 302)

Reflection: This pattern reflects the advice for Ruis, Reuring, Rust of the CRa (2019). Therefore it is still applicable in the modern context.

60 ACCESSIBLE GREEN**



If the greens are more than 3 minutes away people don’t use them.
(Alexander et al., 1977: 305)

Reflection: A 3 minute walk constitutes to a 250m radius. With the current debate on urban green space and ecological services, this proximity to green remains relevant.

61 SMALL PUBLIC SQUARES**



They work best with a maximum diameter of 18 meter
(Alexander et al., 1977: 311)

Reflection: The diameter of 18 meters seem to be rather small in high density contexts. This will have to be related to volumetric and network properties of the site. Nonetheless, a need for human scale overseeable spaces is still relevant.

69 PUBLIC OUTDOOR ROOM**



What is needed is a framework that is just enough defined
(Alexander et al., 1977: 350)

Reflection: With the strides made in the slow urbanism movements of the past decade, this bottom-up approach is still viable. However, in bigger multi-use layouts a more top down approach to these spaces is necessary to maintain the public balance between uses.

96 NUMBER OF STORIES*



Set a four storey height limit to the site. Do not let the building exceed more than 50 percent of the site.
(Alexander et al., 1977: 474)

Reflection: These rules are not applicable in the current complex multi-layered layouts of compact cities. New ways like setbacks and heightened public spaces already mitigate the negative effects described by Alexander et al. Moreover, new paradigms have over time led to new notions of acceptable heights.

97 SHIELDED PARKING*



Large parking structures are inhuman and should be shielded.
(Alexander et al., 1977: 477)

Reflection: Removing the car from sight or even out of the equation is becoming more and more popular in highly compact cities in Europe. Therefore parking solutions like these are still very relevant.

100 PEDESTRIAN STREET**



Arrange buildings so they form pedestrian streets with many doors.
(Alexander et al., 1977: 490)

Reflection: Other authors like Gehl (2013) and Montgomery (1998) have also underlined this pattern for urban life in compact cities. Therefore still relevant.

119 ARCADES**



Arcades play a vital role in how people interact with buildings.
(Alexander et al., 1977: 580)

Reflection: Underlined by Gehl (2011), this solution still seems to work well in compact layouts to ensure interaction and therefore urban life. However, some reservations have to be made in the scale of these arcades as modernist shopping centres have worked out bad.

120 PATHS AND GOALS*



Place goals during the routes that are no more than 100 meter apart.
(Alexander et al., 1977: 588)

Reflection: A fine grid of intermediate goals and lines is still a good way to approach walkable environments. These goals however might change in the near future as the usage of spaces will change.

121 PATH SHAPE*



Streets should be for staying in and not just for moving.
(Alexander et al., 1977: 590)

Reflection: The modernist notion has long been tried to be overturned, leading to new ways to interpret the streetspace. However, as long as the car has such a prominent place in our daily urban system, streets will not soon return to being for staying.

124 ACTIVITY POCKETS**



If the edge fails, then a space will never become lively.
(Alexander et al., 1977: 600)

Reflection: Edges are vital for the liveliness of compact mixed use environments. A good hard look at how activity pockets can be created is still vital for urban life to be accomplished in the compact city.

Why this selection?

The pattern language made by Alexander et al. (1977) is regarded as a milestone in the urban life literature. It proposed a methodology of selecting suitable patterns out of a long list (over 1200 pages) of patterns related to the built environment. Choosing these patterns with the most direct relations to the specific design assignment helps in determining what are universally good patterns for the human species and its living environment.

Of course because of the age of the book, contemporary designers have to tread carefully with applying these patterns to the modern city. However, as these patterns are universal for the human species not much has changed and it can therefore help in creating urban life.

Source: Alexander et al., 1977)

The application and integration of the 20 characteristics described by urban life authors will prove to be difficult. This due to its generic character and overlapping claims on the available space (E.G public transport lines, bicycle paths, broad pedestrian boulevards, urban green space). What will work, is place specific and not to be generated randomly with these 20 characteristics. The optimal density also differs from location to location (Lehmann, 2016).

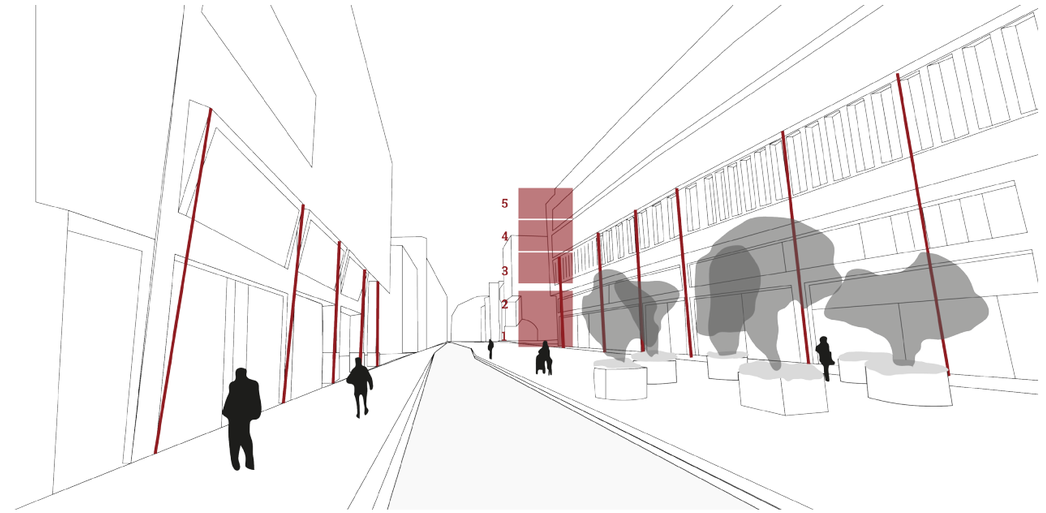
In order to grasp the actual spatial implication for the Hague and the design in this context, case studies will help distil precedents that can be directly applied to the project context. By synthesizing aspects like scale, material, density, usage and functions in proven well-functioning streets/blocks, the lessons from theory are made explicit.

The next step is to translate these lessons learned into a number of patterns that can be used as a reference tool for the final design.

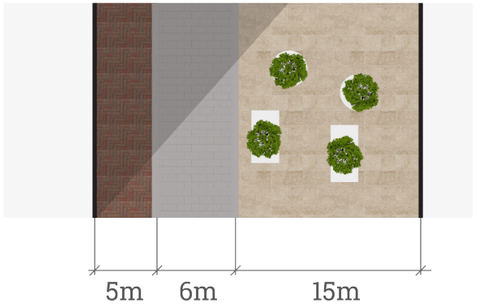
In this section various case studies that have a resemblance to the project context, are assessed. They are chosen based on various aspects that are in some way explicitly related to the CID context. What the cases have in common is that they are all located in the Netherlands. This to ensure the solutions are accepted and to make the context as comparable as possible. Moreover, author regards the Dutch tradition of urbanism and urban design as very strong in terms of urban life and related aspects like walkability and street design.

Case study 1: Grote marktstraat, the Hague

Precedent: central pedestrian street



F98 - Grote Marktstraat, the Hague



F99 - Section 1 : 500

Location	Den Haag, NL
Design	J.P. Berlage, various
FSI	4.0
Typology	Pedestrian street

Precedents

Scale
The scale of the Grote Marktstraat resembles the human scale propagated by urban life theory. The buildings have a maximum of 6 floors and have active, attractive plinths. furthermore, there is plenty of space for the pedestrian and also a 6 meter wide bicycle path.

Material
The materials have a high quality and allow public life or the sidewalk ballet to take place. The materials pinpoint differences in usage. One material for walking, one for cycling and one for strolling/shopping.

Centrality
The FSI map shows that the street is surrounded by blocks with high FSI's, indicating higher densities and stimulating life on the street. Moreover it is well integrated in the network and contains a slight curve.



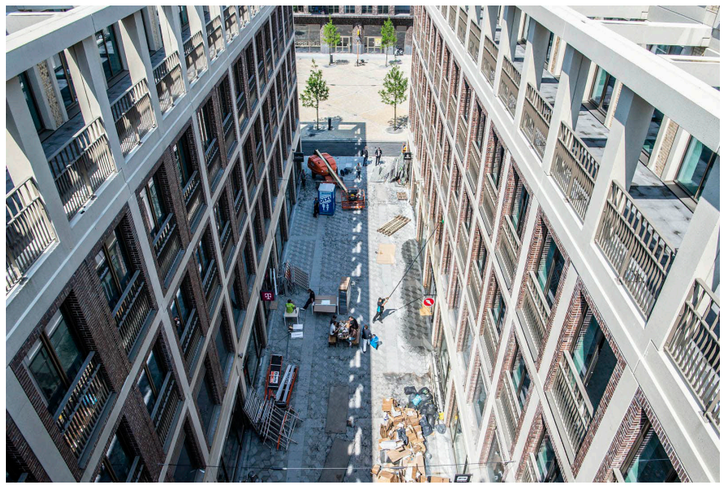
F100 - Location and FSI

Case study 2: Leidsche Rijn centrum, Utrecht

Precedent: Mid-rise high-density new development

Leidsche Rijn centrum is a suitable case study for urban life bccause of its explicit choices for the pedestrian and its close proximity to public transit. Moreover it is a very mixed use area and a good example of a new development from scratch that tries to implement urban life characteristics. The natural centrality of the area because of its location between Utrecht city centre and the new neighbourhood Leidsche Rijn makes it also an interesting case-study in terms of network.

Location	Utrecht, NL
Design	Jo Coenen Architects
FSI	4.5
Typology	Pedestrian centre



F101 - Leidsche Rijn centrum street

Source: Robert Oosterbeek

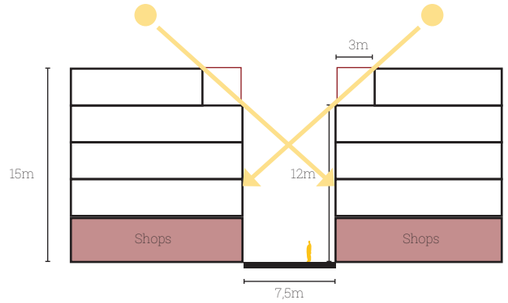
Pedestrian realm - In order to accommodate the pedestrian and encourage walking and social interaction, this street is taken as a reference. The facades have an attractive detailed vertical rhythm and setbacks make the human scale appropriate. Key dimensions are found in 5 layers with a setback after layer 4, constituting to around 15 meters in total height.



F102 - Leidsche Rijn centrum arcade

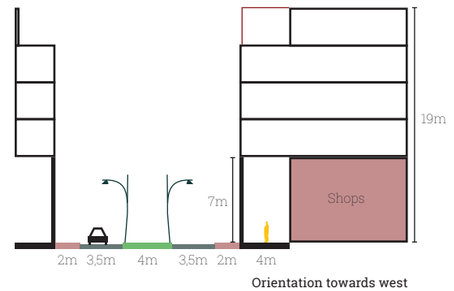
Source: Google Streetview

Eye-level and transition - This is the entrance of the above street. The arcade is also assessed in the pattern selection from 'a pattern language' (Alexander et al., 1977). This proves to be a good tool to create human-scale environments. It also serves as a transition from the car-allowed to the pedestrian-only realm.



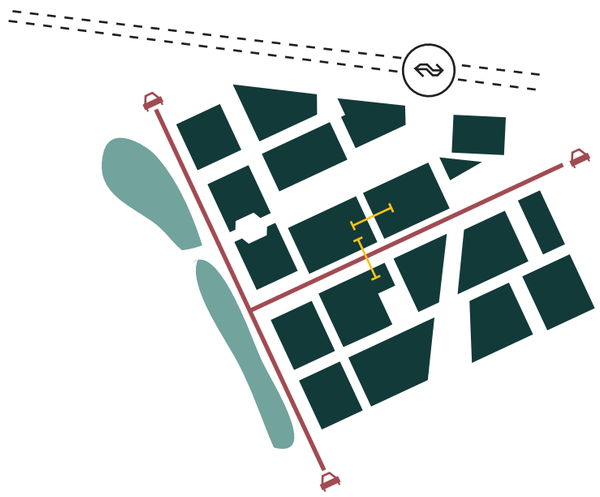
F103 - Section street

Section - A rough section of how in Leidsche Rijn Centrum the assessed pedestrian street is dimensioned. While in this project not everything in the plinths will be shops or functions, the scale will also work for residential usage.



F104 - Section arcade

Section - The car road with the arcades on both sides clearly marks where the pedestrian realm begins and ends. Very human-focused design that incorporates the needs of the human well. Double height shop underline the transition in scale.



F105 - Leidsche Rijn Centrum map

Plan - Leidsche Rijn centrum is based on the idea of the middle European city with medium-rise building blocks and a grid pattern. In the plan the grid structure is clear and contributes to an urban life ensemble of squares, paths and destinations. Because of the public transport connection with the train station, the area is very accessible for the pedestrian. The architecture and network are all focused on this pedestrian character.

Case study 3: Sluisbuurt, Amsterdam

Precedent: Incorporating highrises in urban life focused district

The Sluisbuurt is a for now to-be-built neighbourhood at the East-side of the IJ of Amsterdam. Planned is a high-rise environment with a big focus on mixed-use and urban life at the public space level. It therefore is a good case-study in the context of this thesis. It more or less handles the same themes in terms of creating urban life in a high density environment. Moreover it can teach how towers can be integrated in an urban life manner.

Location	Amsterdam, NL
Design	Gemeente Amsterdam
FSI	5.2
Typology	Towers on podiums



F106 - Hoogstraat Sluiskwartier

Source: Gemeente Amsterdam (2017)

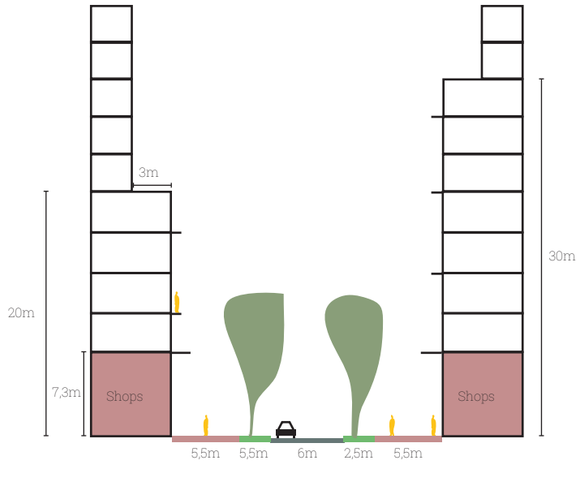
Hoogstraat - In the Sluisbuurt a high street is planned where a high grade of amenities and shops will be located in the plinths. Creating this street in this way, will create centrality for the neighbourhood and a place for social activities. At this street the density is a bit higher to stimulate liveliness and a critical mass of people.



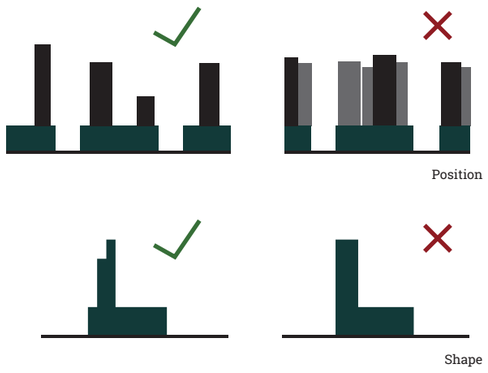
F107 - Overview Sluiskwartier

Source: Gemeente Amsterdam (2017)

High-rise environment - While Amsterdam has a long tradition of medium rise high density environments, the Sluisbuurt adds a new typology to the city. Highrises can have a lot of advantages for urban life if done correctly. It provides a critical mass of people and takes less space. Highrise environments however are very susceptible to inhumane scales and a poor connection to urban street life (Gehl, 2013). This is combated by dense 7-8 storeys podiums. Moreover, setbacks create a more human perspective on street level.



F108 - Section Hoogstraat, Sluiskwartier



F109 - Highrise concept Sluiskwartier



F110 - Map Sluiskwartier

Section - In this section for the Hoogstraat the dimensions used by the designers help in understanding how urban life is created while also being a highly dense environment. Again the double height of shops is applied. Above that 4-7 layers with balconies are located, where-after the highrises are put behind a setback of minimum 3 meters. This creates a human-scale environment on the street, while at the same time providing a high density for new dwellings and shops.

Principles - Assessing the principles of the design team uncovers how highrises are incorporated. The use of setbacks greatly improves the eye-perspective experience. It makes the blocks less massive and combats nuisance from wind. Keeping a sensible distance between towers and their placement also help in making the towers acceptable for urban life goals.

Plan - In the plan again a grid structure can be spotted. The reason for these kind of patterns in modern urban life layouts seems to be its efficient properties in terms of realisable dwellings and an optimized legibility and distances for active modes.

Source: Gemeente Amsterdam (2017)
Images adapted by author

Case study 4: Maankwartier, Heerlen

Precedent: qualitative overcoming of infrastructural barriers

The Maankwartier crosses the railway barrier separating Heerlen North from the city centre. It is a qualitative pedestrian focused district with a high grade of mixed uses and high quality public space. It fits as a casestudy for this thesis as the project area is very infrastructure heavy. This plan serves as a good precedent in dealing with height differences and the overcoming of infrastructural barriers.

Location	Heerlen, NL
Design	Michel Huisman
FSI	4.1
Typology	Heightened district



F111 - Maankwartier square

Source: Weller

Living environment - The Maankwartier focuses on apartment-complexes with balconies grouped around publicly accessible squares. The transition between private and public is very direct. This does however blend the public realm with the private realm, resulting in the public space also being used as the outdoor space for the residents. This encourages an intensive use of the public space and therefore encourages urban life.





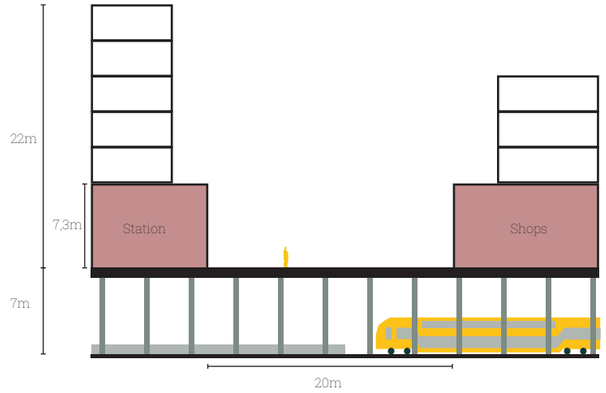


Source: Weller

Source: Zoom.nl | RoosZ

F112 - Maankwartier collage

Architecture solves height differences - The chosen typologies in the Maankwartier all help in making the transition from the base level towards the 7 meter high platform. The architecture is very authentic with use of local materials and a historising atmosphere. Stairs are still needed and the differences do pose a challenge. Terraced greenery is used to make an attractive route.



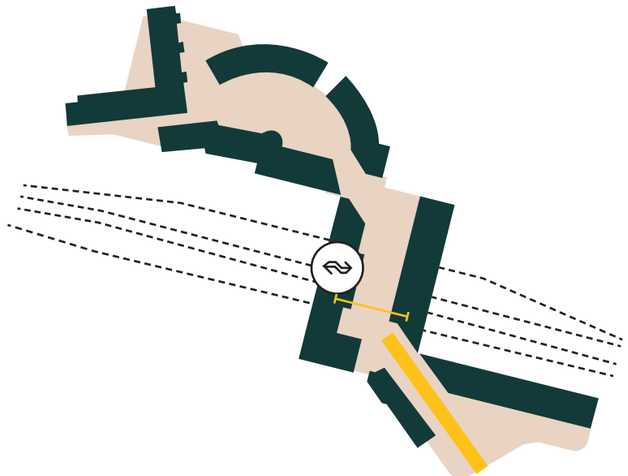
F113 - Section Maankwartier

Section - The section shows that above the train tracks as much as 7 layers are achieved. Policy documents even speak about a maximum possible height of 33 meters, constituting in around 11 layers. This is what was possible when this development was planned around 2005. New technologies might increase the maximum possible height of buildings on top of tracks.



F114 - Principle ramp Maankwartier

Ramp - Where there are various stairs in the area, the most promising element of the plan is the ramp. It is around 76 meters long and crosses a height difference of 7 meters. This constitutes in a 9,5% slope. A ramp can help in making the area on top more accessible, as wheelchairs and bikes are not obligated to take elevators. This contributes to more liveliness in the elevated spaces and therefore more potential for urban life.



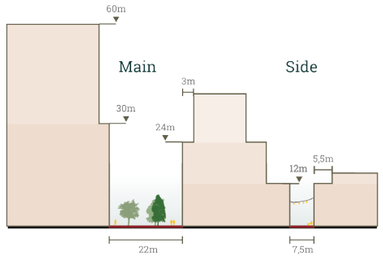
F115 - Map of Maankwartier

Plan - The plan clearly shows the main route of the district. As the main goal is to bridge the train-tracks and connect the north and south districts with eachother, it is a bit of a different configuration than the aforementioned case studies. Volumes do carve out human scale spaces and squares, making certain spaces have more centrality than others.

Source: Weller
Images adapted by author

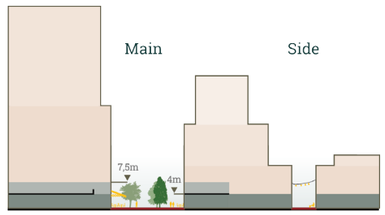
URBAN QUALITY PATTERNS

Patterns distilled from the case-studies



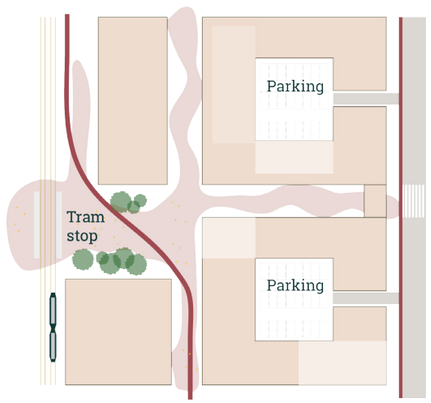
Setbacks

Use setbacks of minimum 3 meters after 4 floors (12m) in sidestreets and max. 8 floors + plinth (30m) in high streets, to realise higher floor counts while maintaining a human environment on street level.



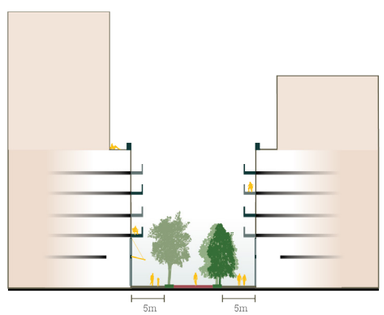
Double height plinths

Double height plinths allow for more program density at street level making more urban life possible. It also reduces the experienced height of the total volume. Make these plinths not higher than 7,5 meters.



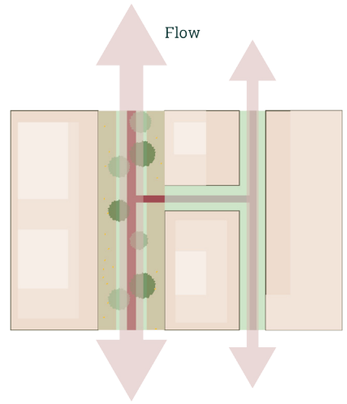
No cars to be seen

Remove when possible the car totally out of the equation. This promotes active modes and attractive pedestrian usage of the spaces. Use public transport or smart car parking.



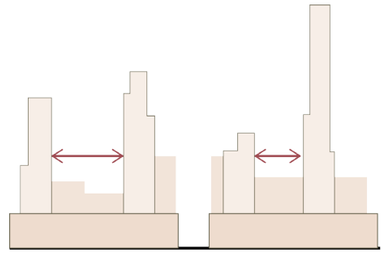
Wide sidewalks

In main streets pedestrian walkways with sidewalk cafe's need a minimum width of 5 meters in order to comfortably facilitate urban life.



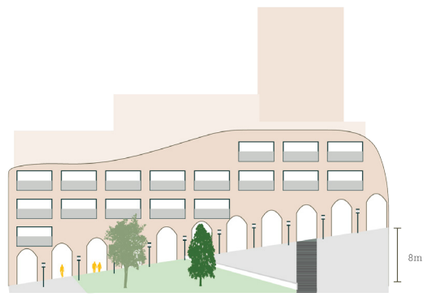
Design according to centrality

Main streets can have higher buildings, but also need wider street profiles than sidestreets to comfortably accomodate both users that are travelling through and users that are staying. This stimulates social interaction (Gehl, 2013), while also accomodating more quiet environments in the sidestreets.



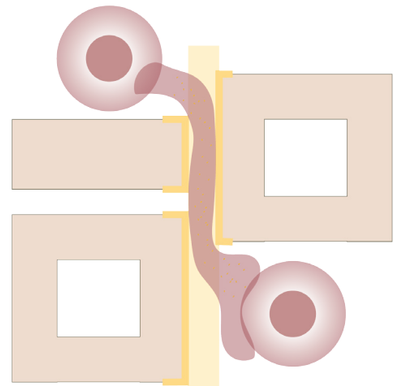
Put highrises on podiums with plenty of space inbetween

Highrises add variation to living environment options in urban life neighbourhoods. To do this properly and facilitate urban life, never put them next to the street. Use podiums and setbacks to make a smooth transition on eye level and battle wind nuisance.



Solve height differences with architecture

Height differences are always an obstacle for slow traffic. Using architecture like arcades and street elements make interesting pathways and stimulate curiosity.



Use existing hotspots to guide quality

Stations for example have a big attraction. Use these attractors to determine where urban quality investment is most effective.

Quality study

SQ3: What are the indicators of urban life and how do they translate to practical design solutions in the CID context?

The chapter on urban quality made the 20 most important lessons from urban life authors spatially explicit. What resulted is a generic toolbox that shows the big overlap of the various themes that are propagated by urban life authors. This means there is a big pressure on the streetspaces to accomplish multiple goals. Choices are therefore needed to be able to give right to each of the themes propagated by the authors.

Not everywhere urban centrality is possible to achieve. This means that streets which have less centrality can be used for urban life goals that require less vibrancy. This can for example be urban green space or common spaces for residents. Streets with a high grade of centrality can in turn be used for more public functions like sidewalk cafes and public transport. The key word is the context of the place.

In order to bring the urban quality theme further in the CID context, case studies with comparable contexual elements like close to a train station, same typology and a proven state of urban quality will be analyzed for patterns. This helps in creating the actual pattern language for urban life in the CID. From this result the quality can be combined with the other researches into volumes and network.

The answer to the third subquestion *'What are the indicators of urban life and how do they translate to practical design solutions in the CID context?'* is that ***the indicators are best described by 20 distinct themes that all have to be incorporated in some way into the urban fabric to achieve urban life. Practical design solutions can be derived from proven case studies with similar contexts and then classifying the different urban environments. These urban environments can then be connected to urban volume properties and the centrality within the actual urban network by a holistic design for the CID area.***

Conclusion SQ3

8 INTEGRATED SCENARIOS

Contents

Scenario guidelines

CID: 20 scenarios

The range of scenarios

Scenarios

Assessment

Conclusion

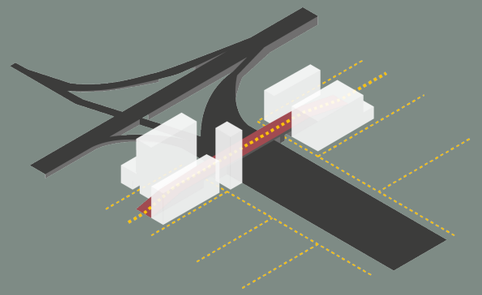
This chapter will formulate three densification and urban network scenarios for the project site. One scenario will resemble the municipal policy for the area, one will focus on a total implementation of urban life and the last one will try to achieve the same while limiting the development area. This in order to be able to measure what differences highrise and middle rise make in terms of urban life goals.

Related subquestion:

SQ4: Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?

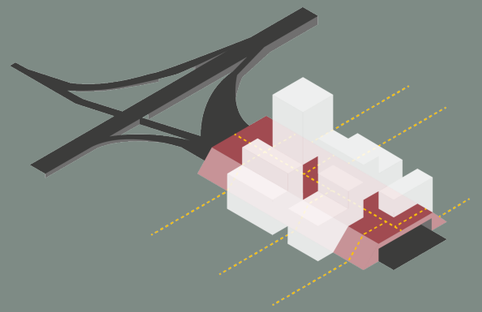
SCENARIO GUIDELINES

Future scenarios for train tracks in the CID



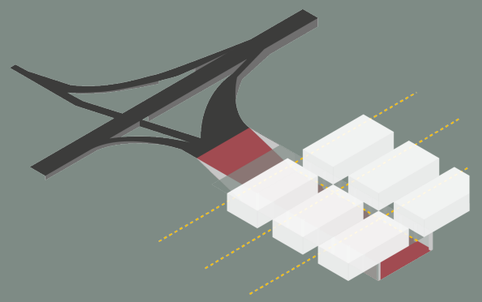
1 Using the current situation

Current municipal policy and structure visions concentrate on improving and densifying existing infrastructures. The train tracks are mostly kept untouched and this scenario is by far the most cheap option. However, negative spatial externalities from the 100 meter wide train emplacement might prove detrimental to future CID success as an urban district.



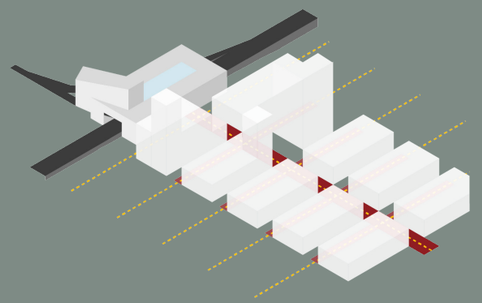
2 Overbuilding

A good option to raze the infrastructural barrier might be overbuilding the emplacement. This has already been done multiple times in European cities with similar inner-city densification ambitions. This option might prove to be feasible as it greatly improves the area and has a minimal impact on underground infrastructure and existing train tracks. Moreover, the new developments can alleviate the financial burden. Height differences will however be created leading to design challenges.



3 Burying the tracks

In this scenario the CID can be comprehensively and qualitatively interconnected on the same level, while maintaining the unique three station situation. This however requires a very comprehensive and expensive transformation of the train emplacement and underground infrastructures. This scenario also brings the most costs and the most disruption.

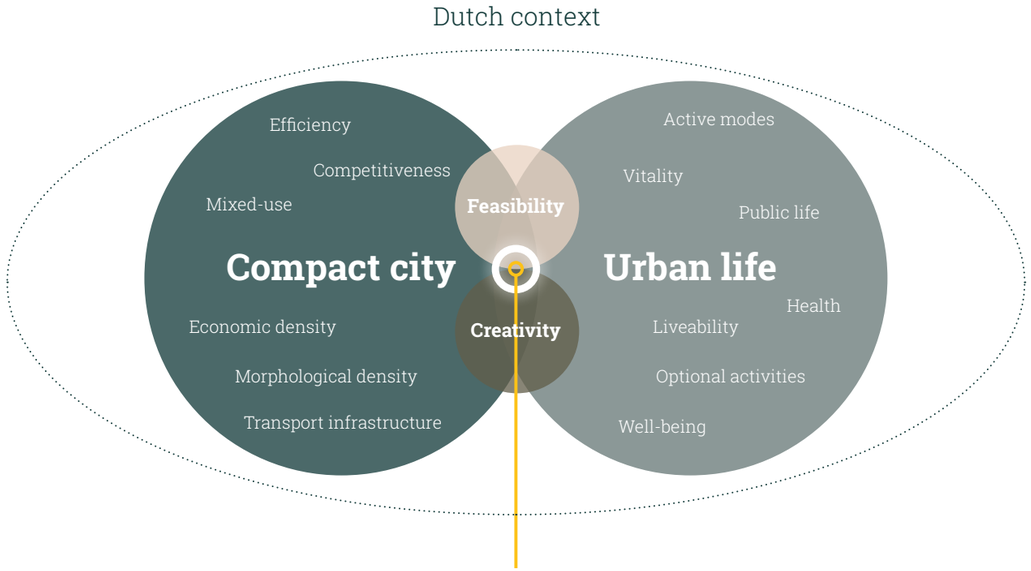


4 Grand Central station

This idea has for the past 20 years been brought up multiple times by various parties. It bundles the three intercity stations in one big station and cleans up the train emplacement entirely. The grounds can then be used for extensive development. While this idea looks logical and promising, many hurdles and negative externalities associated with the concentration might arise. Concentrating all capacity on one station can for example lead to capacity problems. Moreover, even less of the city will be convered by acceptable walking radiuses to train stations.

F117 - Train track scenarios

Concentrating scenarios using the design framework



An urban design of the CID that mitigates the negative effects of the compact city using urban life principles

F118 - Diagram of design framework

Specifying the guidelines

In the design framework of this thesis the aspects of feasibility and creativity were added to the main researched subjects. The aspect feasibility will thus have a key role in determining what are deemed appropriate scenarios for the CID in this thesis. As there are countless options to deal with the infrastructural barriers, some are more feasible than others. In order to determine what scenarios will be researched more in depth, the term 'feasibility' will have to be elaborated more explicitly.

As stated in the methodology chapter, feasibility in this thesis does not have a strict financial character. It merely describes the intent of the thesis: to formulate **an urban design that could be carried out, starting tomorrow.**

This means the scenario will have to at least analyse and respond to existing recent ambitions. Moreover, a feasible design for the CID has to respond to the existing infrastructural context in a realistic but also multidisciplinary manner. This means vital concerns in terms of car traffic flow, reachability by train and enormous costs that are very hard to defend when opposed to its merits, have to be incorporated. Author is aware that this might limit the ambition of the solutions. However when assessing what the current Dutch housing market debate is currently concerned with and especially the neo-liberal character of the densification practice, **a design that focuses on more feasible scenarios that respond to present-day challenges, is needed more than ambitious far-away perspectives.**

Reflecting these statements on the four scenarios mentioned on the left page, leads to a preference to scenario 1 and 2. These scenarios have the most potential for eventually leading to a feasible urban design. While they are more complex in its design implications, the short-term relevance is more pronounced than the other two. The current urban design challenges in the Netherlands are simply complex and multidiscplinary. **Making a grand vision that is not responding to funding realities and other disciplines like traffic engineering and civil engineering, is not what this thesis wants to achieve.** It wants to show how the compact city can incorporate urban life qualities within the confines of the existing contexts.

Exploring 20 developmental scenarios for the CID based on characteristics

Criteria:

Volumes *- this criteria describes the expected amount of added units and transformation potential.*

0 = low amount | 10 = high amount

Network *- this criteria describes how much the main paths improve walkability and interconnectedness of the district*

0 = not walkable | 10 = interconnected

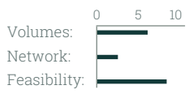
Feasibility *- this criteria describes how much steps have to be taken to make the scenario financially and politically feasible.*

0 = unfeasible | 10 = easily feasible



1: municipal

Based on the municipal strategy to develop the CID. A rectangle of various different market-focused 'gebiedsagendas'.

