

Connected design

A scenario based design for transit oriented development in the Vlietzone The Hague.

By Jomme Rooijakkers

COLOPHON

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A scenario based design for transit oriented development in the Vlietzone The Hague.

THESIS

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Preface

With this document I present you my thesis plan for the coming months. In this plan I describe what the context is of my graduation project.

The location that I focus on is the Vlietzone in The Hague. In the following months this location will be the basis for a design approach and possible future scenario development for the Vlietzone to solve the problems within The Hague. At the end of the semester I would like to present an action plan and three possible future scenarios and a key intervention.

As final product I would like to contribute with my thesis to the body of knowledge. This thesis plan will be the first steps in that direction. This thesis flan will further explain my goals, methods, and research direction. I hope you find this thesis plan an interesting read.

Jomme Rooijakkers

Index

1.	Introduction	page 7
2.	Location	page 15
3.	Objective	page 23
4.	Theory	page 31
5.	Methodology	page 35
6.	Study area	page 41
7.	The Hague	page 45
8.	Structural elements	page 55
9.	Infrastructure	page 63
10.	Scenarios	page 77
11.	Design	page 91
12.	Reflection	page 113
13.	Bibliography	page 117
14.	Appendix	page 121

1. Introduction

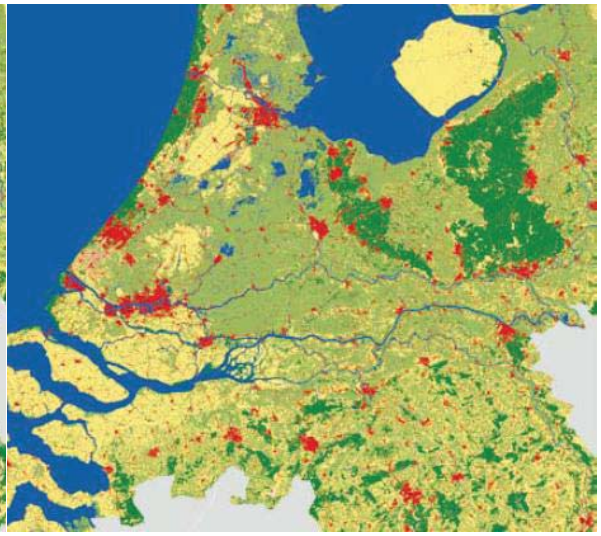
1

Population growth Netherlands

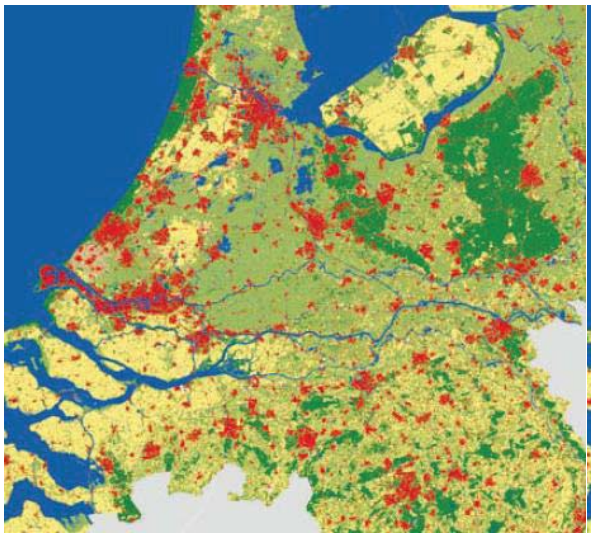
The Randstad is growing, 700,000 new inhabitants need to be housed before 2025. After this time 400,000 more are expected to settle within the Randstad. For the city of The Hague this means that 55,000 new inhabitants will settle there. From these 55,000 about 50% of these inhabitants will be housed in renovation projects and small inner-city developments. The other half will be divided within new extension areas. The fifth memoranda spatial planning state that no new extensions are allowed outside the city red borders. Within these borders is the Vlietzone the biggest area. The Municipality has therefore decided that 12,000 of these new inhabitants can settle in the Vlietzone. (CBS)



Randstad in 1990



Randstad in 2010



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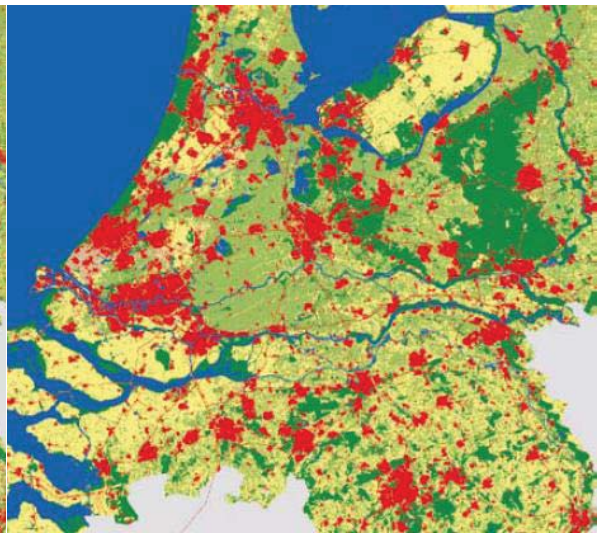

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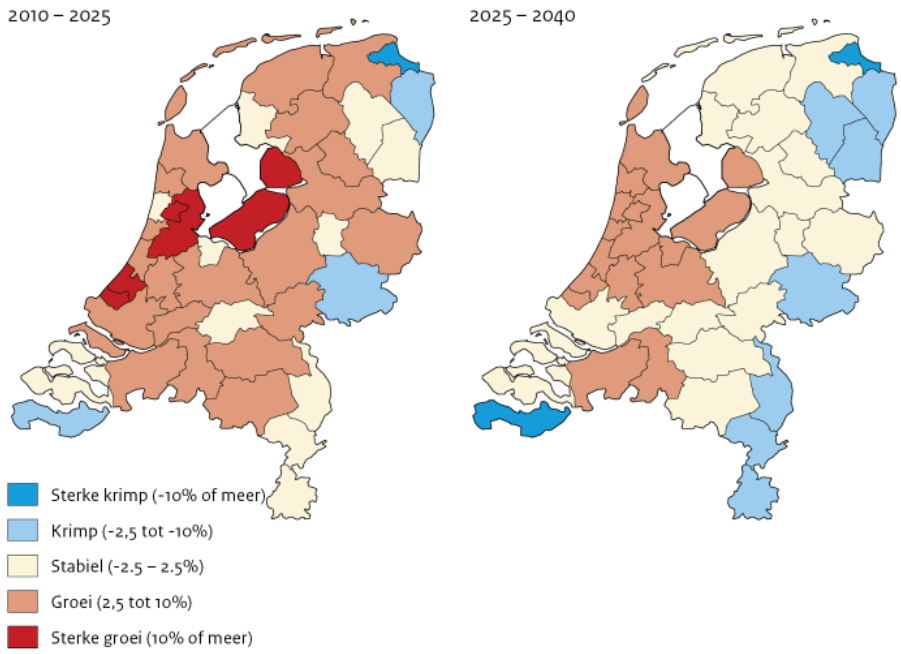
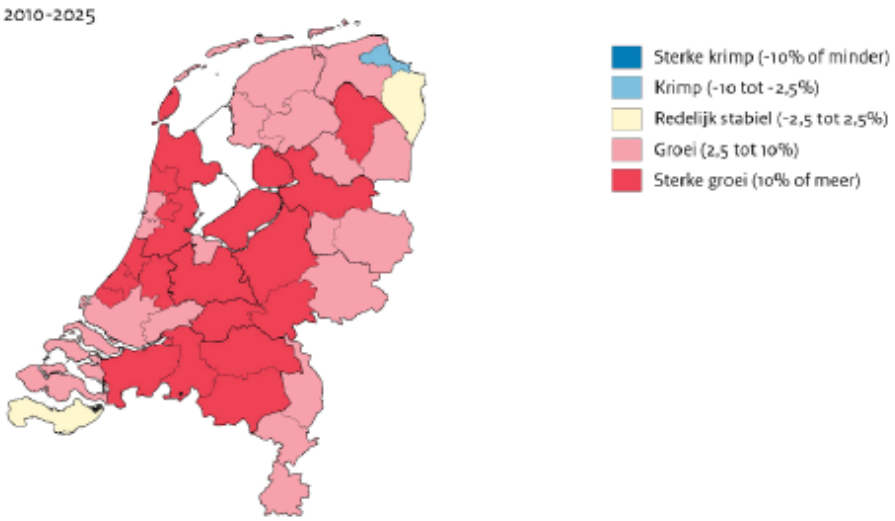
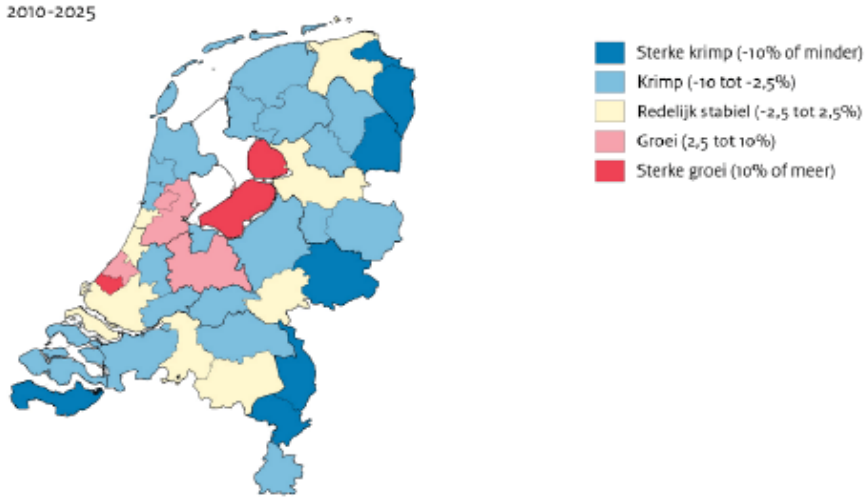


Growth inhabitants source: CBS



Growth in number of households source: CBS



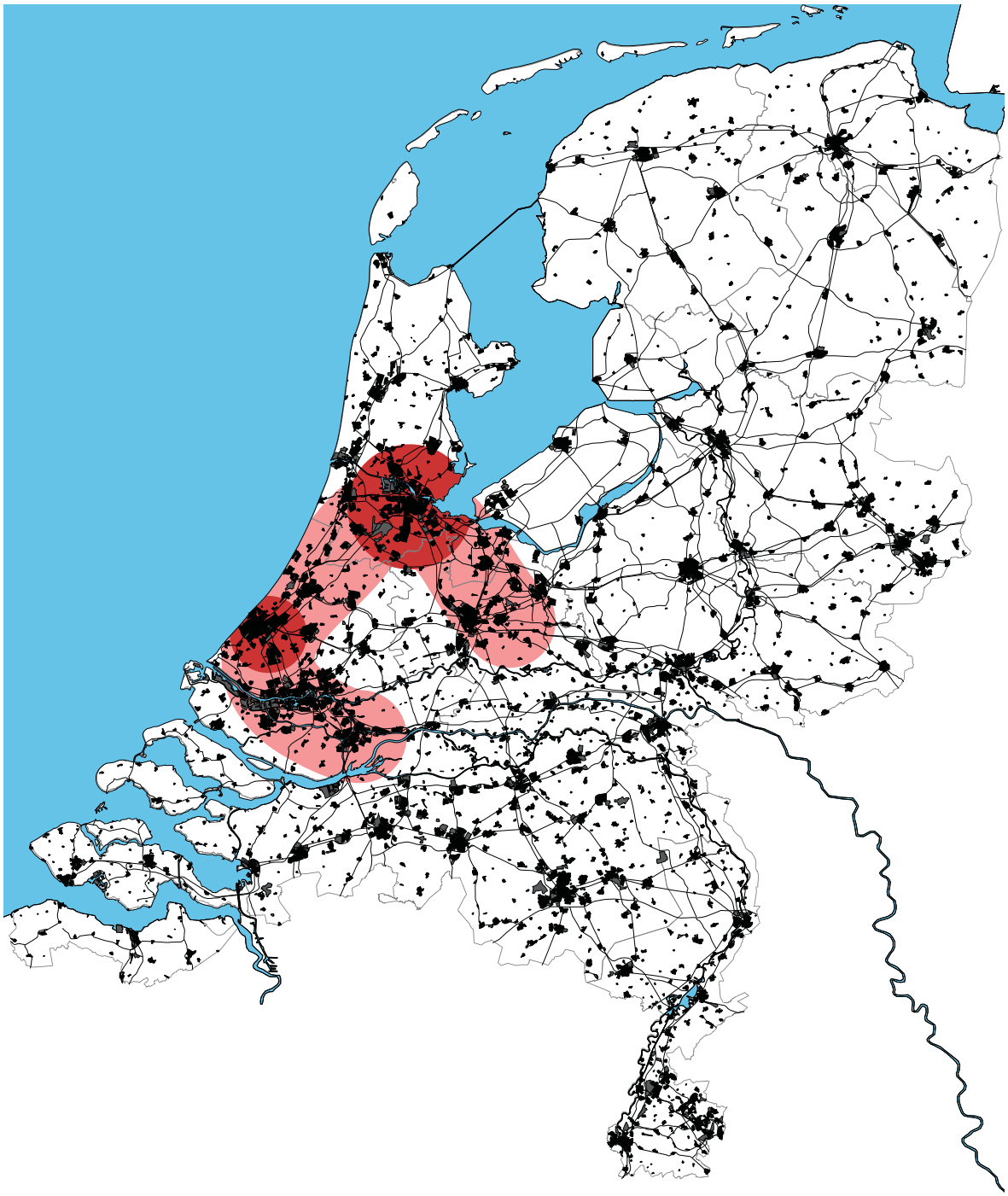
Growth in labour force source: CBS

1

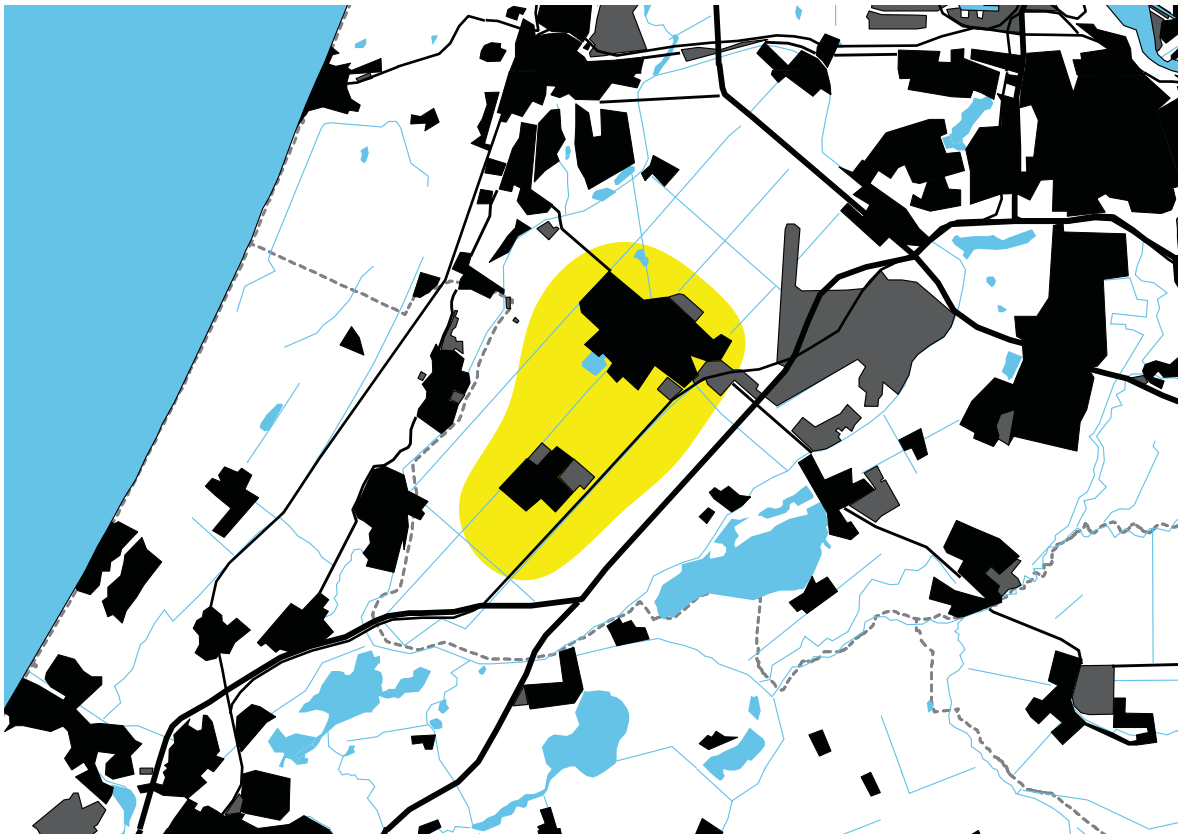
Locations for development

With the population growth of the Netherlands, more pressure is placed on the already crowded Randstad. Due to new national building policies and the current planning act, called the fifth memorandum building outside the city boundaries is prohibited. Within the Randstad there are only two areas left that are big enough for the large city extensions needed to cope with the population growth. These two areas are the Haarlemmermeer polder and the Vlietzone, both have very interesting possibilities.

I have chosen the Vlietzone because of its location. It borders the city of The Hague at the central route of multiple important connectors, both road and train. This makes an interesting mix to focus on an urban design focused on transit oriented development (TOD).