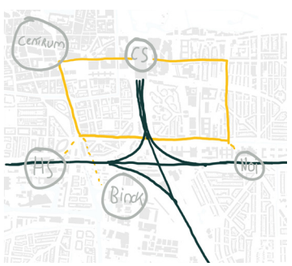




6: extended cross

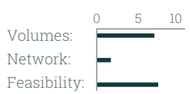
Adding the HS to Binck connection concentrates density also along the southers side of the train tracks.





2: rectangle

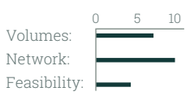
Expanding on municipal strategy and adding Theresiusstraat and proximity of Beatrixkwartier.





7: interconnected clusters

Drawing straight lines between clusters and densifying along them.

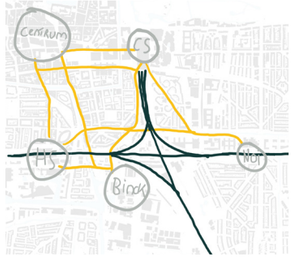




3: Mercuriustracé

Completing the once proposed big round around the Spoorcirkel by extending the Mercuriusweg across the Utrechtsebaan.

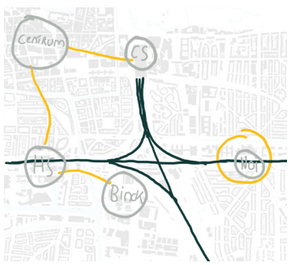




8: the walkable CID

Completing the once proposed big round around the Spoorcirkel by extending the Mercuriusweg across the Utrechtsebaan.

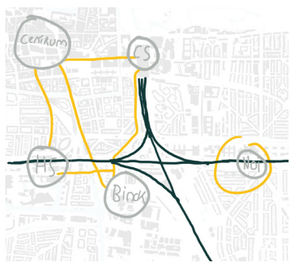




4: the central U

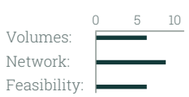
Connecting the three main clusters, while letting NOI be a self-sustaining island.

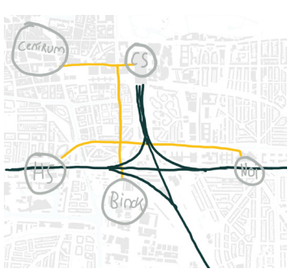




9: four direct lines

All clusters except NOI qualitatively interconnected. NOI self-sufficient.





5: the cross

Straight lines through the Rivierenbuurt spur development in short walkable routes.

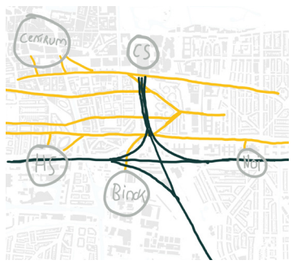




10: integrating Binck

Just focusing on the integration of the new Binck cluster with qualitative routes. Densify along them.





11: horizontal

Long lines characterize the Hague's network. Focusing on the horizontal connections make barriers more permeable for pedestrians.





16: south corridor

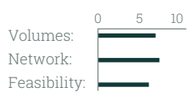
Focusing on the south clusters has a lot of undeveloped terrain. Now not a human-friendly place.





12: vertical

The long vertical lines can optimally connect the south clusters with the northern clusters.





17: along railways

Densifying along the railways and the Schie canal improves border vacuums and walkability.





13: horizontal and vertical

Focusing on both directions uncovers a fine gained grid. Transforming such a big area may prove hardly feasible however.





18: the circle

Concentrating on the area between the four west clusters, makes the CID compact and focused. However backsides will exist.

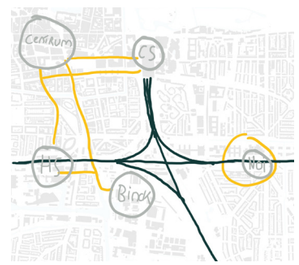




14: incorporating Binck

Integrating the new Binck cluster along the Schie canal and the car infrastructure.





19: double U

Two main development lines connect the four western clusters. NOI will be isolated.

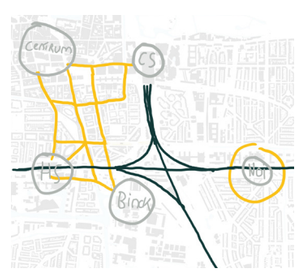




15: connecting centraal

focusing on good routes to the Centraal cluster stimulates development and improves walkability in the most deprived area.



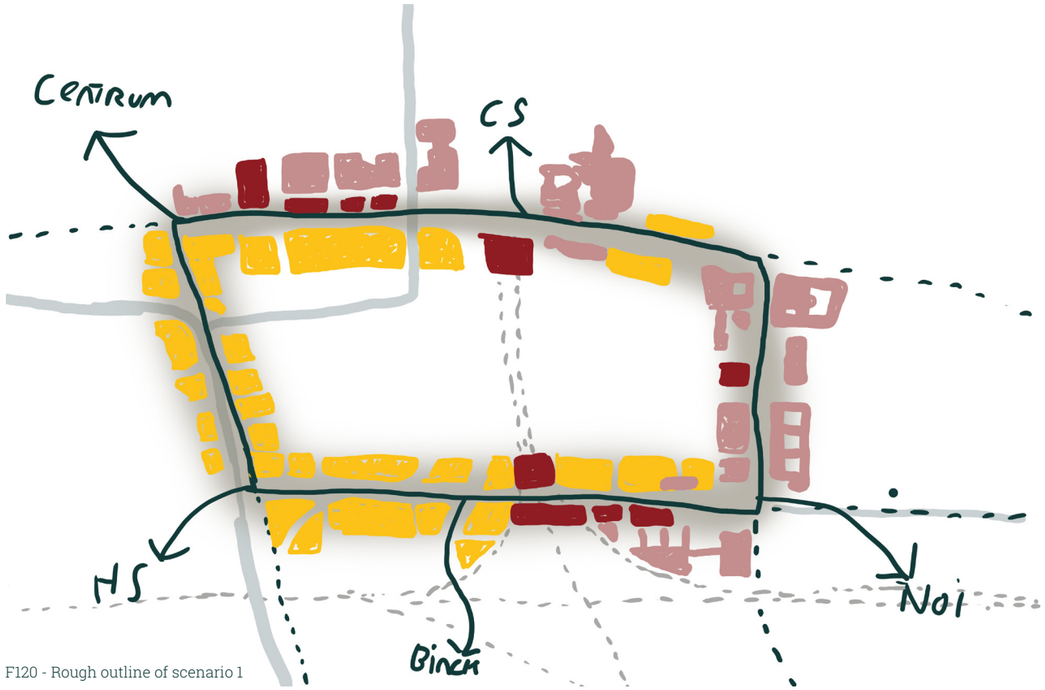


20: western redo

Comprehensively transforming and densifying the western part creates an expansion of the city centre.

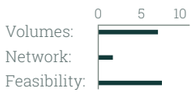


Scenario 1: focus on feasibility and easily available ground



F120 - Rough outline of scenario 1

= transformation
= new infill
= strengthen

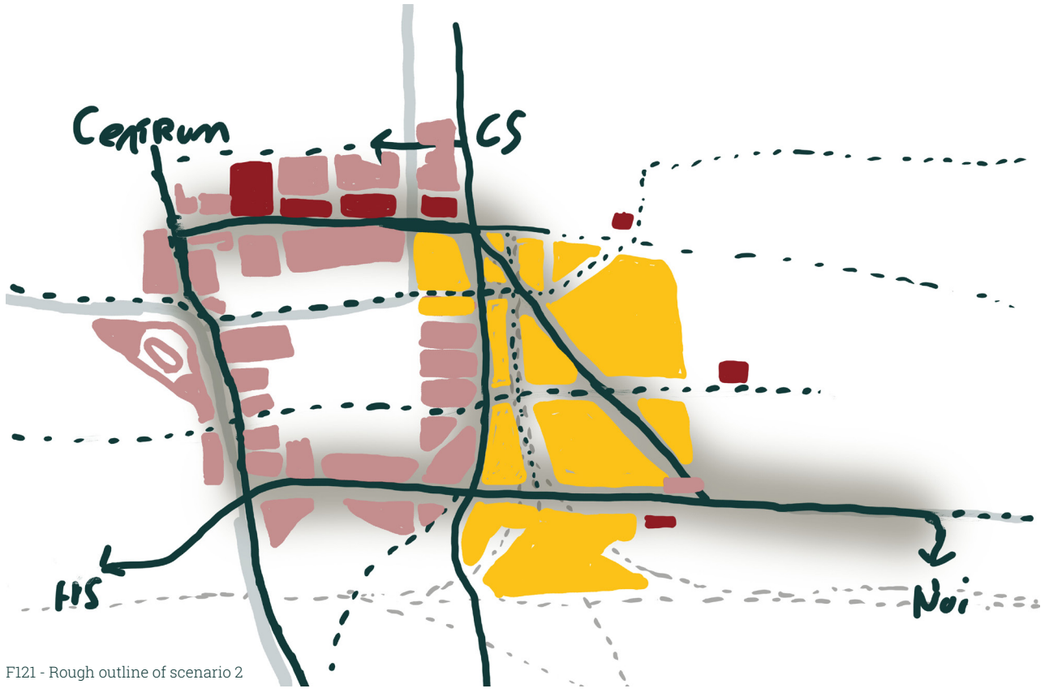


The safe option: select market-driven development

The go-to strategy of the municipality for the central innovation district can be regarded as a safe approach. This is not surprising regarding the political, societal and financial reality of the municipality. Key themes are to develop free land within the city, maintain the existing built fabric and mostly facilitating the market initiatives. As already expanded upon in this thesis, this approach fits the neo-liberal zeitgeist and reality in the Dutch development market. Moreover, current property-owners have a general fear for new developments. In literature mostly described as NIMBY-ism (Dear, 1992).

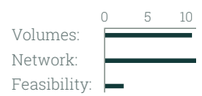
This approach is therefore very understandable. The reality of urban design in a democracy just is this way, and for good reasons. It is therefore also important to make note of this approach and research what it means when it is tested using the urban life metrics of this thesis. However, as stated in the problem statement, comparing these realities with the stated ambition in terms of program, spatial quality and mobility it remains to be seen how well this scenario performs.

Scenario 2: focus on walkability, quality and human scale



F121 - Rough outline of scenario 2

= transformation
= new infill
= strengthen



The optimal option: the modern notion of urban life applied to the CID

Where the safe option mostly follows the neo-liberal context, political reality and especially current financial possibilities, this scenario will approach the CID in a new perspective. While it still follows a notion of feasibility, this notion is way looser and based more on societal, environmental and spatial benefits rather than direct economic profits.

The goal of this optimized option is to test how the three themes of urban life work together or contradict themselves. At the same time the stated ambitions for the CID will be tested for how realistic they really are. The notion of feasibility will act as a control mechanism. This is done by continuously reflecting on this theme.

To uncover the potential, the previously established metrics for urban life will be applied on the central innovation district. First analyses already showed that this will mean a main focus on the central infrastructural heavy parts of the CID and a dominant focus on urban life volumes, network and quality. How these aspects come together will be uncovered by research-by-design.

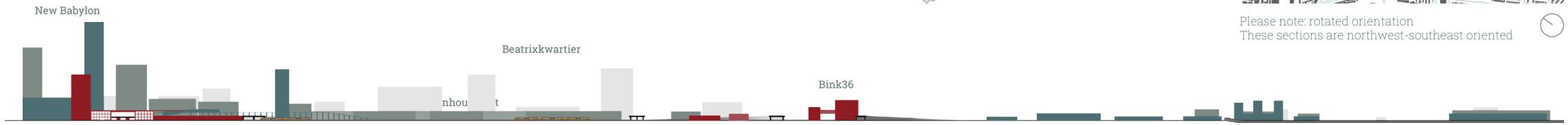
In the following chapters the notion of this radical option might shift and be reassessed. This is the core of a design process. As it is iterative, notions might change during the research.

SCENARIOS

Average building heigh

(Rough estimate)

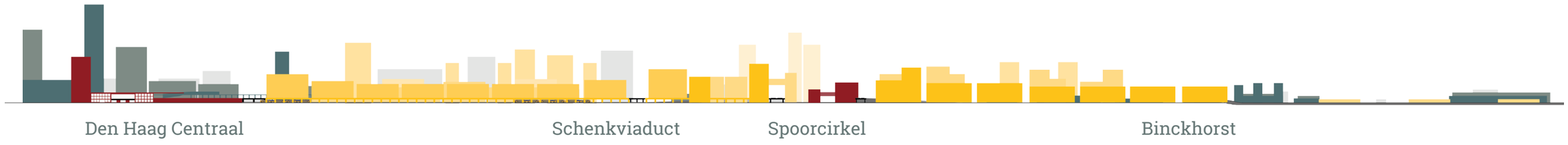
25m



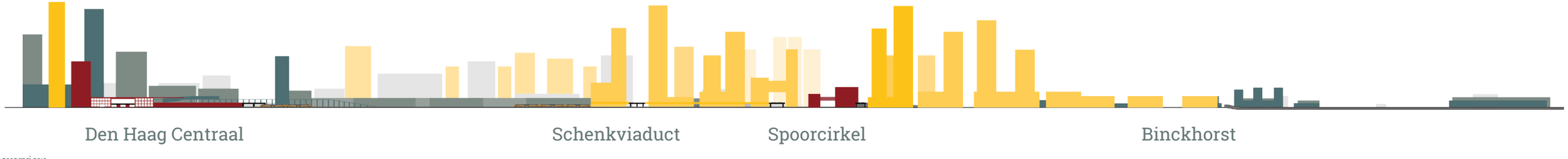
65m

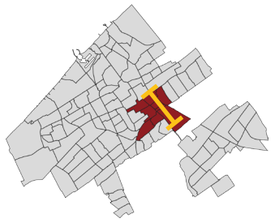


27m



60m



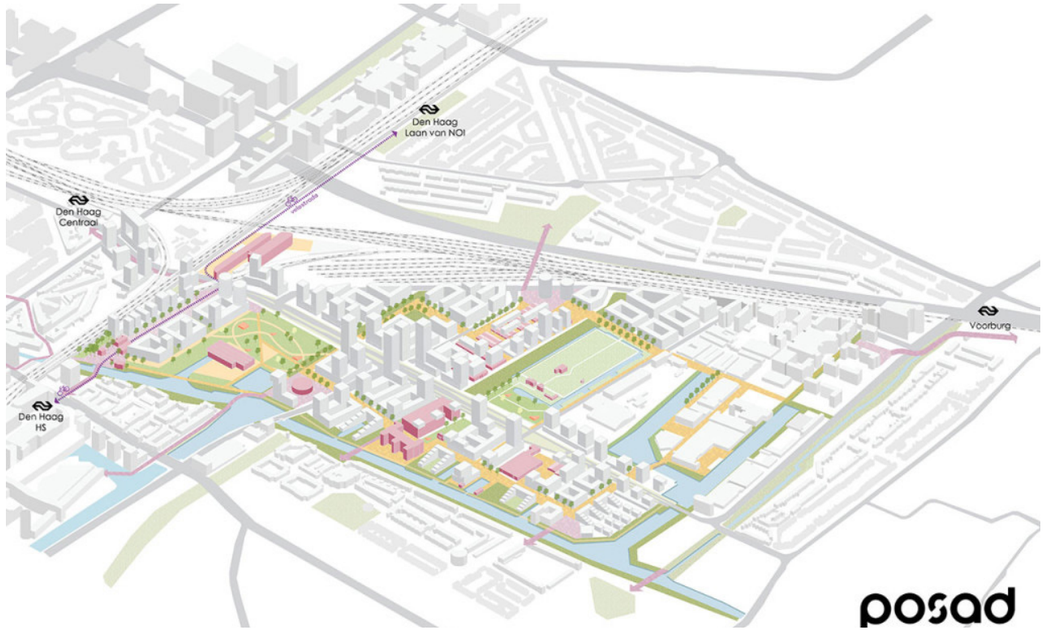




Please note: rotated orientation
These sections are northwest-southeast oriented

F122 - Three scenarios overview

Scenario 1: Binckhorst towerclusters



F123 - Development vision for Binckhorst

Source: POSADMAXWAN

Clusters of towers in a distinct skyline

The first scenario mostly follows the current municipal policy for the CID. In this policy 5 clusters of high rises will be realised. Three around the intercity stations and two in the Binckhorst. The clusters in the Binckhorst will be grouped around 'HOV' which stands for High-grade public transport. This can either be a tram line or a metro line going towards Den Haag Centraal and eventually Scheveningen.

This scenario is characterised by strengthening existing connections in the CID. Existing infrastructure like the Schenkviaduct and the Prins Bernhardviaduct will be adapted and densified. The railway empacement will largely be left untouched as well as the Bezuidenhout-West Neighbourhood.

Most slow traffic from the Binckhorst towards the centre will go parallel to the Schie canal, while the Binckhorstlaan serves as a new artery for the S100 centre ring-road.

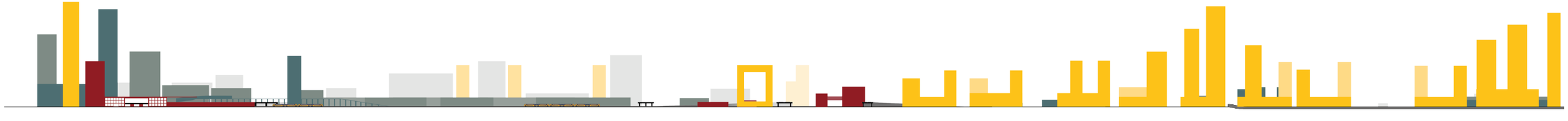
Main typology: towers on a podium

Concept: polycentric transit city

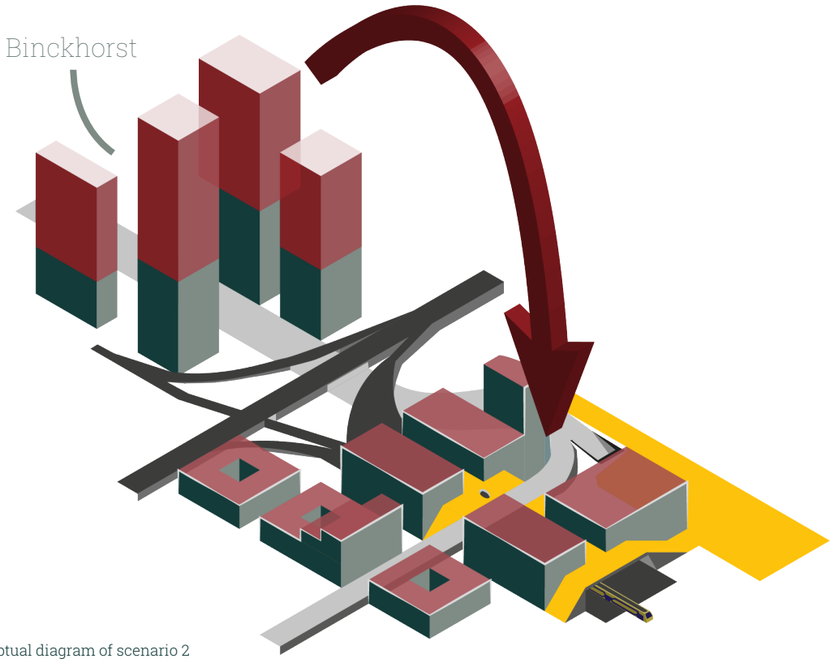
Barrier strategy: splitting the slow traffic connection from other traffic

Section





Scenario 2: medium-rise core densification



F124 - Conceptual diagram of scenario 2

Densifying to overcome barriers

The second scenario is based on the results from the volume study, network study and the quality study on urban life. Here urban blocks are used that comply to urban life themes and the program of 18.500 homes and 500.000m^2 office space. It supports the three high rise clusters around the intercity station, but propagates a move away from highrise clusters in the Binckhorst and instead densifying the core of the central innovation district. This means an overbuilding of the rail emplacement and a transformation of the Bezuidenhout West neighbourhood towards a higher density.

The densification will be achieved by medium rise urban blocks that have a mixed program and build upon the existing orthogonal street network of the Hague. The kop van Binckhorst will also be integrated in order to create a walkable compact city in the CID between stations and workplaces while maximising the effectiveness of the walkability range of the stations.

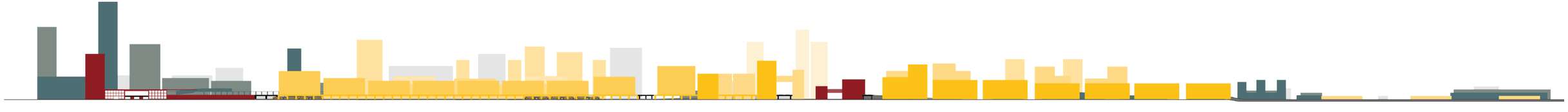
Main typology: urban blocks

Concept: monocentric connector

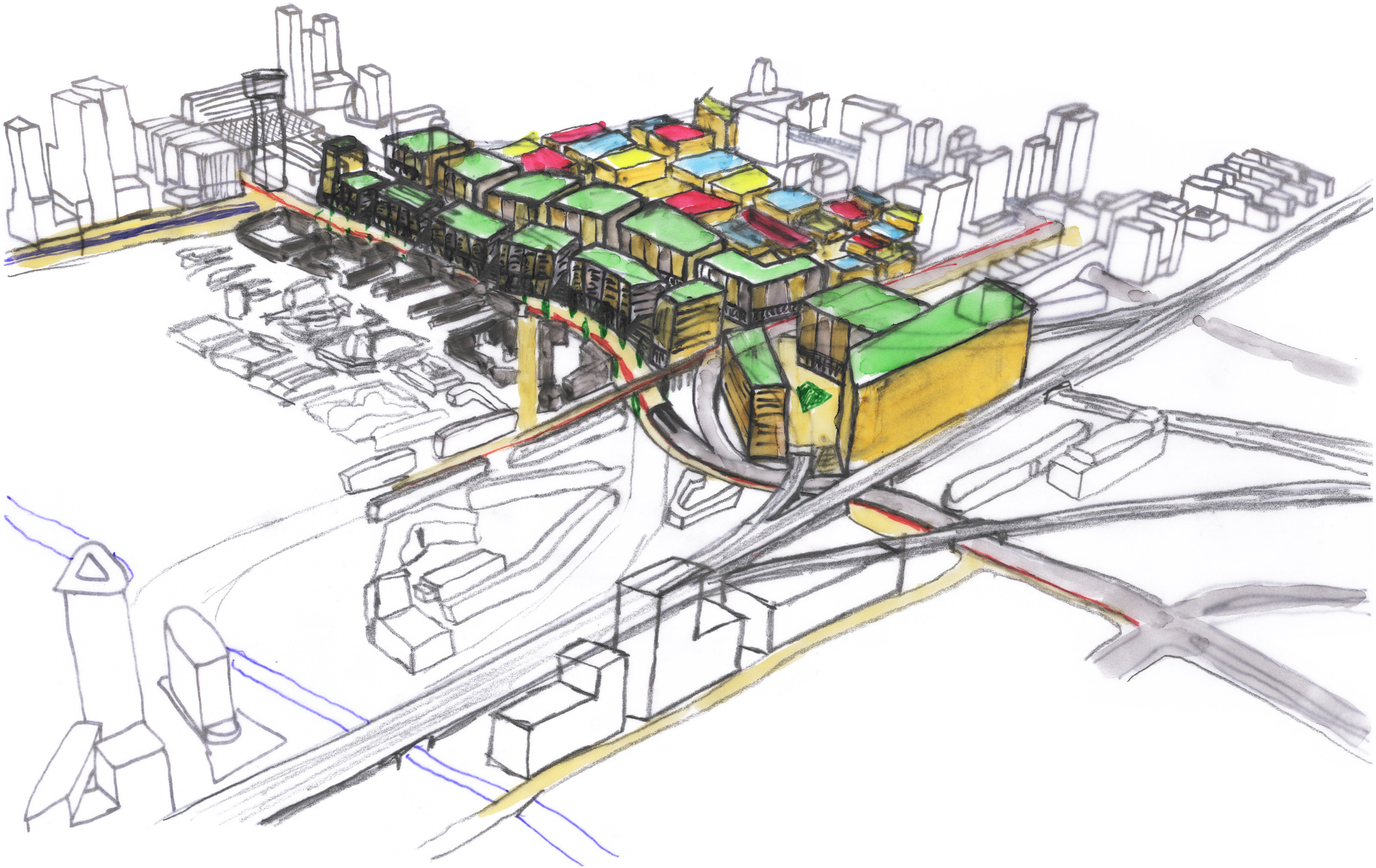
Barrier strategy: overbuilding and concentrating

Section



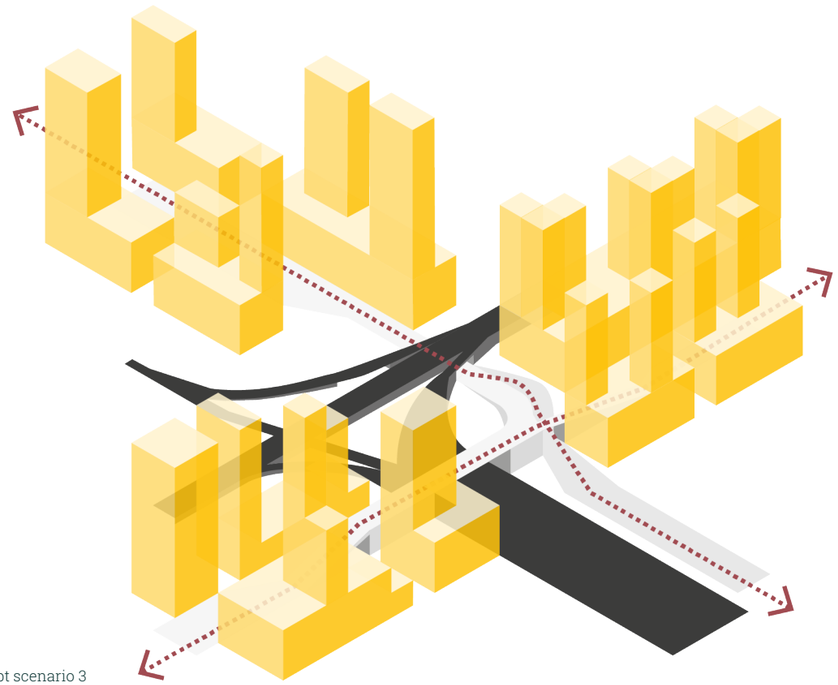


Scenario 2: Sketch



F125 - Sketch of scenario 2

Scenario 3: two axis approach



F126 - Concept scenario 3

Strict concentration for optimal centrality

The third scenario is based on making optimal connections within the current urban network. It densifies the axis between Holland-Spoor and Laan van NOI and the axis Binckhorst to Den Haag Centraal. It aims to overcome the railway circle by intensifying the area and improving the slow traffic infrastructure.

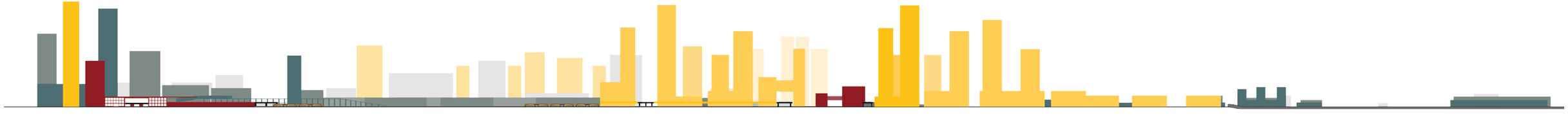
Because of the limited space available in this scenario while maintaining the minimal program, highrises will play a vital role in achieving the goals. This leads to a high average height and a distinct tower skyline for the CID. This makes this scenario an opposite extreme for the urban blocks scenario 2. This scenario will therefore help in identifying if highrises can achieve the same or at least minimal standards of urban life as scenario 2. While some vital aspects of urban life are not met in terms of for example ideal volume and scale, other aspects like centrality and critical mass might very well perform much better than scenario 2.

Main typology: Highrises

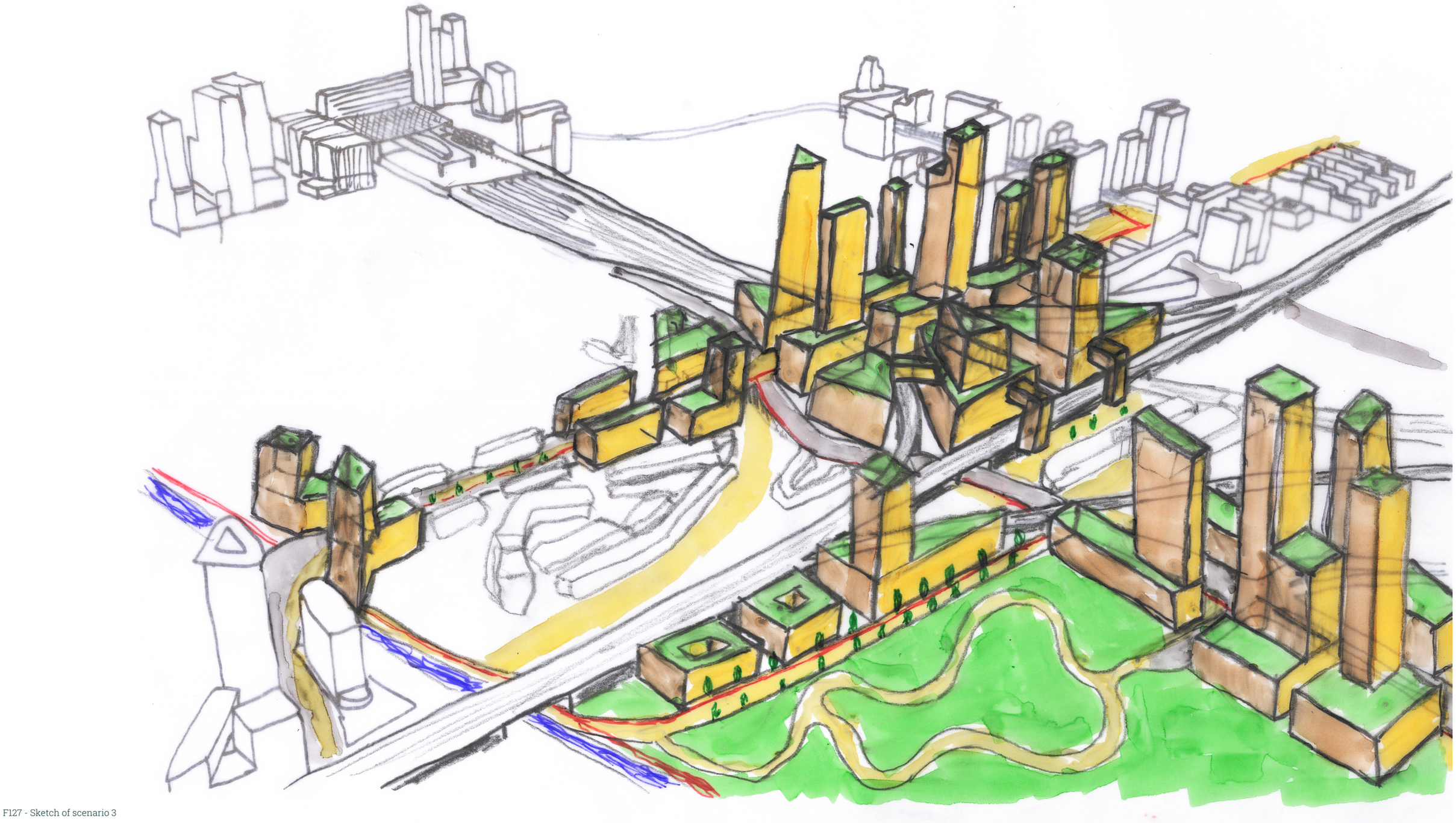
Concept: Intense connecting lines

Barrier strategy: Intensifying and improving existing modes of crossing





Scenario 3: Sketch



F127 - Sketch of scenario 3

ASSESSMENT

	Betweenness of pedestrian network	Costs	Volume: Dwellings amount	Volume: Type diversity	Network: Walkability CID	Network: Cluster density	Quality: Public spaces	Quality: Street life
Scenario 1 **Binckhorst Towerclusters** **Main typology**: towers on a podium **Concept**: polycentric transit city **Barrier strategy**: splitting the slow traffic connection from other traffic		+	+ The amount of dwellings in this scenario will be high due to the predominant highrise typology and the high densities around public transport nodes.	- The diversity will be lower than average because of little variation in typology. However, the podiums will contribute to some variation.	-- Walkability of the CID will be very low because of the lack of measures in the area between the clusters. This will lead to sub-optimized betweenness of clusters.	-- Because of the sole focus of cluster creation in the Binckhorst and around the three intercity stations, the density of clusters in the CID will keep roughly the same as the current situation, only adding the Binckhorst cluster as a point of interest.	- Public spaces will be plenty in the Binckhorst. However due to its mix with industrial usage it will be robust and undefined.	- The highrises and the busy Rotterdamsebaan together with the in-function industrial uses will make street life hard to achieve. The podiums and concentrated density however will have a positive contribution.
Scenario 2 **medium-rise core densification** **Main typology**: urban blocks **Concept**: monocentric connector **Barrier strategy**: overbuilding and concentrating		--	+- Due to its medium rise character more space is needed to reach the same amount of dwellings as a highrise environment. However, when designing these medium rise typologies in a high density and intensity a good amount can still be realised.	+ In medium-rise environments type diversity can be achieved more easily, as slight differences in heights and sizes of dwellings already have a big effect on type diversity.	++ Walkability will be hugely improved. Infrastructural barriers can be qualitatively razed by overbuilding them and in turn create new qualitative routes between clusters.	++ Because of the addition of new clusters in the middle of existing clusters the cluster density of the CID improves. This means shorter trips are necessary to reach a place of interest.	++ Public spaces thrive in medium density environments according to urban life theory. These environments help in the usage of the spaces and encourages social interaction both from inhabitants and passers-by.	++ Street life mostly happens at the first six to seven layers of volumes (Lehmann, 2016; Gehl, 2013). Therefore medium rise environments are optimal for street life to be encouraged.
Scenario 3 **two axis approach** **Main typology**: Highrises **Concept**: Intense connecting lines **Barrier strategy**: Intensifying and improving existing modes of crossing		+-	+ Highrises in combination with podiums along two axes will reach a significant addition to the amount of dwellings quickly.	+- Diversity will be greater than a predominantly highrise focused strategy. However, the amount of dwellings is still heavily reliant on highrises in this scenario.	+ Walkability will be slightly improved because of a new Schenkviaduct with accessibility for pedestrians and densification with functions directly adjacent to it.	+- Cluster density will also see a slight improvement in this scenario as the pedestrian zone with quality will slightly move to the centre of the CID. However existing infrastructural barriers will only on select points be razed.	+- Public spaces will also see a slight uptick in quality. However, not all clusters are evenly qualitatively connected.	- Street life will still be poor because of the public spaces mostly being located near big car infrastructure and highrise environments that tend to be windy.

Integrated scenarios

SQ4: Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?

This last chapter researched and determined the three most probable scenarios for the CID using the metrics described in the methodology of feasibility and focus. The first was based in the municipal approach of focusing on development in the Binckhorst and around existing station clusters, the second was focused on a full urban life overhaul of the central infrastructure-heavy part of the CID and the last one was focused on select densification axes where all investment can concentrate on to reach an optimal centrality there while keeping other areas untouched.

The assessment clearly showed the dilemma the CID is facing. On the one hand the optimal urban life scenario (2) has a lot of associated costs. At the other hand, the two other scenarios (1, 3) seem to have some big uncertainties associated with them regarding social sustainability and overall functioning of the CID as a district.

Further research-by-design is therefore needed to really determine what the future of the CID should be when taking all aspects into account. These three scenarios are not sufficient to answer the posed questions of this thesis. Reflecting on the assessment chances may lie in a combination of the three main scenarios.

Therefore the preliminary answer to the fourth subquestion *'Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?'* is that ***at this point there is a good grasp of possible futures for the CID area. However, because of the complexity and the multifaceted challenges that have to be integrated to comply to the requirements stated in the methodology of this thesis, a satisfactory answer to this question cannot yet be given. Explicit design research is needed to uncover the potential conflicts of interests and possible ways of solving these conflicts. The next chapter on research-by-design therefore will build onto the finding of this chapter and combine aspects to come to a more integrated answer to the fourth subquestion.***

Conclusion SQ4 (part 1/2)

9 RESEARCH-BY-DESIGN

Contents

Vision

Plan area

Design goals

Clusters and flows

Vision map

3D study

Stationsplein

Mondriaanplantsoen

Victoryplein

Key Design iterations

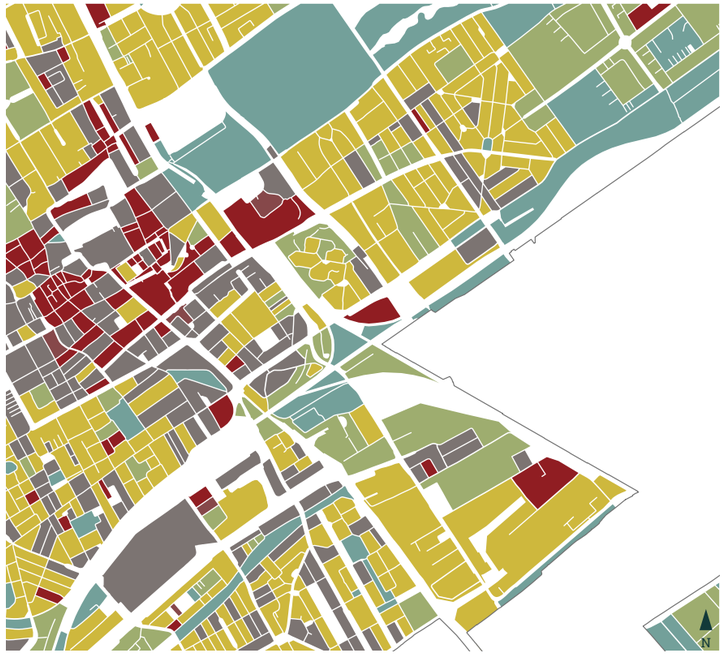
Conclusion

This chapter will build onto the previous chapter and specify the design conditions for the site. It does this using research-by-design: trying various solutions that are site-specific. This helps uncover potential conflicts and how these can be solved. In the end, the conclusions will guide the final design of the CID.

Related subquestion:

SQ4: Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?

Results from volume- and networkstudy

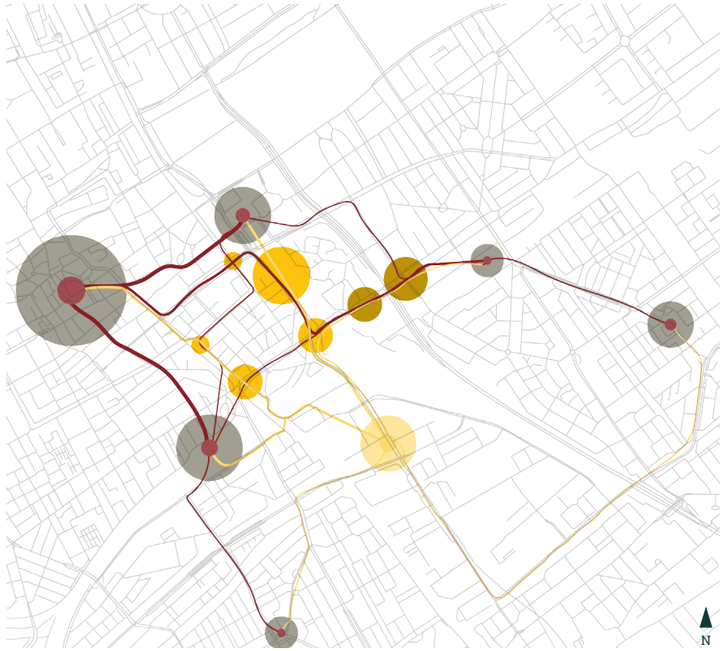


F128 - Density map

Density map

In the density map derived from GSI and FSI data for the building blocks, types seem to relate to their respective urban life function. This means centre parts where there is a high grade of mixed uses and urban vibrancy, fall into specific type-groups, while areas more in the periphery have a different type assigned.

This result can now be used to determine what volumetric action is needed to activate certain areas. Other areas may be left alone as they already function as needed.



F129 - Network and cluster map

Network and cluster map

The network map stems from the goal to interconnect the clusters of the CID in a human-minded and walkable way. This means new places have to be created along the way in order for the area to invite walking and reduce the notion of distance for pedestrians.

This conclusive map can now be used to determine where centrality and new places have to be created and at the same time let this be reflected in the volumetric properties. As the lines now follow the current urban network reserach by design has to eventually determine what the more ideal pathways and cluster will be. For now however, this serves as a good starting point for the research-by-design.

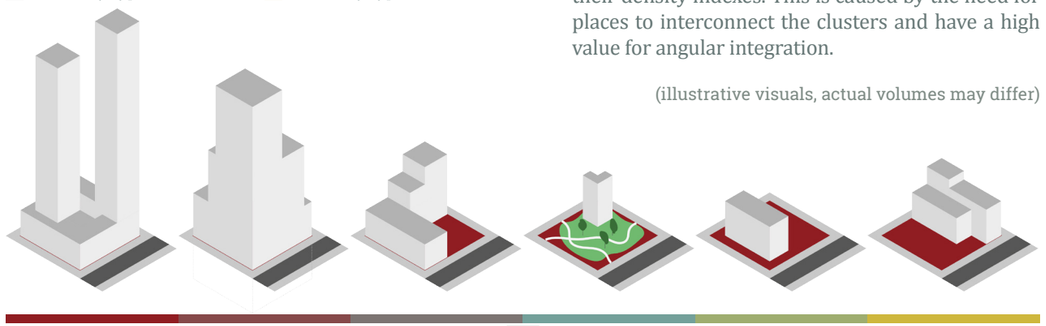
Vision on future density and slow traffic network



Density type 1
Density type 2
Density type 3
Density type 4
Density type 5
Density type 6

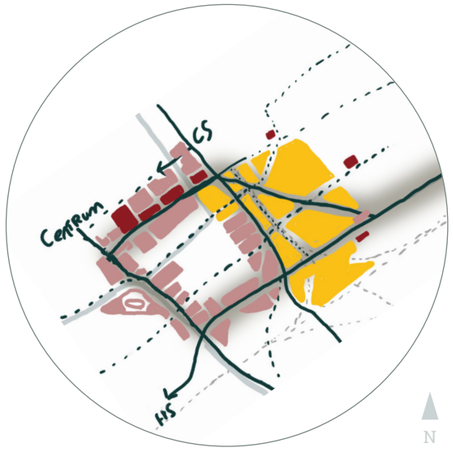
In the vision the centre of the Hague and its volumetric properties will be expanded towards the east. This means the blocks located there will change in their density indexes. This is caused by the need for places to interconnect the clusters and have a high value for angular integration.

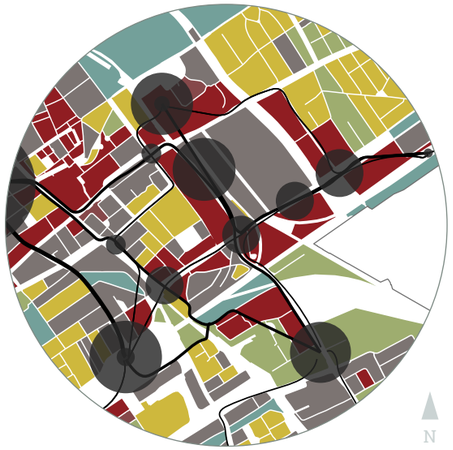
(illustrative visuals, actual volumes may differ)



F130 - Vision on density

Determining the plan constraints







F131 - Plan area determinants

1 Optimal urban life scenario

While multiple scenarios were approached and evaluated in the previous chapter, a research-by-design with such a heavy reliance on theory and data works best when done in a more radical optimized approach. Therefore the plan area for the research-by-design will be located in the more central infrastructure-heavy parts of the CID. This will help in identifying optimal solutions and easily applying urban life theory.

Reflecting on these results will help determine what are vital developments and what each of the urban life themes means when opposed to the high ambitions of the central innovation district.

2 Vision on density and centrality

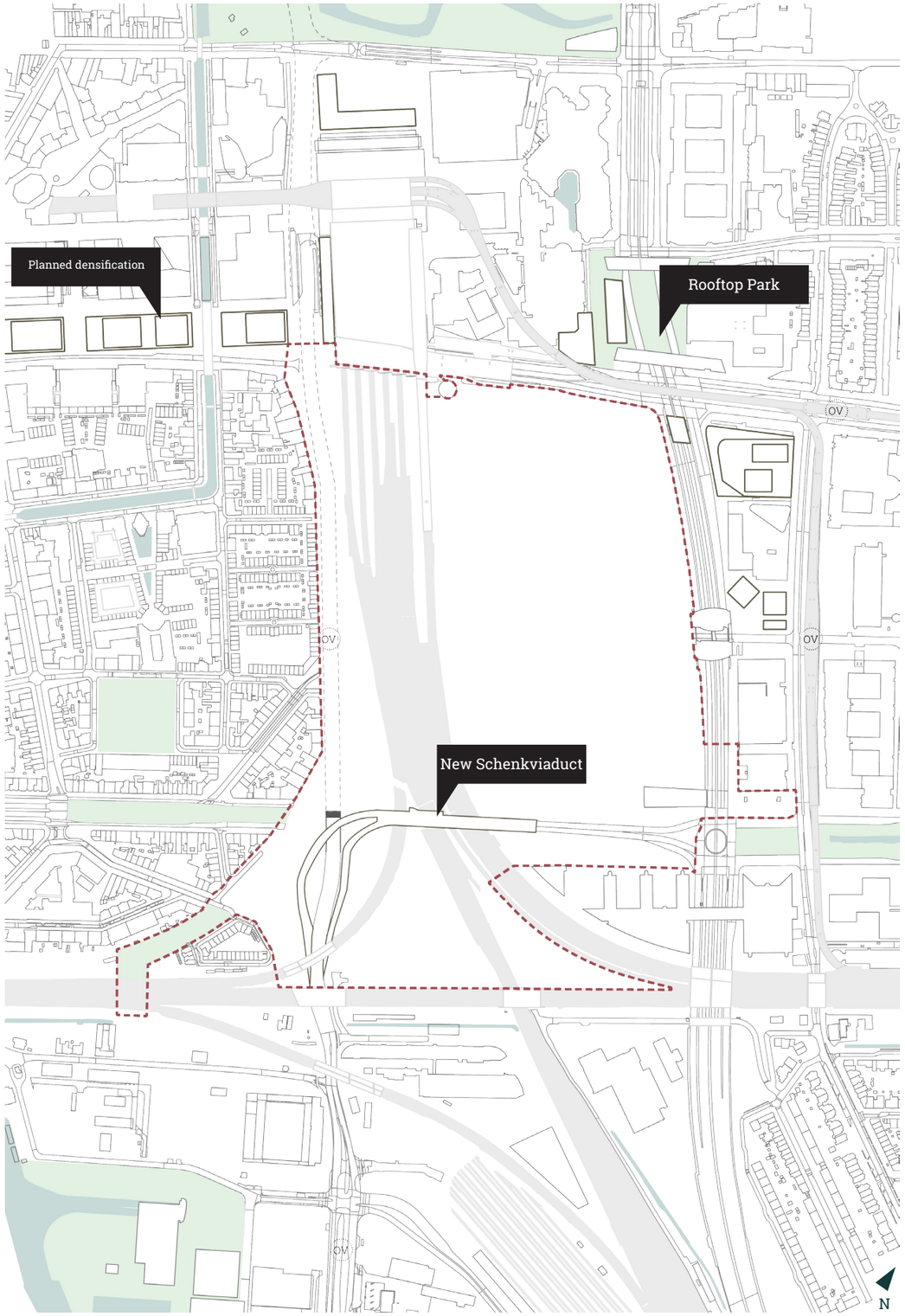
The second factor for determining the plan area is the vision on density and centrality. This helps in understanding where a lack of connections exists and where new spots have to be created in order to interconnect clusters. It also prescribes volumetric properties for the aimed environment.

As the conclusions from this vision were that the centre will have to be expanded towards the Laan van NOI and Beatrixkwartier to comprehensively connect the clusters in an urban life manner, the program and ambitions of the CID agenda will have to be located here.

3 Optimized betweenness

As a prerequisite for centrality and walkability of the network, the betweenness metric prescribes a qualitative impulse for the area right in the centre of the CID. An urban life focused densification for the CID that interconnects all clusters can therefore not be realised without activating this area of the railway emplacement and Bezuidenhout West.

Combining these three elements from the previous research towards urban life in the CID, leads to this plan constraint for the design. In this map future developments from the municipality are incorporated like the new Schenkviaduct and their densification projects, mostly in the residential-tower typology.



F132 - Overview map of plan area

Plan area - planned developments



Source: Syntrus



Source: Synchroon



Source: OKRA



Source: Provast

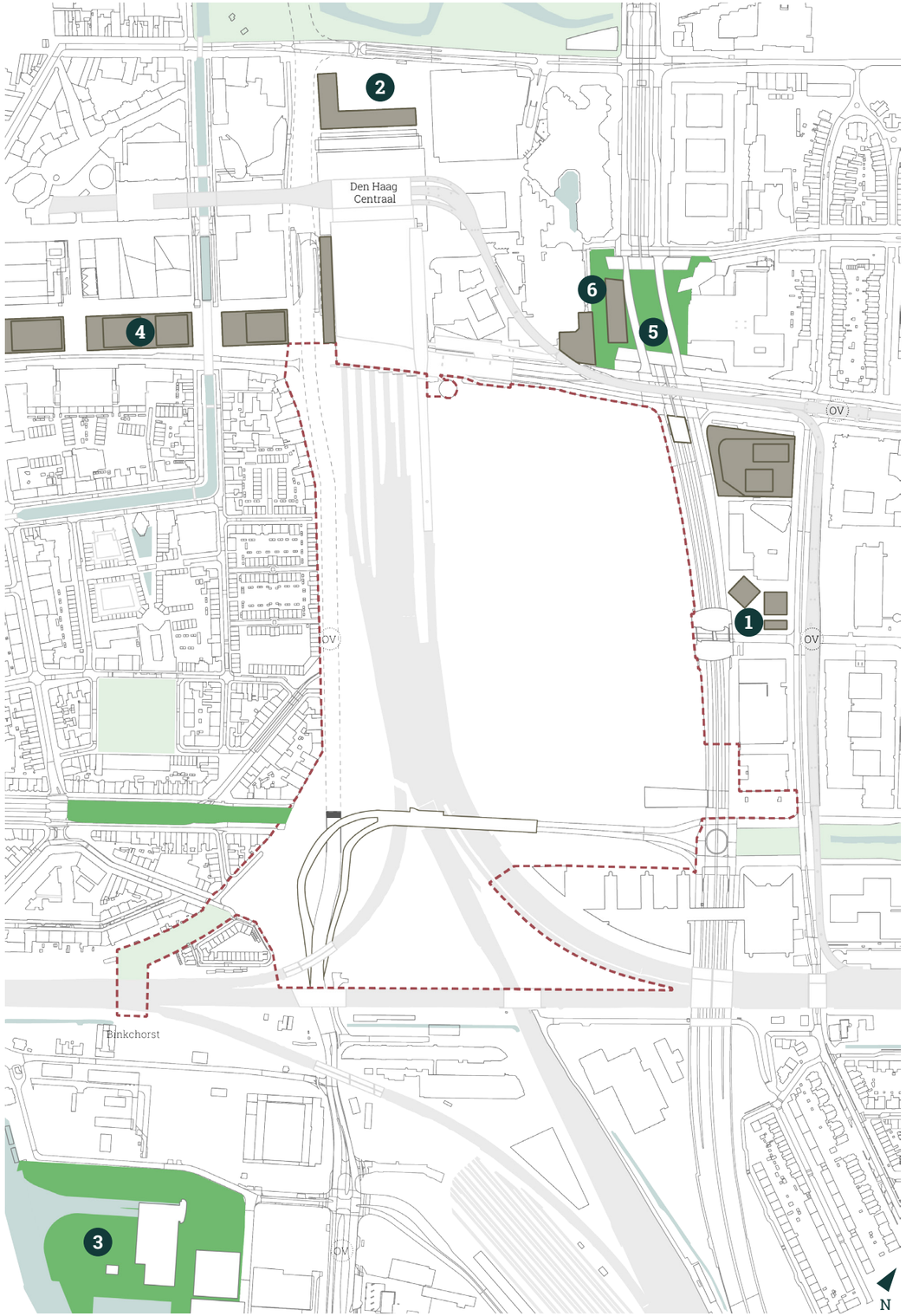


Source: Provast



Source: Gemeente Den Haag (2019c)

F133 - Planned developments

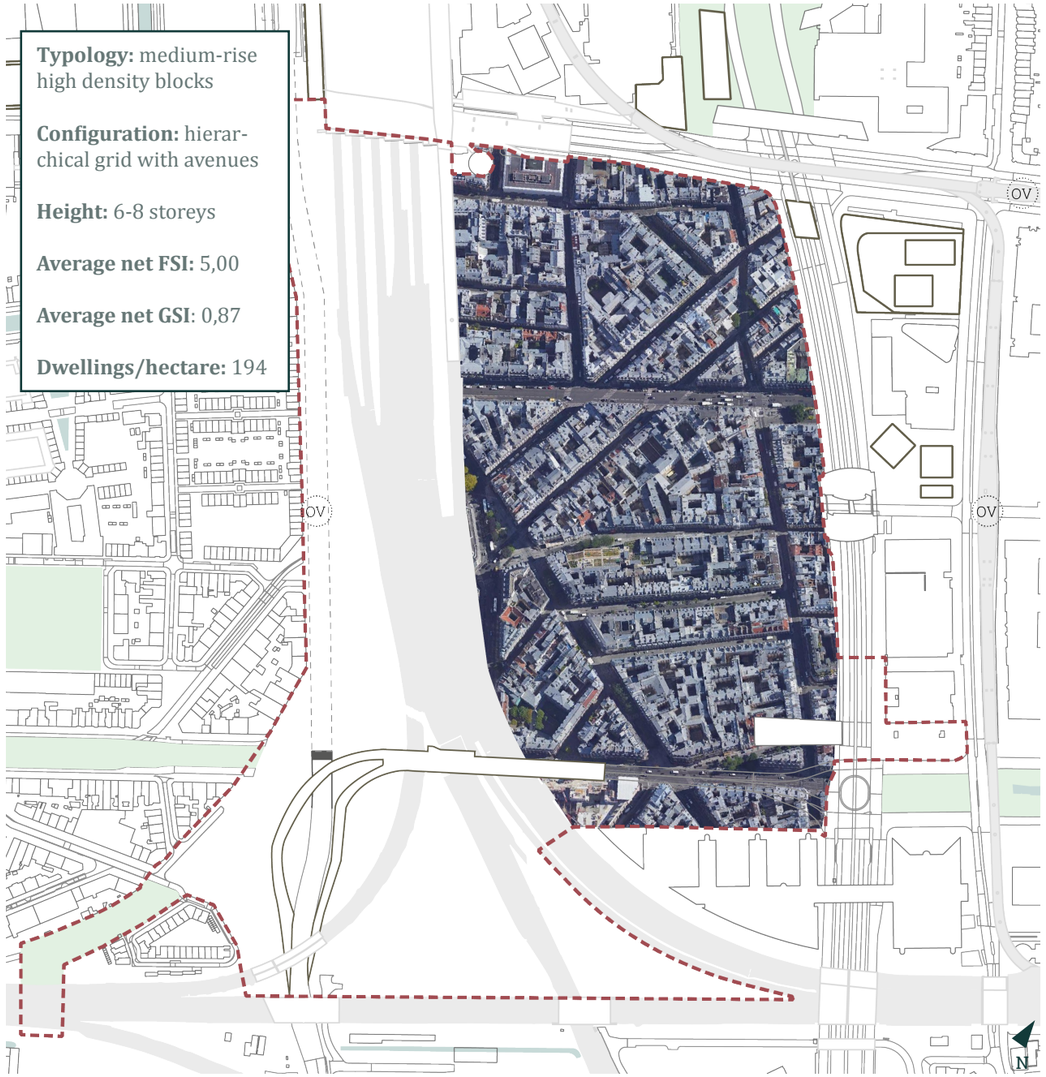


F134 - Overview map of planned developments

Plan area - scalestudy

Paris

Haussmannian blocks



F135 - Scalestudy of Paris block

Source: Google maps

This scalestudy shows the implications for building in a Paris-like density with exclusively medium-rise building blocks and a high density.

Especially the hierarchical network of broad avenue's and smaller, more human scale streets directly connected to these bigger lines, shows a walkable, liveable environment where urban life is easily facilitated while at the same time being in a highly compact and dense environment. Climate adaptiveness and urban green space however, seem to be scarce. The public realm in general is quite limited, leading to questioning if the social connections in high density environments as described by Raman (2010) are happening.

Social activities therefore seem to be less than optimal in this compact cityform.

New York City

Manhattan grid



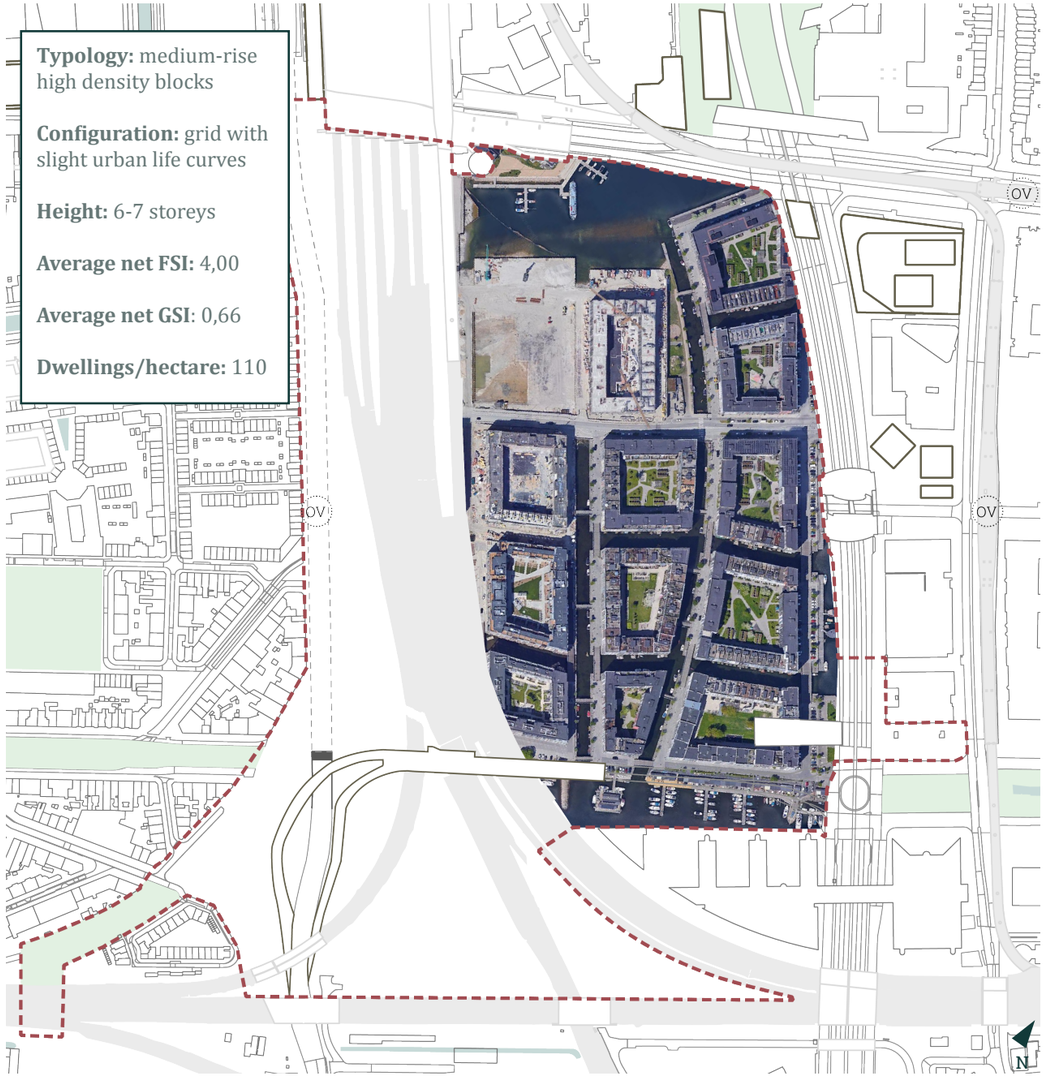
F136 - Scalestudy of New York block

Source: Google maps

How different the urban scale in North American cities is, really shows in this scale-study. When compared to the Parisian blocks the jump in scale of both roads, volumes and blocks is remarkable. Being a planned city from the start, Manhattan, NYC does a lot of things right in an urban life perspective. The blocks are walkable, mixed, green and easily navigable. However, human scale lacks with the infamous closed plinths of the office-buildings and the car-centric character of the grid. Moreover, the pure grid has a few downsides when compared to urban life literature. Pedestrians have to stop at each crossing and the long straight routes might become boring quickly.

As a precedent for the plan area, the scale and grid does not fit the location as well as the Parisian network.

Copenhagen
Sluseholmen



Typology: medium-rise high density blocks

Configuration: grid with slight urban life curves

Height: 6-7 storeys

Average net FSI: 4,00

Average net GSI: 0,66

Dwellings/hectare: 110

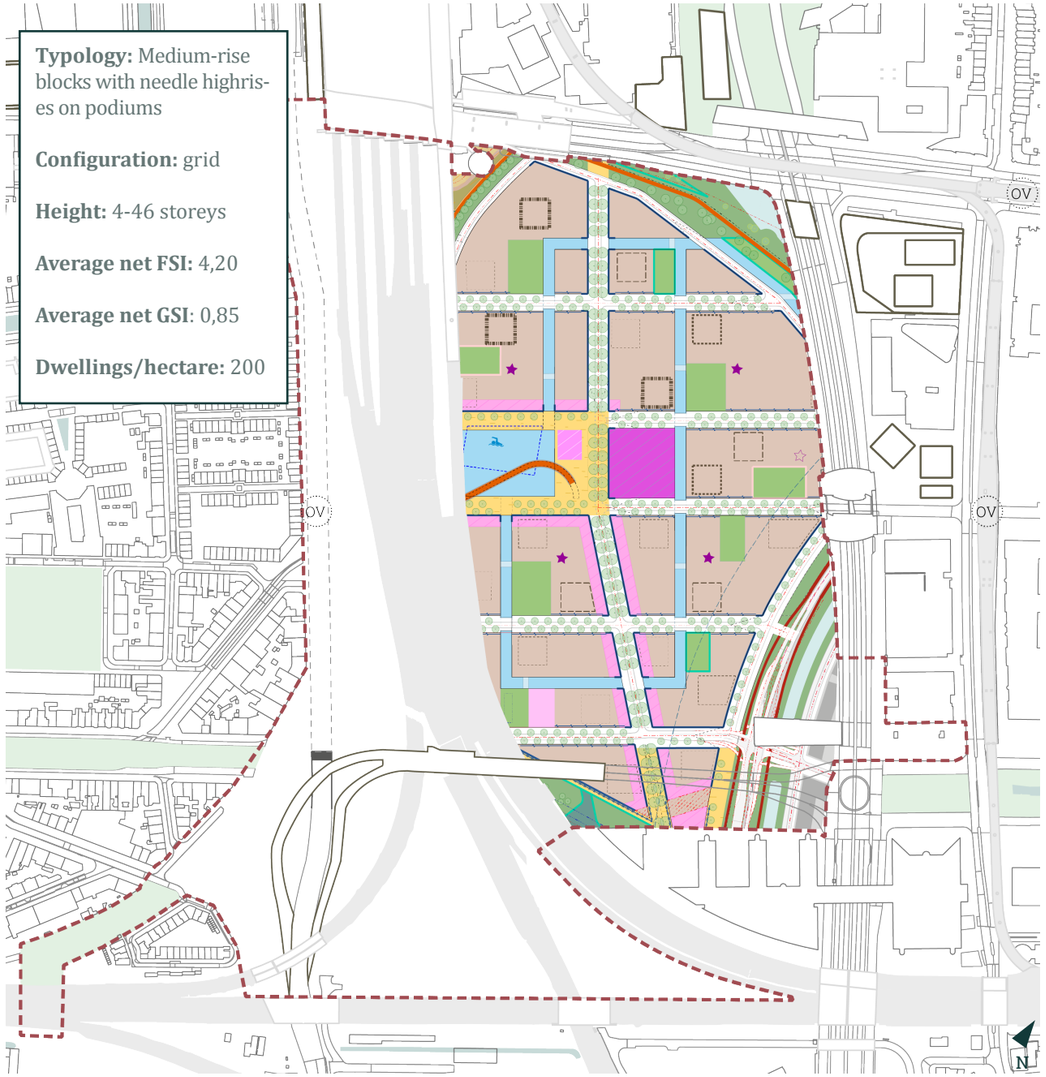
F137 - Scalestudy of Sluseholmen block

Source: Google maps

The Sluseholmen project in Copenhagen by Dutch architect Sjoerd Soeters has a well elaborated and urban life focused human scale. Apartment blocks of maximum of 7 layers are grouped around communal green spaces. Around the blocks are pedestrian friendly roads and canals. The façades have a lot of variety as they are each designed by different architects. This leads to interesting streets and an especially well-designed transition from public space to private dwelling. Social activities are also facilitated by these communal spaces.

However, when assessing the scalestudy the quantity of communal green spaces seems to be over the top for the aimed character of the CID. Moreover, the blocks are too big in size to contribute significantly to the densification goals.

Amsterdam
Sluisbuurt



Typology: Medium-rise blocks with needle highrises on podiums

Configuration: grid

Height: 4-46 storeys

Average net FSI: 4,20

Average net GSI: 0,85

Dwellings/hectare: 200

F138 - Scalestudy of Sluisbuurt block

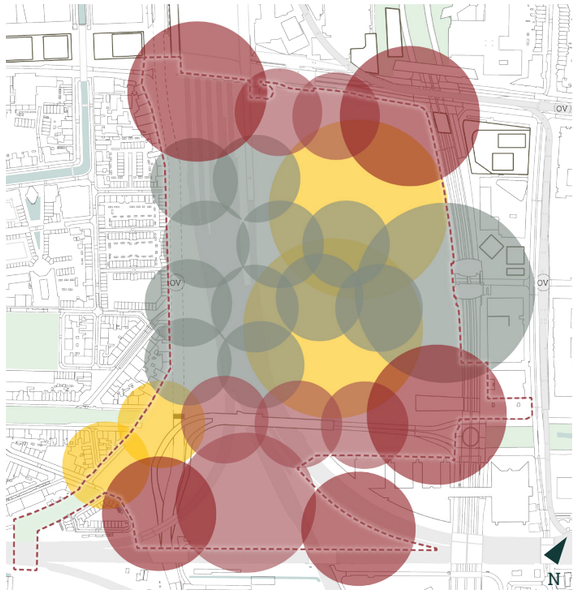
Source: Gemeente Amsterdam (2017)

The Sluisbuurt in Amsterdam is a to-be developed densification site where a high density will be achieved using select towers and a general high density medium-rise environment. The municipality is aiming for 5500 dwellings and 100.000m^2 of other uses. This leads to a density of 200 dwelling/hectare with an FSI between 2.2 and 5.2.

This project shows a great deal of similarity with the stated goals for the CID site. It adheres to urban life principles while at the same time allowing select highrises to increase the density. The scale is also very much alike the plan area. A great deal can be learned by investigating the how and what of the Sluisbuurt.

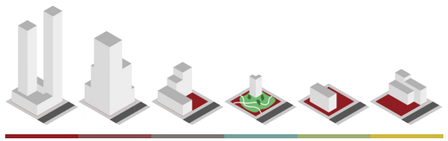
Plan area - densities

The density types from the volumestudy help in determining where what density type should be applied to get the appropriate compactness and openness for the aimed environment. It does this by the six distinct types classified by FSI and GSI properties from the Spacematrix methodology (Pont, Haupt, 2010).

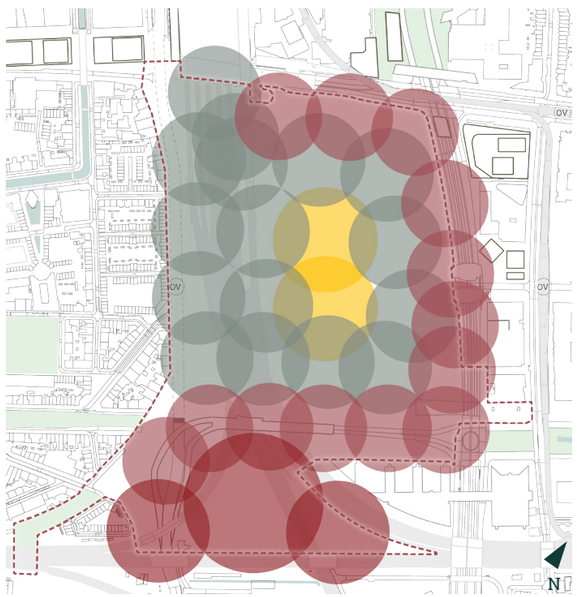


Scenario 1: Inner-oasis

The first scenario for the densities in the plan area is to create inner-oasis of lower densities. Along the sides and existing highrise environments higher densities are allowed to maximize benefits of the proximity to public transport and other amenities. More in the centre of the plan area lower densities can serve as easier-going areas. In this scenario the street connecting the traintracks platform with the Beatrixkwartier has a higher density type. This to ensure centrality is created.