Randstad with growth centres

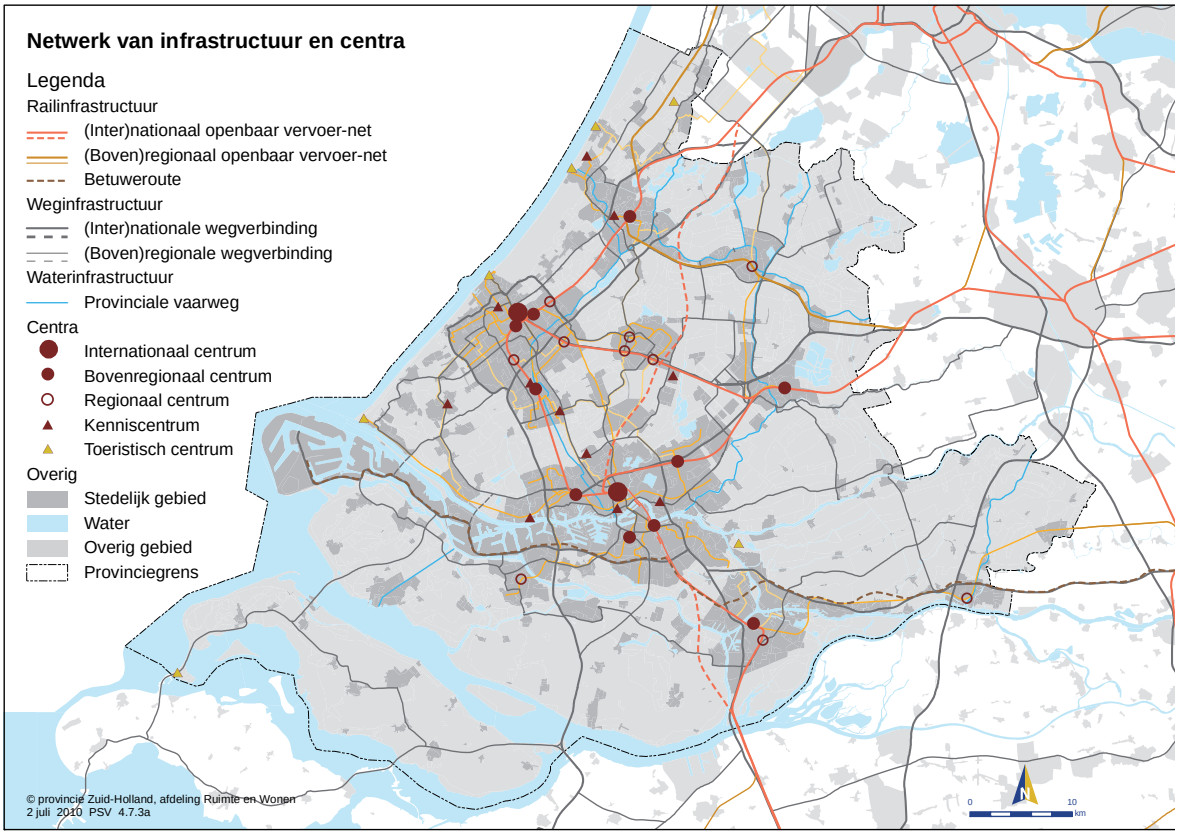


Haarlemmermeerpolder, development area in Noorth-Holland

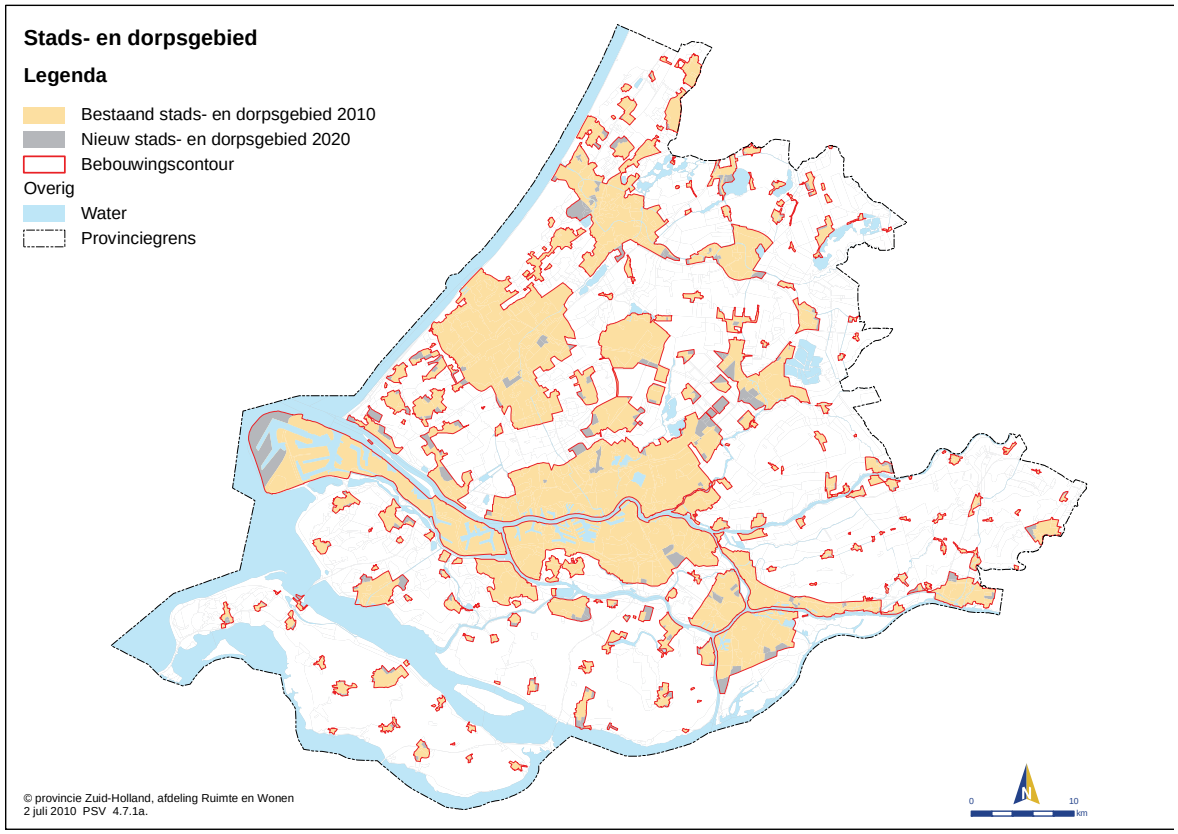


Vliet- and Zwethzone, development area in South-Holland

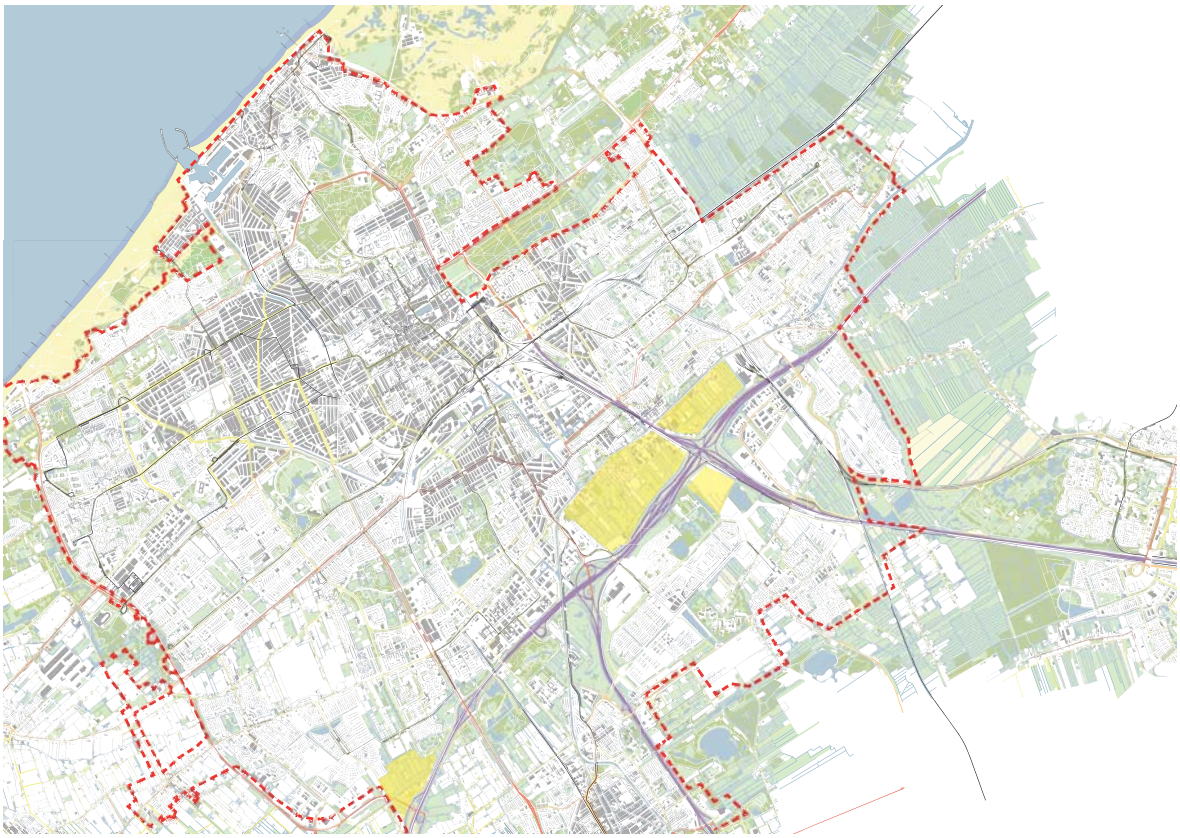
1



Structures in South-Holland where cities can expand



Building boundary, areas in South-Holland wherein cities can expand



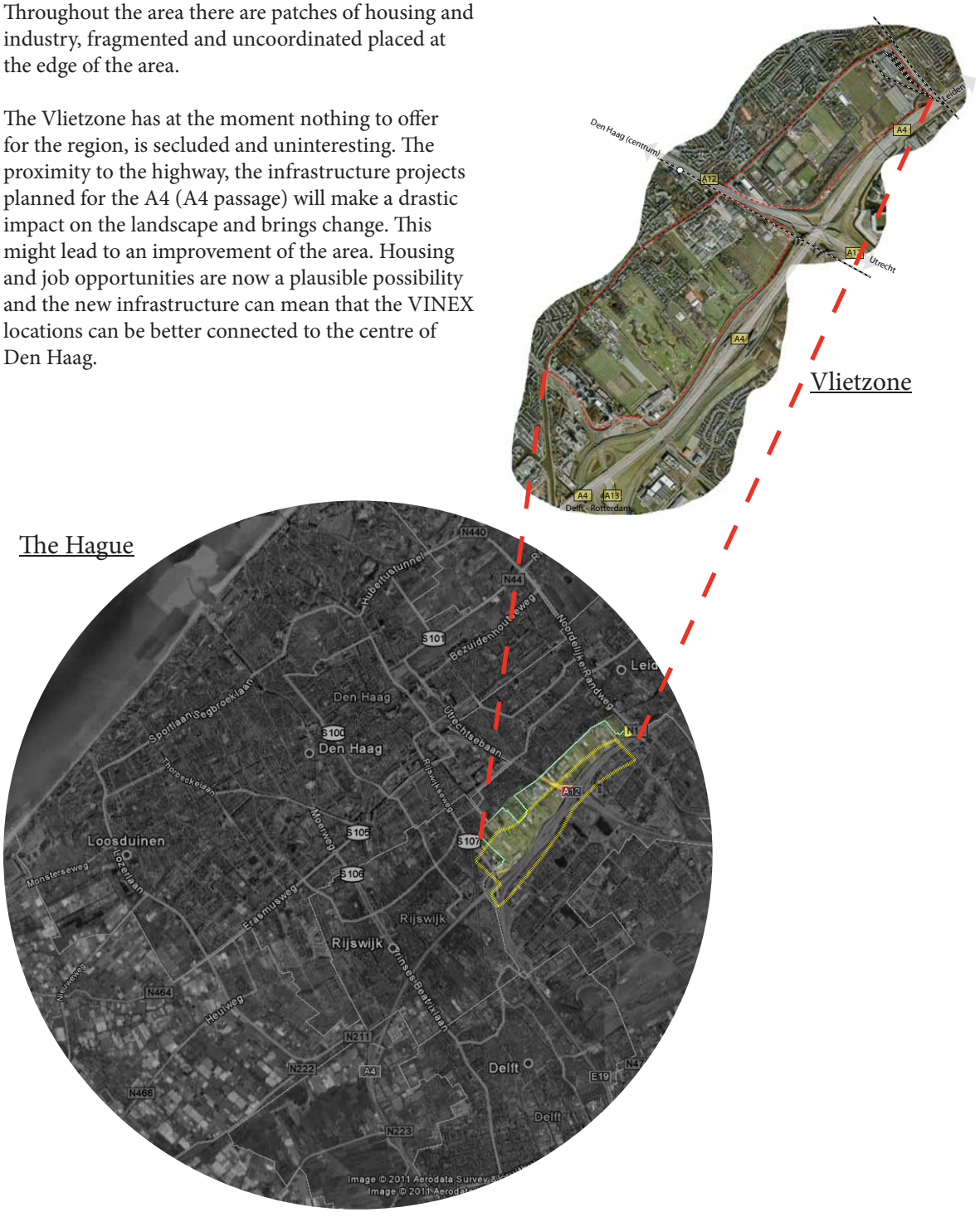
Building boundary, area wherein The Hague can expand with large open areas open for development in yellow

2. Location

2

The Vlietzone is a low density, mainly natural, district within the municipality of Den Haag. Surrounded by a smal canal and the highways A4 and A12 it is fairly isolated and cut off from the city. The surrounding neighbourhoods are not connected and mostly completely closed off.
The main features at the location are small patches of agricultural land an allotment gardens. Secluded from view en tucked away in the corner of the area is the Amusement park Drievliet. It is a relatively small park. Next to the park is a large golf course that consumes about one third of the project area. Throughout the area there are patches of housing and industry, fragmented and uncoordinated placed at the edge of the area.

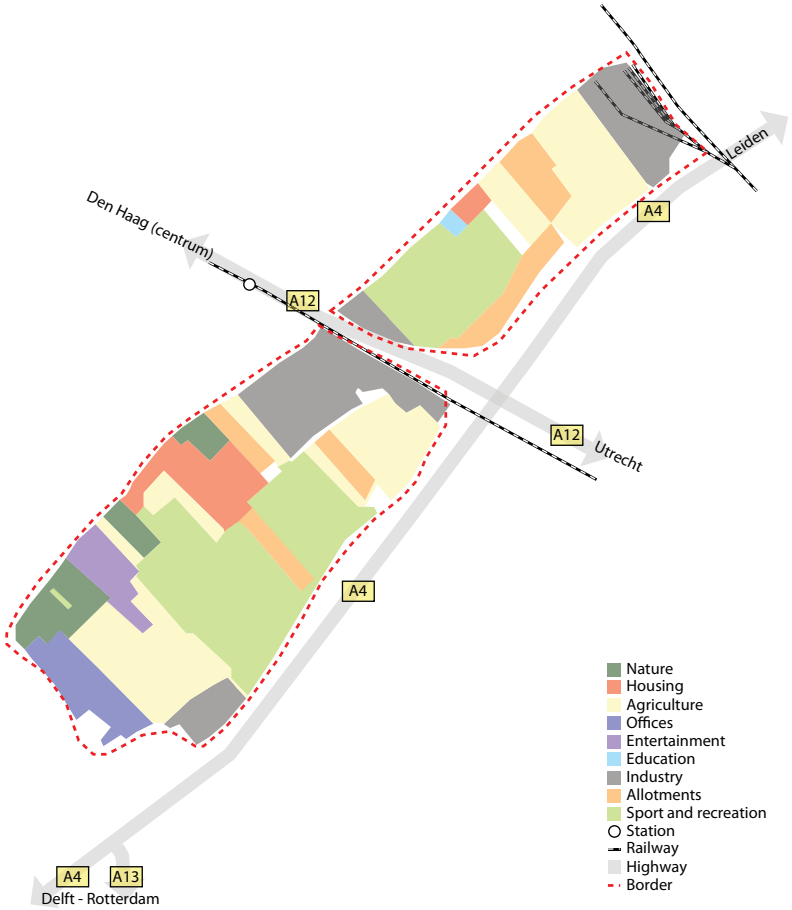
The Vlietzone has at the moment nothing to offer for the region, is secluded and uninteresting. The proximity to the highway, the infrastructure projects planned for the A4 (A4 passage) will make a drastic impact on the landscape and brings change. This might lead to an improvement of the area. Housing and job opportunities are now a plausible possibility and the new infrastructure can mean that the VINEX locations can be better connected to the centre of Den Haag.



Vlietzone located inside The Hague



Vlietzone 1:55.000



Vlietzone and functions

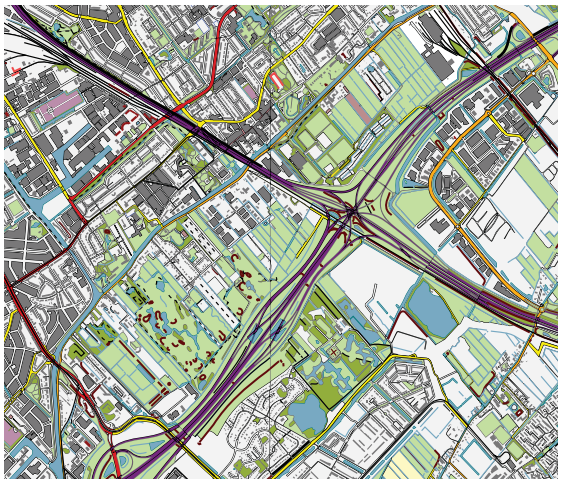
2

On the other side of the highway there is Leidschenveen-Ypenburg. This district is an established expansion of The Hague where the development started in 1997. With development focused on family housing, most of the developed units were large row houses with garden. The location next to the railway and highway provided an ideal location for housing focused commuting workman.

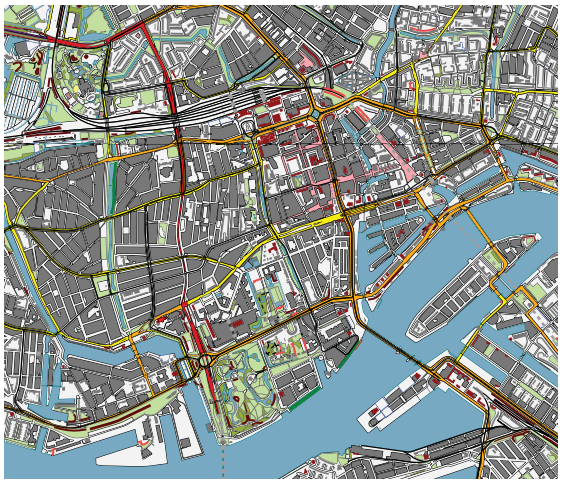
On the other side of the Vliet canal is the town of Voorburg. It is fairly old town capsulated inside the city of The Hague. Most of the nearby functions are provided inside Voorburg. The newly constructed Park Leeuwenberg is part of the municipality of Voorburg. So to build in the Vlietzone multiple Municipalities have to partake in resolving the problems. The same goes for the highway that traverses the municipalities of Voorburg, The Hague, Rijswijk and Delft.