F139 - Density scenario 1



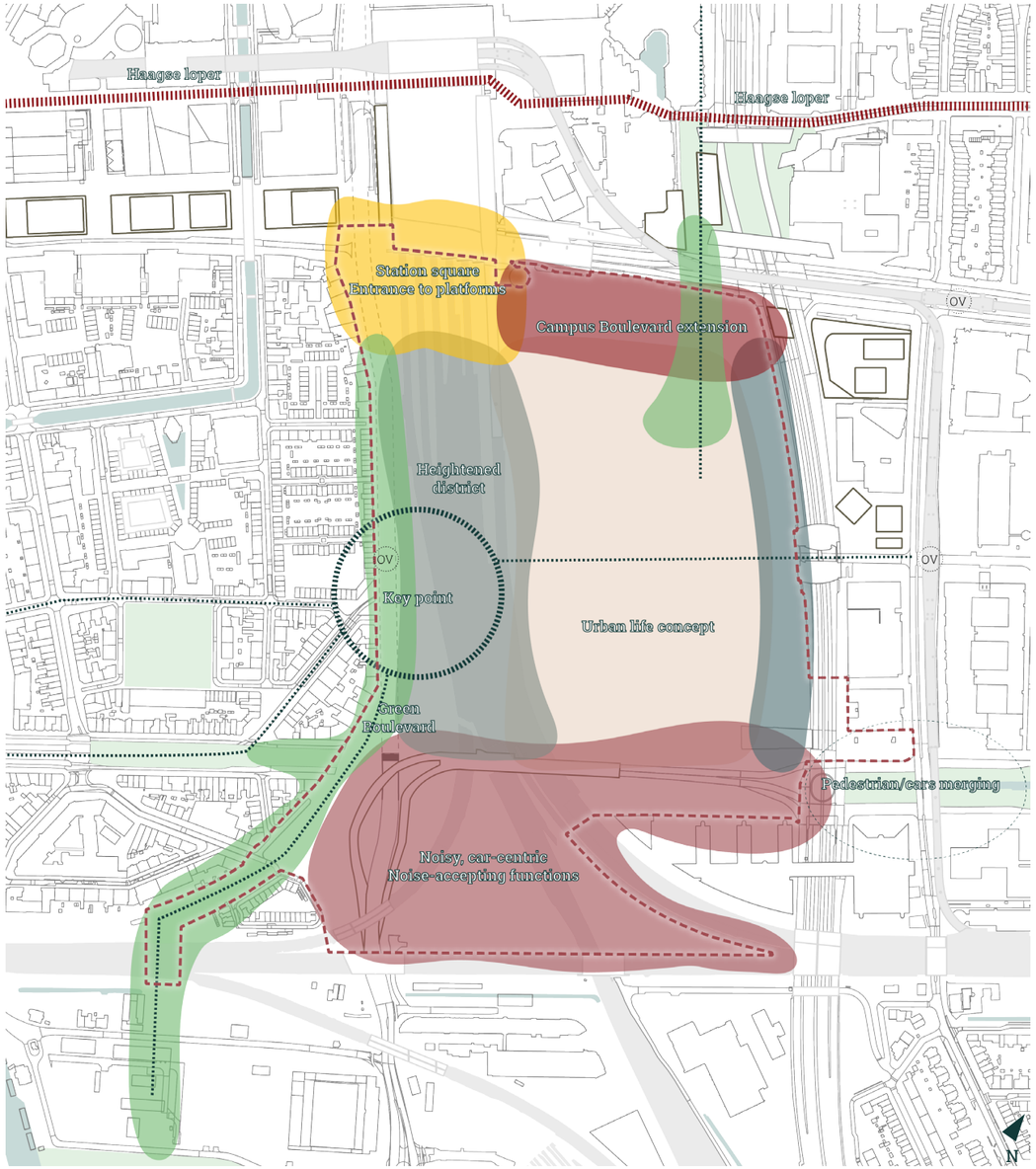
Scenario 2: Select concentration

The second scenario focuses more on a gradual build-up of density from the centre of the plan area. This results in rings of higher densities that eventually culminate in lower densities in the centre. This results in a gradual build-up needed for clear choices regarding centrality and proximity to other services.

F140 - Density scenario 2

Plan area - environments

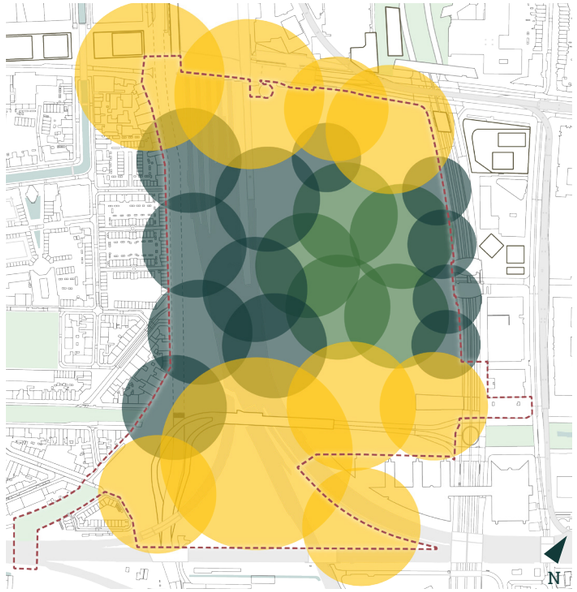
The plan area consists out of different living environments. This is an outcome of the various contexts of the area. Near the car infrastructure of the new Schenkviaduct more noisy, less urban life environments can be expected. The heightened district serves as another border of the area that has its own challenges and constraints. Other areas are all influenced by their immediate contexts and this will have to be accounted for in the design scenarios.



F141 - Plan area environments

Plan area - metromix

The 'Metromix' is defined by the College for Rijksadviseurs (Cra, 2019) and describes three distinct zones in a well-designed densification project with mixed uses. The first is Reuring which means high usage activities are allowed and noise from other uses is tolerated. Ruis means a living environment where one can vaguely experience the hustle and bustle of the city but at the same time enjoy living in some easier-going environments. Rust is the most quiet zone. Here noise has to be limited and inhabitants want to live in peaceful environments preferably with enough urban green space and other spatial qualities.



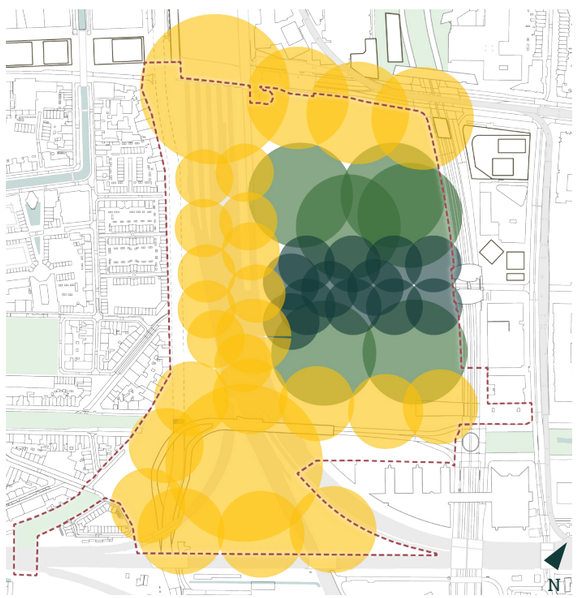
Scenario 1: Inner-oasis

in the first scenarios again inner-oasis are explored for the plan area. This results in a clear and gradual build up between Reuring, Ruis and Rust. The more car intense areas at the north and south parts of the plan area have a reuring character, while the parts inbetween tend to do more with Ruis and Rust.



Source: from Metromix (Cra, 2019)

F142 - Metromix scenario 1



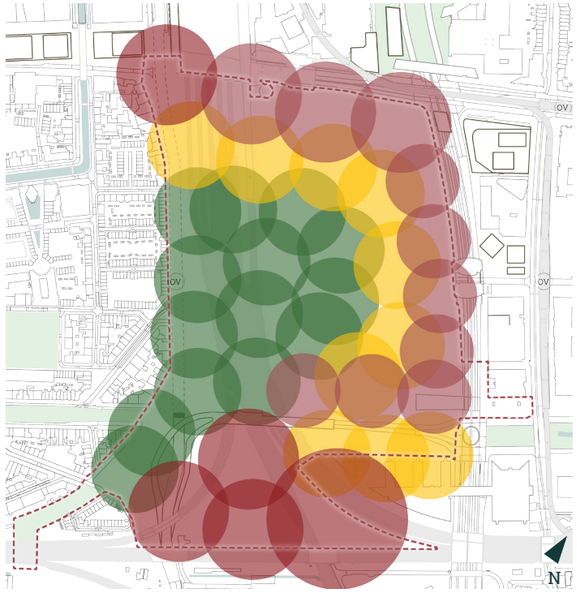
Scenario 2: Select concentration

The second scenario sees a bigger role for Reuring in the area. This to ensure there is enough centrality for the mixed uses and guide users towards new attraction points in a reuring environment. This gives a chance to the Ruis and Rust environments because they are now more shielded from accidental flows into their areas. This gives a clear distinction between areas of activity and areas of reflection.

F143 - Metromix scenario 2

Plan area - heights

Building heights will have to be determined in an iterative 3D study in order to incorporate scale, shadow and other urban life concepts. However, the options for the general concept can already be made explicit in plans and sections. This helps in guiding and specifying the design guidelines. The scenarios build on top of the previously assessed aspects. In the final design multiple scenarios can be combined or overlapped.

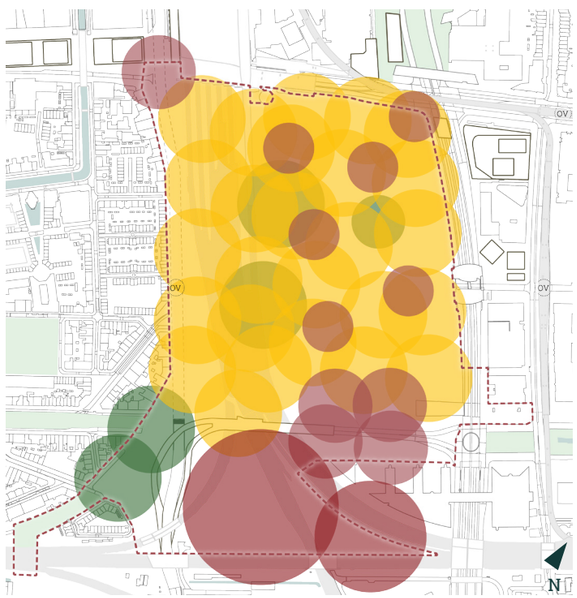


Scenario 1: Build up to context

The first scenario builds up towards its surroundings. Towards public transport the building heights will rise while more towards the centre building heights will have a more nuanced character. This can then result in differences in environment and experience of the neighbourhood.



F144 - Building heights scenario 1



Scenario 2: Sluisbuurt concept

In the second scenario there is a more overall concept of height with select point for highrises. The advantage of this scenario is that a higher density can be achieved without having to build too many highrises that affect wind and shading.

F145 - Building heights scenario 2

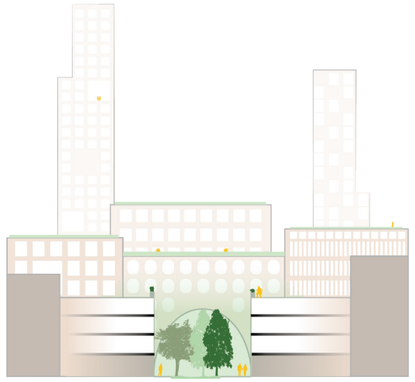
DESIGN GOALS

Volumes



An expansion of the centre

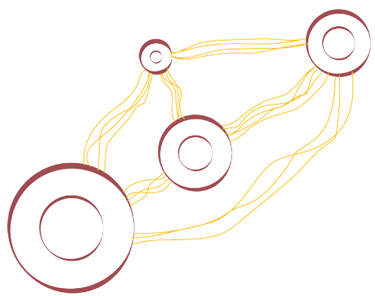
Expanding the centre in terms of typologies, volumes and atmosphere, helps in realising a well-functioning high density living environment.



A qualitative and quantitative housing contribution

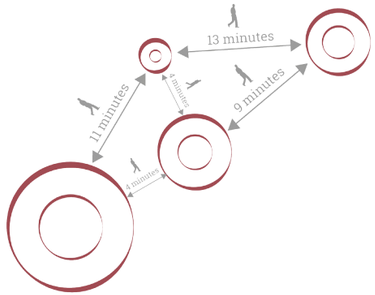
Housing should both be a qualitative and a significant quantitative addition to the city. This because of the huge housing shortages and the wish for more diverse high-density living environments. This can be done by multiple layers of housing types and volume properties.

Network



Optimized betweenness

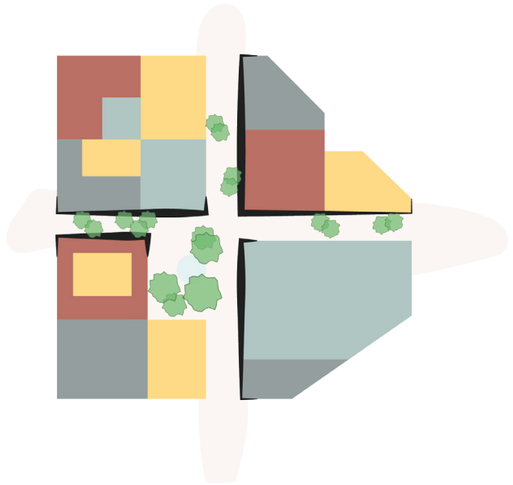
Optimized betweenness means the shortest path is also the most interesting. This way pedestrians and cyclists are automatically using the more attractive routes of the district. Moreover, centrality will emerge along these routes, while other routes can focus on a more quiet residential character. Focus also on maximum angular integration in the design of these routes.



The ‘15 minute city’

Parisian mayor Anne Hidalgo coined this term to describe the new mobility concept for Paris. It means that the six factors that make an urbanite happy being having a dwelling in dignity, working in proper conditions, being able to gain provisions, well-being, education and leisure, are all found within a 15 minute walking radius (O’Sullivan, 2020).

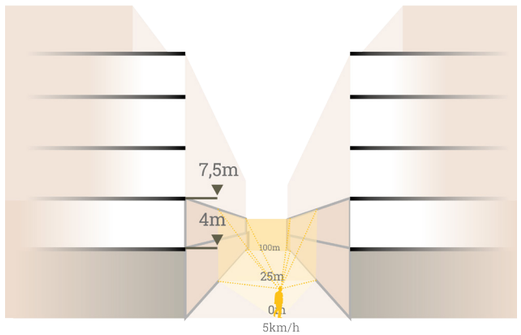
Quality



Identity and ambition with the Victory BoogieWoogie

The Victory BoogieWoogie serves as an inspiration on various themes in the new CID district. It is an analogy of the mixed uses, the varying building heights, the never-similar pattern of the façades, the centrality of the street network and the total configuration of the new district.

Using this analogy the district will give an answer to the stated high ambitions as being an unique district in the Netherlands or even Europe. Mondriaan is forever cemented in the identity of the Hague, not only through his art, but also through his abstraction of the dynamics of a city.

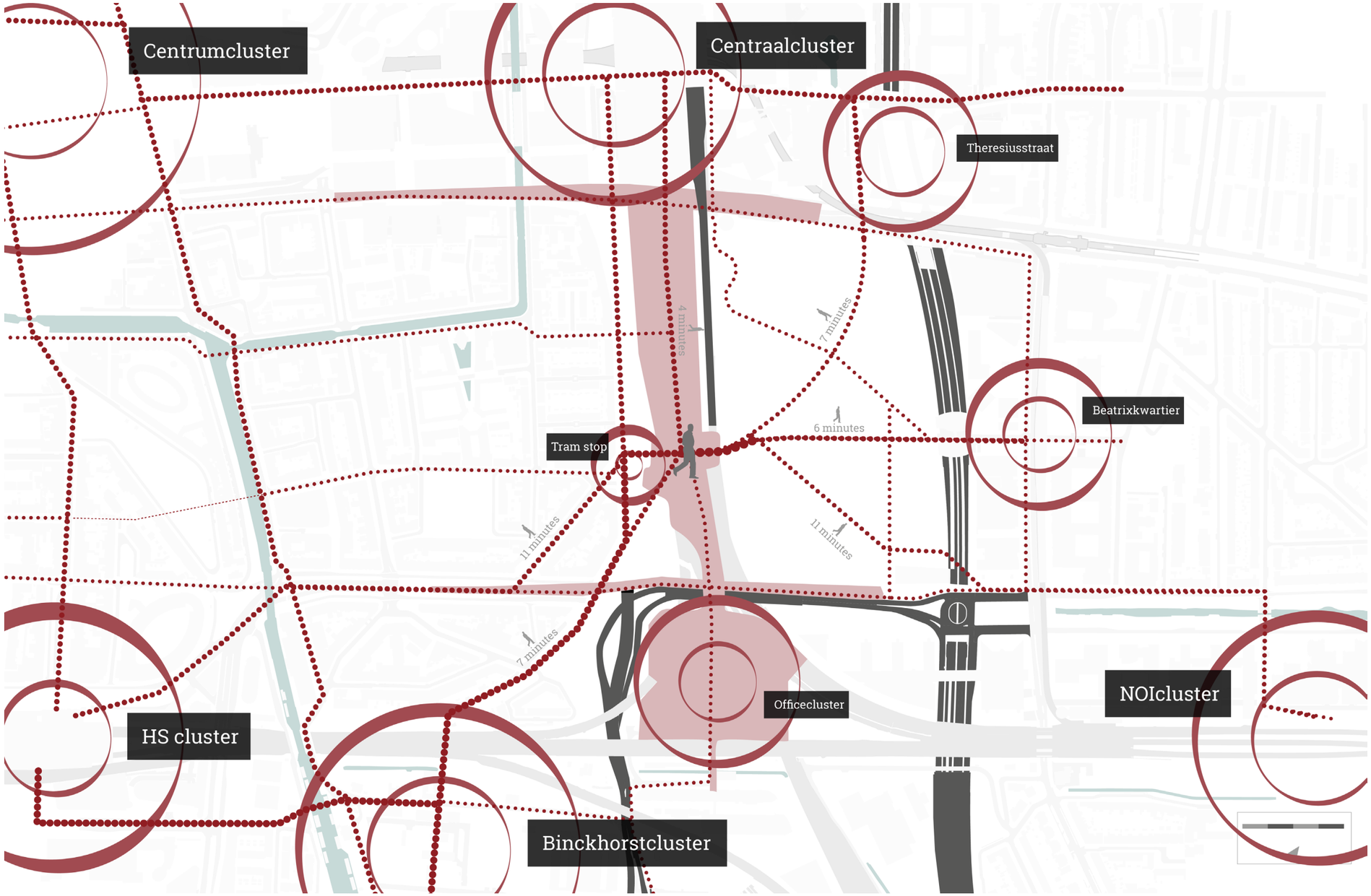


Human scale through urban life patterns

The human scale in the district is guided by the urban life literature and case studies. These clearly prescribe what dimensions and qualities a good urban life design should have.

Doing this check with established literature and practice ensures tested tools for urban life are being applied. This is required top optimize high density living and mitigate the negative effects of the compact city.

Pinpointing the centrality of the future network



F147 - Cluster map

Combining the results from the volumestudy and the networkstudy, the relevant clusters in the CID are identified. Following the analysis, we can confidently state that these clusters will play the most important role in the CID. Some clusters have a bigger weight and thus a bigger attraction in the network. This results also in flows with different weights. In this map a network is designed based on characteristics of the current network, anticipation on the future network and lastly designing with the creation of new hotspots in mind.

Centrumcluster
This cluster has the most amenities/shop density and is the biggest attractor of the area. Here inhabitants from all over the CID will go to.

HS cluster, Centraalcuster and NOIcluster
These clusters will in the future be thoroughly densified and intensified. Along with their location near a major train station and other public transport modalities, this will cause them to in the future be the main concentrations in the CID.

Binckhorstcluster
This cluster will see the most amount of new residents and development. It will in the future play a vital role in the urban system and causes a big number of pedestrian/cyclist flows through the area.

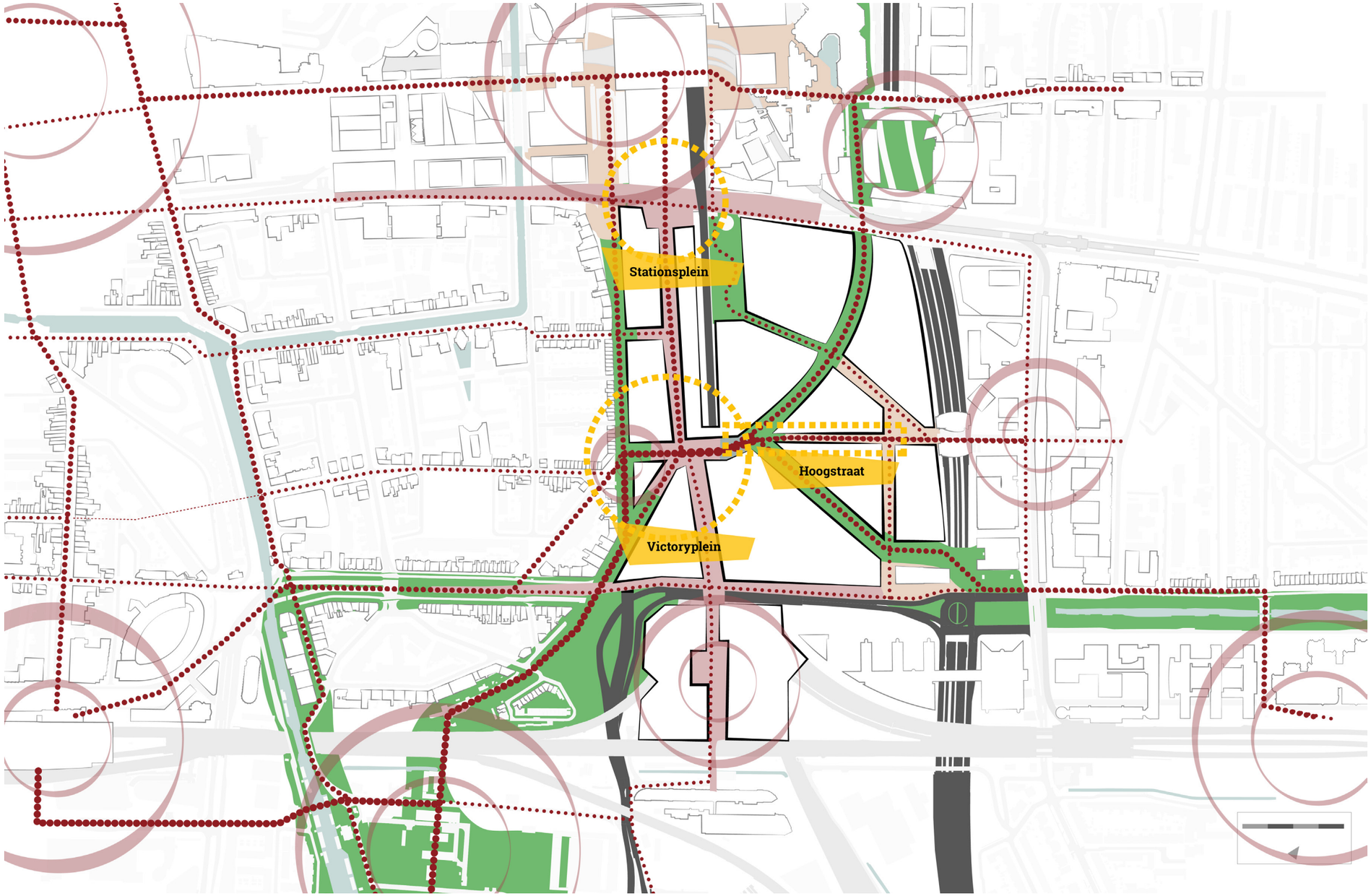
Theresiusstraat, Beatrixkwartier and new Officluster
These clusters will have a secondary importance within the area. They each have their own individual attractors. These are vital for anticipating the other main flows in the CID.

Legend

- = Heightened platform
- = Railways
- = Infrastructural barriers
- = Flow

VISION MAP

A connected, walkable and optimal densified CID



F148 - Vision map

The vision map displays the result of taking all previous constraints and features into consideration. It is the synthesis of network features, volume goals and urban life theory. These aspects are merged together into a loose design that will guide the consequent 3D studies towards the final design.

From the resulting vision map three areas are identified as being vital for the design. These will have to be designed in micro-scale in order to uncover the urban life implications.

Stationsplein
As the new district will directly connect to the Centraal Station this will be one of the main attractors for the new district. In order to make the station more accessible, a new station entrance should be added. This will greatly improve the surrounding area and connect the ground level with the platform level.

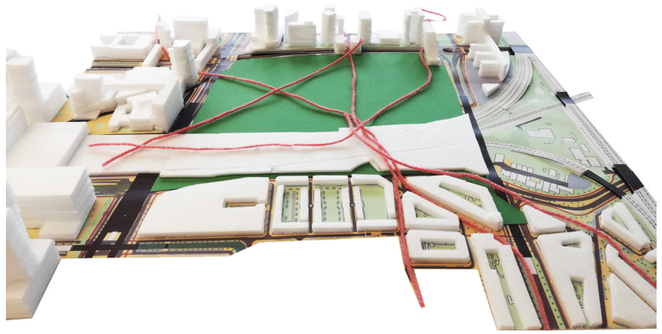
Victoryplein
Following the expected flows, this point will be crucial in the network. Therefore alot of centrality is expected to arise here. This is an ideal chance to create a new point of attraction that is on walking distance from all other clusters. Moreover, it can contribute in qualitatively connecting the 8 meter high platform with the ground level.

Hoogstraat
The hoogstraat will be the street with the highest centrality in the new Victorydistrict. Designing this street in microlevel helps in showing how the new district will function regarding urban life.

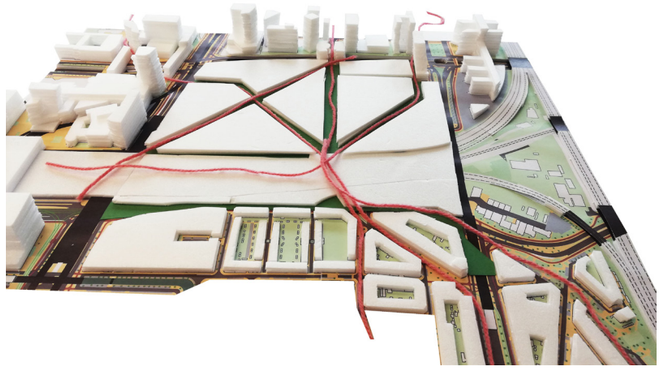
Legend

- = Heightened platform
- = Railways
- = Infrastructural barriers
- = Flow
- = Green space focus
- = Urban focus

Process



Main routes - The main routes derived from betweeness algorhytms, main clusters identification and continuation of existing horizontal lines, structure the design.



Volumes - The volumes carved out by this main network serve as the first urban life layer in direct connection to the main routes and human scale.



Blocks - Superimposing a finer grid (albeit for now random) creates the first building blocks and network of the design.



Heights - Assessing the first scenarios stated, the design follows a first height responding to context strategy. The middle keeps more 'rust' character while the edges with more traffic are more dense.

F149 - 3D physical model process

Result



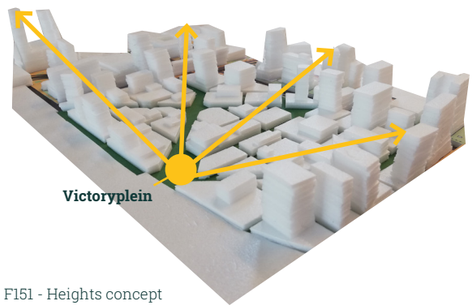
F150 - Overview of 3D physical model

The result of the first 3D study is a first outline of the new Victorydistrict. There were various scenarios tested for the plan area. Variants in Metromix, building heights, densities and environments were tried.

The 3D study showed that building heights reacting to surrounding heights and progressing down towards the centre, delivered the most interesting eye perspective result. Throughout the new district a clear layered urban environment can be experienced. Central is the Victoryplein in this experience. From there user flows will be guided in different directions.

The configuration of the main pathways and sub pathways create centralities on certain positions. Here building heights and densities respond to these higher centralities by being slightly higher.

Together these measures contribute to the first variant of the Victorydistrict. In further iterations the heightened district will be added to the 3D testing. For more advanced testing, the preliminary 3D results will now be further tested in a digital 3D model.



F151 - Heights concept

3D study - conceptual sketch

THE VICTORY DISTRICT

STATIONSPLEIN



Source: Peter Ruge Architekten

F152 - Stationsplein precedent

MONDRIAANPLANTSOEN



Source: Pinterest/Aquaturk

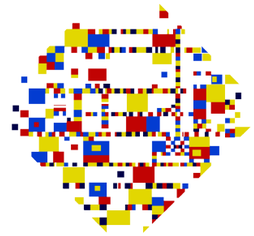
F153 - Mondriaanplantsoen precedent

VICTORYPLEIN



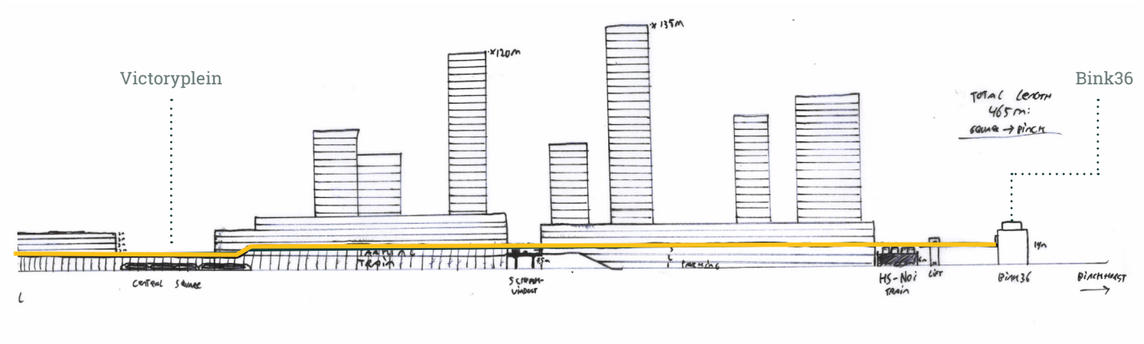
Source: Iwan Baan

F154 - Victoryplein precedent



The design and concept of the 'Victorydistrict' is based on the famous work ' Victory BoogieWoogie' from Dutch painter Piet Mondriaan. This abstract piece display the hustling and bustling of the city. As Mondriaan is engrained in the Hague's identity, the piece signifies the synthesis of this thesis. It combines the network of a city, with a great variety of rectangular volumes and open spaces. The design therefore can be regarded as a 3D version of this masterpiece.

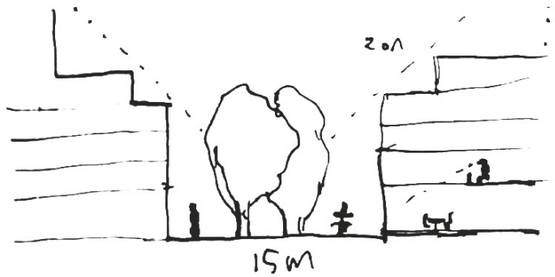
3D study - dimensions of routes



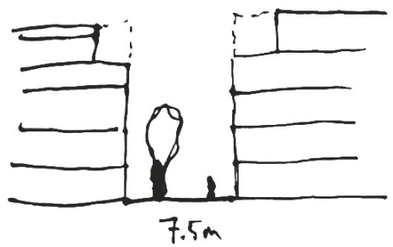
F155 - Conceptual section of officecluster route

The dimensioning of the routes in the district will have to follow the design goals stated previously. This means in order for urban life qualities to exist in the densified areas, certain ratios will have to be followed. Research from the previous chapters of this thesis showed that for the ratio mostly 4-5 layers are acceptable in a street of 7-8 meters, while 7-8 layers can be applied at wider street widths of 14-15 meters. These result in a ratio that supports street life while not being too big for the human scale or too small for the required high density requirement.

The above section illustrates the principle of the heightening of the Spoorcirkel district. It means the pedestrian route will rise 4 meters from the Central 'Victoryplein' Square all the way to Bink36. Underneath this heightened base level parking and amenities for the district can be located. Further design is needed to prevent inhumane spaces to arise. However, due to the limited scope of this thesis, this office district will need further research to fully develop. For this thesis this is not a priority.



Main passageway



Sub passageway

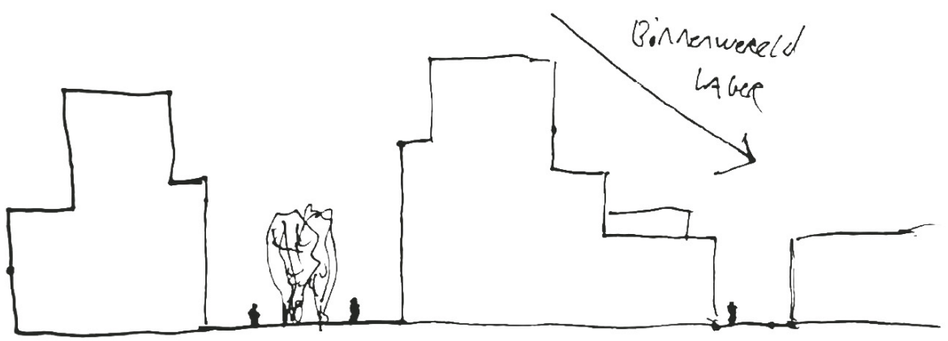
Building onto the conclusions of the research two structuring elements for the district can be identified. One being the main passageway, where the centrality and higher densities require a broader width that corresponds to more active qualities of urban life.

At the other hand sub passageways that are more intimate and have less centrality in the bigger city network will structure the rest of the district. These smaller passageways will have a more quiet character and serve the local residents.

These two structuring elements will outline the district by following the already determined routes between clusters in the CID and directly around the plan area.

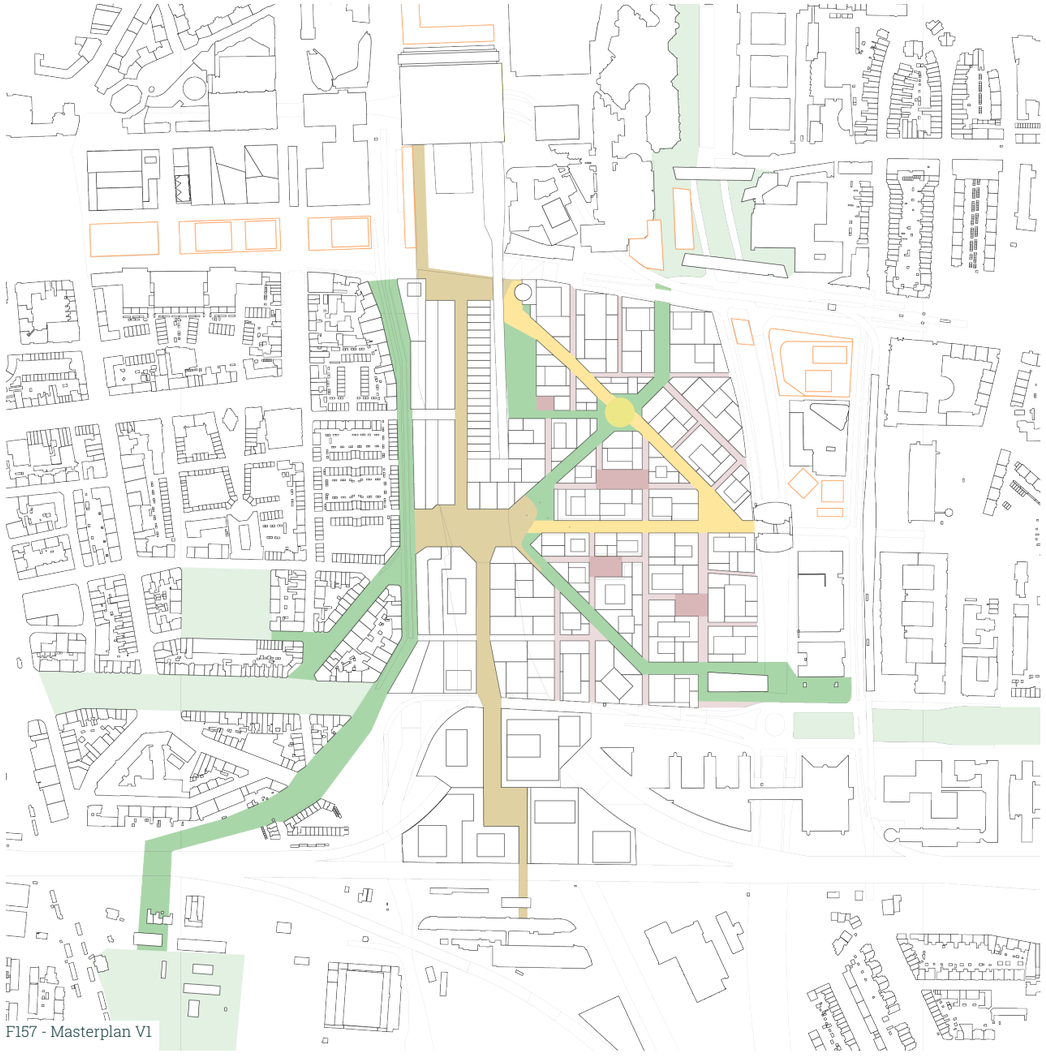
More interesting are the places in the district where these two scale levels will meet. As they have different criteria regarding building height and centrality, smart placement of urban volumes will have to react to the created network.

This is why as a general rule, the more quiet inside pockets created by the 15m streets will have lower building heights. This will lead to a stepped typology of the building blocks. Using the Victory BoogieWoogie again as a starting point, the district will take an explicit shape.



F156 - Hand-drawn conceptual sketches

Plan - Variant 1



F157 - Masterplan V1

Masterplan

This first variant serves as a starting point for the further research-by-design. By making a first version already explicit, it uncovers bottelenecks in the plan and highlights where design iterations are needed to improve the final design.

This plan builds onto the findings of the previous chapters and combines the various scenarios into one holistic plan. The routes are derived from an optimized betweenness and a maximized angular integration. The volumetric properties are derived from the volume study and the quality study. This culminates in high density blocks with select high-rises with setbacks.

New centralities are created through urban form. This results in the Victoryplein as main new attractor and various smaller communal spaces with a more quiet character in the residential zones.



F158 - Functionmix and heights V1

Functions and heights

The true Victory BoogieWoogie is uncovered in both the heights of the buildings, as the functions within. This is a broad mix of offices, commercial, residential and everything in between. Rectangular shapes that are smartly configured along with heightened gardens and intertwined public spaces results in this BoogieWoogie.



F159 - Figure ground V1

Figure ground

In the figure ground the relation with surrounding blocks is displayed. Clear is the higher density and intensive usage of open space. This follows the same principles as an historic inner city: high density but with an interesting human scale public space.



F160 - Figure ground present day

Present day situation

In the present day situation the gap caused by the various infrastructural barriers in the area is easily spotted. Moreover, Bezuidenhout-West is now an isolated piece of the city, very close to the city centre.



F161 - Figure ground new situation

New situation

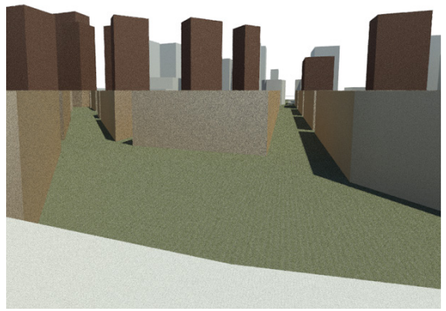
In the new situation the significant densification results in a razing of infrastructural barriers for pedestrians and attractive new routes that interconnect the clusters of the CID.

Eye perspective 3D iterations

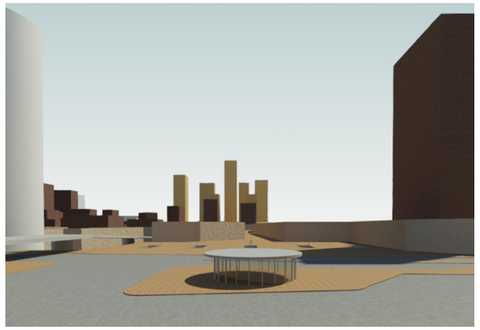
View from Victoryplein

View from Stationsplein

Iteration 1

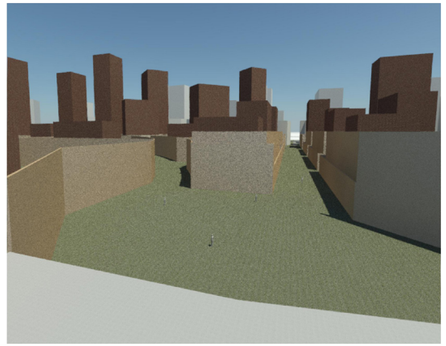


Straight lines accentuating the different routes

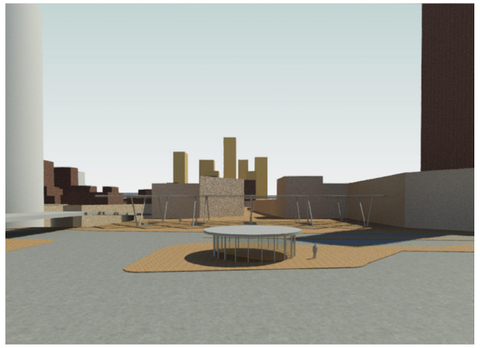


Basic volumes and connection to bus platform

Iteration 2

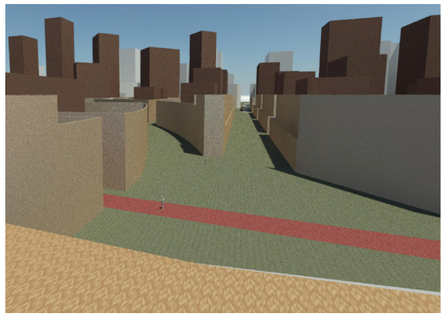


Slight curve in order to make the path more interesting

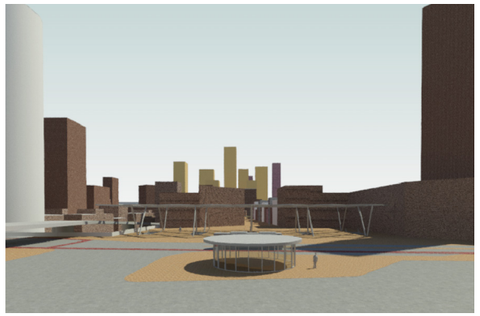


Adding new station entrance and adjusting heights to centrality

Iteration 3

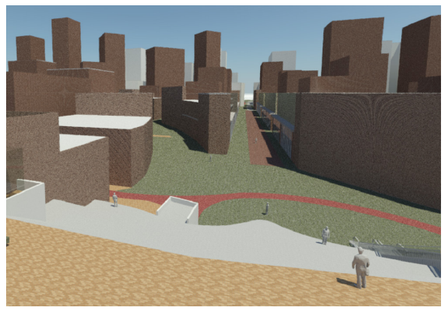


Correcting configuration for human scale square



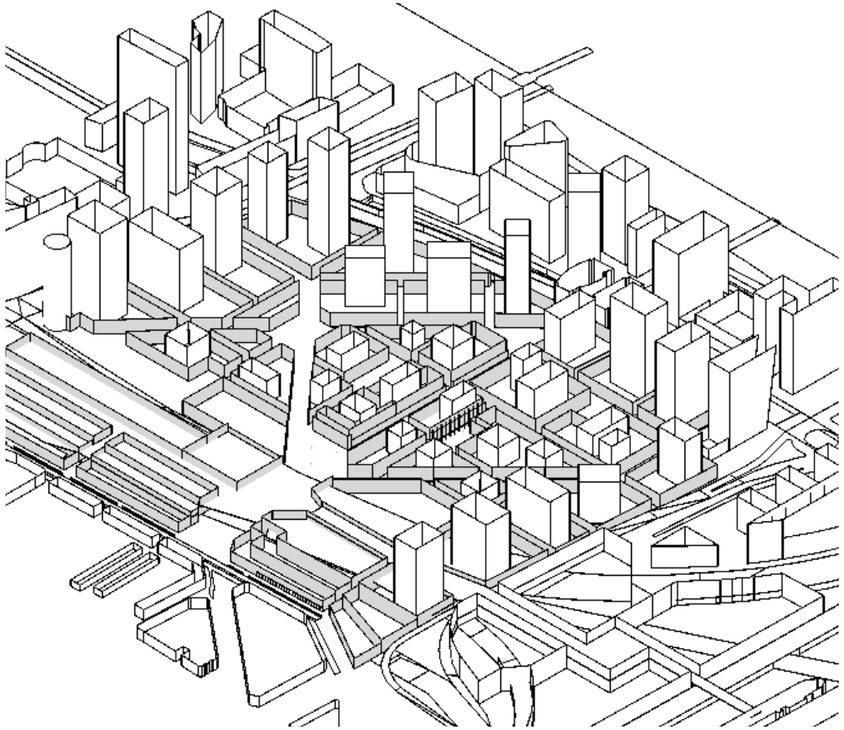
Define heights, bicycle paths and other detailing

Iteration 4



Adding stairs, adjusting heights and overall design

F162 - 3D iterations eye perspective

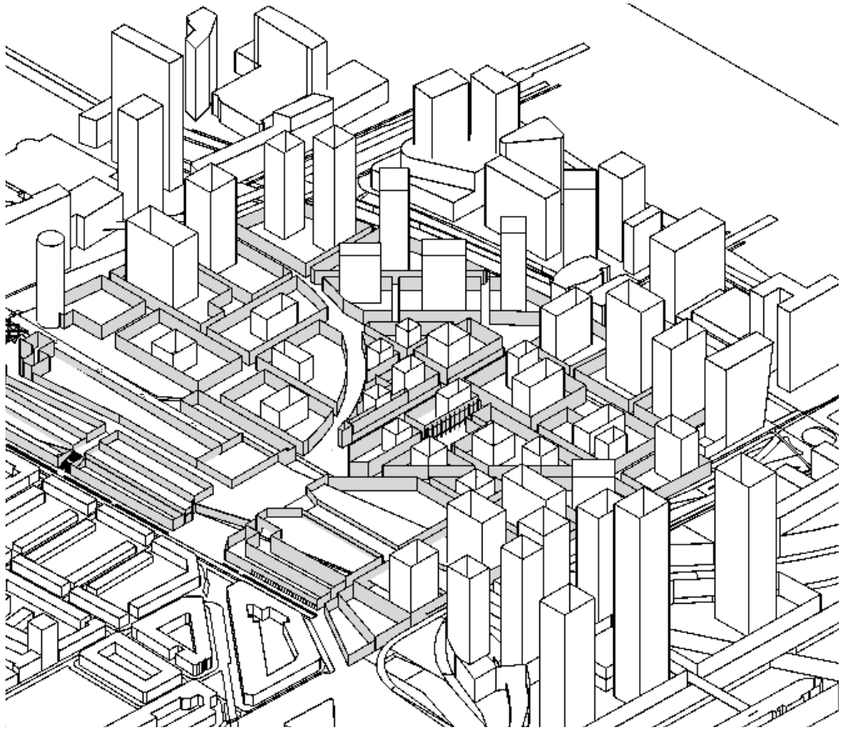


F163 - Isometric overview V1

Isometric view: variant 1

The isometric view of the first design variant shows the concepts already pretty well. Building heights and their stepped buildup from the central point is visible.

What lacked in this variant was the main street structure that lacked place specificity. This resulted in some suboptimal encounters with volumes.



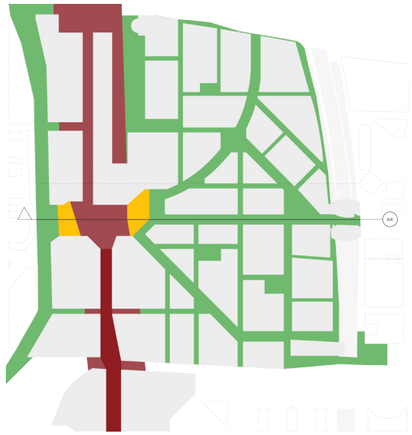
F164 - Isometric overview V4

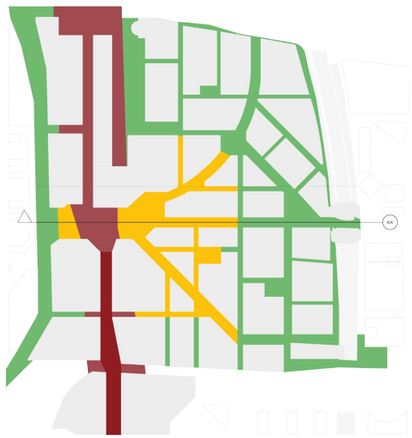
Isometric view: variant 4

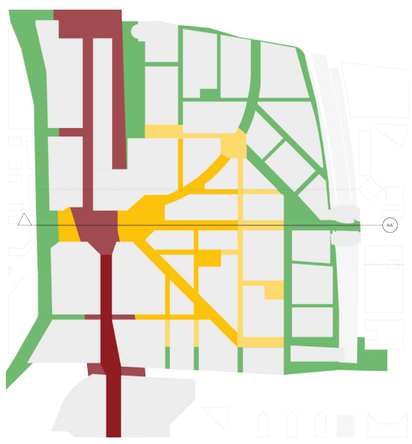
After various iterations, this variant shows a more nuanced and developed structure of volumes, streets and open spaces. Also the tower-cluster of the office district in the Spoorcirkel was added to more extensively research the effect of towers on the eye level perspective.

District scale iterations

Height difference Victorydistrict







F165 - Maps and sections of height difference scenarios

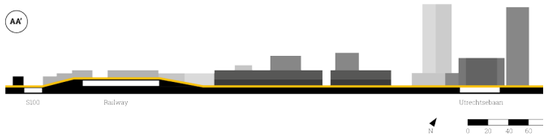
12m 8m 4m 2m 0m

High Low

1: Victoryplein terraces *Chosen option*

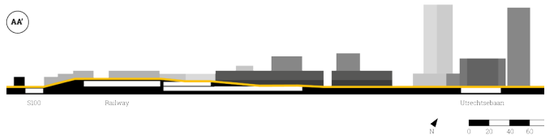
The first option limits height differences to the central Victoryplein. On both sides it will handle the 8m difference with terraced public spaces and greenery. The Victorydistrict will mostly be located on the same height level as the environment.

Assessing the feasibility of the project, this option is chosen for further study.



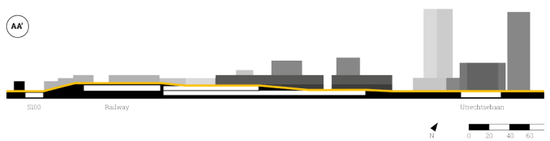
2: Middenstad

This option takes inspiration from the height differences in Leidsche Rijn Centrum. It constitutes of a bovenstad and a benedenstad which is then transitioned in a Middenstad. This way the height difference will be more subtle, while at the same time surprising vertical relations can emerge throughout the district.

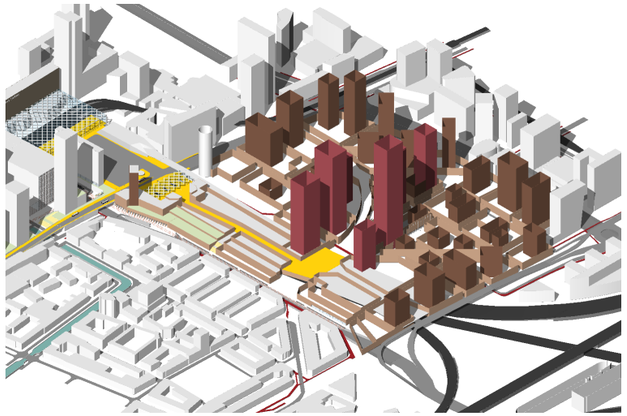


3: Subtle differences

The last option has the most subtle approach to the height difference. The slope will be more spread out throughout the district. Under the slopes parking garages can be located, adding to the functionality of the height differences.



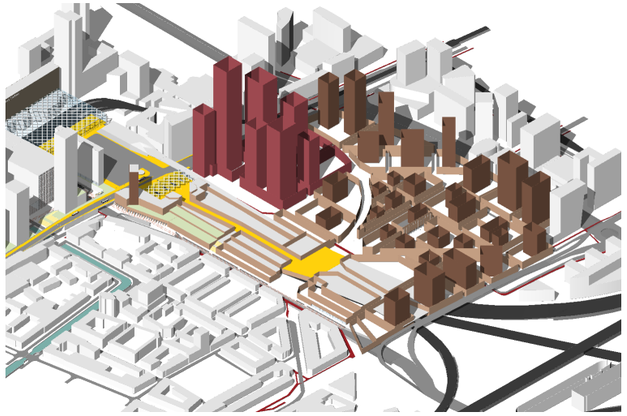
Location of office highrise cluster



F166 - Highrise cluster location scenario 1

Scenario 1: Centralised officetower axis

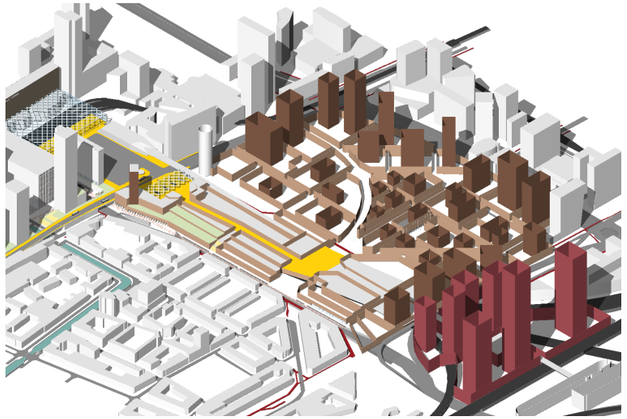
In this scenario towers will be placed along the 'Hoogstraat': a line between two public transport stops and close to the main 'Victoryplein'. Doing this will result in a high grade of centrality in the 'Hoogstraat'. However, It will negatively impact urban life because of its height.



F167 - Highrise cluster location scenario 2

Scenario 2: Transit Oriented Development towers near Centraal

In this scenario the officetowers are placed closely to the additional station hall of Centraal. This will result in a good practice of TOD. Moreover, urban life is still allowed to take place in the central parts of the Victorydistrict. The parking/supply pressure however will be huge and a spatial challenge.



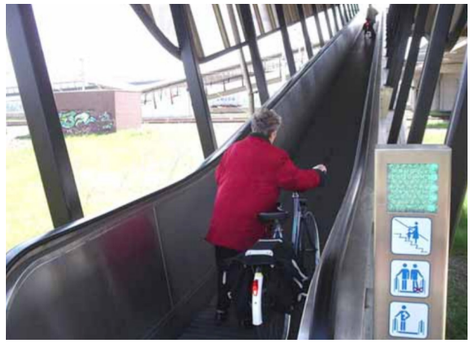
F168 - Highrise cluster location scenario 3

Scenario 3: Railway circle *Chosen option*

The last scenario places the officetowers in the currently unused Spoorcirkel. Doing this will mean creating a perfect central place between the three main trainstations. This will however lead to longer walking routes. At the other hand, the location is directly connected to the S100 ringroad and parking can be an ideal infill of the lower floors surrounded by railways. The cluster can also serve as a new attractor leading to much wished pedestrian streams through the main streets of the new district and an extra connection to the Binckhorst.

Victoryplein iterations

Height difference for bikers



F169 - Rollend tapijt near Heijplaat Source: Intergo

Rollend tapijt or stairs/lift

'Rollend Tapijt' can help bridge the height difference in an acceptable way for bikers, while limiting the required space. As the height that has to be bridged is 8 meters, ramps will need a high amount of space to be able to make the ride acceptable.



F170 - Bridge over Rijnkanaal Source: IPVDelft

Compact ramp

The 'Liniebrug' crossing the Amsterdams Rijnkanaal has a height difference of 10 meters. To be able to make the rise acceptable for bikers while at the same time maintaining landscape integrity, the bridge has a dwindling ramp. This might be a solution for the limited space near the Victoryplein.



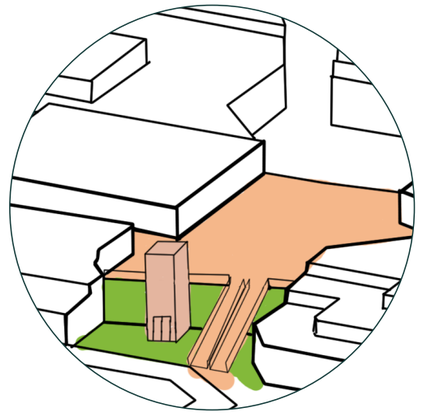
F171 - Bypass scenario map

Bypass

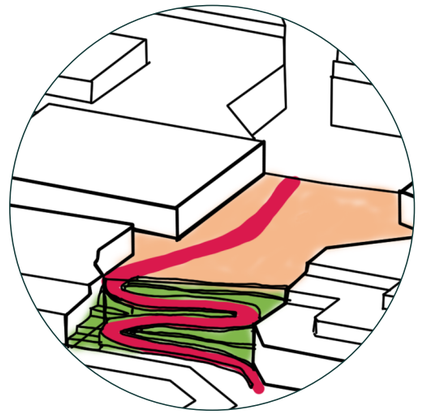
Chosen option

By adding a ramp in the space of the former Schenkviaduct, Bicyclist can comfortably ride around the Victorydistrict not dealing with sudden height differences. However, the district itself will have less activity and the routes will be less attractive for bicyclists, being mostly located near big car roads.

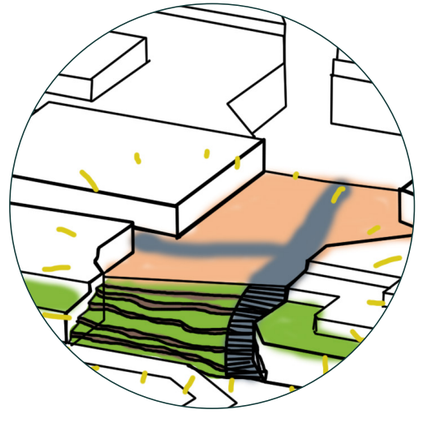
As the height difference is quite an obstacle and the bypassing routes work also in the bigger system, this option is further used.



Rollend tapijt or stairs/lift



Compact ramp

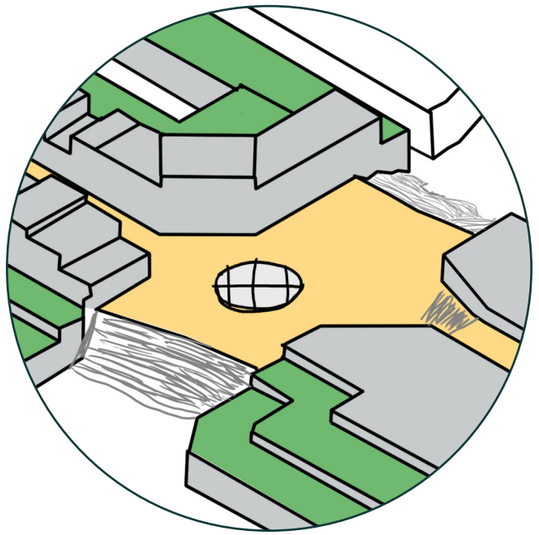


Bypass

F172 - Bicycle scenarios sketches

Victoryplein iterations

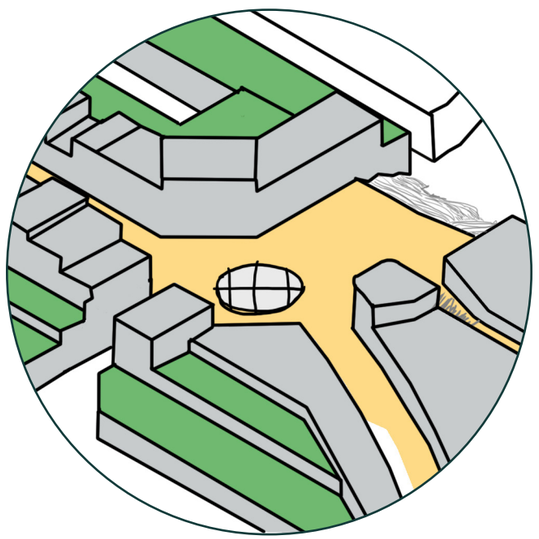
Optimization of configuration, flows and volumes



F173 - Victoryplein initial design sketch

Initial design

In the initial design of the Victoryplein the two sides of the platform were regarded more or less equal. This would result in stair elements at both sides making the configuration of the total square like a cross. The advantage of this form is that each of the sides would get more or less the same importance in the total functioning of the space.

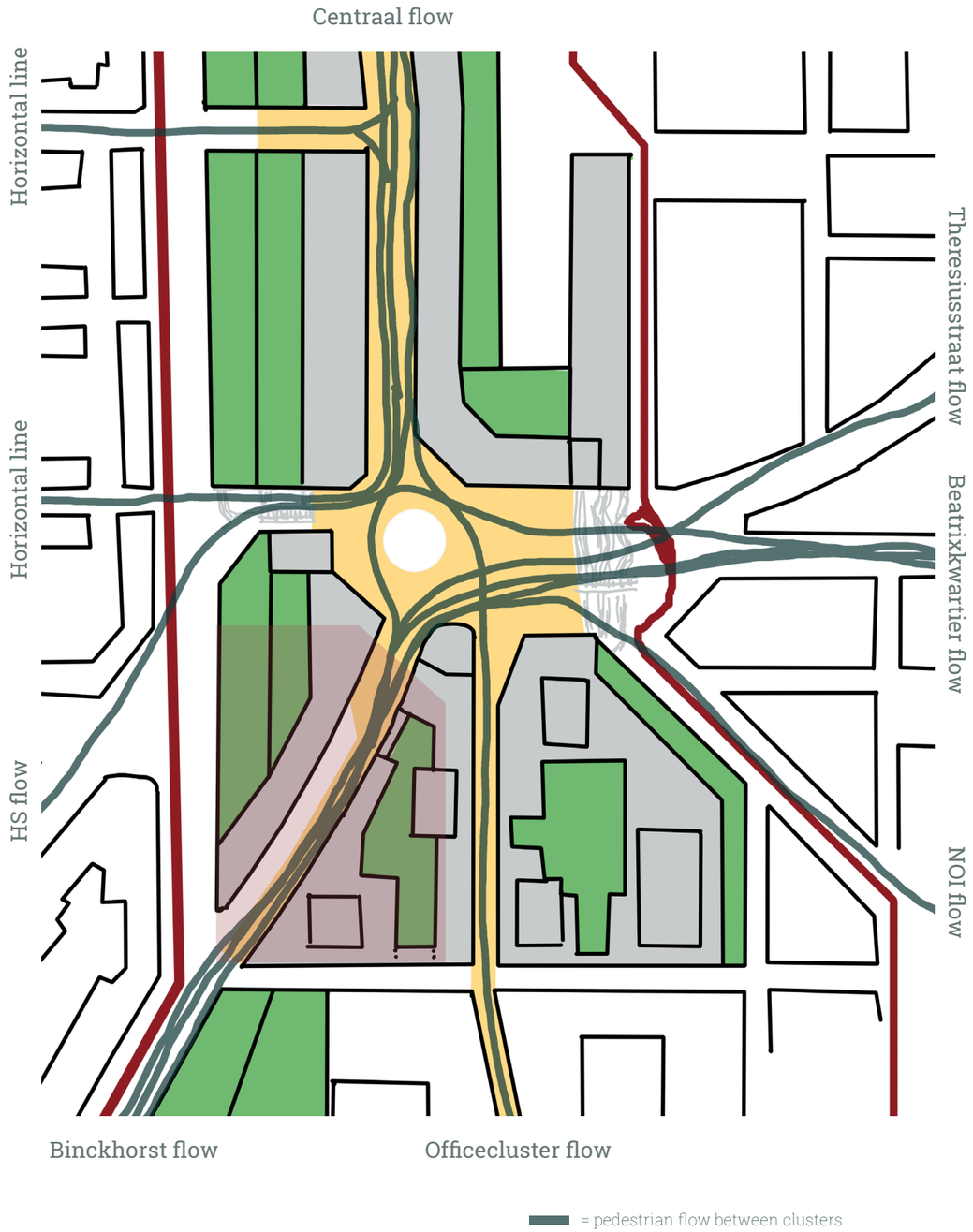


F174 - Victoryplein redesign sketch

Redesign

Chosen option

Further flow analysis based on betweenness patterns and optimal angular integration showed that the biggest flow: that from the Binckhorst cluster towards the Centraal cluster and vice versa, would rather follow the street on ground level as this resulted in the smallest amount of angular encounters. This resulted in the redesign of the square that follows the main flows of the area more.



F175 - Conceptual map of Victoryplein and flows

Stationsplein iterations

Optimization of configuration, flows and volumes



F176 - Stationsplein scenario 1

Scenario 1:
No Koningstunnel entry tunnels

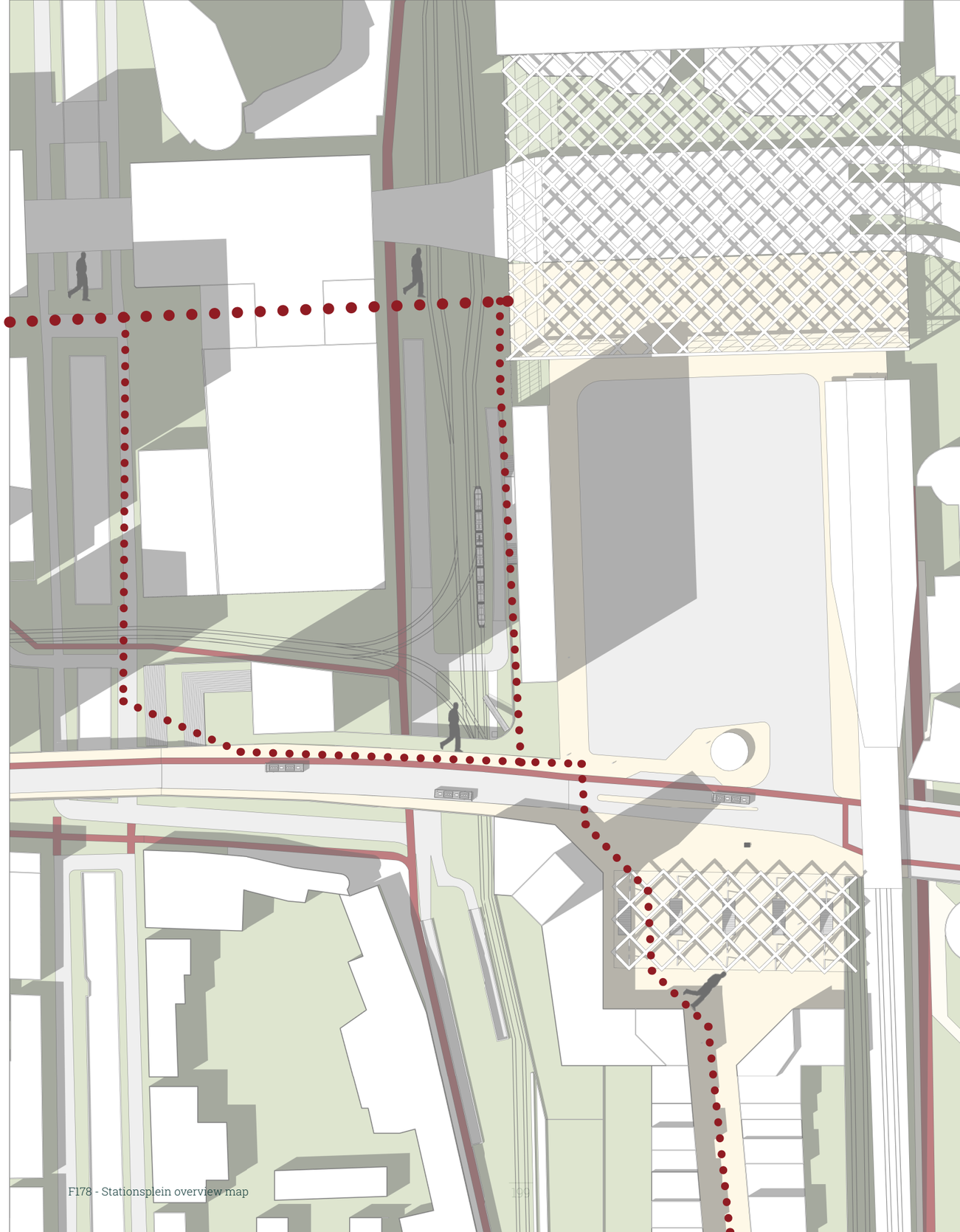
Public space takes over the infrastructure heavy crossroad. Verticality is solved by terraced greenery and attractive paths.



F177 - Stationsplein scenario 2

Scenario 2: *Chosen option*
Adapting to Koningstunnel entry tunnels

Public space solved more vertical using the planned developments, avoiding the busy tramways and entry roadways of Koningstunnel/S100.



F178 - Stationsplein overview map

Integrated scenarios

SQ4: Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?

In chapter 8 a first part of subquestion 4 was answered. However, because of the complexity and the multifaceted nature of urban life, a complete answer could not be given. The previous chapter added explicit research-by-design to help answer what scenarios will connect the CID clusters in an urban life way.