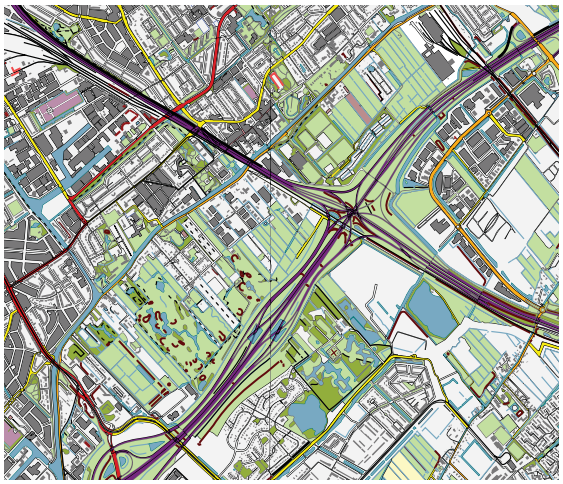


Vlietzone, google maps and GEO kaart



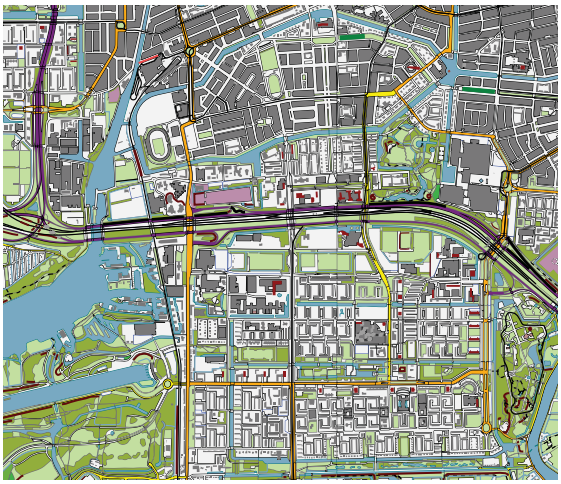
Rotterdam centre, google maps and GEO kaart





Vlietzone, google maps and GEO kaart





Amsterdam Zuid-as, google maps and GEO kaart





Amsterdamse bos, google maps and GEO kaart





Delft centre, google maps and GEO kaart

2



estate:
-historical heritage
-high-value
-private and secluded
-car is main transport mode



Villa:
-high-value
-private and secluded
-car is main transport mode



Historic Homes:
-historical heritage
-high-value
-urban living
-multi-mode transport



Wholesale:
-local attraction
-secluded
-car and truck access



Offices:
-mixed-effect
-high-prestige
-private and secluded
-car, bicycle and public transport



Garage:
-local impact
-private and secluded
-car and truck



Drievliet:
-amusement park
-regional attraction
-public
-car and public transport
-noise pollution



Golf club:
-private and secluded
-car is main transport mode
-regional
-not everyone alloowed



Sports Fields:
-public
-local
-car and bike

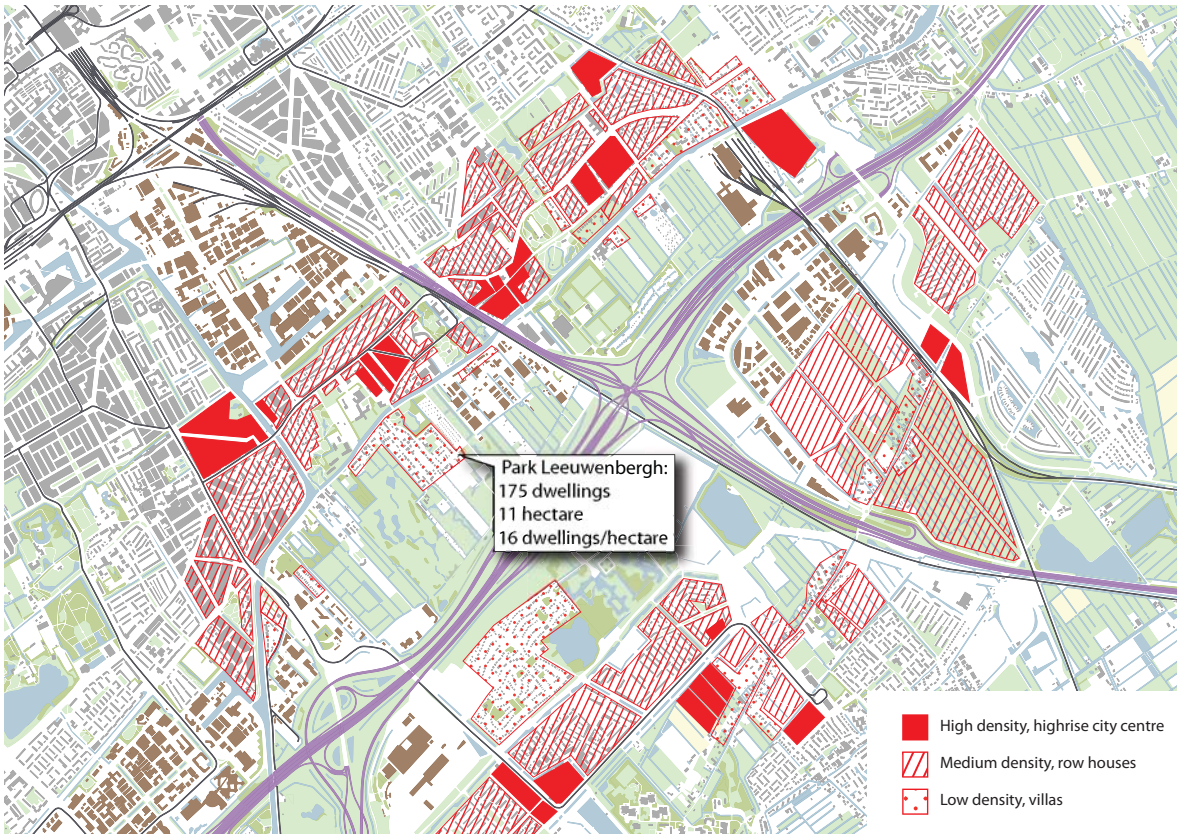


Fields:
-secluded
-car and truck access

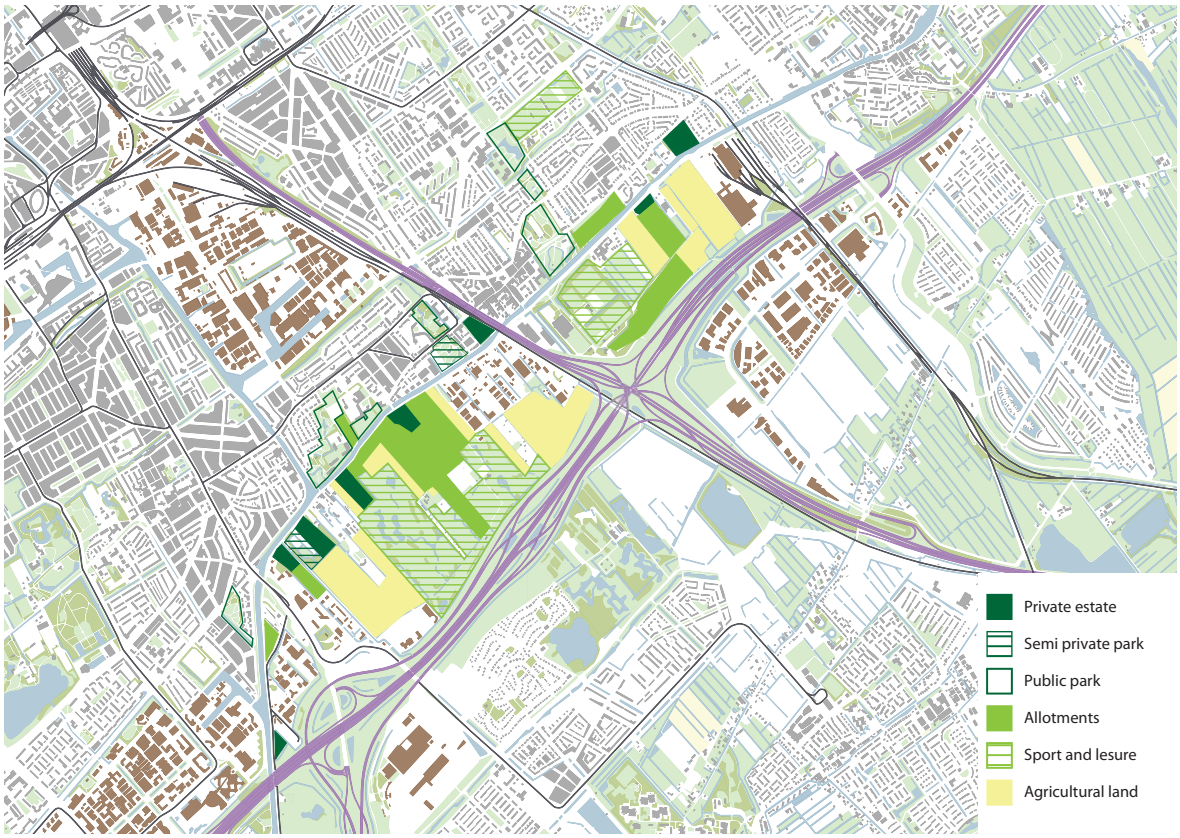


allotments:
-private and secluded
-car and bike

Impression Vlietzone



Housing type and density in the Vlietzone



Natural areas and industry in the Vlietzone

3. Objectives

3

Chapter organisation

This chapter is dedicated to the problem definition and the direction and ideas that the final design exercise has to meet. The first subchapter is focused on de problem statement. First the observations made in the in preliminary work are summarised. These observations are made by the first scan of the design area, correspondence with the municipality of The Hague and the preliminary result from the research described in chapter '5. Research'. After this summary the problem statement is formulated, this is the main question that guides the design process and idea. At my graduation I hope to present the results in form of a design. In the chapter '3.4 design objective' the design boundaries sketched.

Problem statement

observations

The Vlietzone area is a large area of 2,7km2 With multiple functions and activities. Such a large area has also a large surrounding area with al lot of actors and qualities. One of these actors is the municipality of The Hague. The proposed program has been used to determine future program and influences. These influence of the activities, actors and qualities create opportunities, but also threats. Below is a short summary of these threats:

1. 12,000 new inhabitants need to be housed in the Vlietzone.
2. There is no money or incentive from the municipality, investors need to be found for development.
3. The relocation of heavy industry needs to be solved inside The Hague.
4. A new artery towards the city centre must be created through the Vlietzone.
5. A new parallel road in combination with A4 revising must be designed to combat congestion.
6. New public transport connections are suggested and must be made.
7. There is a building stop for the area.
8. Small growth now will prevent later development opportunities.
9. The area itself introvert and secluded from The Hague
10. The Vlietzone is located between the regional Randstad network and local The Hague network.

Problem statement

From the stated problems we can distil the direction of what is the most important to solve and what can prepare the Vlietzone for the future. The internal identity of the Vlietzone is in conflict with the region. But also the demands from the municipality are currently outdated and hinder the Vlietzone in transformation. The Crisis has made the future uncertain, the expected certainties and influences will be able to sketch a future where current plans can be revived in. Making these plans or scenarios will determine development opportunities. Waiting 10 years to see what is going to happen will not better the situation for the Vlietzone. To prevent clogging of the are a small area for new development must be selected en designed to support different scenarios for growth. To come to this I have stated the following question:
"What type of local key intervention for the Vlietzone is necessary to realise the most likely future scenarios after 2020?"

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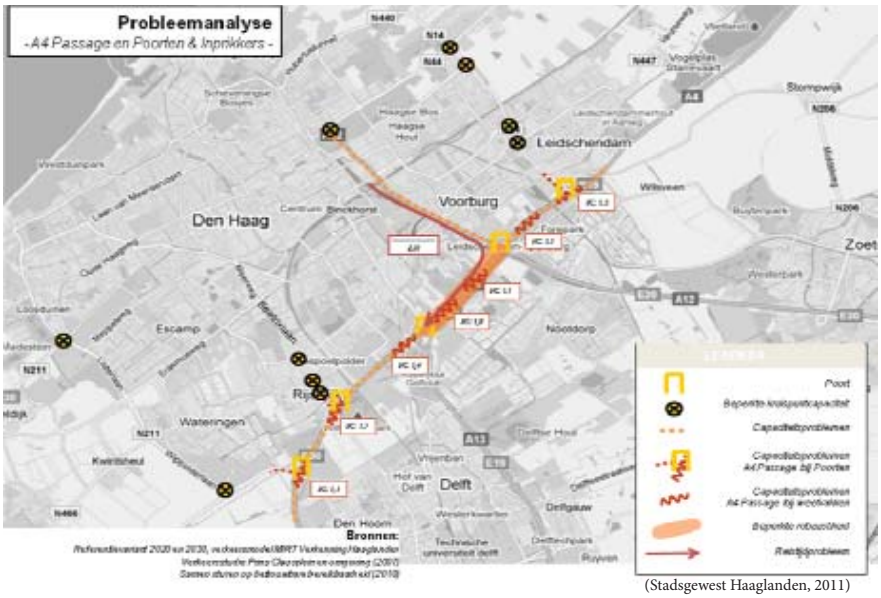


(Stadsgewest Haaglanden, 2011)

Traffic problems and city entrances



Demand for parallel road structure



Build stop

3

Design objective

Future scenarios

As my problem statement suggest, I want to investigate possible scenarios for the A4/Vlietzone. Due to the recent recession most projects, that the municipality of The Hague supported, have been halted or stopped completely. This means that at the moment there is no need for development. Current predictions suggest that the growth of The Hague will lead to future problems. To prevent needles delay of plans that are needed in the near future, I propose a segmented approach, where local development is guided buy future scenarios.
I aim to provide multiple scenarios, so that any changes in municipal aim, growth and economic needs can be met. These scenarios makeup the template for a key intervention area and facilities needed.

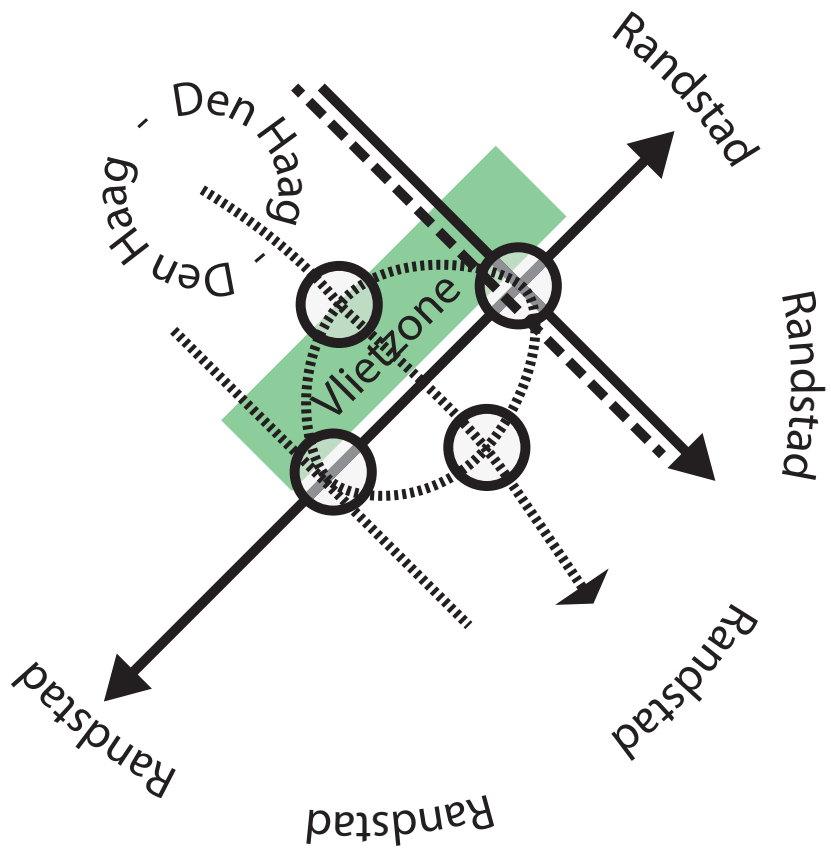
Planning until 2020 and after 2020

The future scenarios will focus on the short and long term opportunities and threats., These future scenarios will focus on the expansion of the A4, public transport, new parallel roads, green structure and economy. First of all, designing a new system for the A4, prevent widening of the surface area, but increasing traffic capacity, then focussing on accessibility of the area.
In the coming months of my graduation research into three possible scenarios will be conducted, providing a solution to the different wishes and possibilities given by the municipality and the province of South Holland. As a result, each of these scenarios will provide different ideas for the area. The different scenarios are divided in; living, green structure and economy. In chapter '6. Design' will these scenarios further explained

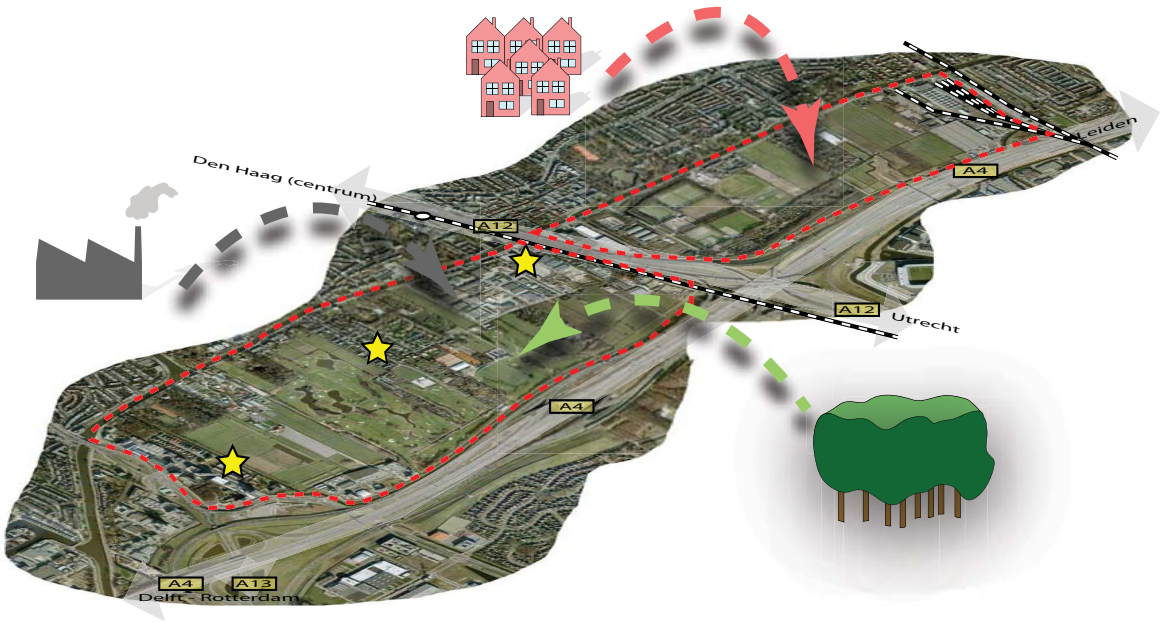
Local design project

The announced plans for new highways and roads into the city centre will need to be integrated with future development. Depending on the most likely future scenario the need for extra connections to the highway might be needed. The second interference is to bring public transport to the area. This makes the area accessible for the greater public. Where and how the best connections can be made is scenario dependent. Connecting the Vlietzone to a nearby station will also be fruitful for its development. All of the taken measures must allow better opportunities for development, but prevent excluding future scenarios. Only by exploring multiple options will be clear what steps need to be taken. Further research into transit and transport will show the best fashion in which these measures can develop.

All these planned infrastructural form the new arteries of the Vlietzone. Along one of these arteries a new key intervention will be designed. This design will be a reaction on the future developments. Adding corresponding facilities to the newly introduced connecting roads, railway and public transport. Building on theory provided by Space syntax and TOD (see appendix A)



Schematic drawing of the Vlietzone



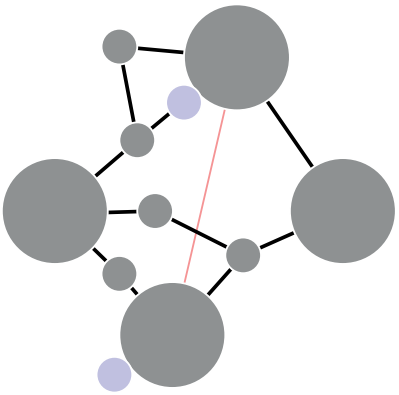
Influences on in the Vlietzone

3

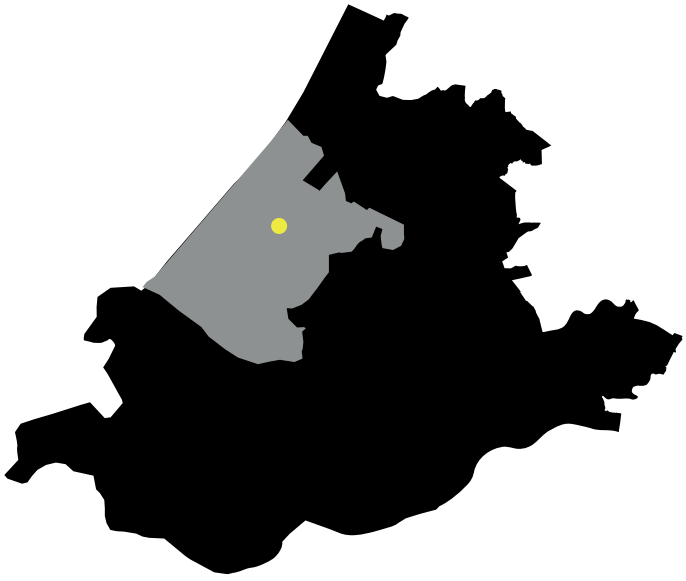


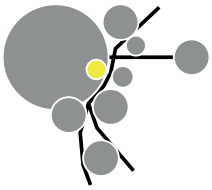
Local scale research



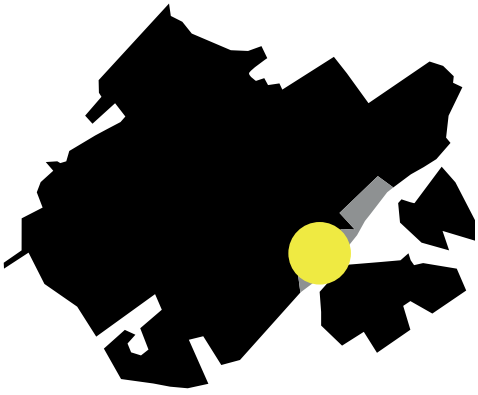


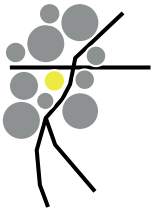
Randstad scale research





Regional wide research





City wide research

4. Theory

4

Chapter organisation

This chapter I elaborate the different theories and their methods that I want to apply to my thesis and design project. This chapter starts with a short description why I think theory is important. The next subchapters explain what each theory provides in information, method and how this can contribute to my design.

Theories en methods

In scientific research it is important to construct a hypothesis, this hypostasis is an educated prognosis of the end result. To test if the hypothesis is correct research must be conducted. Literature, method en theory study provide answers to research techniques. This will lead to a design for a test case to prove the hypothesis.
I stated in the problem statement that the Vlietzone can improve locally and regionally. In my graduation thesis I aim to solve this by stating the hypothesis that:

1. The formulation of possible future scenarios will let me predict future purposes of the Vlietzone for The Hague and its region.
2. A local key intervention will allow gradually development of the Vlietzone instead of uncontrolled growth.

To test if these hypotheses are correct I apply Transit oriented development (TOD), Space syntax and scenario study. The next subchapters describe what each will contribute. In my graduation I hope to provide complete theory supporting my design

Transit oriented development

TOD is an urban theory that follows the beliefs that a well connected society functions better. The focus for design is mixed use and multiple types of public transport and infrastructure that congregate in a central node along a network of nodes (Calthorpe, 2002, Cervero and Kockelman, 1997, Holmes and van Hemert, 2008). These nodes support each other on a local level, while on a larger and more national scale the provide opportunities.

The above is a very handy approach for the Vlietzone. Because the Vlietzone is located between a local and regional connection it can become a new hub in de relation The Hague Randstad. Making TOD an ideal approach to tackle the current problems. (see appendix A)

Space syntax

With the takeover of computer programs and techniques in urban design. The statistical approach to designing has had an uplift, Space syntax is one of the relevantly new techniques. Space syntax has ideas in connectivity and accessibility of networks. Humans have limited ability to remember directions and give directions, preferring the route with the least turns and junctions. This principle forms the basis of space syntax. (Van Nes, 2009, Van NES et al., 2012, Foltête and Piombini, 2007)

In my design space syntax can provide a statistical approach on what connections and streets inside the city are the most valuable. From this rational decisions for design location and the addition of new connections.

Scenario study

This method I hope to find decision-making in municipal and governmental documents like (Özkaynak, 2008). From this I hope to gain a more political view on dissection-making for long-term scenarios and applying this to mu future scenario design. More search for documents and ideas for thus subject must be done in the next month.

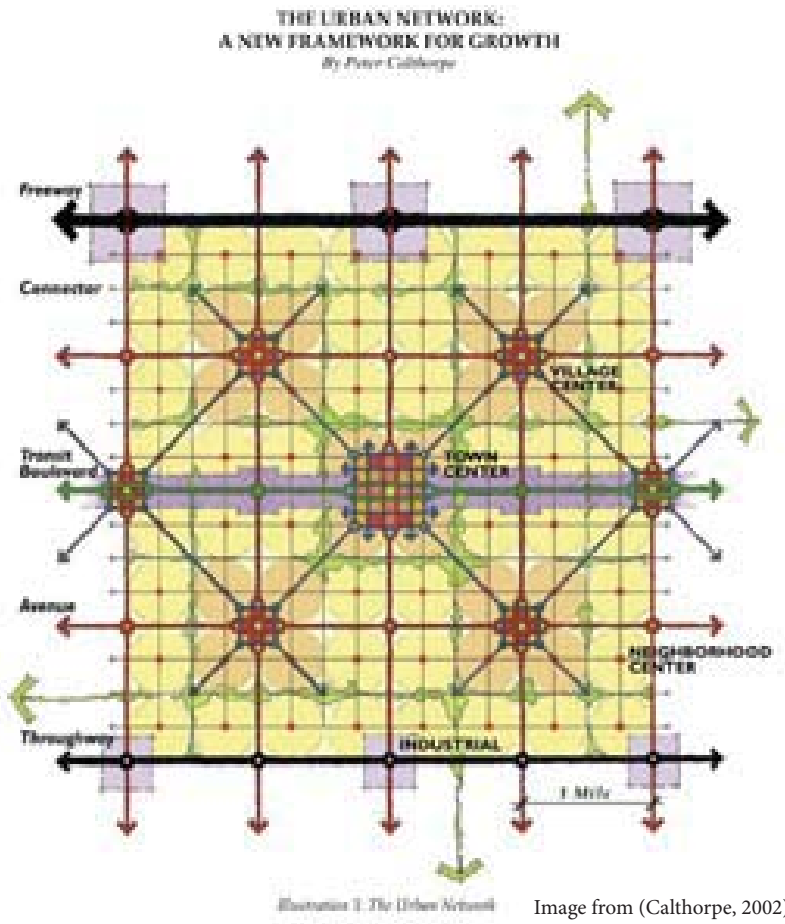


Image from (Calthorpe, 2002)

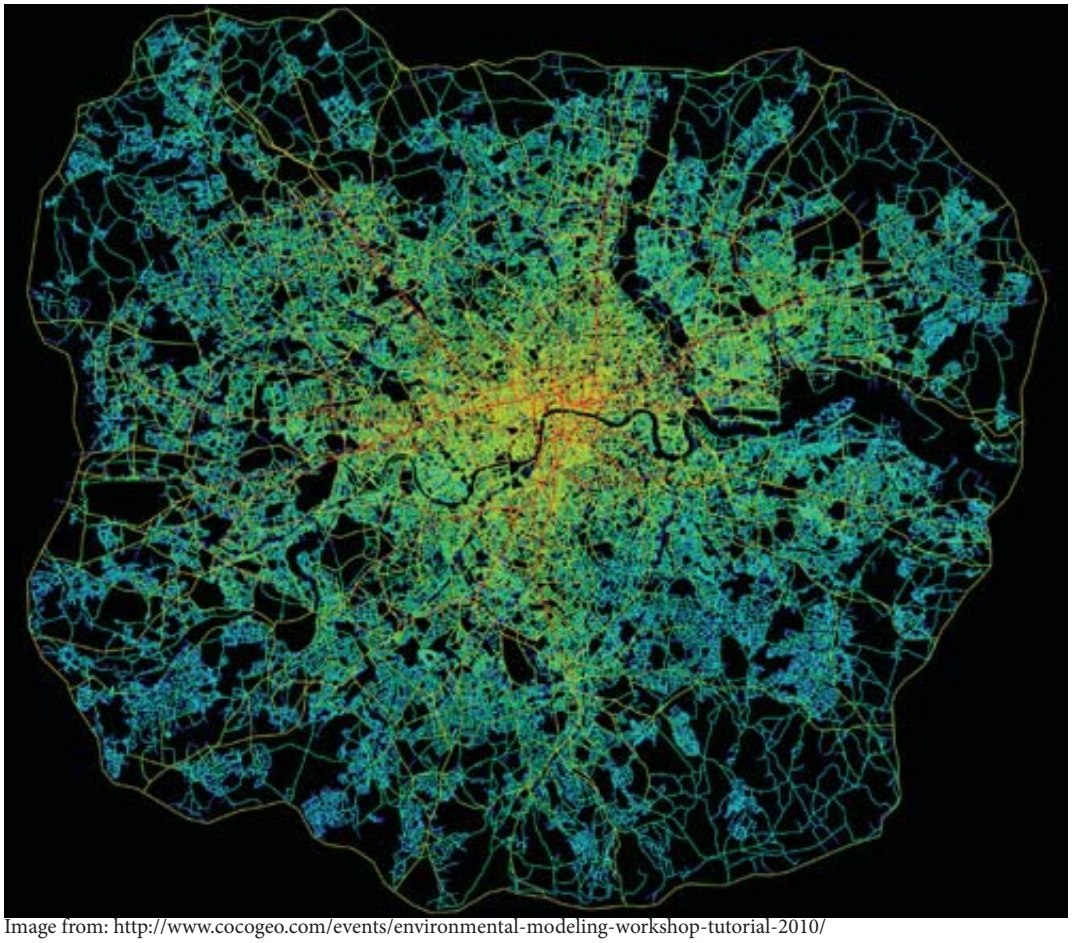


Image from: http://www.cocogeo.com/events/environmental-modeling-workshop-tutorial-2010/

5. Methodology

5

Chapter organisation

Building a sound argument is the basis for a good and strong design. Without the correct background and research any design made will be unfounded and worthless. Knowing what to study and having a general idea in what direction the answer to your questions lie is the basis for a good research. In this chapter I try to organise my research and make it clear in what direction my design project will develop.

This chapter will begin with research questions follow by used literature and research methods. With this information the scientific relevance of my thesis can be explained. This is followed with a time schedule and ended with a comment about ethics in urbanism.

Research question

The problem statement showed that the Vlietzone has an undefined future and also no incentive to activate the area and work towards a new future for the area. To start the search on how to determine the future, question for a research direction must be asked. As the design goal is to compose new possible scenarios for after 2020 and design a local key intervention that initiates the realisation of the future scenarios. Thus the research questions are related to these problems and goals.

Question and sub questions:

1. *What is the role that the Vlietzone will play for The Hague and its region after 2020?*
    - 1.1. *What local qualities are important to the area, what do they provide?*
    - 1.2. *What future and planned local influences have effect on the Vlietzone and what positive or negative effects do they contribute for future development?*
    - 1.3. *What regional influences have make the Vlietzone attractive and what positive or negative effects do they contribute for future development?*
2. *What type of local key intervention will create a good social economic climate and facilitates the realization of the future scenarios?*
    - 2.1. *What important infrastructure connections and network form a new node for growth?*
    - 2.2. *What functions support the Vlietzone the most and relate to the future scenarios?*
    - 2.3. *What social economic living climate is suitable for the Vlietzone and its scenarios*

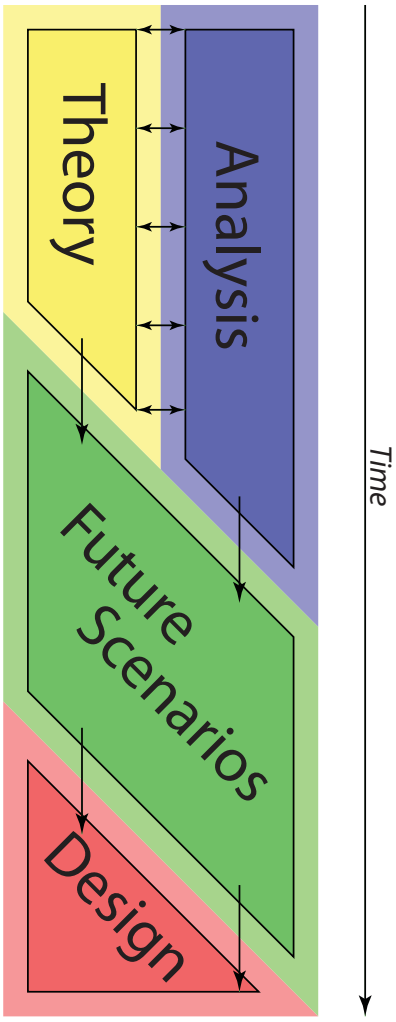
Research approach

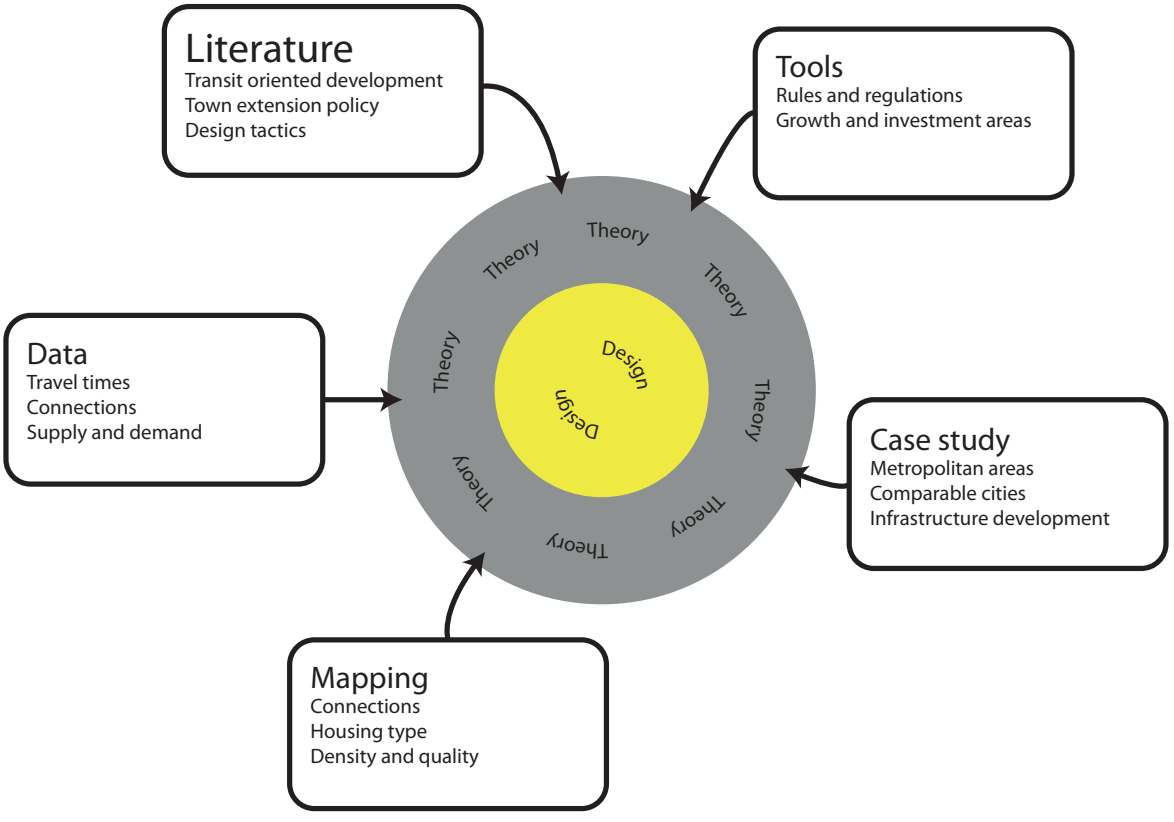
With the research questions defined I must state what can be researched and what techniques and methods I use. These will define the boundaries of the research, allowing thorough information instead of a bread search that hat no solutions.