The chapter started out by determining the actual plan constraints in order to be able to focus the design. After this various scenario's regarding building heights, environment, atmosphere and densities were considered. Design goals that are a synthesis from the previous researches to urban volume, network and quality guided the design choices.

From here, a physical 3D model study was carried out. Here the concept of building heights, main routes and the relation of the plan area to its context were made explicit. Various iterations and fixed dimensions/ratios derived from urban life theory, culminated in a first masterplan. From there, more iterations in various themes and scales synthesized in a complete design for the plan area.

Using this research and the explicit design choices, one can answer the fourth subquestion *'Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?'.* ***In order to optimize urban life in high density configurations and at the same time mitigate the negative effects of density, the design scenarios have to explicitly be tested in the specific CID plan context. This means more broad scenarios will not suffice in creating urban design scenarios that actually work. This is because of the multifaceted nature of urban life. It is a broad term for various aspects of urban design, being urban green space, density, building heights and all other aspects assessed in this thesis. These aspects can hardly be well described in big scale scenarios. Design in both the micro-, macro- and mesoscale is therefore needed.***

From the research-by-design one can clearly conclude that incorporating urban life in the compact city is a continuous balancing act that is best tested by 3D methodologies. Gaining an eye level perspective of the actual implications of design choices helps in assessing if it is acceptable regarding an urban life/human scale standpoint. Other methodologies like mapping and sections helped in explaining the concepts, but not in the actual testing of concepts.

The design scenarios that are able to connect the clusters in a human-minded way are found in a combination of the tested options in this chapter. Each having different implications when combined with the other scenarios.

For this thesis, a combination of the scenarios that were valued as most corresponding to the criteria 'urban life' and 'feasibility' will be elaborated further in the next chapter.

Conclusion SQ4
(part 2/2)

10 DESIGN ELABORATION

Contents

The optimized CID

Masterplan

Sections

Isometric overview

Detailed designs

Subthemes

Phasing

Assessment of design

In this chapter a selection of the assessed design scenarios for the plan area in the previous chapter will be combined on various scales. This will lead to a holistic design dealing with multiple design disciplines, being architecture, landscape architecture and urban design.

Related researchquestion:

Main research question: How can the clusters of the Central Innovation District be interconnected and densified in an urban design that uses urban life principles to optimize high density living and mitigate the negative effects of the compact city?

THE OPTIMIZED CID



F179 - Infill map with clusters and flows

N

0 100 200m

This map illustrates the incorporation of the design in the total Central Innovation District area. Visible are how higher centralities between clusters also lead to wider pathways, while less integrated routes lead to smaller pathways and lower building heights, resulting in more quiet living environments.

The constant balancing act of creating urban life to optimize higher density living leads to these choices in the three urban life areas:

Volumes
Routes between CID clusters with higher centralities result in volumes with higher densities, heights and mixed uses, while lower centralities lead to lower densities and more quiet residential zones.

Network
The new network arised from an optimized shortest path and lowest angular encounters pedestrian space syntax analysis. Other elements were existing infrastructural constraints as well as the feasibility of buildings that could be demolished. Routes with higher centralities have a bigger width, while routes with lower integration have smaller widths. Blocks with higher densities have select access to car-allowed streets, while streets in lower densities are completely car free.

Quality
Building heights respond to the street widths. This results in fixed ratios of building-to-street that correspond to urban life indicators. Highrises are incorporated by stepped increases in heights, responding to surrounding buildings. The district has a pronounced pedestrian focus and applies the lessons learned in the quality chapter.

Legend

= Green roof
= Railways
= Infrastructural barriers
= Flow

F180 - Masterplan Victorydistrict

MASTERPLAN

In the masterplan the design proposal for the plan area is displayed. Visible are the different public spaces and routes through the area. The plan consists of a heightened district above the railway emplacement. Here a distinct yellow brick mix is chosen to highlight this. Using the busplatform at Centraal and a new added station hall, the Victory-district becomes easily accessible from the Centraalcluster.

The Victoryplein is the heart of the project. Here the railway emplacement can be crossed qualitatively using a sculpted staircase and elevators/ escalators for vertical movement. Here a replica of the 'Victory BoogieWoogie' of Mondriaan is paved on the surface. Direct and attractive paths to all relevant clusters of the CID come together at this point, creating centrality and urban vitality. This makes the big infrastructural barrier of the railway emplacement easy to cross.

In the district itself a high density is created by using smart principles for maintaining human scale. Principles like setbacks, height restrictions and a gradual build-up to the existing context, make highrises on select locations not only acceptable, but also functional to foster a critical mass of users for shops and amenities.

These are in turn located along two specific axes that can easily be supplied during closing hours and have building-to-street ratios of an historic inner-city.

The Hoogstraat is the most central part of the district. It is also in the axis between two public transport stops and connects the Beatrixkwartier with the other clusters. This makes a high-urban pedestrian atmosphere justified and feasible.

Lastly, a green corridor lingers throughout the district, serving both as an attractive direct route between CID clusters and as an ecological zone connecting the river Schenk with the Haagse Bos.

materials



Yellow brick pavers

Usage: Heightened district

Bond: Running



Red brick pavers

Usage: Hoogstraat

Bond: Running



Lightbrown pavers

Usage: main passageways

Bond: Herringbone



Grey brick pavers

Usage: Sub-passageway

Bond: Running



Sawed granite

Usage: Victoryplein

Bond: Header (sawed side)



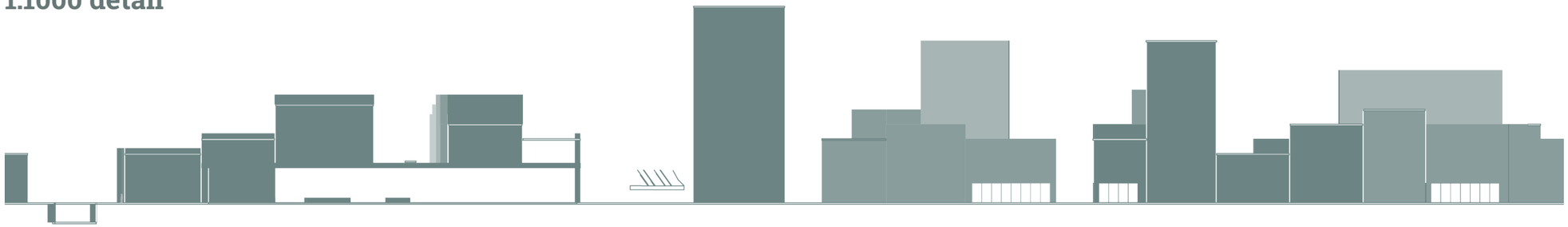
Mixed blue-brown pavers

Usage: Local shopping corridors

Bond: Running

F181 - Brick paving material samples

1:1000 detail



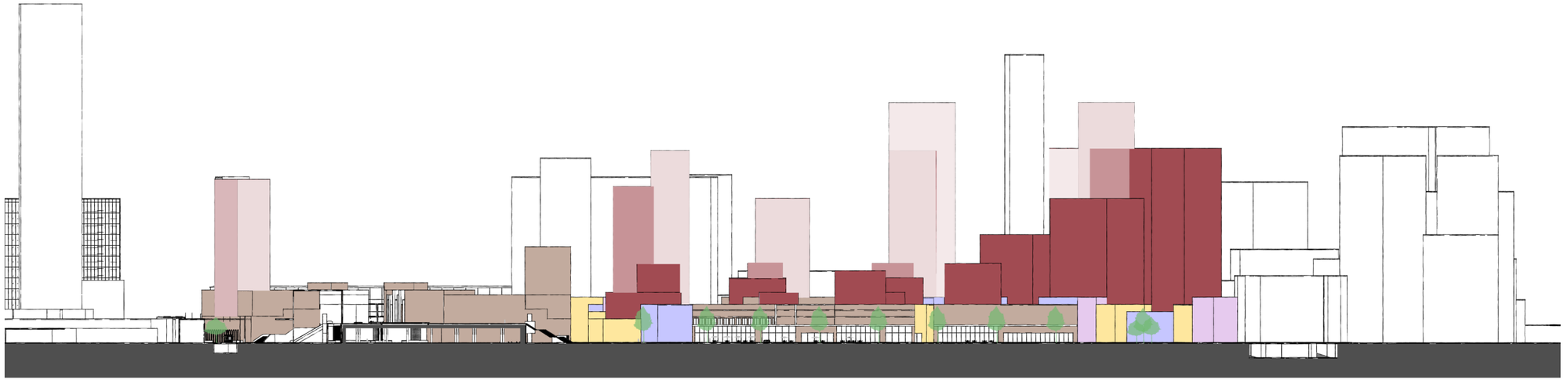




TECHNICAL SECTIONS

East to west section

1 : 2000





F183 - Section EW Victorydistrict

South to north section

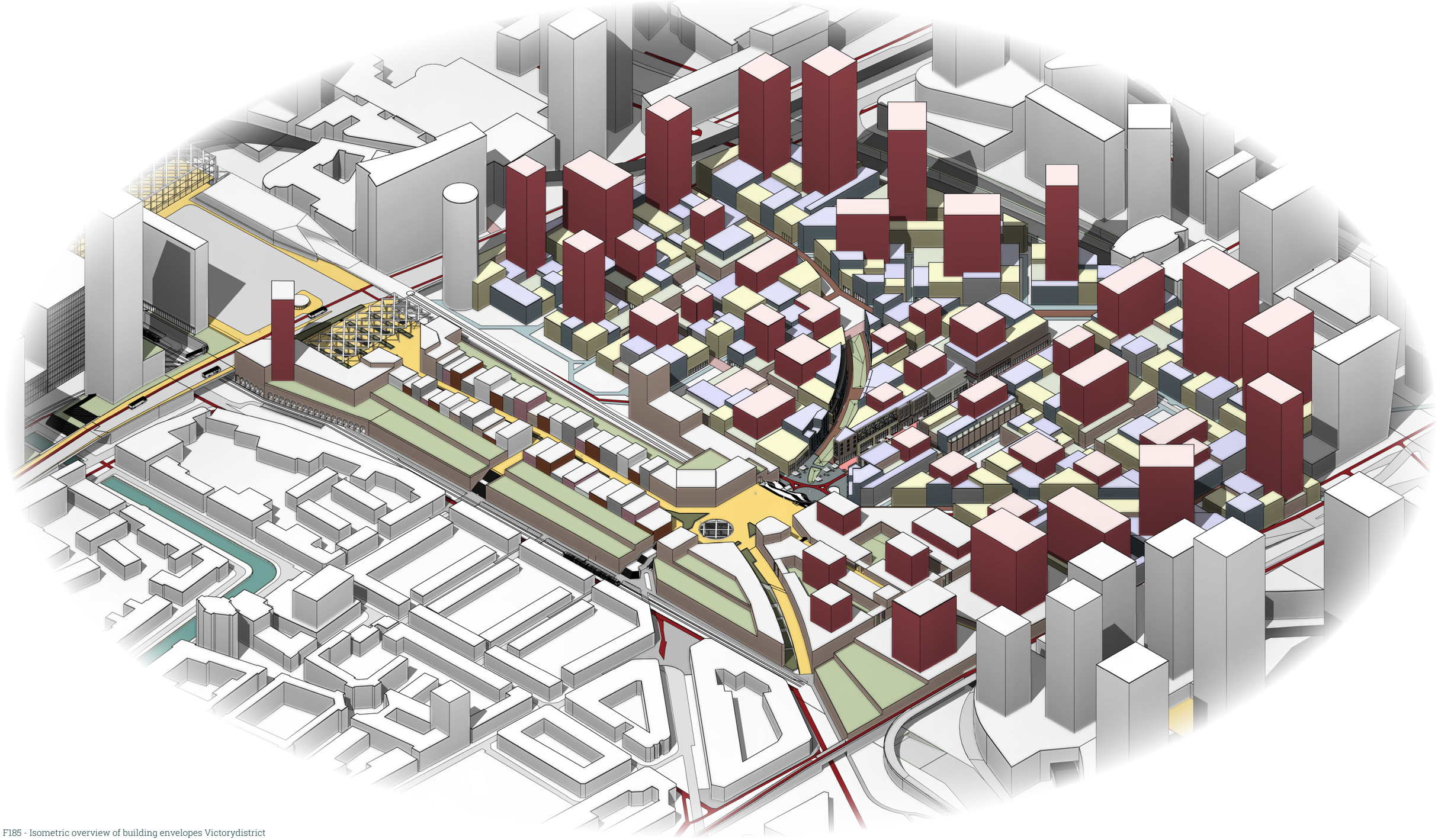
1 : 2000





F184 - Section SN Victorydistrict

BUILDING HEIGHT ENVELOPES



F185 - Isometric overview of building envelopes Victorydistrict

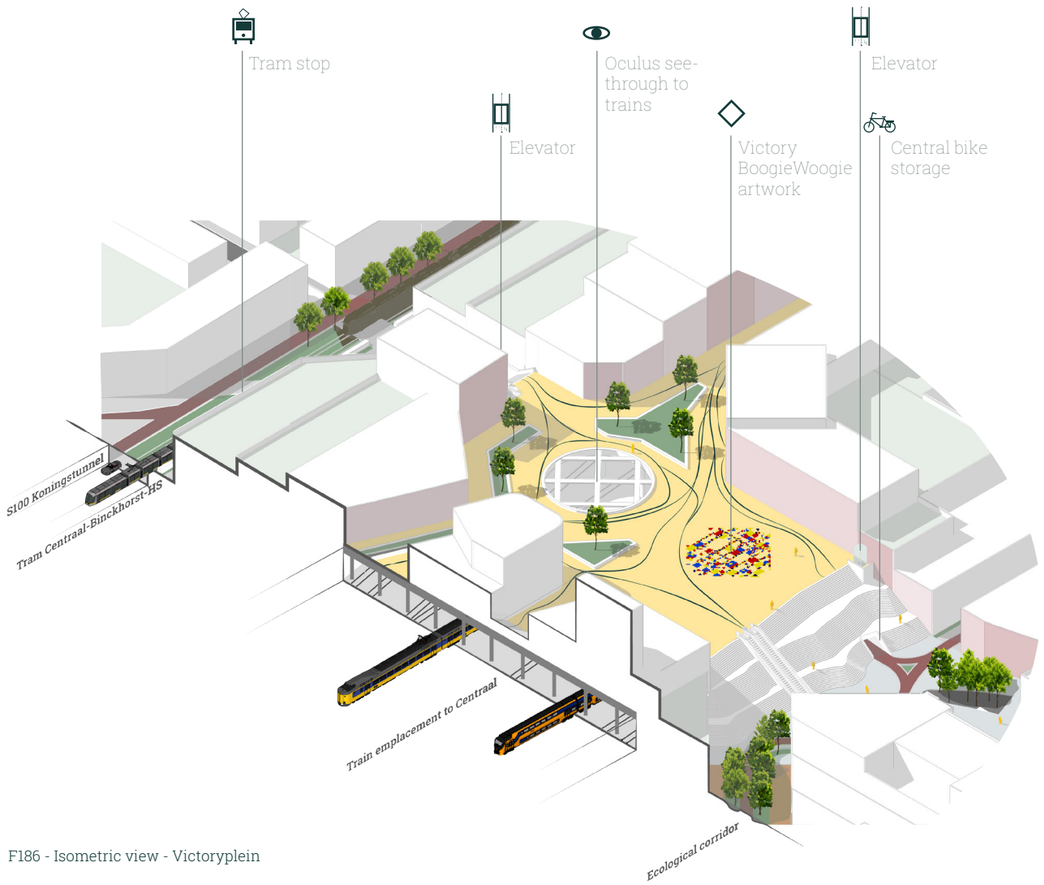
DETAILED DESIGNS

Victoryplein

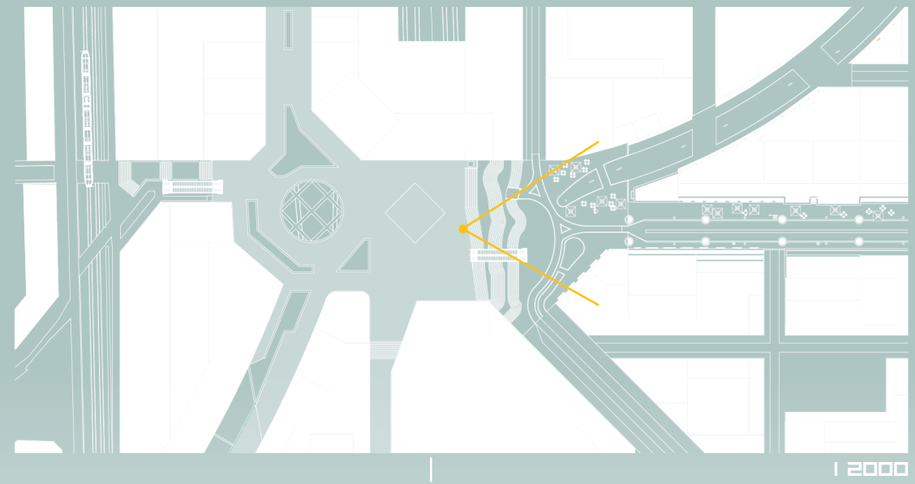
The Victoryplein serves as the central heart of the Central Innovation District. Here shortest paths to all clusters can cross the railway emplacement. Monumental stairs cross the 8 meter height difference. Under the stairs a bike storage is located, making use of all spaces. Because of the big amount of pedestrian flows coming together at this point, functions that need a high grade of centrality are feasible. This encourages the mixing of uses and short distances for residents to amenities.

Central in the square is a circle window showing the trains driving underneath. Next to this is a replica of the 'Victory BoogieWoogie' placed on the ground surface. Escalators and elevators on both sides makes sure the height difference can be crossed by all modes of slow traffic. Building heights and façades differ, suggesting a historic inner-city shopping street.

Standing on the 8 meter high platform and looking east towards the new district results in the view on the right page. Here various urban life principles are visible, while at the same time highrises are present. The first 7.5 meter is the most important, here street life takes place. Above this the next 3 or 4 layers (depending on street width and centrality) have a direct connection to the street with clear sightlines staying well within the 25m social range of human vision (Gehl, 2013). Above this section, highrises building up to context are located after a minimum 3 meter setback.



F186 - Isometric view - Victoryplein

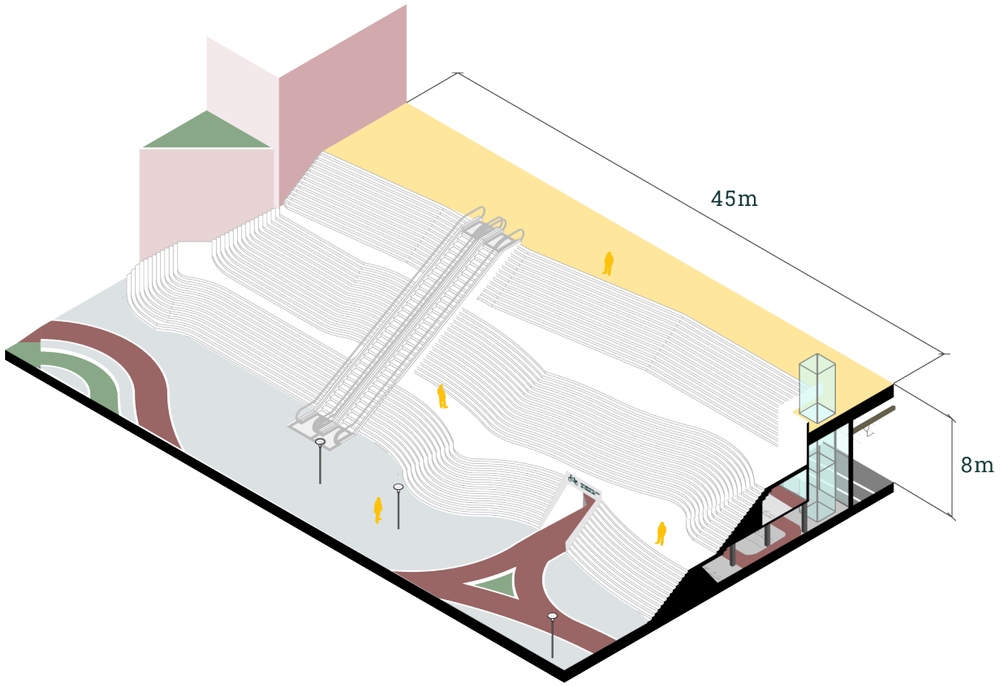


VICTORYDISTRICT



F187 - Victoryplein render

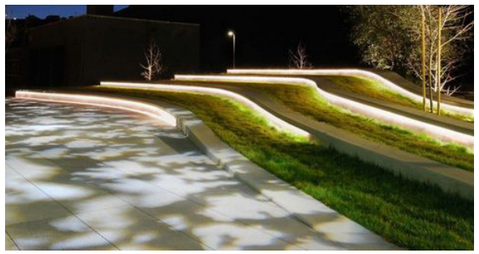
The grand stairs



F188 - Isometric view - The grand stairs 1 : 500

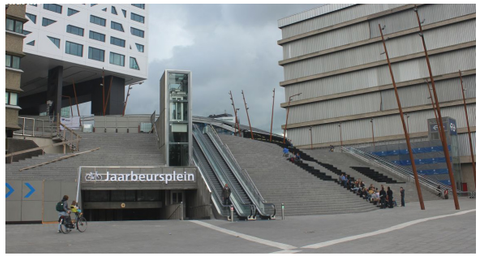
0 5m 10m

Precedents



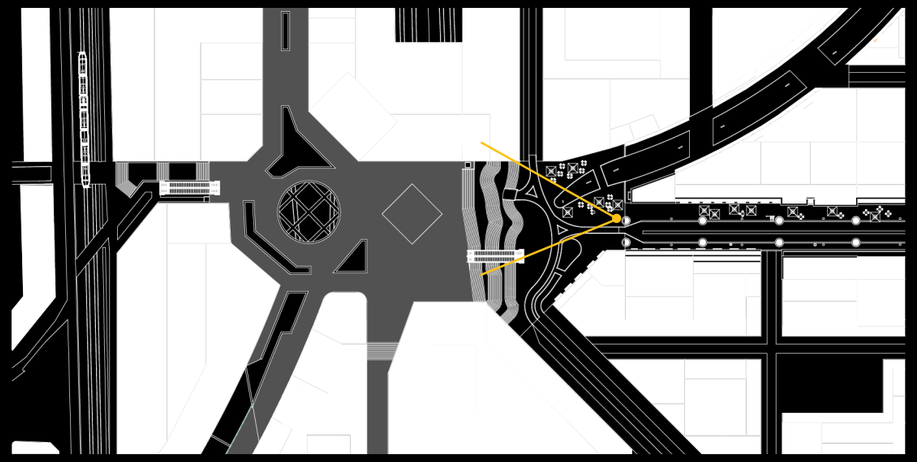
F190 - LED-lined steps Source: FVT Leds

As safe and well-illuminated spaces are a prerequisite for good walkability (Forsyth, 2015; Gehl, 2013), the landscape architecture and lighting plan of the spaces will serve a crucial role in elevating the spaces to places. These led-lined steps make for an attractive aesthetic and makes it safe to move up the stairs during nighttimes.



F189 - Jaarbeursplein, Utrecht Source: Rob Hendriks

The Jaarbeursplein in Utrecht is a good example how a significant height difference can be used to create a social space. The place is now used intensively for events, protests and general urban life. Within the stairs, a big bike storage is located, cleaning the street from stray bikes and making it an attractive mode of transportation to the railway station.





Hoogstraat

As the Hoogstraat serves a vital connection between the Beatrixkwartier and the Victoryplein, along with being the connection between two public transport stops, a high centrality is located in the street. This means various public functions are feasible in the plinths, with especially hospitality functions staying relevant for the future. The design of the street therefore focuses on an optimal form of both a high quantity of program/housing and urban vitality.

Street life is important for these goals. Therefore highrises will be put after a setback, sun and shade will be optimized using terraced volumes and wide pavements will allow space for sidewalk cafes on the sunny side. The street is an important connection, but also needed for logistics of the functions. Therefore it will be designed as an autoluw zone, with focus on the bicyclist. Heights follow the prescribed patterns of the urban quality chapter. This ensures the human scale in the street.

Urban greenery can be found along façades and in the street trees. However, because the primary focus of the street is on a more urban atmosphere, greenery will not have to have the same quality as in the ecological zones of the district. This makes the Hoogstraat feasible for higher urban functions and gives space for these activities.



F192 - Hoogstraat concept sketch



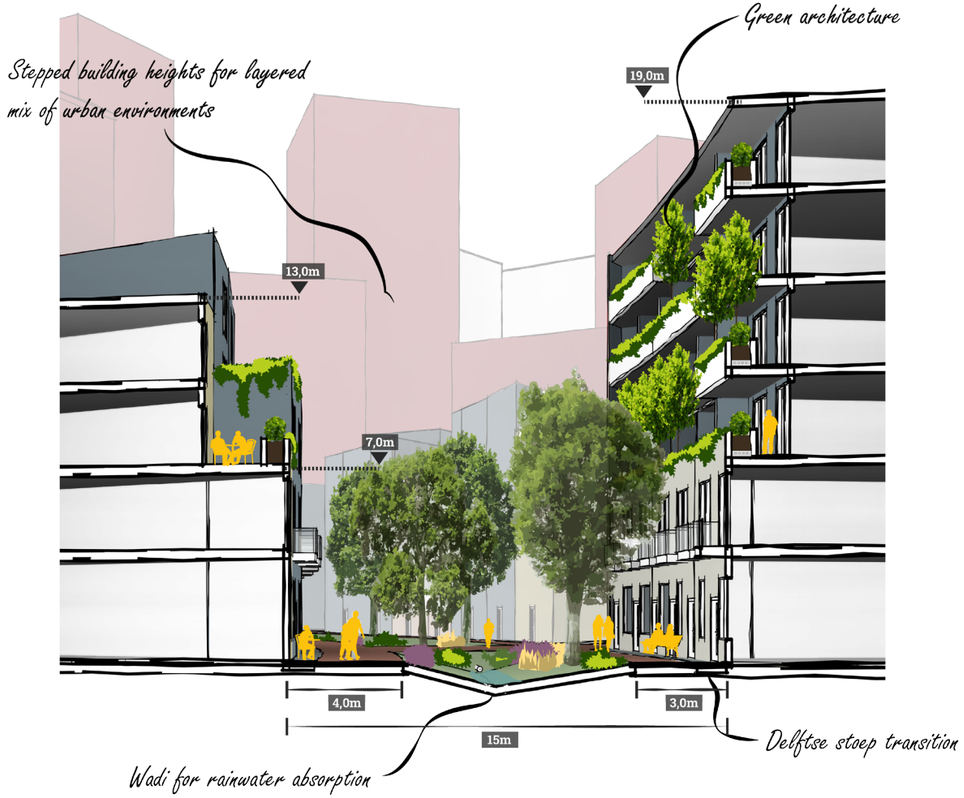
F193 - Hoogstraat render

Ecological zone

The ecological zone running through the project area connects the river Schenk with the Haagse Bos. As the profile is only 15 meters wide, no clear and obvious precedents are found of such a small ecological zone. However, recent discourse on urban green space (Haaland, van den Bosch, 2015) has focused on qualitative multifunctional green spaces in very compact urban configurations. Therefore the future compact city might very well need more compact zones of qualitative greenery.

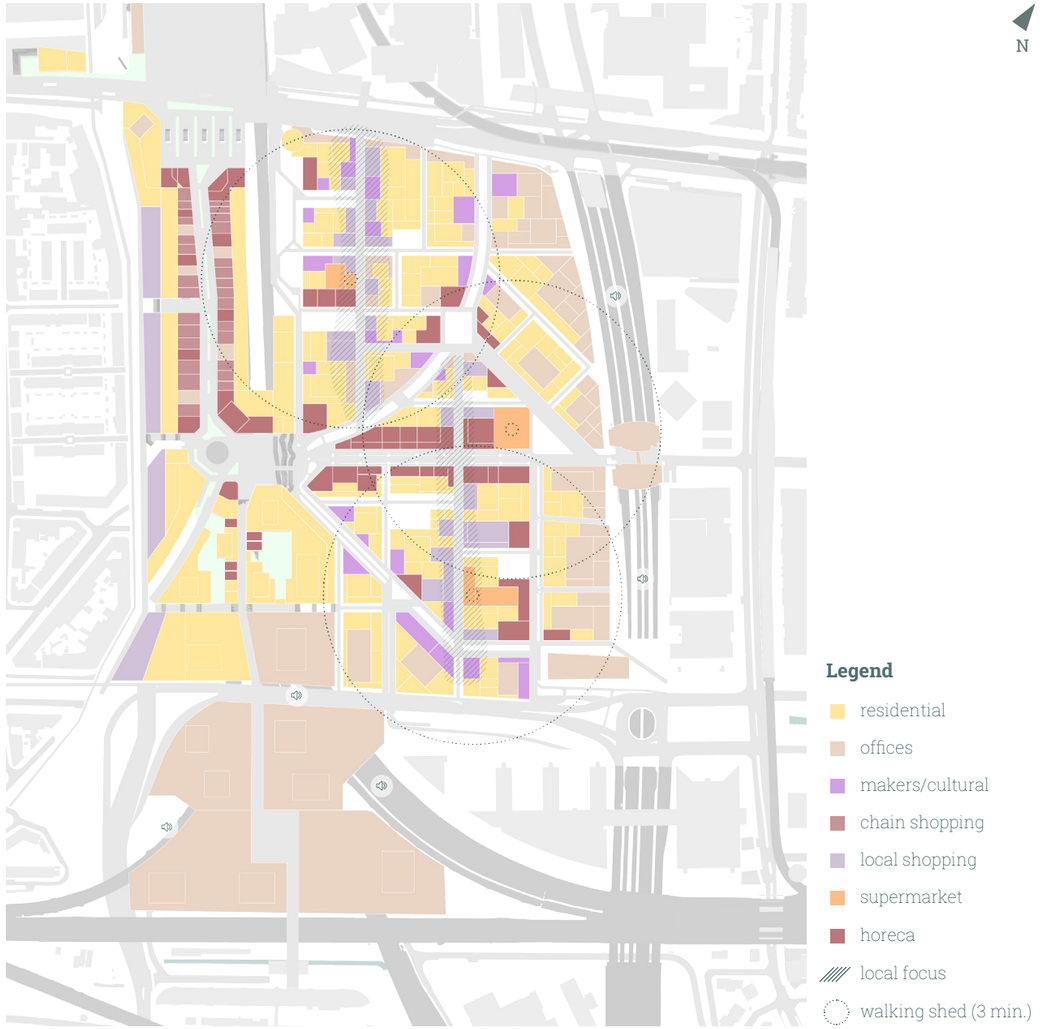
In the Victorydistrict, this zone serves multiple purposes. It serves as an addition to water retention by functioning as a wadi, it attracts insects with lush greenery that is feasible because of the high densities surrounding it and it provides residents with much needed social spaces for neighbour gatherings. As described by Raman (2010), communal spaces in high densities play an important role in reducing distance between neighbours in a social network and in promoting social interaction in general.

The design of the zone is geared towards these goals. The transition between public and private is kept quite hard. This to encourage residents to see the public space as a extension of their private realm, encouraging usage. Moreover, green architecture in the façades contribute to the space, improving the ecological value and underlining the atmosphere of the zone.



F194 - Ecozone concept sketch

Street level program



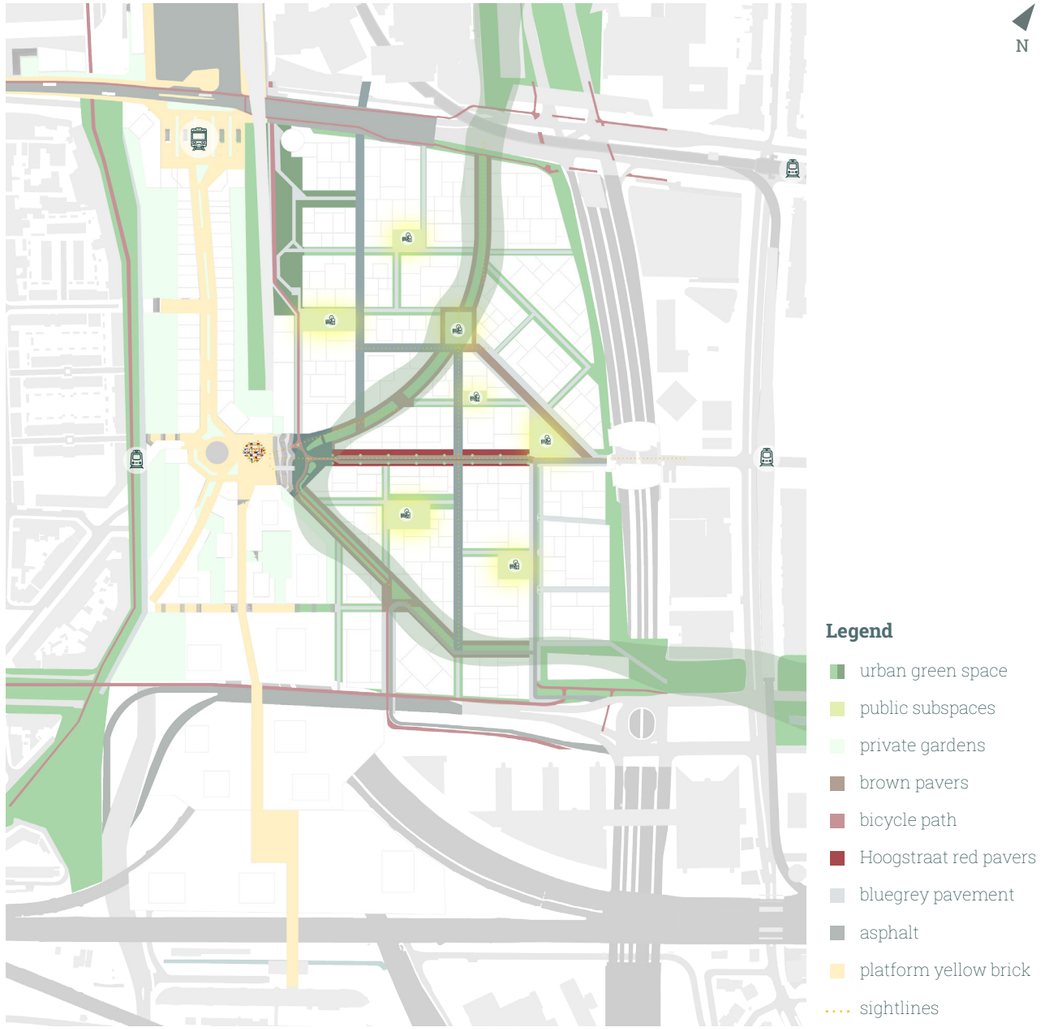
F196 - Street level programmatic ambition

Smart mixing

The program of the volumes on street level greatly influences the urban life properties of the street (Gehl, 2013). The plan mixes the various functions on ground level according to the network and volumetric properties. This means streets with higher centralities and pedestrian flows will get a more public program and open plinth character. Restaurants and cafes will mostly be concentrated in streets with high pedestrian flows, while residential functions are grouped more around quieter squares with a lower flow.