1. To find local qualities, current buildings must be mapped and actors involved summarised. In addition landscape and waterscape must also be mapped. The local road system has to be documented as well as public transport. In the end The documentation of the work area will give insight in current activities. Giving qualities to each will value what is important for the are and what form a burden, thereby deciding where can be improved upon and what should be transformed. Similar to what is done in the chapter mapping only more thorough and adding relatable qualities.
2. To find the future influences we must find future plans for the area. These future plans can be found at the municipality in the master plan (Stadsgewest Haaglanden, 2008) and the governmental approach (MIRT Verkenning Haaglanden, 2011, Stadsgewest Haaglanden, 2010, Stadsgewest Haaglanden, 2011). These future plans are susceptible to change. Most of these plans date from before crisis and have the ideas that now are unrealisable, but will continue, however different, in the future. This literature study will provide information that can be mapped evaluated and check by new information on relevancy filtering the most likely future local influences.
3. Regional influence in the area are many, but only a few are real important. To make the Vlietzone regional attractive, road and public transport network must be mapped. Together with the airports and large economic centres this forms the basis on what must be added to that network. The surrounding green structure can also be a factor and should be taken into account. The influence of national networks crossing the Vlietzone can only be understood by mapping them and their actors.

With the mapping of these elements and the examination of documents give a combined vision of the future and make it able to distil plans and direction from it.

1. The value of the network can be shown by 'Transit Oriented Design' (TOD) study and by the statistical approach of 'Space Syntax'. TOD will show where nodes will be the strongest when focussing on public transport, while 'space syntax' will show how well roads are connected into a network and parts of the city. Literature research and theory from that together with an statistical analysis can provide the best answer


Theory
Analysis
Future Scenarios
Design
Time


Literature
Transit oriented development
Town extension policy
Design tactics
Tools
Rules and regulations
Growth and investment areas
Data
Travel times
Connections
Supply and demand
Theory
Design
Case study
Metropolitan areas
Comparable cities
Infrastructure development
Mapping
Connections
Housing type
Density and quality

for a design location.
2. This research can only be done when the scenario forming is complete. Based on the future plans related functions can be selected and weighted. This selection of functions has its own preferences with accessibility and environment this will leave a select group for the design location.
3. A study into housing policies, needs and population expectancy, may show what type of housing is needed. The future scenario determents the density and thereby the extra functions needed to give quality to the area. Expertise and some reference projects might simplify the design decisions.

Finding a local key intervention node for design is the first step, but also a relative simple one. The exploitation and design of this node depends on the study of the future scenarios. Only when the first study is done can de design process begin.

For the search of the research questions the following methods will be used:
-Literature study (TOD)
-Literature study (Municipal and governmental policies)
-Literature study and statistical study (housing and growth)
-Statistical study (Space syntax)
-Mapping of local en regional infrastructure
-Mapping of functions
-Mapping of spatial and morphological aspects (Vlietzone)
-Mapping regional important projects
-Analysis and rating of the above mapped qualities

Scientific relevance

For the graduation project in urban design a student is involved in research and design. For both research and design the students is trying new methods and techniques. The new insight in information will result in new ideas. These ideas form the basis of new theory to add to the body of knowledge. In this thesis plan I try to predict the results from my research hand how this will add to the body of knowledge.

The literature study of TOD (see appendix) is an important addition to transit oriented development in the Netherlands. This method has been only recently been introduced in the Netherlands. TOD is only now being applied to city centre and the central stations on the railroad system in the Randstad, but not jet on the scale of urban expansion areas (Geurs et al., 2012). This search can be interesting, connecting even larger network and infrastructure to urban program. Shine light of transit can influence living and design approach.

With the current economic crisis the future is very uncertain, this is also true for current design project. Most of the project before the crisis were short term project commissioned by a client. Most of these project have now been halted or even cancelled, due to lack of funding. With my thesis I try to show possibilities and techniques in long term design, this to keep the development process going.

The design that I propose will be a test case for this future focussed planning. Forming a link between the importance of public transport and regional connectivity, taking in account for future alterations affecting local design. Providing a base for new study and research for next year's graduates.

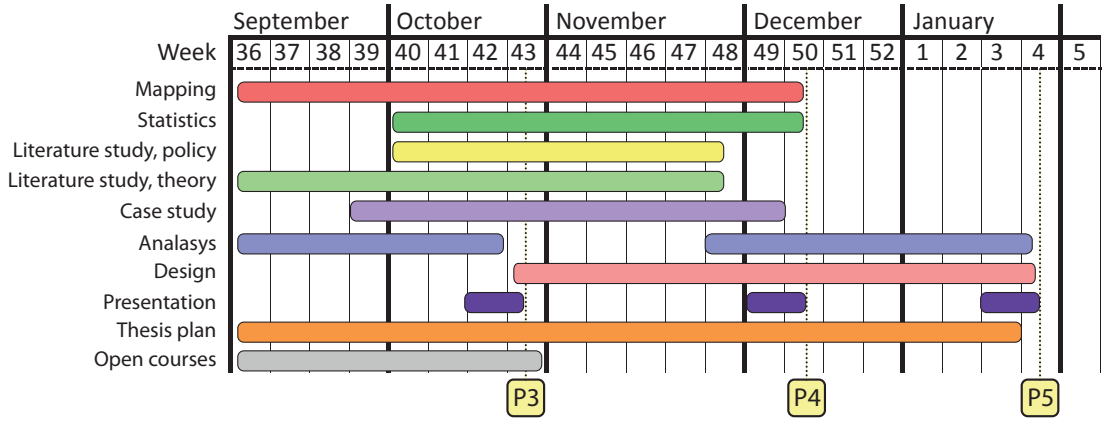
Schedule

see image next page

Ethics in urbanism

In urbanism we need to keep moral values. We cannot lose them, because without them we are no longer doing good, but harm. We have to keep to a system of principles were you should not wilfully neglect an aspect to improve another. This is ethics useful in urbanism. In this profession we plan and design so that living conditions and therefore life will be better. But this brings us often at crossroads, when we have to value one over another.

The hardest choices are what to demolish and what to preserve. While roads and highways have no sentimental value, removing them might affect lives. The hardest is it with nature and housing. People depend on having them and cannot miss them. In my graduation process I strive to minimize the effect and personal cost for the inhabitants of the Vlietzone. Providing equal compensation or improvement to compensate for these costs. Cost are not the economic value, but also quality of living en environment. We have to be careful to see value in terms of economic gain. The value of living is far greater than money can buy. In this ethics in urbanism pays the biggest role. As an urban designer you have to decide when money dictated quality, choosing lightly will ruin you design, living quality and the social quality of a plan.


September
October
November
December
January
Week
36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 1 2 3 4 5
Mapping
Statistics
Literature study, policy
Literature study, theory
Case study
Analasys
Design
Presentation
Thesis plan
Open courses
P3
P4
P5

6. Study area

3

Areas of Influence

With a graduation project orientated on transit oriented development, scale and types of transport are very important. For this reason multiple scales for research and mapping areas are used within this graduation project. This chapter describes these scales and explains usefulness of each to the project.

National (Randstad)

An important part of transit oriented development is that far away locations become close by reducing travel time. With the reduction of travel time, nodes of dense cluster of different modes of transport arise in a network of lines crossing the country. These nodes are found all across the Randstad and form the core as well as the engine of the Randstad.

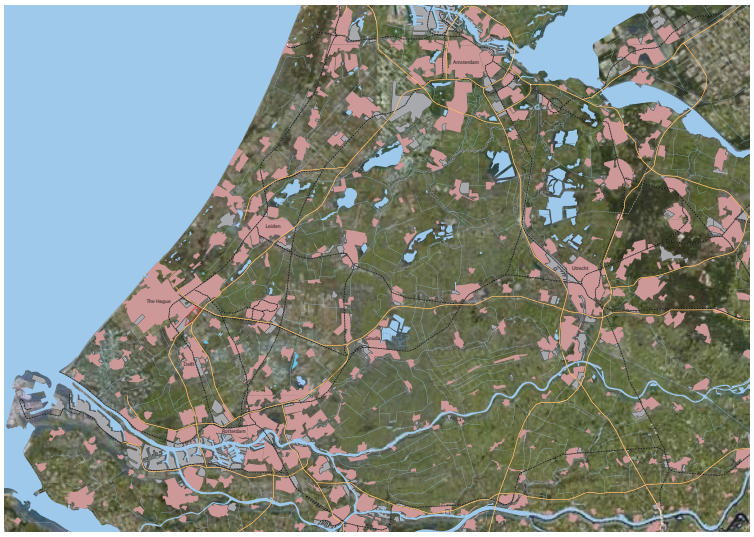
The importance of this size of study area for the Vlietzone is to envelop an area that is large enough to house the basic long range modes of transport, including national train, highway, and international airports. Besides transport different cities within the Randstad have their own special qualities and local nodes that provide a specific function to the region.

These nodes are useful for developing the Vlietzone. Because the connectivity and functions of these areas, as well as the possibility of a better or new connection, to the node or even the area, determines the type of functions possible and suitable for the new Vlietzone development.

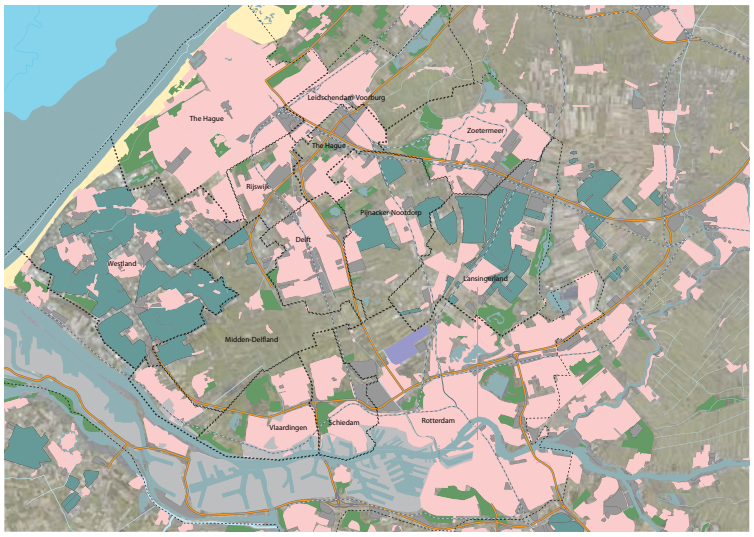
Region (Rotterdam - Haaglanden)

From the scale of the Randstad a more narrow scale is that of the region formed by the cities of The Hague and Rotterdam. The cities already work together to become the centre of the south-wing of the Randstad.

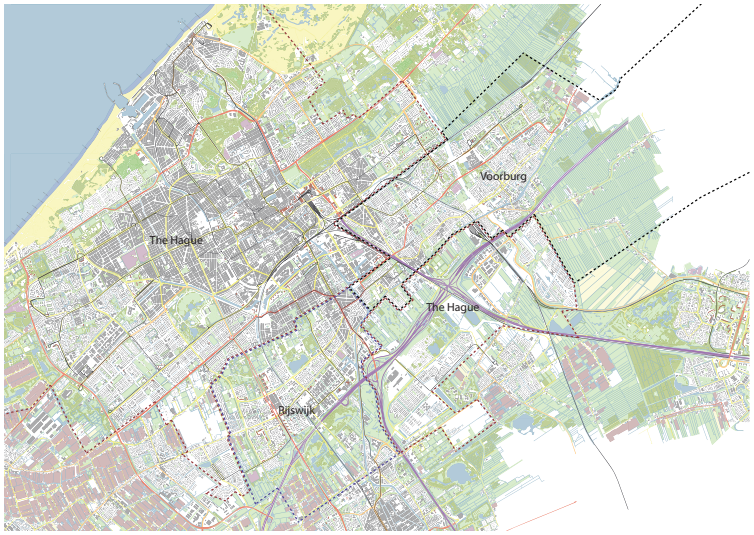
Because of the central location of the Vlietzone within this area makes this an interesting scale for the search and usage of new connections possibilities. The current network of transport modalities in the area is extensive.



Randstad scale for area of influence



Regional scale for area of influence



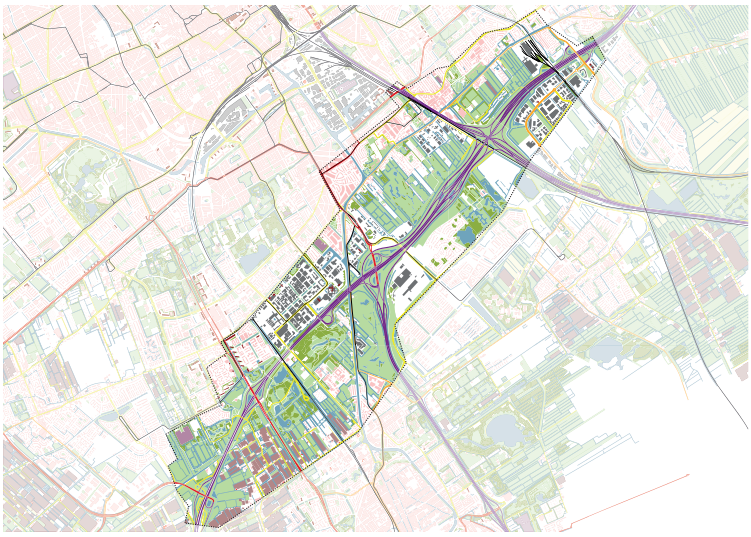
City scale for area of influence

The highway, train and Randstadrail already form connections and nodes along it side. But also new improvements to this infrastructure might prove relevant for the Vlietzone.

Therefore this scale allows for the research towards new connections in the area and to what nodes the Vlietzone can best be connected.

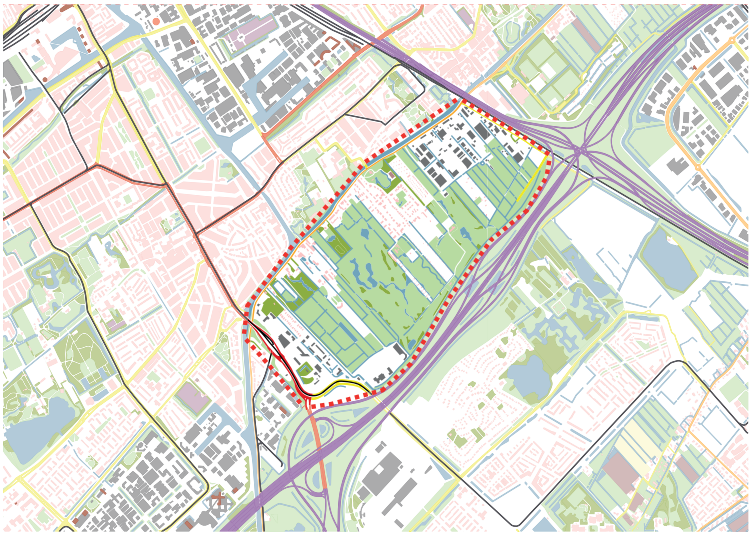
City (The Hague)

The third scale level is that of the city of The Hague. The relation Vlietzone and city is very important. Where the Vlietzone is a central location in the region, viewed from the city it is the edge and entrance.



Study area for area of influence

From this scale level, history and city wide functions will be researched. These will point out important locations within the city. This will determine what is missing or needs to expand upon and what functions can be incorporated into the Vlietzone. Local infrastructures and transport will play a crucial role. This scale can provide the new transport lines that have to grow or what new lines are introduced. New road connections can also be incorporated into the Vlietzone.



Plan area for area of influence

Study area (A4 Vlietzone)

This scale is the by the municipality of the Hague defined size of the Vlietzone, while designing for this whole area is not possible, the size is an excellent research area to distil local trends, morphology and typology.

This area is more focused on the road system, but provides also insight of the local/regional connections cutting in the area. This general orientation and infrastructural element can determine shape and form of the design.

Plan area (South-Vlietzone)

The last scale of influence is the one where a new plan within the Vlietzone will be realized. This is an area wherein development is possible. While the Vlietzone itself is much larger, this area is suitable for development and has already some basic functions to expand upon.

The most important for research and design at this scale is the local structure, morphology, and typology. These will determine form of the plan and because the small scale a sizable area that can be worked with without losing oneself in the massive scale.

Summary

The large scales are used to determine what types of functions are possible in the Vlietzone. The large scale infrastructure will contribute to this and provide information on how to better improve regional connections.

The local scales will also focus on function, but mostly on typology and morphology. Where new connections are best suited and how the orientation and location is best for new development.

The results from the analysis within these scales will lead to the possible future scenarios.

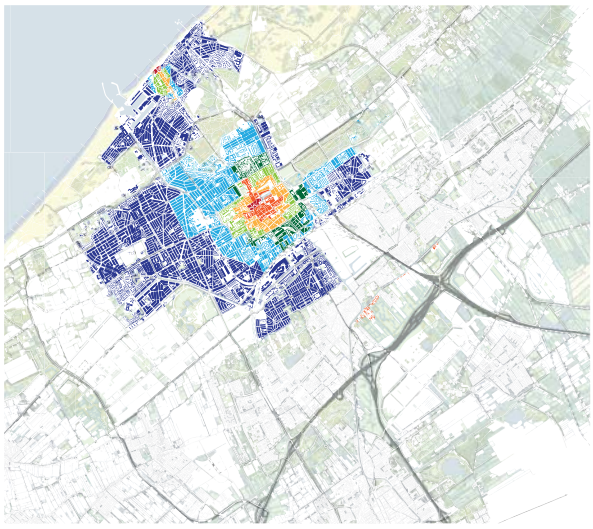
7. The Hague

7

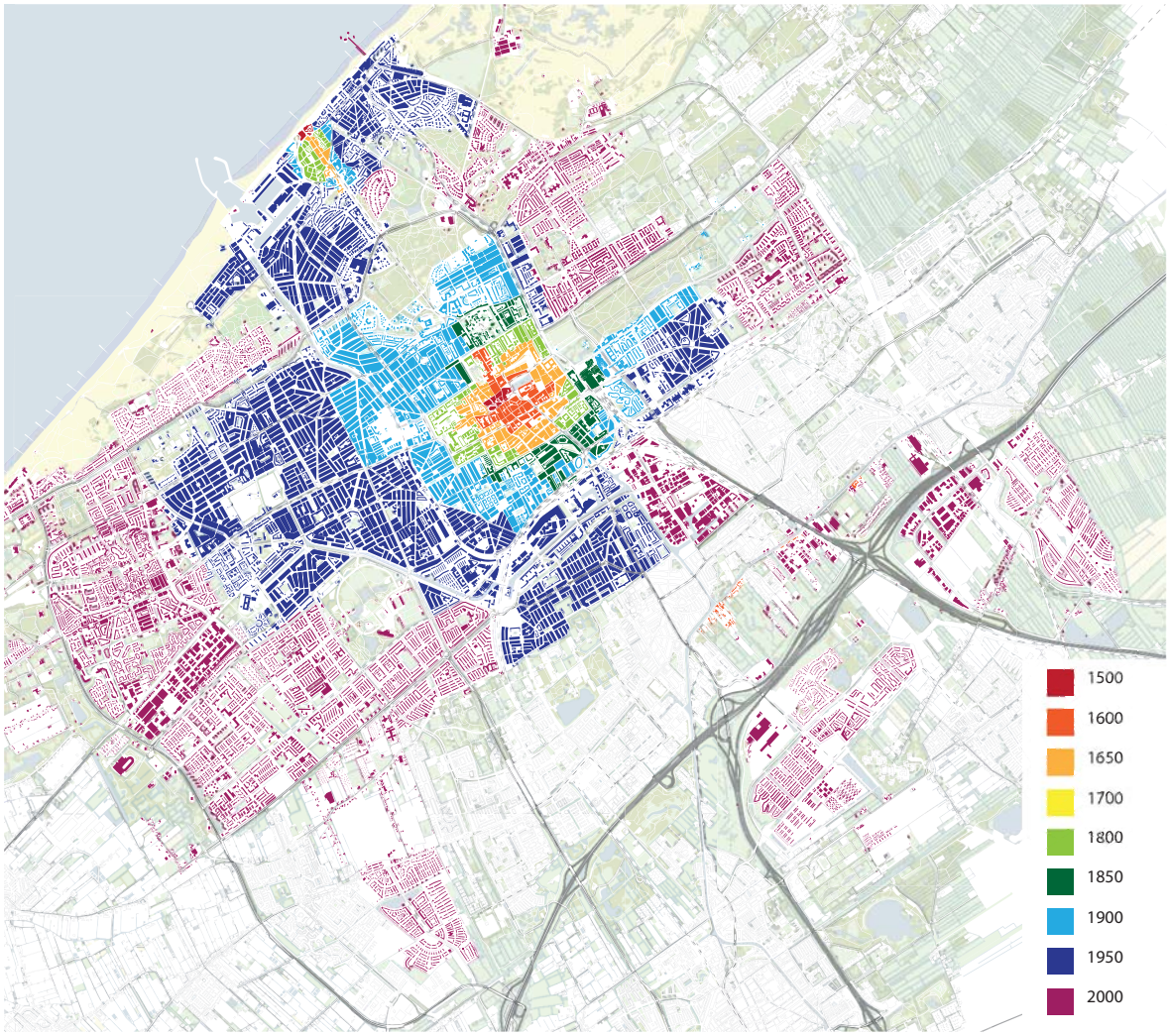
Historical growth The Hague

The current city of The Hague has more 500.000 inhabitants, which makes it the third largest city in the Netherlands. Around 400 years ago the city was not as large as it is today, but it has been the seat of parliament since 1584. It stayed a relative small city and started to grow when the industrialisation kicked in around 1900.

Currently The Hague is a city oriented around labour. It has a relative young population and working force compared to the rest of the Netherlands. It city centre is just as many Dutch cities densely populated, with most of the families living at the edge of the city near Ypenburg and Nootdorp



The Hague in 1950



The Hague in 2000



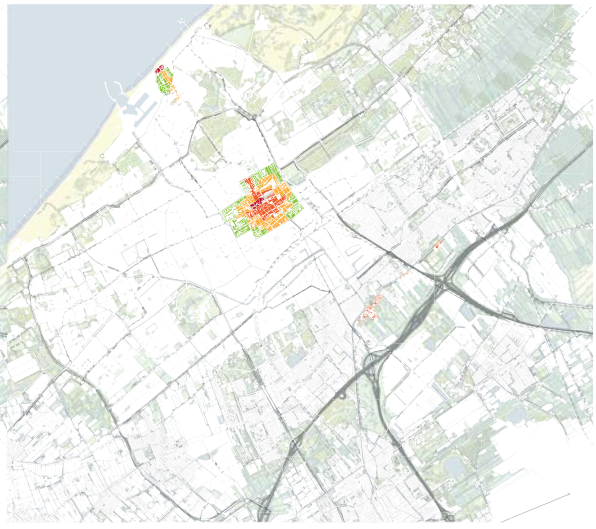
The Hague in 1500



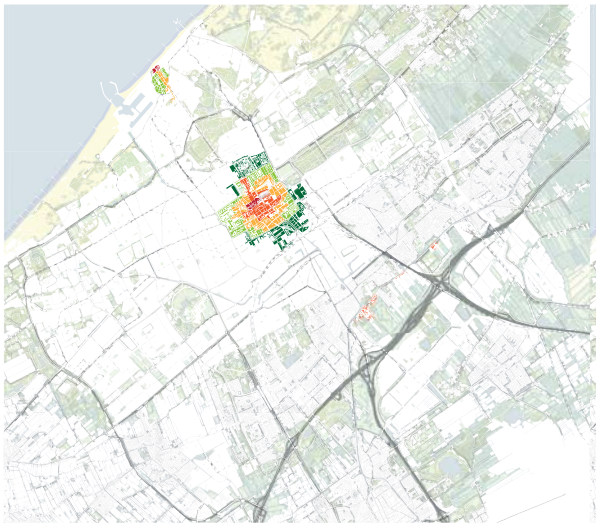
The Hague in 1600



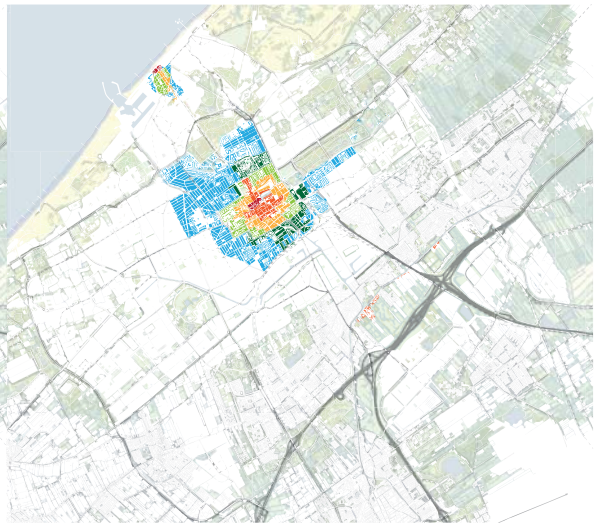
The Hague in 1650



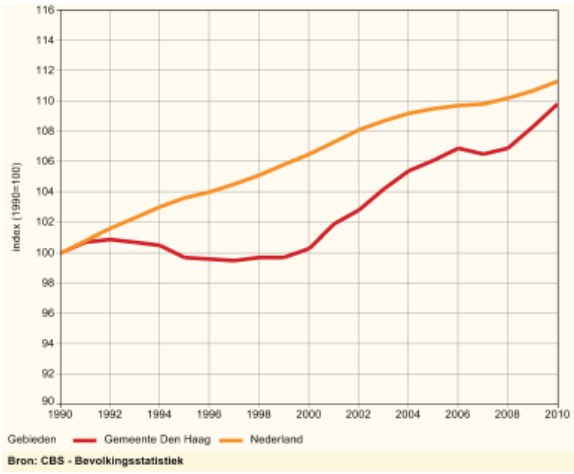
The Hague in 1800



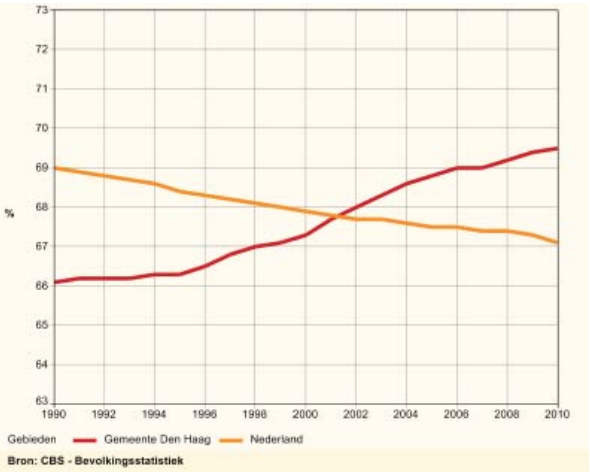
The Hague in 1850



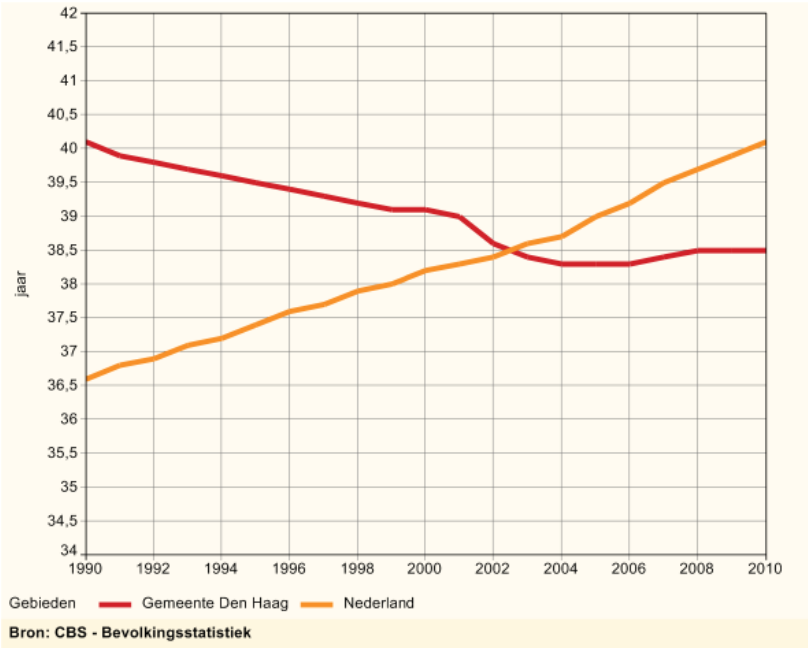
The Hague in 1900



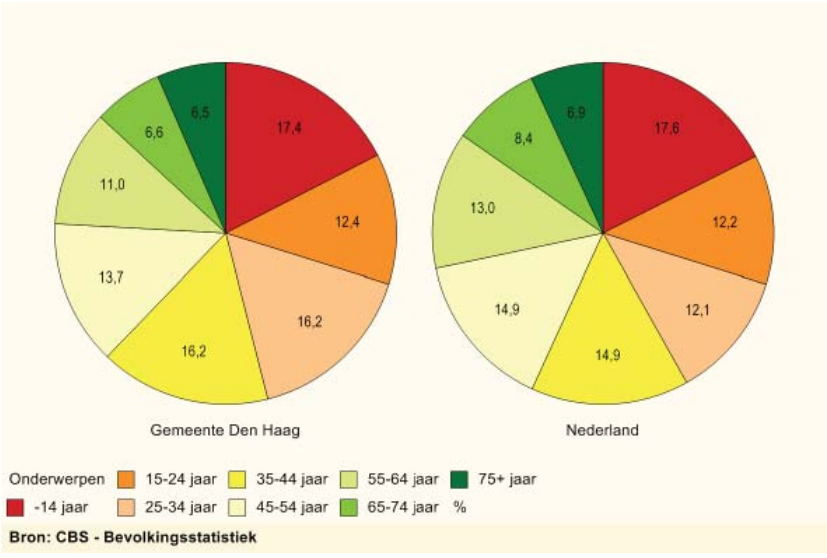
Population growth



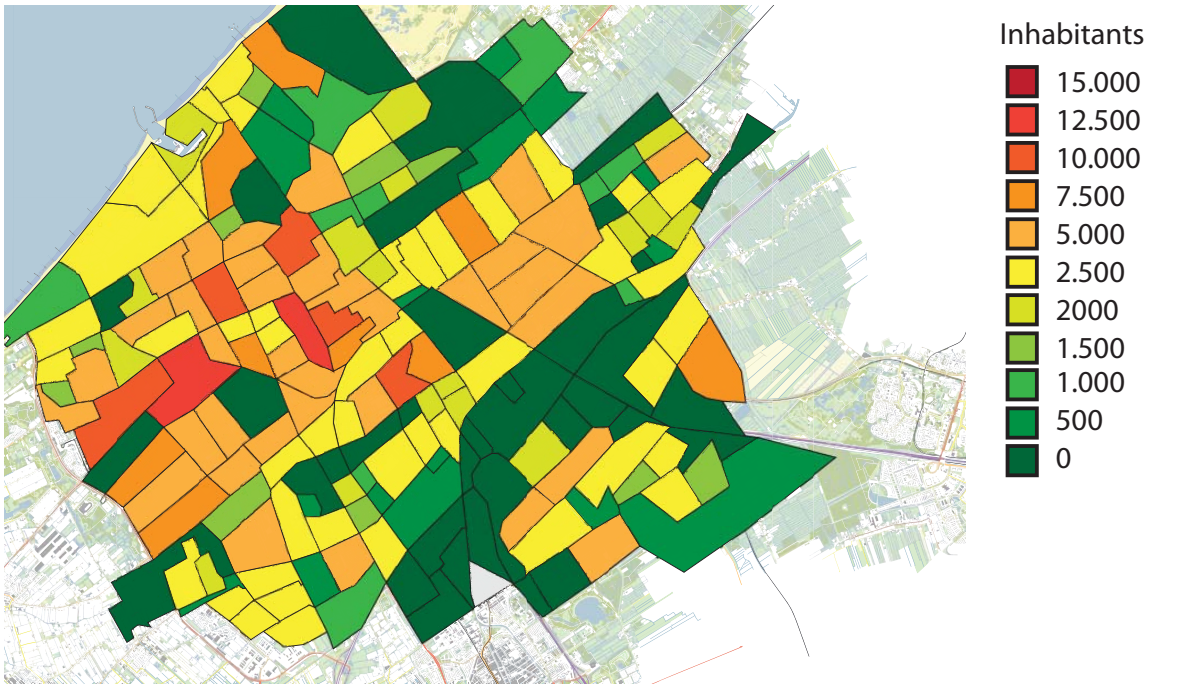
Labour force



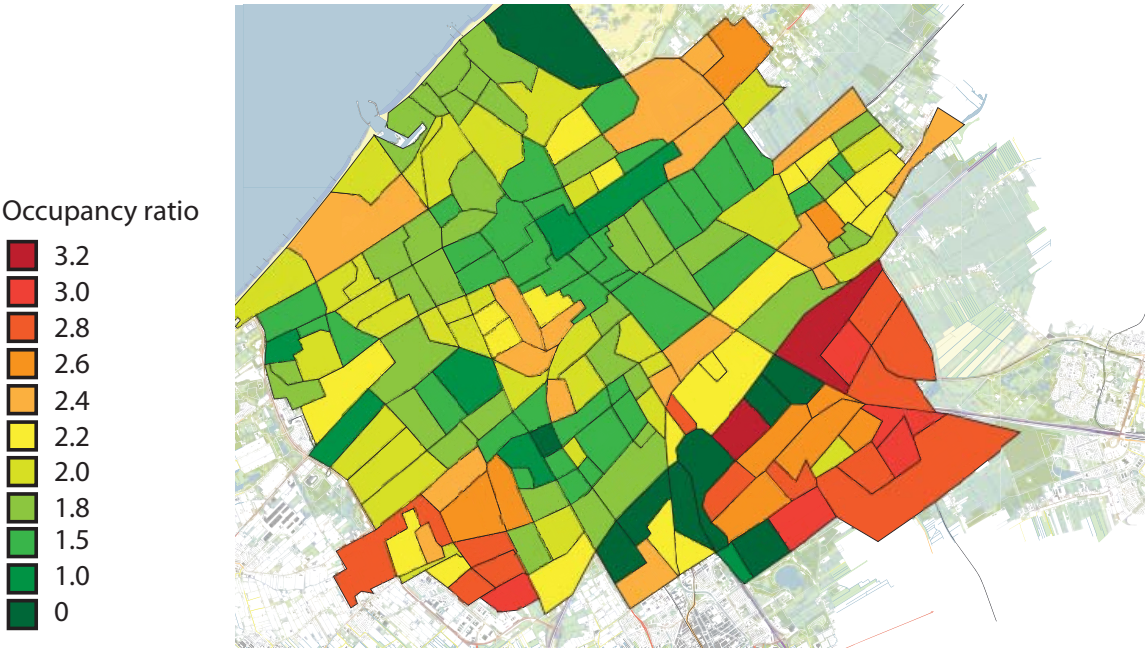
Average age labour force



Population



Amount of inhabitants per neighbourhood for the cities The Hague, Voorburg and Rijswijk