Office functions are mostly located around the edges as they are more resilient to sound. Moreover, a distinction in shopping streets is made in local (like bakeries, butchers) and more citywide program.

Public space



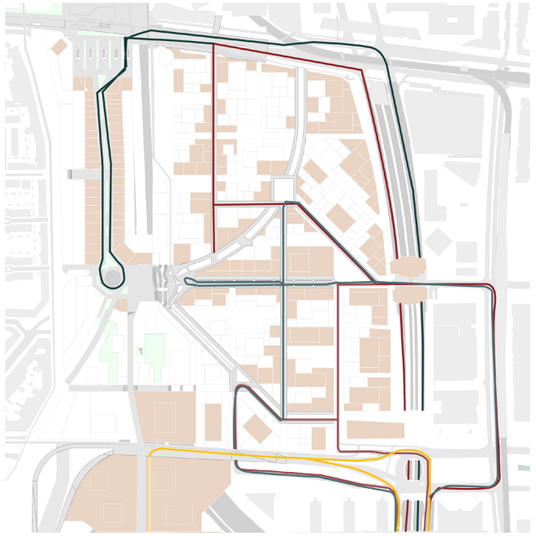
F197 - Public realm in the plan area

Urban-life-enabling spaces

The main focus of the public spaces in the plan are to enable urban life and react on different uses. Therefore streets with more centrality have a more urban character with associated paving patterns, while the ecological zone has a more nature based design. These transitions in materials and scales help in facilitating different uses of the areas. Smaller public subspaces are open to a communal infill while main routes with a more city-wide importance like the shopping street at the heightened platform, are designed in a more robust way.

The plan also incorporates the concept of manageable segments (Gehl, 2011) by making sightlines not too long and have the main paths dwindle. This makes the plan walkable.

Logistics

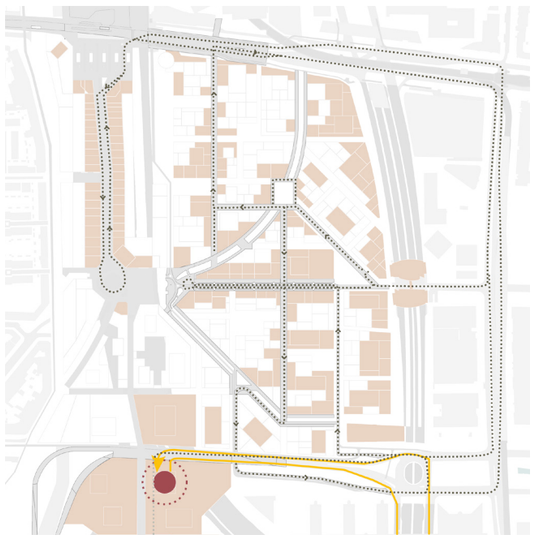


F199 - Victorydistrict logistic routes map - scenario 1

Scenario 1: classic urban logistics

Because of the mixed uses in the Victorydistrict, urban logistics are a key aspect of how the public space will be used. Thinking about scenarios beforehand will help minimizing the negative impacts of urban freight logistics. In this first scenario the logic of classic urban logistics is followed, this being freight comes from the highway into the city and drives right towards the destination. In this scenario access will be limited to certain streets and sometimes to certain times. The sketch shows that all destinations are more or less reachable by freight carriers. However due to the big stream of different freight, more units will drive through the district.

- urban freight traffic
- logistic need



F198 - Victorydistrict logistic routes map - scenario 2

Scenario 2: consolidation centre

The second scenario focuses on a consolidation centre at the edge of the district. Here all freight coming into the city will deliver their goods and a smaller class of vehicles (for example electric small carts) will bring freight to the destination. This will result in less disturbing encounters with pedestrians/inhabitants. However, this method will result in more trips if smaller vehicles with less spatial impact are used.

Due to its more sustainable notion and least impact on urban life, this option for logistics is deemed most desirable.

- urban freight traffic
- logistic need
- small logistic vehicle
- traffic direction
- consolidation centre

Car concept

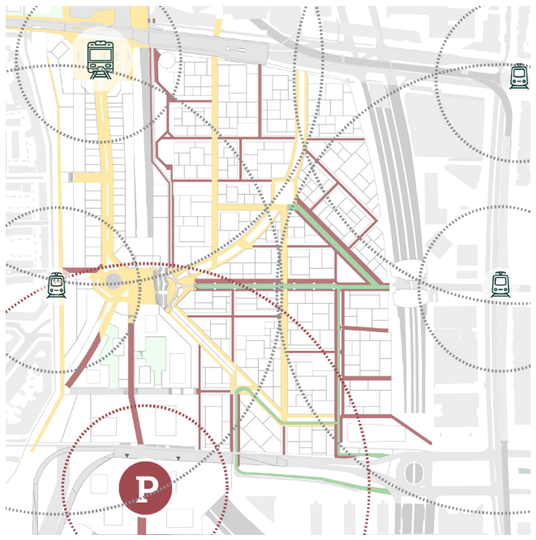


F201 - Victorydistrict traffic map - scenario 1

Scenario 1: parking near car arteries

As the impact of cars should be minimized according to urban life theory, parking can be concentrated on the edges of the district. This will result in a car-free central part while the car-parking is still within a small distance of the personal homes. A central mobility HUB can serve as a way to encourage sharing cars and lead to a slight modal shift in the use of transport options. This however does mean that smart parking solutions within the volumes will have to be realized, in order for it not to impact the plinth on the street level.

- car allowed
- only inhabitants
- car not allowed
- car parking
- pedestrian shed



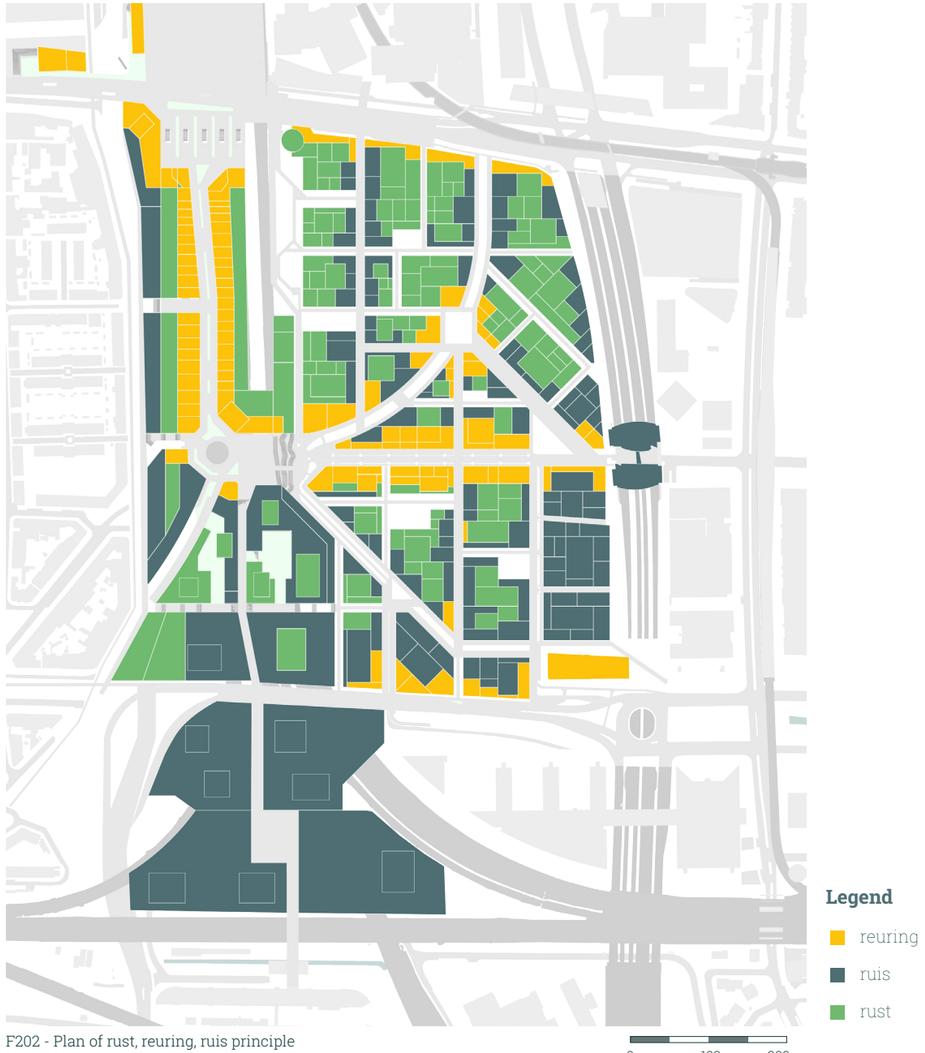
F200 - Victorydistrict traffic map - scenario 2

Scenario 2: total focus on other modalities

In the second scenario full advantage will be taken of the reachability and walkability of the plan area. Because of the urban life focused design of both the environment as the network, public transport is within 5 minutes walking distance from most homes. This will for the most part serve the transit needs of inhabitants. Cars can be parked on the most suitable place in the area: between the railways in the Spoorcirkel. Here it has a direct connecton with the S100 ringroad and the office cluster and does not impact the public space negatively. As the district is designed comprehensively focused on this mode of transport, this is the most desirable scenario.

- car allowed
- only inhabitants
- car not allowed
- car parking
- pedestrian shed
- public transport

Rust, reuring, ruis



F202 - Plan of rust, reuring, ruis principle

Room for differences

As described by the College van Rijksadviseurs (Cra, 2019), a mixed-uses district needs space for three atmospheres: rust (quiet zones), ruis (noise) and reuring (vitality). Other urban life authors like Gehl (2013) and Alexander et al. (1977) also underline the importance of quiet zone in the city.

The Victorydistrict again incorporates this by letting centrality and the overall urban network, as well as the quality of the public space and the materials used, reflect the zone's purpose. Rust areas are defined by more small scale, lower building heights with a non-vital function in the overall network. While at the other hand reuring zones are characterised by sidewalk cafe's, centrality and various groups of users, both inhabitants as people passing through.

Nature inclusivity



F203 - Plan of nature inclusivity in the Victorydistrict

Green spaces with multiple functions

As described by Haaland and van den Bosch (2015), green spaces have a need for multiple functions in the high density compact city. Therefore, the greenery used in the Victorydistrict tries to accommodate ecological services, qualitative routes, improvement of health as well as qualitative communal spaces for residents. It does this by connecting the ecological zone of the Haagse Bos with the river Schenk zone, completing the loop. At the same time, these green spaces create qualitative green routes inbetween clusters. Green roofs serve as communal outdoor spaces and more public green spaces are spread out through the district. This all facilitates the important aspect of urban green space in urban life high density district. Lastly, big sewage lines can be diverted to avoid collision with roots.

PHASING

Current situation to optimal improvement



Phase 0 - current situation

Phase 1: The first en foremost step into creating urban life in the CID, is prioritising slow modes of traffic and public transport. This means big automobile infrastructures should be reduced. Existing plans of the local government already propose directly connecting the S100 ringroad to the Schenkviaduct. This will free up space for greenery on the current spot of the viaduct. On top if this, in this phase the Koningstunnel should be prolonged. Again in favour of attractive slow traffic and public transport coming from the newly developed Binckhorst.

Phase 2: The heightened district on top of the rail emplacement will reduce noise pollution and create new connections, improving the walkability significantly. This step is also crucial and should be carried out early in the process as it will stimulate investment in the area by private parties.

Phase 3: The main axis between the Beatrixkwartier cluster and the Centraal/HS clusters, the Hoogstraat, can then be developed into first a new neighbourhood center for Bezuidenhout West and later a central part of the total Victorydistrict.



Phase 6 - optimal situation

Phase 4: The densification will first focus on transforming corporation properties. These are relatively easy to transform and can be done in a way that social, environmental and economic goals are fulfilled. Current resident can return because of the high density that is realised.

Phase 5: The last step would be the transformation of privately owned properties. Residents can be bought out or the developing party can wait until residents want to sell their houses.

Phase 6: The Victorydistrict is completed and fully in use. Because of the long (approx. 35 years) development process, some elements will be different than now anticipated. This is inherent to urban design with long development times. However, determining a good development process now, will help make the plan adaptable in the future.

2020 - 2027



Phase 1
Automobile circulation

Initiative: government

2025 - 2035



Phase 2
the heightened district

Initiative: government/developers

2030 - 2035



Phase 3
Hoogstraat and Spoorcirkel

Initiative: developers/corporations

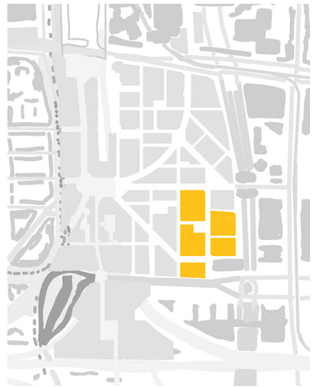
2035 - 2050



Phase 4
Transform corporation property

Initiative: corporations

2040 - 2055



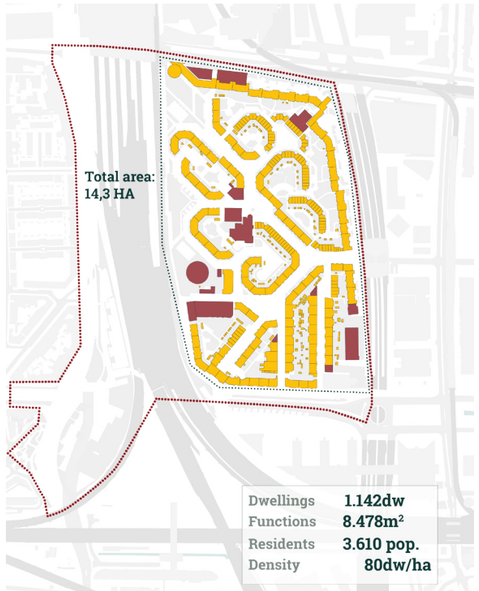
Phase 5
Transform private property

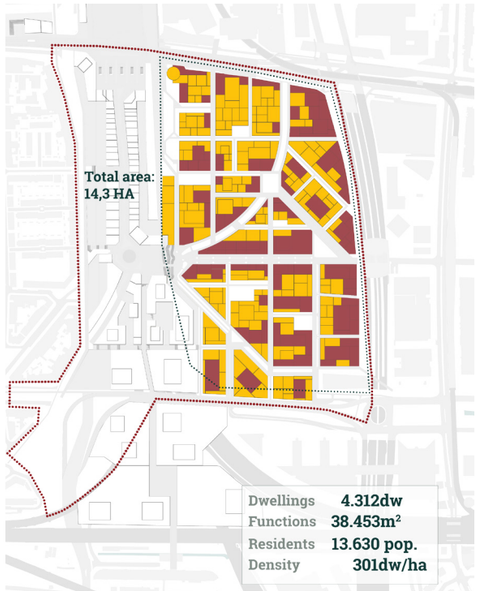
Initiative: developers

F204 - Phasing illustrations

Density

Residential function Other function





F205 - Density assessment

Current situation

In the current situation there are 1.142 addresses located in the circled area of 14,3 hectares. On the ground floor, 8.478m² of functions are located according to BAG. The total amount of residents in the area is estimated at 3.610 persons (CBS, 2019).

The functions currently located are mostly aimed at health and community services. There are practically no shops and most of the frontages are entrances to apartments.

The density of the area is currently around 80 dwellings/hectare with most blocks having a net 3.5 FSI.

Plan situation

In the plan situation, counting the amount of floorspace in m² and roughly dividing this by reference sizes of dwellings + expected percentages for hallways, common spaces and elevators, 4.312 dwellings are realised according to the elaborated variant. 168 dwellings are kept in this plan, mainly located in the northeast round tower. This means the net densification comes at 4.312 - 974 = 3.338 dwelling units extra.

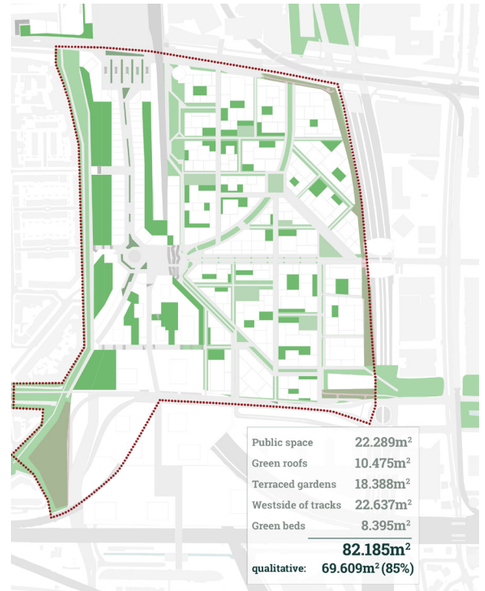
The functions located in the area will be highly diversified. This will consist of shops, offices, small-scale manufacturing and other mixes of primary uses. These together total in 38.453m² on the ground floor. Office towers located in the area are not incorporated in this number. The density rises to roughly 301 dwellings/hectare with an average net FSI of 5.5.

Conclusively, the actual urban life focused densification of the area resulted in only 3.338 extra dwelling units. This is only a fraction of the planned 18.500 homes in the total CID. This again challenges the feasibility of this number of dwellings in the area.

Urban green space

Grass undefined Park Roof garden Unqualitative





F206 - Urban green space assessment

Current situation

In the current situation there is a total of 91.688m² of greenery according to the Dutch Basisregistratie Grootschalige Topografie (BGT). Of this greenery, 23.769m² is of park quality, which means these consist of plants, hedges, high grasses and green that is suitable for multiple uses. 32.531m² is undefined grass that mostly serve as 'kijkgroen'. 35.388m² is allocated to private gardens which for some part are quite stoney in character.

Making an inventory based on ground observations and sattelite mapping, roughly 61.370m² can be classified as qualitative greenery. This makes 67% of the total amount. Qualitative greenery is greenery that can be used for multiple activities and serve at least two criteria of this list:

- Ecosystem services
- Social communal space
- Climate adaptation
- Climate mitigation

Plan situation

In the plan situation a reduction is measured: 82.185m² of greenery means a total reduction of 9.503m² of urban green space. This is caused by the almost 4 times as high density for the area. This was paired with a significant rise in the GSI, leaving less ground space area for green infill.

However, what is notable is that there is actually a rise in qualitative greenery. 69.609m² can be qualified as serving at least two criteria of the aforementioned list. That corresponds with 85% of the total surface of green space. This is caused by designing the green spaces that are left with multiple purposes in mind. This is propagated by various urban green space researchers (Haaland, van den Bosch, 2015). Compact cities to them should strive for multiple uses of urban green space.

Conclusively, a drop in amount of green space seems inevitable in densification projects with urban life focused volumes. However, improving the uses of the green spaces that are left, can help offset this reduction. Nonetheless, climate mitigation and adaptation mostly ask for more green surface area. This is a dilemma in which one should find a balance.

Health

Noise pollution

Noise sensitive

Medium pollution

High pollution



F207 - Noise pollution assessment

Current situation

The map of the current situation shows the current noise pollution levels in the plan area. Especially the railway emplacement, the Utrechtsebaan and the S100 ringroad are big contributors. This leads to significant noise pollution even to sensitive functions like housing.

Accompanied with the noise pollution is air pollution stemming from the cars and trucks entering the city here. For the railway this is less relevant as most trains are electric. Hazardous goods are also not expected on the railway emplacement leading to Centraal as it is not a freight train destination.

These pollutions together cause the negative effects associated with the compact city. For good urban life, these effects should be mitigated.

Plan situation

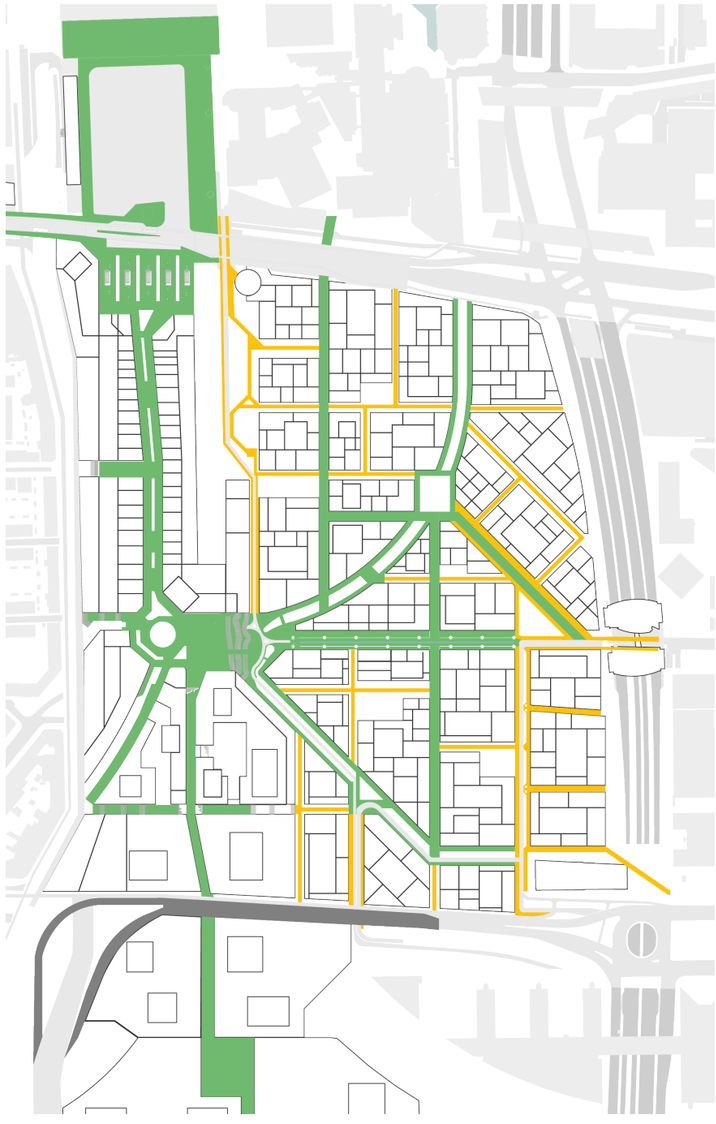
In the plan situation the extensive overhaul of the infrastructure has significant effects. More noise sensitive functions can be integrated in the area without having adverse health or well-being effects. Moreover, the lowered noise pollution contributes to less psychological stress and the possibility for quiet zones in the city.

The places where noise pollution is still located are perfect locations for less noise sensitive functions like offices and manufacturing. Doing this smartly can also create space for urban logistics and parking structures. However, there is a risk of creating monotonous areas with only urban life 'hostile' functions, this can be mitigated by smartly sequencing opening times and separating urban life foot traffic from logistic traffic.

COVID-19 resilience

Caution (<3,5m wide)

Safe (>3.5m wide)



F208 - COVID-19 resilience map

An aspect that became relevant during the last quarter of the thesis, is the performance of the city spaces in times of pandemics and thus, social distancing.

While not designed while keeping social distance in mind (rather to the contrary), the plan area does perform well. A distance of 1,5m can be easily maintained because of the wide pedestrian walkways where no cars are allowed. This means many users can use the space while not having to fear contraction of the virus.

Moreover, because of the grid-like configuration of paths, alternative routes can be easily taken to avoid crowded places.

This conclusion reiterates the importance of pedestrian-focused areas where most of the space is for precisely that modality only.

Walkability: before

In the current situation a walk from Den Haag Centraal to Laan van NOI or the Beatrixkwartier takes the pedestrian mostly along big car veins. During the route 5 collision points with the car are encountered. This means stopping the walk, waiting for the stopping light to turn green.

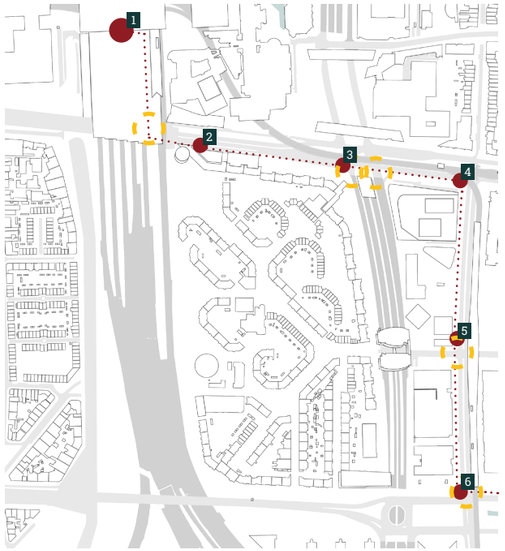
In the plinths no functions are located. Moreover, the morphology of the buildings makes for long and dull stretches of walkways. The route is experienced as a concrete jungle where the pedestrian clearly has no priority.

Total length: 1452m

Walking time: 18 minutes

Collision points: 5

Right of way: Cars



Collision point with car

Scene

Route

Cullen-sequence



F210 - Scene 2: view along Prins Bernhardviaduct



F213 - Scene 4: entrance to Beatrixkwartier



F214 - Scene 6: towards Laan van NOI

Start

Further towards Laan van NOI



F209 - Scene 1: view from Den Haag Centraal



F211 - Scene 3: encounter with Utrechtsebaan entryways



F212 - Scene 5: situation near OV-stop Beatrixkwartier

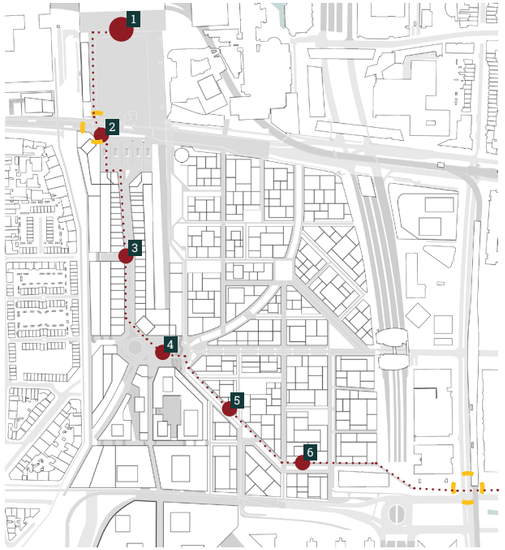
Source: Google Streetview

Walkability: after

In the plan situation, a route from Centraal to NOI and the Beatrixkwartier becomes available that will lead the pedestrian along a totally car-free route. Plinths are mostly open and various points of interest are located along the way. This makes for an interesting inviting walk that incorporates the human dimension (Gehl, 2013).

The routes are also optimized for a shortest path betweenness and a low amount of angular shifts. Both proven to encourage usage of the routes (Pont, Haupt, 2010; Ye, van Nes, 2014).

Total length:	1063m
Walking time:	12 minutes
Collision points:	2
Right of way:	Pedestrians

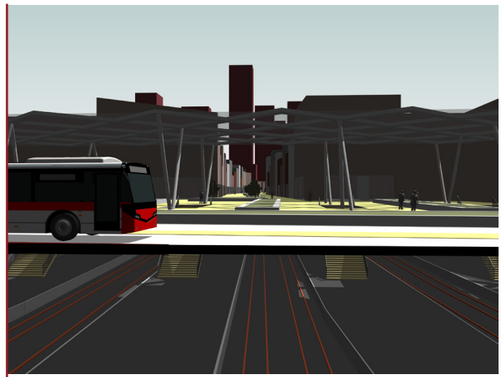


Collision point with car

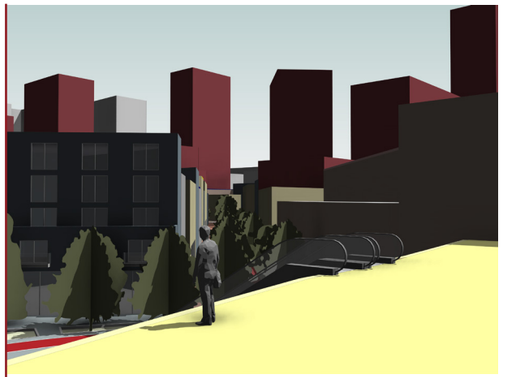
Scene

Route

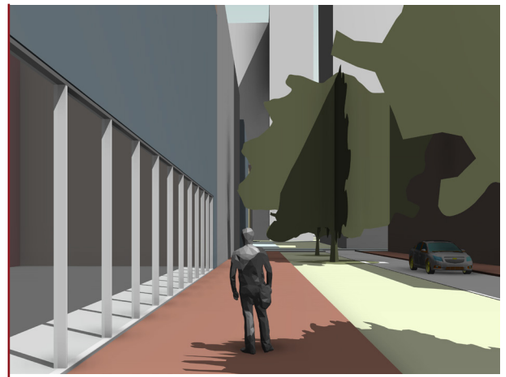
Cullen-sequence



F216 - Scene 2: new Stationsplein



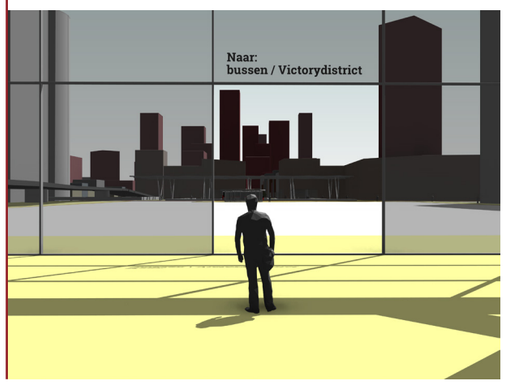
F218 - Scene 4: view from Victoryplein



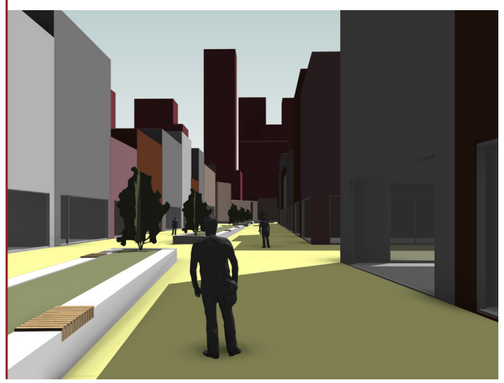
F220 - Scene 6: towards Beatrixkwartier

Start

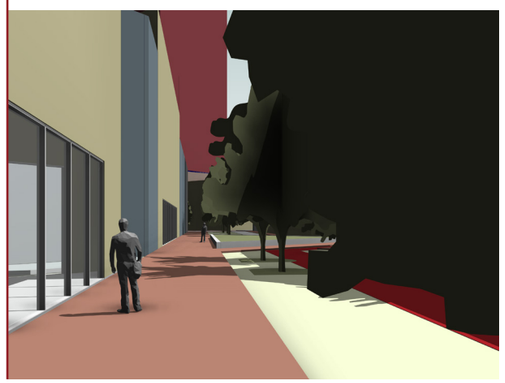
Further towards Laan van NOI



F215 - Scene 1: view from Den Haag Centraal



F217 - Scene 3: Shopping street towards Victoryplein



F219 - Scene 5: ecological corridor

11 CONCLUSION & REFLECTION

Contents

Transferable lessons

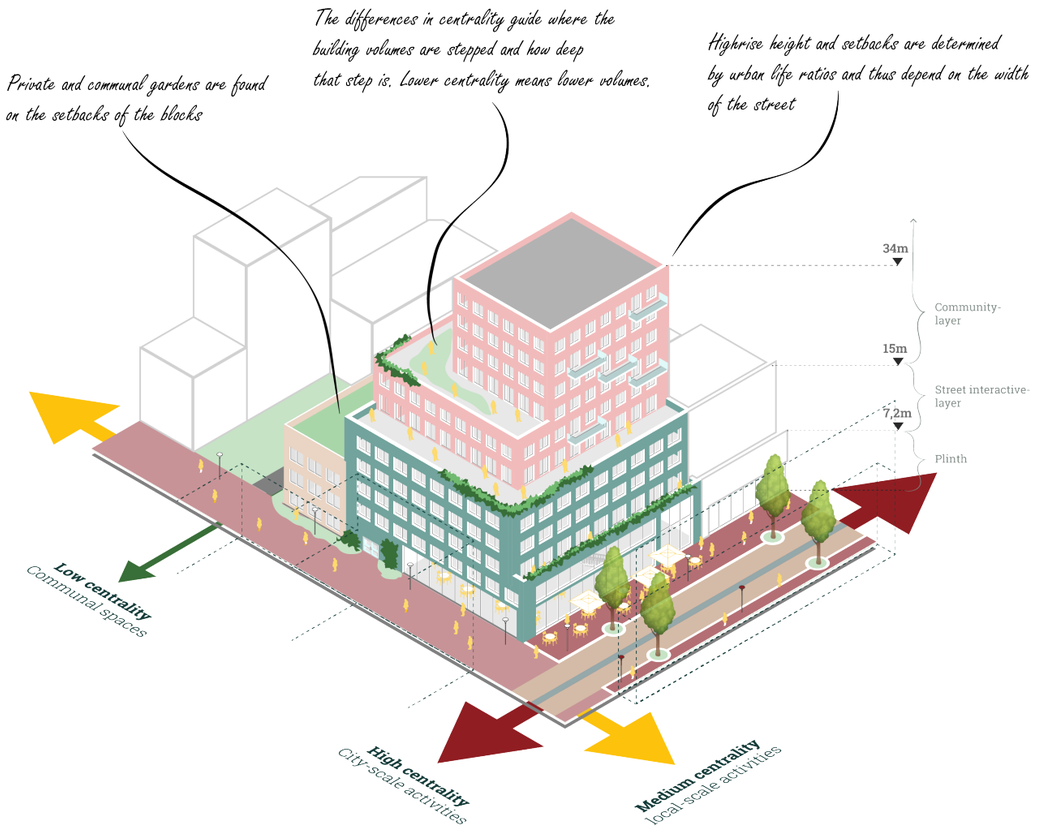
Conclusions + recommendations

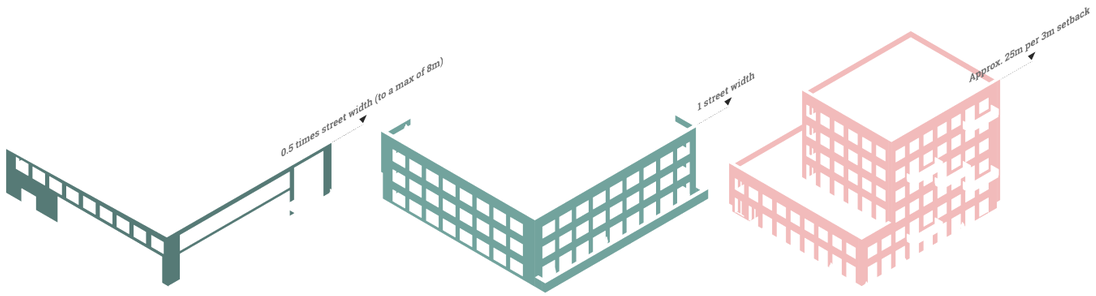
Reflection

In this chapter all sub-researches will state their conclusions and in the end the main research question will be answered. Limitations and reflections on process, transferability, societal relevance, scientific importance and ethical considerations are also described.