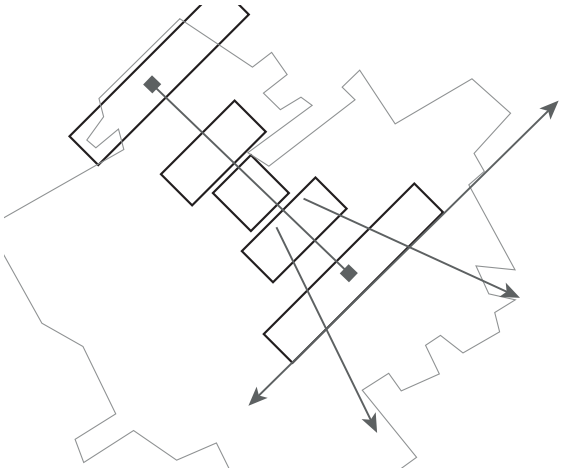


Neighbourhood housing density for The Hague, Voorburg and Rijswijk

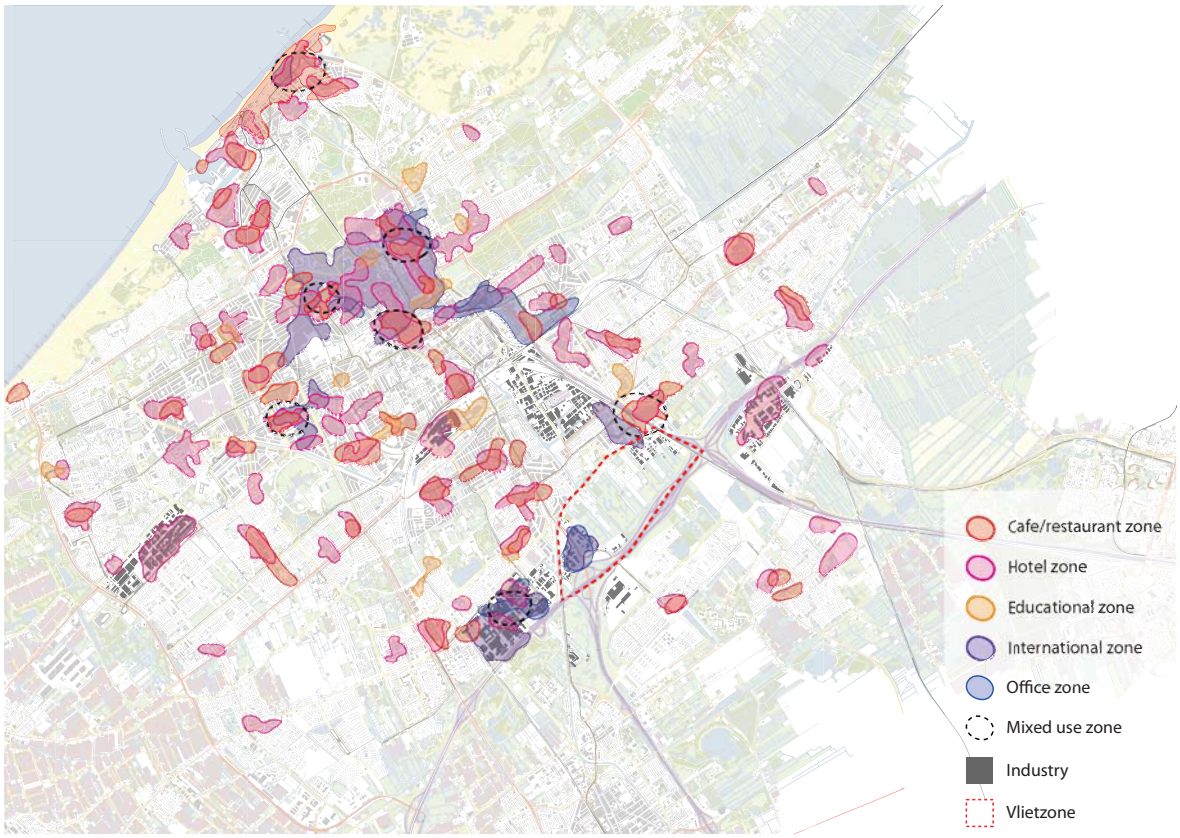
7

Functions in and around The Hague

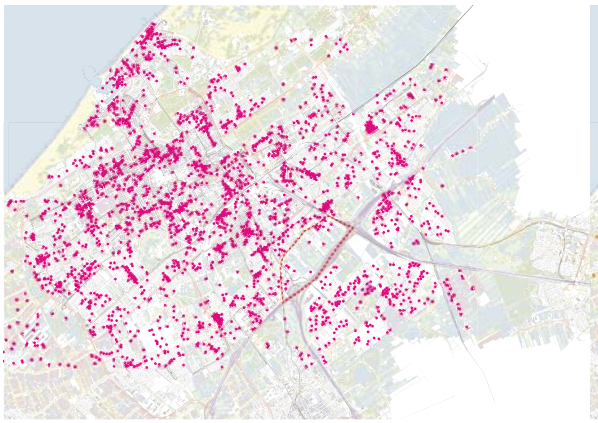
Within The Hague are a few clusters of functions that determine its structure. Scheveningen for example has a high concentration of hotels en shopping sites. A little bit south the international zone starts with small offices and international facilities. The city centre is again shopping oriented, while north of the city next to the Utrechtsebaan is a large office park with high-rise up to 150 meter. Further south east is the industrial area Binckhorst. At the edge of the city we find the Vlietzone as an empty strip of land surrounded by city expansions.



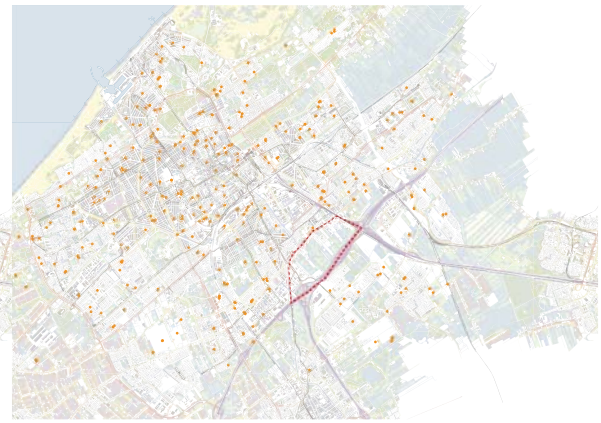
Schematic of The Hagues important zones



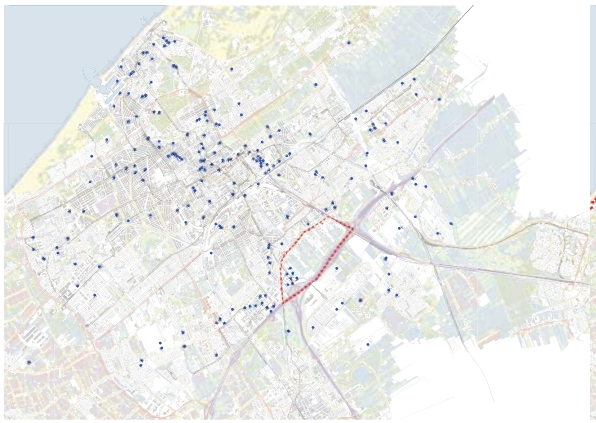
All clusters in The Hague



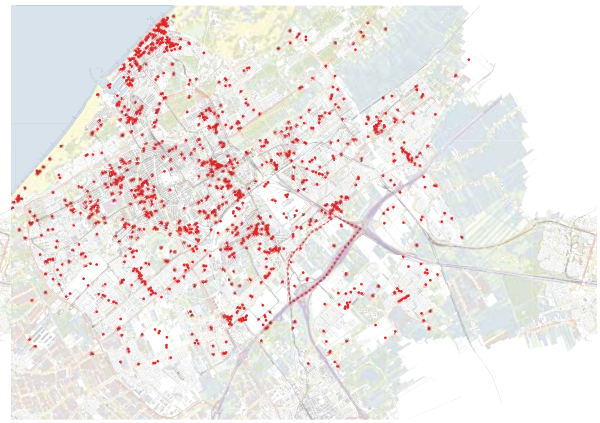
Shops and retail in The Hague



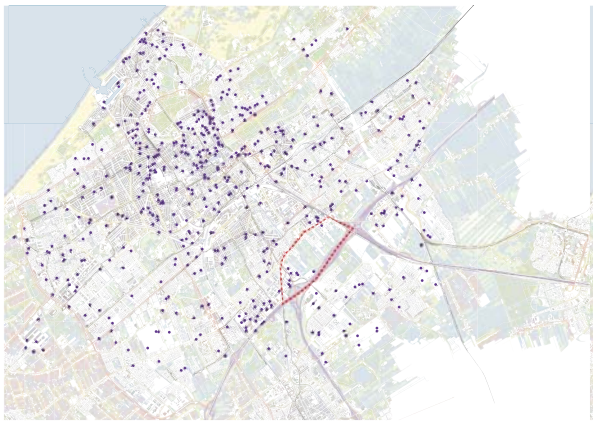
Educational facilities in The Hague



Office locations in The Hague



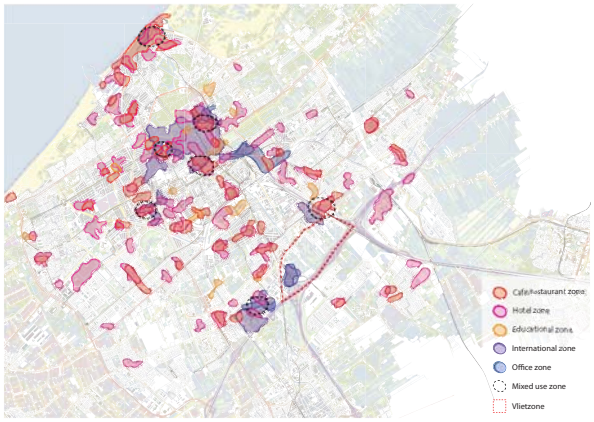
Hotel, restaurant and cafe locations in The Hague



International institutions in The Hague



Industry in The Hague



Clusters in The Hague

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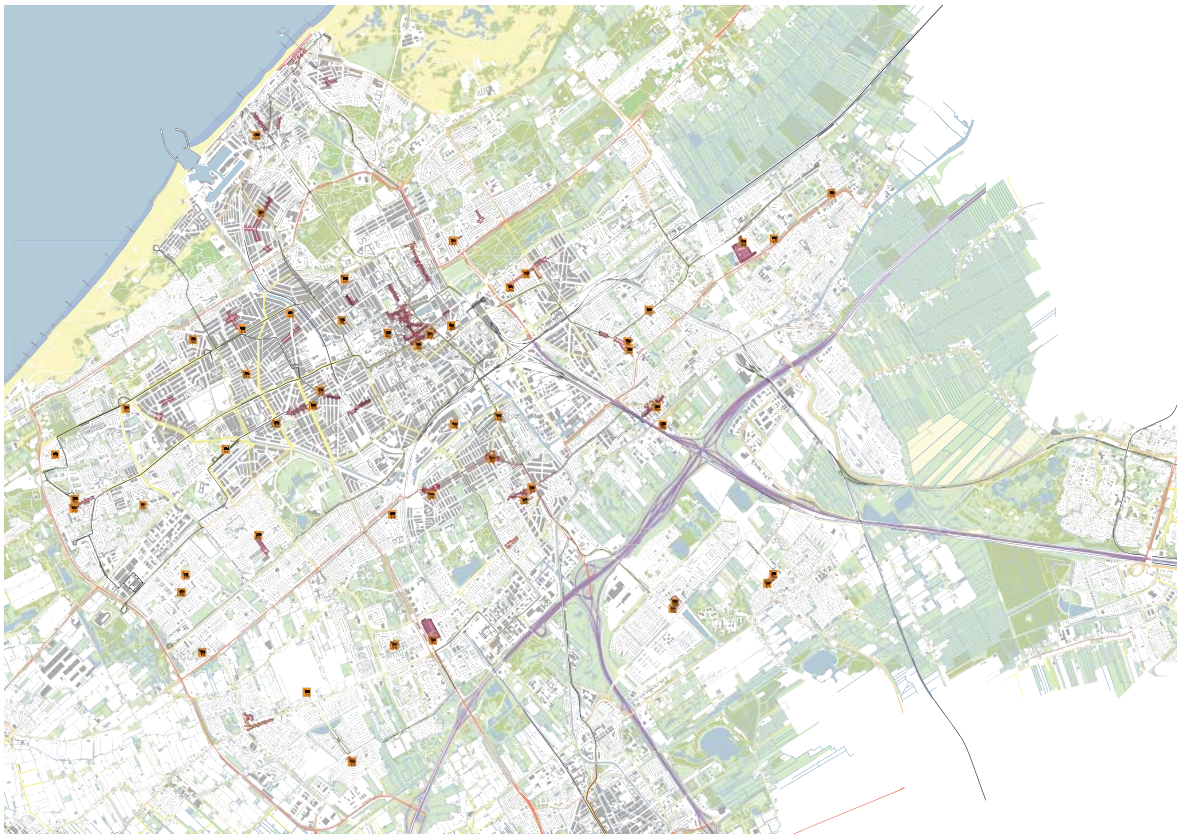
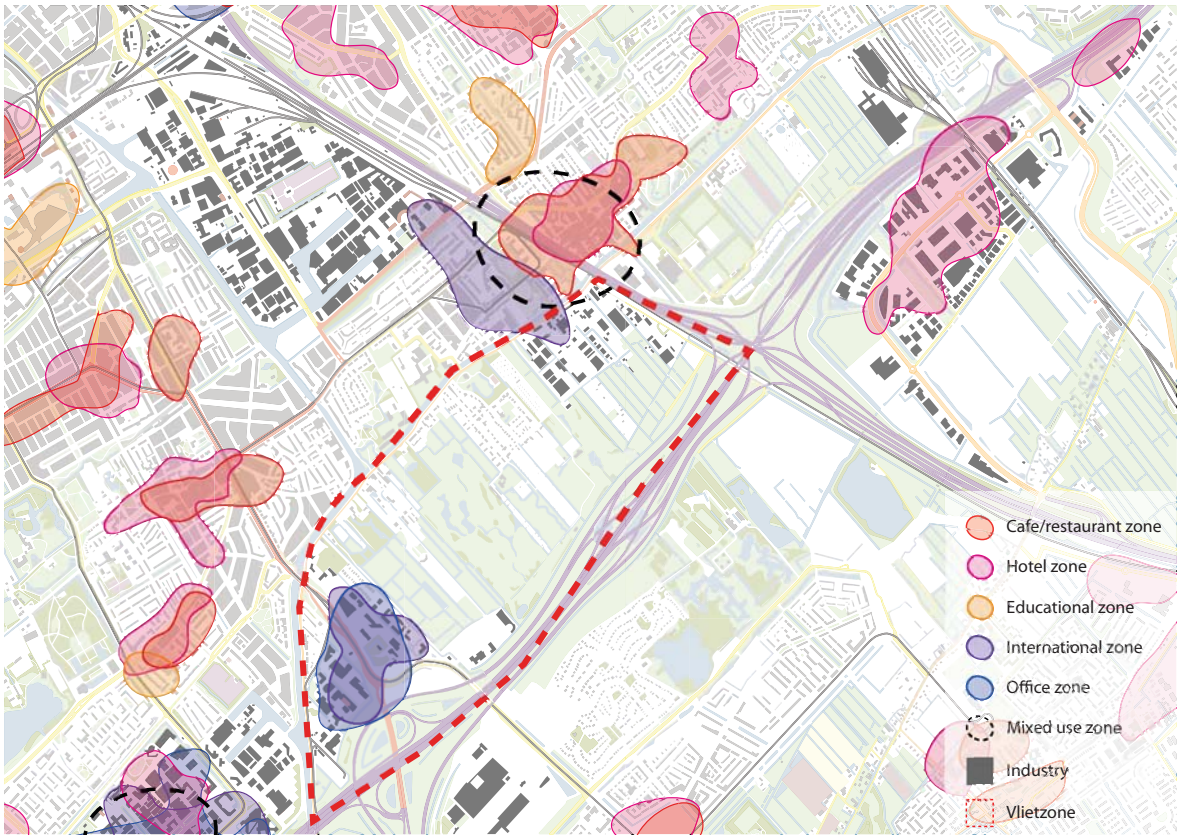
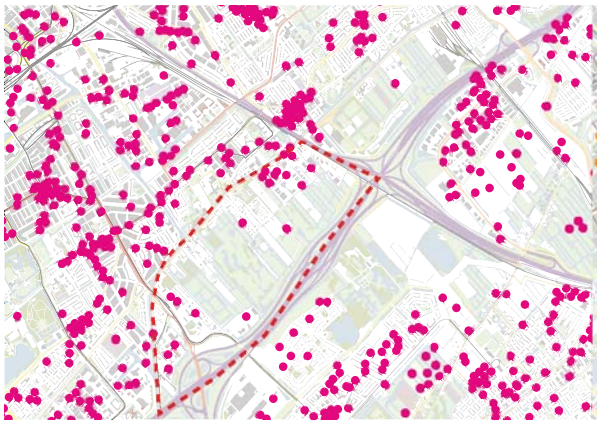


Important shopping locations in The Hague



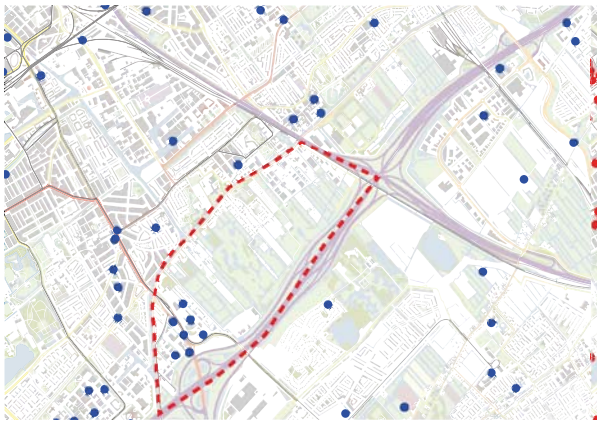
All clusters in the Vlietzone



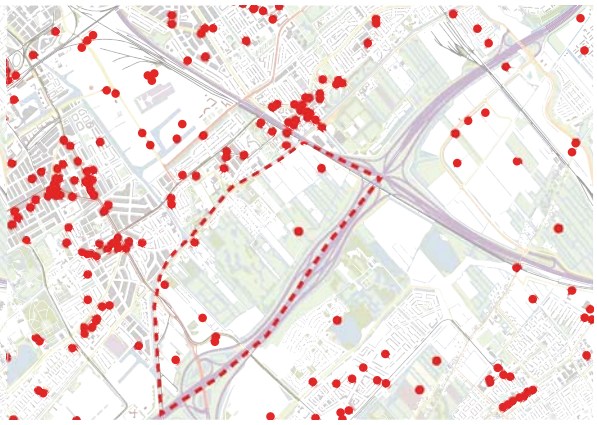
Shops and retail in the Vlietzone



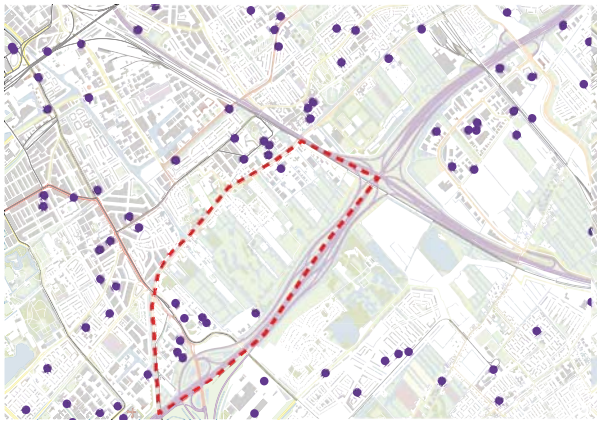
Educational facilities in the Vlietzone



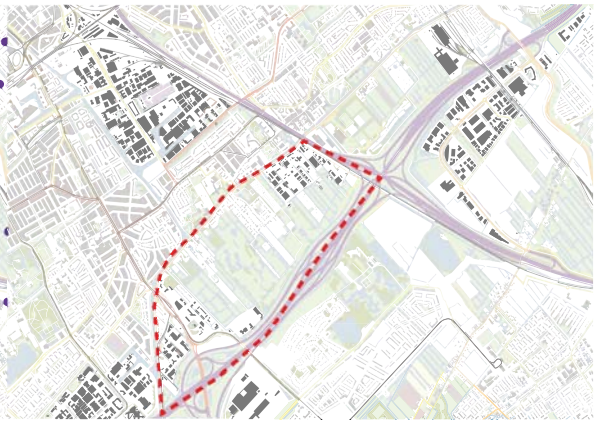
Office locations in the Vlietzone



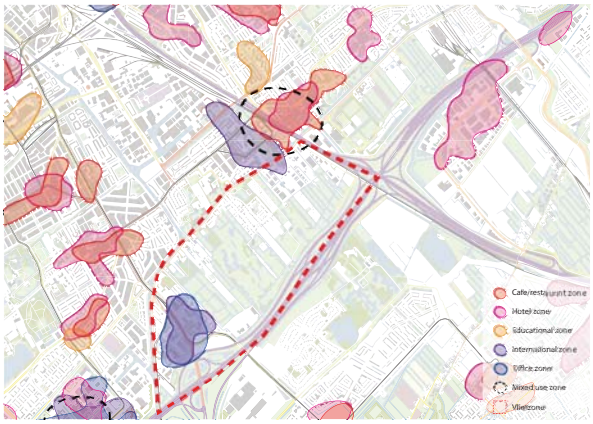
Hotel, restaurant and cafe locations in the Vlietzone



International institutions in the Vlietzone



Industry in the Vlietzone



Clusters in the Vlietzone

8. Structural elements

8

Chapter explanation

With this chapter of my graduation thesis I try to provide a basis for upcoming design decisions. I try to accomplish this by mapping the frame work of underlying networks on a regional, municipal and local scale. These different networks consists of nature, public transport and infrastructure. The findings from this research can be added to the theory of TOD, therefore establishing a new framework to build possible scenarios from and derive a suitable design location.