Related researchquestion:

Main research question: How can the clusters of the Central Innovation District be interconnected and densified in an urban design that uses urban life principles to optimize high density living and mitigate the negative effects of the compact city?





Plinth

Aim: functions

The plinth is crucial for street life. At high centralities, it should be open, detailed and have a human scale. Vertical rhythms help in achieving more interesting walks.

This research showed that the height is most ideally half the width of the street. This means at a 15 meter wide street, a maximum plinth height of 7.5m should be strived for.

At high centralities, functions like sidewalk cafe's, restaurants and shops are appropriate. At lower centralities nice green entrances to homes are preferable.

Street-connected layer

Aim: families

This layer contributes to street life by providing oversight and a direct visual relation with the street. This provides safety and an at all times lively street.

A 1:1 ratio to the width of the street works best for the human scale. It provides enclosure and ensures a functioning social field.

At high centralities this layer serves as achieving a critical mass of people to make the space lively, while at lower centralities this layer provides social control and enhances neighbour relations.

Highrise community layer

Aim: smaller households

The highrises can be incorporated in urban life compact cities by using setbacks. This results in stepped buildings that in turn can stimulate communal spaces at heights. A good rule of thumb is to use 3m setbacks after 25 meters of height. This ensures wind nuisance will be minimized and at eye perspective, the height will not lead to inhumane scales.

At higher centralities also higher buildings can be developed as this is deemed acceptable at highly public places. At lower centralities building heights should be limited to ensure human scale.

TRANSFERABLE LESSONS

Incorporating urban life in compact city densification

Concluding the research and reflecting upon the data and knowledge collected, this spread will state the transferable lessons of the thesis. Policymakers, urban designers, planners and other urban development stakeholders can use these lessons to integrate the compact city and urban life goals in order to create a more human scale city that stimulates positive urban life qualities. Of course as these are the transferable lessons they have to each be applied in their own respective contexts.

On the left page, an isometric overview of an actual block within the plan area is shown. This block is chosen because it shows three separate grades of centrality and reacts on these accordingly. Using the properties of the block the essence of the transferable lessons can be extracted.

Firstly, ***the centrality is determined by two metrics and one analytical approach***. These are the space syntax angular integration and the betweenness shortest path algorithm that serve as metrics for the analytical approach of cluster/attractor identification. This means the expected slow traffic flow can be determined and where for example routes have to qualitatively cross infrastructure.

Secondly. ***street properties are connected to these centralities.*** This means places with a high centrality will have more city-scale activities like shops, hotels, restaurants and supermarkets and consequently a wider street profile. Medium centralities have a more local character, examples are small scale offices, work-spots and local bakeries. Lower centralities are ideal places for more communal spaces where some quiet 'reload' zones can be located for residents.

Following this concept, ***the volumetric properties of the building will also respond to this classification***. As such, building heights can be higher near wider street profiles, while lower centrality smaller street profiles also require lower building heights to ensure human scale. To comply to the compact city goal of densifying existing urban areas, high building heights can be incorporated by introducing setbacks. This results in stepped typologies of buildings, each layer with a different connection to the street life. Due to the setbacks, wind nuisance from highrises can be mitigated and the result is a varied palette of living environments. Moreover, studies (for example: Laven, Van der Ham, Veelders, & Karssenberg, 2016) suggest that these setbacks greatly reduce the impact of highrises on eye-level perception.

To these principles, the conclusions of the 3D research-by-design for the project site can be added. As numerous dimensions and principles were tested, the best ratios are displayed in the graphic. An important finding was the impact of the street-to-building-height ratio on the role of the layer within urban life. This meant ***a subdivision in three layers could be made***: (1) the plinth, which has a direct connection to the street and contributes significantly to urban life functionality. (2) the street connected layer, where there is still a direct visual and functional connection to the street which contributes to safety and liveliness. (3) the highrise community layer, which due to its stepped morphology and further separation from the street functions more as its own community of residents. This layer supplies the critical mass needed to maintain local functions and of course reach compact city goals.

For the ratios the plinth was found to work best when no more than half the street width was used, with a maximum of 8 meters of height. This because the eye perspective has a fixed field of vision that works best under this 8 meters. Very small streets (<4m) profit from plinth heights of less than 3 meters.

The street connected-layer works best with a 1-on-1 ratio to the street width. This ensures a 45 degree angle at most to the street. The highrise community starts with a minimum setback of 3 meters after this layer. The height is dependent on the context. What worked in this research is relating the height to the surrounding existing blocks by gradual steps in height. Make sure to incorporate smart setbacks in the highrises. A good rule of thumb is to use 3 meter setbacks after each 25 meter of added height.

Using these guidelines can lead to a more human scale and more integrated urban life features to highly densifying existing urban areas. Further research can focus on testing these values to representative groups of users and parametric modelling for further testing of the stated dimensions.

CONCLUSIONS AND RECOMMENDATIONS

This thesis attempted to find the balance between high densities in the widely accepted policy of compact cities (Deilmann et al., 2018) and the 'urban life' approach to cities as described by a wide variety of both older and more recent human-focused urban design advocates (Gehl, 2011, 2013; Lehmann, 2016; Jacobs, 1961; among others). The hypothesis that followed from literature research was that introducing 'urban life' aspects could optimize the social, environmental and economic functioning of high density living environments and mitigate the three most pronounced negative effects associated with the compact city approach, being personal well-being, personal health and traffic congestion (OECD, 2018a).

The relation of these two concepts was found through research-by-design methodologies on the 375 HA inner-city densification site Central Innovation District (CID) in the Hague. In this research the three identified main aspects of urban life -being urban volumes, urban network and urban quality- were each assessed separately and then integrated in design scenarios. From these design scenarios several iterations and prioritisations were made to come to a final design that is an answer to the main research question: ***'How can the clusters of the Central Innovation District be interconnected and densified in an urban design that uses urban life principles to optimize high density living and mitigate the negative effects of the compact city?'***

The conclusions of each subresearch will now be briefly mentioned after which the main research question will be answered.

On urban life volumes SRQ 1

The first sub-research-question *'What could the proposed densification of 18.500 dwellings and 500.000 extra m² of office space look like in terms of urban typology, configuration and morphology?'* was answered using stamping studies of volumes that were regarded as having a high grade of 'urban life' by Lehmann (2016).

The research showed that the proposed numbers for the CID are too high to realistically only place volumes that correspond to urban life volumetric properties. These properties were identified as being the medium-rise urban block typology of 6-7 layers high, with attractive plinths and vertical rhythm in the facade. With the limited space available, a significant number of highrises will have to be integrated in the future urban densification. Therefore, the answer is that the proposed densification will have a mixed typology of both medium-rise as highrise volumes, the configuration will preferably follow the urban blocks structure and the morphology willl have a wide range of scales, that focus on the human eye perspective.

The 3D research-by-design led to these recommendations for ensuring volumes contribute to urban life in high compact densities:

» Strive for ratios between street width and facade height that correspond to human-focused historic inner-cities. These are mostly found between 1:1 and 1:4 ratios. This gives enclosure to people (Gehl, 2013).
» Use setbacks to allow for higher building heights, while maintaining the inner-city ratio between street width and facade height. A rule that worked in the research-by-design is after one street width of height a setback in the facade.
» Give highrises a significant setback from its podium. This to ensure wind nuisance on the street is mitigated and towers do not directly enter the eye level perspective.
» Ensure a stepped and layered build-up for higher volumes. This creates a high variety of living environments for residents and ensures enough daylight for each dwelling. At the same time, the street-level eye perspective gains a more layered diverse view that stimulates their senses.
» Allow both sun and shading on the street level by smartly using stepped terraced buildings. These also contribute to a greater connection to the street with many balconies and gardens on higher levels.
» For façades follow the main lessons of the main urban life authors. For example the book 'cities for people' (Gehl, 2013) is a great resource propagating many doors, vertical rhythms and detailing of façades.

On urban life networks SRQ 2

The second sub-research-question *'In what way are the current CID-clusters disconnected and what is needed to improve and maintain the interconnectivity?'* was answered using space syntax angular integration mapping, betweenness algorhythms on shortest path and cluster identification.

The analysis of the current situation uncovered the lack of connections for slow traffic in the area, especially pedestrian foot traffic. This despite the close proximity of train stations. Moreover, attractive routes were only found in very select streets leading to the city centre. Holistic walkability, as described by Forsyth (2015), is a key component of urban life, as also underlined by Gehl (2011, 2013), Lehmann (2016) and various other urban life authors (Alexander et al., 1977; Lynch, 1966). They describe that, in order for making routes walkable, a fine grained network of interesting paths and destinations should be established. For the plan area, this resulted in creating new attractive routes that interconnect the clusters and creates new points of interest along the way. What helped was determining where most centrality was to be expected in order to pinpoint locations for new developments that reacted on the appropriate centralities.

Following from the network analysis and research-by-design, these recommendations help in creating an urban network that encourages urban life and functions well in high density compact cities:

» Identify surrounding clusters of interest in the plan area that are within a walkable range, say maximum of 25 minutes, and determine what role they full-fill in relation to the other clusters. Also determine how big their influence is. An historic centre with many amenities has more influence and pull-factors than a public transport stops. Yet both cause user-flows.
» Use these clusters to draw shortest path lines with varying degrees of intensity, depending on the expected flow. This helps in determining what the most central routes in the plan area are for pedestrians and cyclists.
» Create a finer-grained network of places of interest when lines are becoming too long to be an acceptable walk. Making routes more attractive (Gehl, 2013) and adding new places of interest (Lynch, 1961) increase the distance pedestrians are willing to walk.
» Design the width, program, functions, building heights and materialisation all according to the appropriate centrality. This means higher centrality streets get more public functions and materialisations, while other streets get a more quiet character with more communal spaces for direct residents. This makes space for both reuring (vibrancy), rust (quiet) and ruis (ambient noise). All three being needed in a modern-day functioning existing city (Cra, 2019; Alexander et al., 1977).
» Incorporate from the beginning emergency services access and logistic needs. Focus primarily on pedestrian dominance of streets but keep selected spaces accessible for cars.
» Gently dwindle paths to make walking interesting and try to avoid long stretches of straight lines.

On urban life qualities SRQ 3

The third sub-research-question *'What are the indicators of urban life and how do they translate to practical design solutions in the CID context?'* was answered using both an extensive literature study and more practically using analysis of promising case studies and distilling applicable patterns from these studies.

The literature study concluded that for urban life to be achieved, an urban design should strive for 20 distinct qualities. These were: small urban blocks, open and lively edges, mix of building ages, mix of primary uses, eyes on the street, sidewalk cafés, human dimension, no border vacuums, common spaces, urban green space, manageable segments for walking, public transportation focus, walkability, bicycle culture, active modes encouragement, spatial centrality, social interaction, social fields, social activities and a critical mass of people.

Applying all these qualities is overwhelming, as some definitions are normative and open for interpretation. The urban quality metric turned out to be the most difficult to objectively describe. However, applying these indicators to concrete case studies made the lessons more explicit in the CID context. For this conclusion the most striking findings in terms of urban quality themes from the research-by-design will be named, the transferability however will greatly depend on the context of the project.

The following recommendations were distilled from the research-by-design in the CID plan area:

» Using centrality lines can cluster activities on certain points where lines and thus, routes meet. These are suitable and likely to become vibrant social spaces. Concentrate social activities around these points.
» Work with the social vision described by Gehl (2013). This means 25 meter is a good maximum size for social interaction spaces, while a maximum of 100 meters should be used for more open space to keep them safe

and provide oversight.
» When densifying, highly compact environments will always decrease urban green spaces. As described and propagated by Haaland and van den Bosch (2015), new urban green spaces in compact cities should have multifunctional uses. This to ensure that the more scarce greenery in compact configurations is used more intensively. This thesis tried to apply this call for multifunctionality by providing green public spaces, green communal roofs and an ecological zones with a width of 15 meters that also served as intimate public space. The functioning of these green spaces however could not be tested enough, as author lacked expertise in regards to ecological needs. Further research is therefore needed to more conclusively examine design solutions for urban green space in high densities.
» High densities already automatically provide urban life qualities. Critical masses of people, good public transport, manageable segments and mixed uses are all applied easier in compact cities. Just densifying can already be enough to spark good urban life.

On design approach SRQ 4

The fourth sub-research-question *'Which urban design scenarios are able to connect the four CID-clusters in a human-minded city at eye level approach fostering urban life?'* was answered first using three extreme scenarios and then testing and specifying design solutions using a research-by-design methodology.

In order to optimize urban life in high density configurations and at the same time mitigate the negative effects of density, the design scenarios have to explicitly be tested in the specific CID plan context. This means more broad scenarios will not suffice in creating urban design scenarios that actually work. This is because of the multifaceted nature of urban life and the complex nature of compact cities. Urban life is a broad term for various aspects of urban design, being urban green space, density, building heights and all other aspects assessed in this thesis. These aspects can hardly be well described in big scale scenarios. Design in both the micro-, macro- and mesoscale is therefore needed.

The following recommendations were distilled from the research-by-design in the CID plan area:

» incorporating urban life in the compact city is a continuous balancing act that is best tested by 3D methodologies. Gaining an eye level perspective of the actual implications of design choices helps in assessing if it is acceptable regarding an urban life/human scale standpoint.
» While there are some generalizable rules extracted from this thesis, most urban life solutions are specific to the plan context. This means the term 'urban life' can mean different things in different places. However, as Gehl (2013) propagated: the human has the same needs and wishes as other humans. It is biology. Therefore creating cities that have a positive influence on their senses is an objective 'good' city.
» The design scenarios that were able to connect the clusters in a human-minded way, were found in a combination of the tested options. This implicates that multiple design iterations and variations help in eventually reaching an integrated answer.

On the CID, the Hague MRQ

The main-research-question *'How can the clusters of the Central Innovation District be interconnected and densified in an urban design that uses urban life principles to optimize high density living and mitigate the negative effects of the compact city?'* can now be answered using the results of the four sub-researches and the final design conclusions.

The volumestudy proved that the quantities of 18.500 new homes and 500.000m² of office space named by the local government, would not fit using urban life volumes. This would mean most of the new volumes would consist of high towers near transportation nodes. This thesis offered an alternative: a new high density mixed neighbourhood on one select central place in the district. This realisation that the quantity of houses mentioned would never fit following existing notions of urban life volumes, led to a research more focused on incorporating higher buildings in a way that the street life and the human dimension are not negatively affected. In this way, the thesis optimized adding high quantities of dwellings in compacting cities while realising urban life principles.

The location of this new development was based on the network analysis, showing lack of future walkable connections between clusters within the Central Innovation District. To be able to stimulate walking in such a well-connected area in the country, the local government should fully embrace the overcoming of existing infrastructural barriers. The main development in this should be the creation of high quality pedestrian walkways over the railway emplacement. Most ideally, a heightened district can be created to completely mitigate noise pollution and border vacuums.

The urban design should combine all aforementioned recommendations in regards to volumes, network and quality. This will lead to an optimized environment for adding large quantities of housing in a way that significantly improves the whole city and minimizes the impact of the negative effects associated with the compact city. These negative effects were identified as being traffic congestion, personal health and personal well-being (OECD, 2018a).

Traffic congestion was mitigated by focusing on active modes and public transport in the plan area. Tunnelling and overbuilding infrastructural barriers further mitigated negative effects like noise pollution and emissions from traffic congestion. Moreover the pedestrian barriers these kind of infrastructures cause, were razed in this way.

The negative effect on personal health is mitigated by adding qualitative greenery, removing emissions from cars and encouraging active modes of transportation.

Well-being is positively influenced by removing noise-stress by the addition of explicit quiet environments and overbuilding of the train emplacement. Moreover, more social spaces are created by focusing primarily on communal and public spaces, while private spaces are less pronounced. However, private spaces are still included by broad balconies and stepped terraces, giving users places to reload.

However, the main take-away from this thesis should be that optimizing the compact city with urban life principles is a constant balancing act. There are not many clear-cut solutions that solely have positive effects. While the designed district shows how the balance can be achieved, it is an highly optimized scenario. In that way it does not realistically reflect the current realities in financial feasibility and certainly, the approach to existing urban area. Politically it is very difficult and controversial to demolish existing built fabric in favour of building an optimized new district. At the other hand, the current dire need for housing and the unique position the CID full-fills in this housing debate and theories on good urban life and compact cities, the CID offers a unique chance to boldly take a step into fixing the mistakes made in the past in urban design and guiding the inner-city/outer-city housing debate into a new direction.

Limitations

Compact cities are complex environments with many different stakeholders, existing conditions, political preferences and thus opinions. Creating an urban design in such a dynamic setting, will hardly be able to account for every aspect. This thesis therefore should not be seen as a prescription. It merely questions the current stance towards urban densification and shows an alternative that might be the other extreme.

As for the reliability of the used theories, a portion of the used urban life literature is already quite dated. The used theories are also only a fraction of the body of work in the urban life subject. Many other associated disciplines like psychology, sociology, ecology and planning might add different perspectives. This broad range of perspectives is inherent on working on human environments.

The level of depth of this thesis greatly varies per theme. While the urban design side might be well developed and elaborated, more theoretical aspects may have a quite shallow underpinning. This is caused by the prioritisation of the thesis. Clear goals in terms of what this thesis should accomplish guided the end result towards being more design-heavy.

REFLECTION

Initial proposition

Travelling weekly by train through the Hague and simultaneously through an area that is one of the biggest inner-city densification sites of the Netherlands, sparked my interest in the area temporarily known as the Central Innovation District (CID). Hard to imagine that one day this area full of big infrastructure like roads and rail would be a heavily densified area with more than 40.000 extra persons (Gemeente Den Haag, 2019a). Knowing the neo-liberal practice of 'gebiedsontwikkeling' through my job at the chair of area development, I wondered how such a difficult area would be densified in a way that corresponds to the current urban design stances towards good quality of urban life.

Policy documents revealed there was no urban design for the area. Rather the area was divided in 'gebiedsagenda's' that roughly stated quantitative numbers and qualitative wishes. As is common practice in modern-day neo-liberal planning, the planning strategy was heavily based on plot-led development and trying to incentivize private developers to also contribute to public space.

'Adding density does not automatically mean adding urban life, smart design is needed to make these two go hand in hand.'

In my personal view, this planning strategy is surely realistic, but very risky for the quality of the area in the future. Developers do not have nearly the same goals as city planners. They are in it for short-term (around 3 years) gain and then sell the development and responsibilities to either investors or residents, while city planners want a qualitative district that corresponds to societal goals.

Moreover, such comprehensive numbers for densification goals of this area asks for bold urban design strategies that look into how such an increase in density can also lead to an increase in urban life for the whole area. Adding density does not automatically mean adding urban life, smart design is needed to make these two go hand in hand.

This knowledge gap led to the initial proposition of how the compact city and urban life are related and strengthen or weaken eachother.

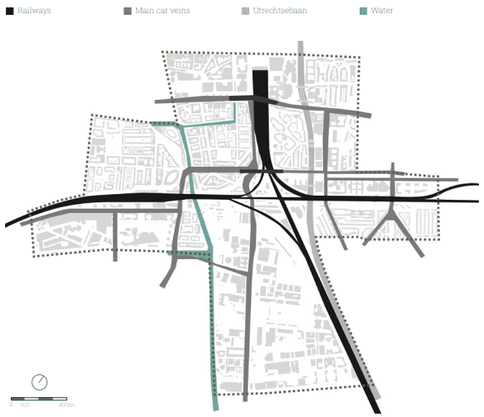


Figure R1 - Big infrastructure in CID area

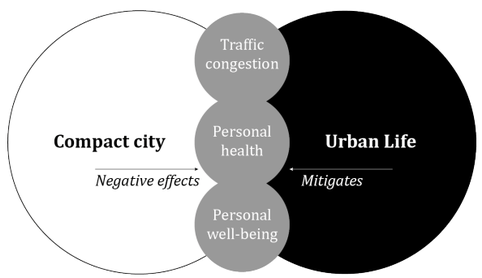


Figure R2 - Initial proposition

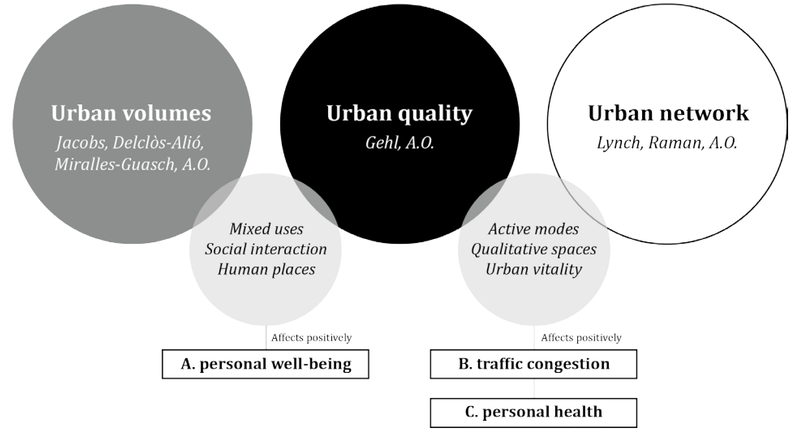


Figure R3 - crucial themes for urban life

Methods

From the literature study three distinct themes of integrating urban life in the compact city were determined. These were urban volumes, urban network and urban quality. Determining these themes early on in the process helped in shaping the methodology and the further research plan. However, pinpointing such an important aspect for the thesis carried some risk: this synthesis of my own literature study had no explicit precedent in other literature. This meant a first step away from already established theory. Because of the broad scope of each theme however, I was confident that it was rigid enough to guide my methodology.

The methods itself were guided by subquestions that in turn were guided by the three distinct themes. Two aspects were added to come to the final research plan. These were creativity (because of my goal to strengthen my design skill in this thesis) and feasibility (because I wanted to design in a realistic way that could actually be carried out in the next 10 years). This cascading of aspects that inform the eventual methodological framework can be seen in figure R4.

The advantage of this way of working was that the research questions had clear goals in what piece of the puzzle they would solve. The disadvantage was that the scheme was heavily reliant on assumptions that were not yet tested. This meant the whole methodology had more than 20 re-iterations. Most of these iterations were caused by small changes in conceptual understanding of the problem and that some aspects were deemed more important than others, while the scheme was very egalitarian.

Another aspect that made the methodology hard to confidently grasp, is the uncertainty that comes with making this research plan. As the research is not yet carried out, you can not know if methods will work. What happened frequently throughout the actual execution of the thesis is that other methods were far more fitting than the one described in the methodological framework. A concrete example is that for the urban quality chapter the theoretical research was not very useful for the design itself. Case studies that had a known reputation of good urban life were far more helpful. Eventually distilling patterns from these studies helped the most, while the pattern method was not described in the methodological framework.

These kind of challenges might be less frequent when you are more trained in these kind of researches. Then you already know what methods work and what do not for your stated goals.

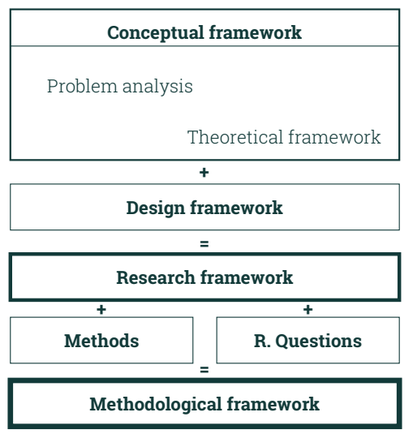


Figure R4 - methodology alignment scheme

Research

Volume study
Because there are no existing urban design plans for the area, it is hard to visualize the stated numbers and their implication. 18.500 dwellings on a site that is 375 hectares roughly translates to 50dw/ha. This however is still not the right figure because of various infrastructures, zones where buildings cannot be placed and other restrictions.

Therefore the volumestudy aimed to give an estimate on how the area would be impacted if the stated densification was carried out. Moreover, this chapter also aimed in determining what urban volumes are regarded as beneficial for urban life.

During this study it proved hard to really determine what is a 'good' density and how volumes should be shaped. Measuring the urban form through the Spacematrix methodology (Pont, Haupt, 2010) helped in gaining oversight which kind of volumes are found in what kind of urban environment. The exact form however still remained vague and consequent tries at generating volumes from the measured data were unsatisfactory.

What did help was a more traditional stamping study of precedent blocks that have a good standing in urban life literature (the Eixample of Barcelona for example). This quickly visualised the far-reaching implications of qualitatively densifying such a difficult area. This posed a first idea of how realistic the ideas described by the Gemeente Den Haag (2019a) were in regards of quantity related to quality. If the current conservatist stance towards existing neighbourhoods would be followed, enormous towerblocks would be the only option to reach the stated goals. This was a key moment in understanding the mismatch going on in the CID.

Network study
The network study was especially useful to gain understanding of what urban centrality is and how it can be created. Understanding the notions of angular integration, network density and differences in radiuses are the main lessons learned from this chapter. In terms of answering the subquestion assigned it was hard to yield results. This because the urban network was way more open to interpretation than expected. Moreover, because the plan area was not in its final form, the current network was not as relevant. Therefore, space syntax became less relevant than it would be in a project dealing with an existing fully developed network. As a result, the network analysis of this project was not aimed at diagnosing the existing situation, but rather at what each scenario would contribute to urban life goals in terms of network. These goals were holistic walkability, cycle-ability and a general interconnection of clusters to the to-be-developed area. This did yield results and especially the identification of important attractors and how those would be connected ideally according to urban life literature, was a relevant result.

Quality study
As posed before in the methods section, the quality study turned out different than expected. The lessons learned from the urban life literature translated to too generic lessons to be applied. The urban life terminology was also very open to interpretation. Because this thesis aimed to eventually deliver a design, more concrete, explicit lessons were needed.

A solution was found in adding patterns through case studies. These case studies however were only determined in the later design stage. In this stage these cases guided the decision-making of the final design. Therefore this was the moment where most clearly the process got a more iterative character instead of linear (figure R5). I needed the design phase to finish the urban quality research.

Figure R5 - iterative process of quality study

Moreover, reflecting on the total process the urban quality chapter proved way more crucial to actual design decisions than the other two (figure R6). This challenged the predisposition of the methodology chapter, where all three studies were regarded as equally important.

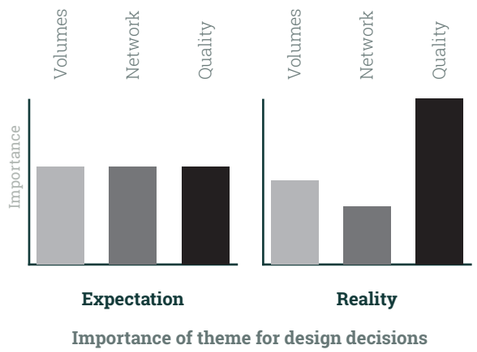


Figure R6 - importance of themes

Scenarios

Following the methodology, the three main studies were used as input for three distinct scenarios in varying degrees of impact. This proved difficult as there were a lot of choices to be made because of the sheer size of the total CID. To mitigate this difficulty, the three scenarios were extremes. Moreover, clear choices regarding the most pressing challenge, the railway emplacement, were reflected on beforehand. This further specified the scenarios.

Because of the aforementioned scale of the plan area at this time and the unclear future in terms of urban development, the scenarios were less useful than expected. Because of this, the development of each of the scenarios could not fully be done. However, because of the more explicit choices and an actual image of the possible futures of the CID, the scenarios could now be tested using the measuring urban form methodologies. This yielded result, as the tests showed a clear 'chokepoint' in the CID in terms of network, volumes and quality. This chokepoint already showed in the previous studies. This resulted in the explicit choice to determine this area as the plan area for the design phase of the project.

'Scenarios cannot be contained to 'one' moment in the process. Research-by-design therefore can be seen as constantly testing different scenarios on all scales.'

Reflecting on this development, the scenario testing proved more crucial for the thesis than one would expect at first glance. It forced design thinking by having to explicitly position volumes according to urban life study. Nonetheless, in a future research methodology the moment scenario-thinking takes over from data analysis, should either be later after the plan area is sufficiently specified or even earlier to specify the studies more towards realistic implementation. This I see as a conflict that is inherent to research-by-design. Scenarios cannot be contained to 'one' moment in the process. Research-by-design therefore can be seen as constantly testing different scenarios on all scales. Further on in this reflection scenario testing proved crucial in the design phase to overcome problems and improve the overall design.

Design

In the design phase many options were assessed. What became clear early on in the design process, are the constant compromises that have to be made. There are no clear-cut solutions and every decision seemed to have a backside. Fundamental questions were in the balancing of feasibility/reality and optimal urban life solutions. Demolishing an entire neighbourhood may seem unrealistic and certainly drastic, however, other challenges like the significant housing shortage, the poor walkability of the area, the infrastructural barriers and the ideal location for walkable densification of the CID were all factors that validify significant transformation.

This freedom to experiment with more drastic solutions leads to uncovering more fundamental conflicts between the compact city and urban life. Modern aims for amounts of greenery, infiltration and urban heat island mitigation clash with urban life targets for ideal densities: compact historic inner-city typologies and ratios. The same goes for housing: where urban life propagates medium-rise densities the existing city simply does not have space for these kinds of developments. Building in greenery then is needed to densify with urban life volumes. This conflicts with compact city policy that states no green should be touched anymore and housing should be solved in the existing city, leading to highrises.

This resulted in the design being a compromise of different influences. On the one hand it incorporates highrises to create a quantitative contribution to housing and a more feasible business-case. At the other hand, it describes clear rules for volumes in order for the highrises to not disturb street life.

Another conflict was found in the goals for nature-inclusivity and ecosystem services for urban green space (Haaland, van den Bosch, 2015). These are hard to achieve in compact layouts. However, making spaces for greenery bigger will result in façades having no relation to eachother, which is strived for in urban life theory.

More specific challenges for the plan area were in how to deal with the railway emplacement. In the project, a heightened district was chosen as the most feasible option. This meant however that height differences would be present in the district. This is not ideal for pedestrians. However, the design proved that the transition can actually contribute to a better urban space.

Transferability

As the basic research concentrated on the generic theories of urban life and the compact city, a part of the results are generalisable. The research-by-design produced more specific knowledge, but the methodologies are applicable in most other contexts.

In the sub-researches, methods that objectively measure the urban form were tested. These methods can easily be transferred to other contexts. Conclusions however may differ, as different contexts ask for other interpretations of data.

The final design is very place-specific. It however can serve as an example on how the relation between the compact city and urban life concepts should be understood.

Societal relevance

The societal relevance of this research can be found by listing the urgency of the assessed themes. As stated in the preface, this thesis is based on three perspectives that each inherently focus on practical societal challenges. Therefore, societal urgency was a precondition when initiating this thesis.

The first societal theme that is assessed is the housing shortage in the Netherlands (Nijskens, Lohuis, 2019). As the location of the design is located in a complex inner-city densification area, the research tries to contribute to new ways of solving the housing shortage while maintaining a liveable human-minded city.

Related to this, is the concept of the compact city and Transport Oriented Development that is widely accepted in policymaking (Deilmann et al., 2019). Therefore the thesis assesses a subject that is currently widely used in city development strategies on both the Dutch national level, as the European supranational level.

The emergence of neo-liberal planning policies (Sager, 2011), is another societal challenge that gives this thesis relevance. Because of the increased focus on efficiency and economy, the social dimension of cities might be underdeveloped. This thesis will research this aspect and try to formulate new ways of designing our cities in a more social manner.

Lastly, one of the concepts of this thesis is to mitigate the main negative effects of the compact city by introducing urban life principles. This aims to decrease traffic congestion, increase good personal health and increase the personal subjective well-being of the users. In this concept the inherent societal relevance can be found.

Scientific relevance

The scientific relevance can be tested by positioning this thesis in recent academic discourse, while pinpointing its contribution to the discourse. Using this method, the key academic terms where this thesis is about, are ‘compact city’ and ‘urban life’.

The term compact city is a broad and widely discussed concept in academic discourse. As it recently gained momentum as the only option for sustainable urban development (OECD, 2018b) caused by the rapid worldwide urbanisation, the compact city concept itself is not controversial. This is also proven by the recent quantitative review by the OECD (2018a) that assessed over 300 mostly recent papers. Contributing to and reviewing this academic discourse therefore gives this research scientific relevance. Moreover, the thesis positions itself as a research-by-design in mitigating negative effects of the compact city. This may contribute to bringing the discourse a step further towards a truly sustainable form of urban development.

The second key term is ‘urban life’. While the term itself is not widely discussed, it describes a group of theories that propagates the same goals. Some describe it as public life (Gehl, 2013), urbanity (Montgomery 1998) or quality of urban life (Maran, Stimson, 2011). This academic discourse is ongoing as the main propagator Jan Gehl is currently comprehensively researching the theme (Gehl, 2011, 2013, 2016). This thesis adds to the body of knowledge on urban life by implementing the theories in an explicit spatial compact city context.

At the other hand, this concept of urban life is not uncontroversial. Marshall (2012) describes early work on the topic as pseudo-science, as it is based on mostly empirical evidence that is not always verifiable with scientific methods. However, following this reasoning the whole concept of ‘design’ can be questioned. This might therefore lower the pure scientific relevance of this research-by-design. This discrepancy between science and design is addressed in the methodological framework. As mentioned, this tries to create validity and rigidity for the research, also in a scientific perspective.

Ethical paragraph

As described in the societal relevance paragraph, this research focuses on mitigating negative societal effects of compact urban development. This is an inherent ethically sound proposition. However, reality may prove to be more grey.

The described neo-liberal context is not equally focused on all users. As Sager (2011) describes, economy and efficiency drive compact urban development. Normative questions like who profits from development and what groups are left behind, are relevant for this research. Moreover, the housing shortage and the scarce space in inner-city developments, leads to high land values and building costs. This makes the actual prices for new residential development unaffordable for a big percentage of society.

This thesis does not focus on these broad issues of spatial justice. It does however act within this context. The influence that policymakers, and therefore urban designers, have in inner-city development, mostly comes down to the public space and affordances. This is where this thesis aims to influence spatial justice, by creating an urban fabric that can be used by everyone in society and that creates affordances.

Creating urban life in these complex inner-cities with an existing fabric/function is a complex task which also has to account for the existing users of the area. Because of the housing shortage, there are two demographic groups: the ones who already live in the area and the ones who have no housing options and want to live in the area. this thesis will mostly patronize the future residents over the current residents in order to create a healthy environment and an optimized urban design. This dilemma is inherently related to the profession as planning and urban design will always patronize one group of users over another (Pløger, 2004).

The key approach used to ensure an ethical consideration is to test the design to a wide range of opinions, both professional and personal.

12 BIBLIOGRAPHY

Contents

Sources

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