Green structure

The first structure to map is the green structure, this chapter deals with the natural areas in and around the Vlietzone, focussing on different influences on different scales. As result I like to show how a network of natural areas contributes to an area of local and regional influence. Mentioning which effect, caused by nature, influences natural relations on different scales and of different importance, might shape the local wish for natural interventions.

Randstad

When we look at the Netherlands we know that most of its economical power and population is located in the Randstad. Inside the Randstad there is a large natural area called 'Goene hart' (Green heart). This area breaks the urban fabric into smaller sizes, alternating urbanized areas and agricultural land. The area of the 'Groene hart' is defined by the five major cities who for the edge of the Green heart, these cities are Amsterdam, Rotterdam, Utrecht, Leiden and The Hague.

With the rapid growth of the Randstad, the demand for housing increased and slowly the Green heart was build up. The last few years municipalities and government have decreed a building stop within the Green heart. As a result this area can be preserved, allowing the Green heart to stay green and different from the dense urban fabric of the Randstad.
The proximity of the Green heart with the Vlietzone means that relation between the Green heart and the Vlietzone is easily made. Although the two areas are not physically connected they are linked in function and experience. Meaning that breaking this link will also break The Hague from the Green heart.

Region

The region around the city of The Hague has many different types of natural area. The two most important of these areas are the already mentioned Green heart and a second large natural area called Midden-Delfland. These two areas are the most important locations of agriculture, recreation and leisure around the city. Another large area for recreation and leisure are the dunes. Between the dunes and the natural areas are patches of agricultural land. Scattered between cities, towns and industry they provide some natural addition to the urban landscape. On the south-west side of The Hague you find an area with mixed use focused on sport and recreation called the 'Uithof'. This area forms a buffer between the city and the greenhouses called 'Westland'. Inside the city boundaries you find a few city parks, these will be discussed in the next sub-chapter.

Currently the Vlietzone is an agricultural zone between the city and the two national areas. It does not yet form a connection nor does it block the expansion of nature, but it is not a contribution to leisure and recreation in The Hague.

Municipality

Inside the city there are five large parks surrounding the city centre, providing tranquil areas for its inhabitants. The most well known park is called 'Malievled', together with the 'Haagse bos' this area is home to many festivals and events, providing entertainment for the city. The 'Zuiderpark' fulfils also this purpose, but functions also as a local park.

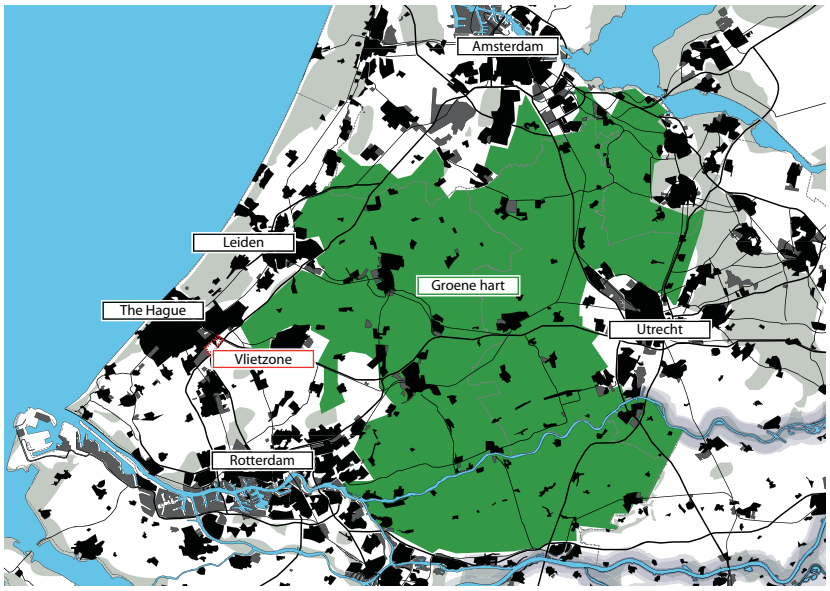
On the edge of The Hague on the border with Scheveningen the 'Scheveningse bosjes' form a buffer between the two cities. The large park houses some villas, but is mostly a quiet retreat from the busy city life. Two other parks that function as buffer zone are the 'Julianapark' and the 'Bosjes van Pex'. The first is situated between The Hague en Rijswijk, the second is a buffer for Kijkduin. Both of these are sport orientated and harbour numerous sport fields and clubs.

The Vlietzone has not a clear relation to these parks, but has some similarities between them. Because the Vlietzone lies at the edge of the city it is a buffer zone for Ypenburg and has the potential to function as The 'Julianapark' and the 'Bosjes van Pex'. A study of the local situation will show how nature and leisure in the area are divided and what identity they provide.

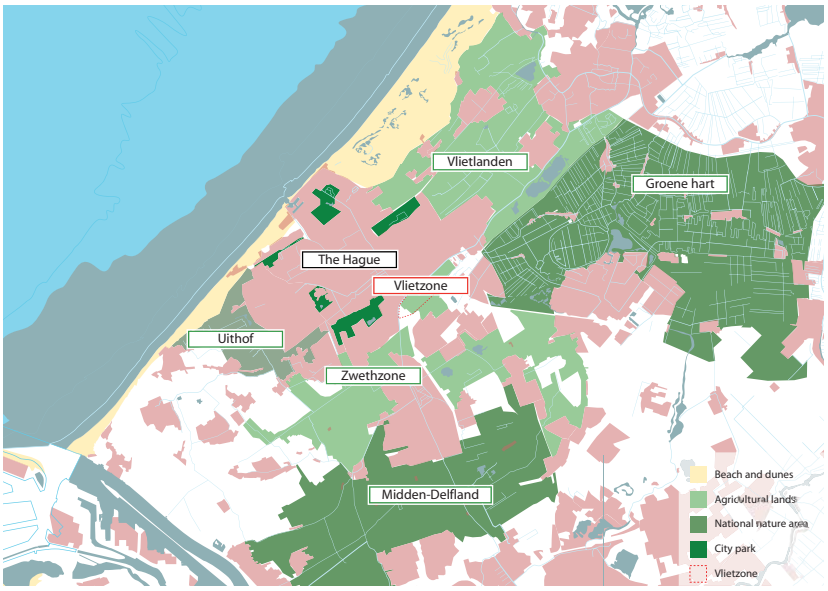
Local

The Vlietzone is divided into two parts by the A12 highway, each part has a different character. While my focus is more concentrated on the south part of the Vlietzone both parts are important to The Hague. The most noticeable green area is the sport and leisure in the Vlietzone. The northern part houses a big sport complex with football fields and other outdoor sport opportunities. The south side has a large golf course, which is an attraction of regional proportions.

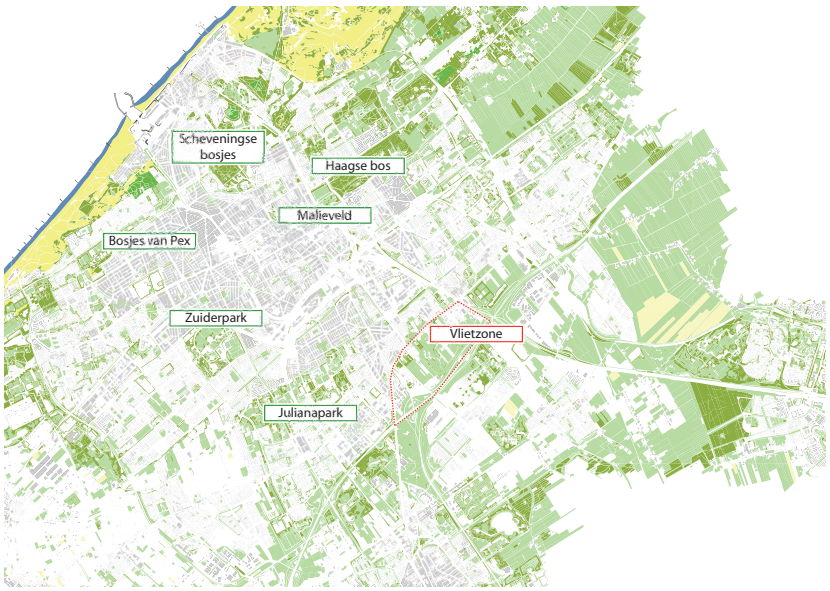
Second really important green influences are the private estates that line the west edge of the Vlietzone.



The 'Groene hart' (Green hart) within the randstad



Nature areas surrounding The Hague and the Vlietzone



City parks of The Hague

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These historic houses are build in large parks, these are not publicly accessible but add to the natural appearance of the area. Most of the Vlietzone is still allocated as agricultural land or allotment gardens. These do not add to local accessible green and only provide leisure for their owners.

The green areas in the Vlietzone are as we noticed very private, they add to the experience of a green area, but do not provide this except for the owners of the land. There are no parks in the area, only smaller ones in Voorburg. So while the Vlietzone looks green and has a small relation to the agricultural lands surrounding it, it is not an additional as a leisure are for The Hague.

Analysis and conclusions

We have seen the different scales of green influences on the Vlietzone, what does this mean for the interaction between the Vlietzone and the different types of natural and green? The two scales compete for importance in the area. I describe the most important factors for the Vlietzone in their own context.

Regional

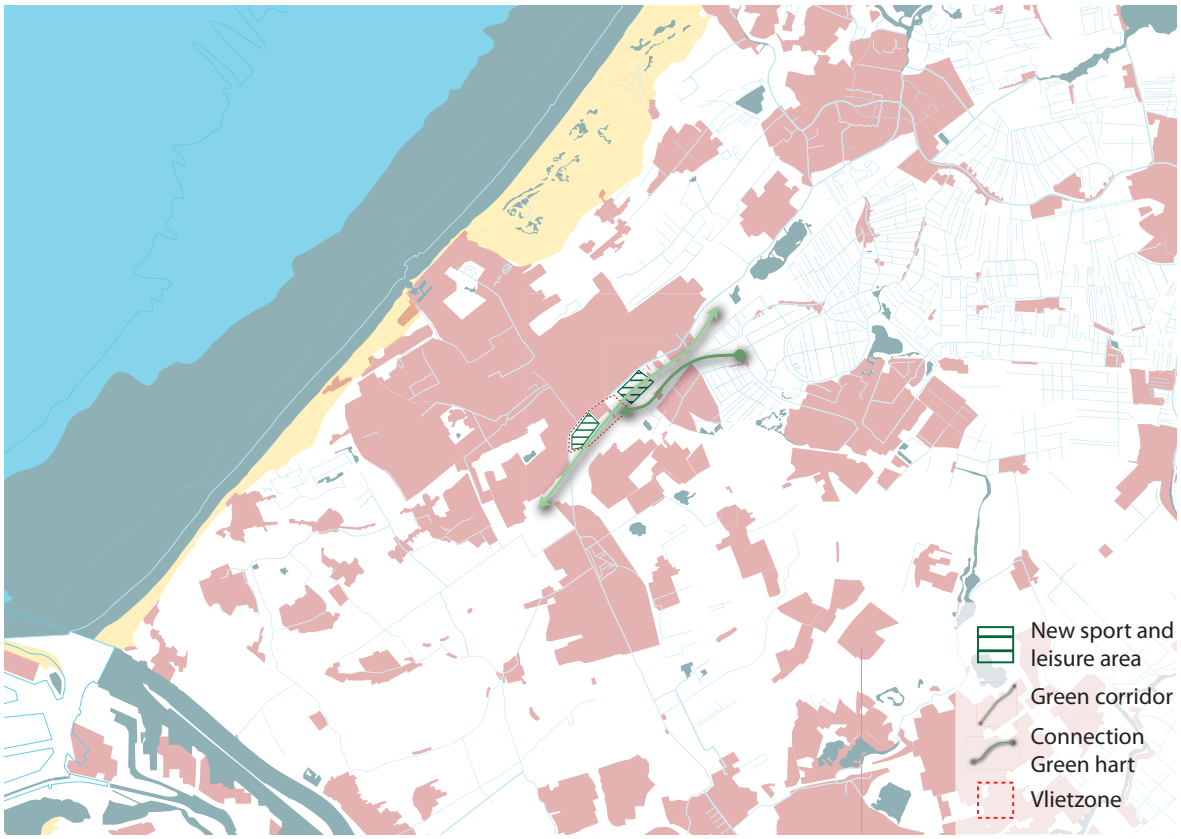
The larger nature areas work best if they have a link with the city, this link can be provided in the Vlietzone. For the Green heart this means that a connection of farms or a local route can create such a connection. For the agricultural lands around The Hague the continuation of farms and agricultural land preserves the image of an agricultural edge around the city. To better link this the Vlietzone as a green area on the edge of the city more comparisons with the 'Julianapark' must be made, introducing more public outdoor activities. The focus on these points allows the Vlietzone to stay connected locally and regionally.

local

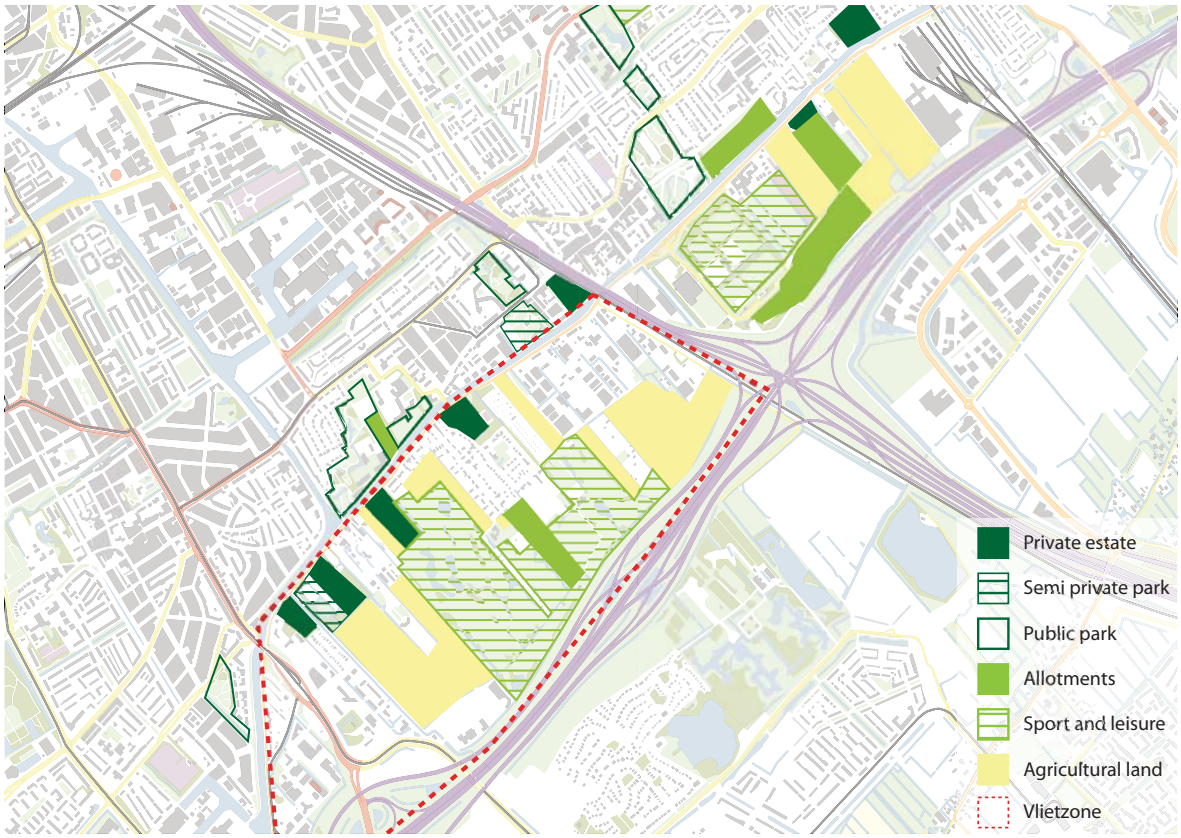
for the local interventions the emphasis is aimed towards preserving the local estates and even expanding on them to improve the image of nature and living. To further accomplish this the addition of parks in the Vlietzone adds a more open and public attitude to the area. In collaboration with larger areas of outdoor sport and leisure, the area becomes a more publicly attractive and fulfils its role as leisure area at the edge of the city.

conclusion

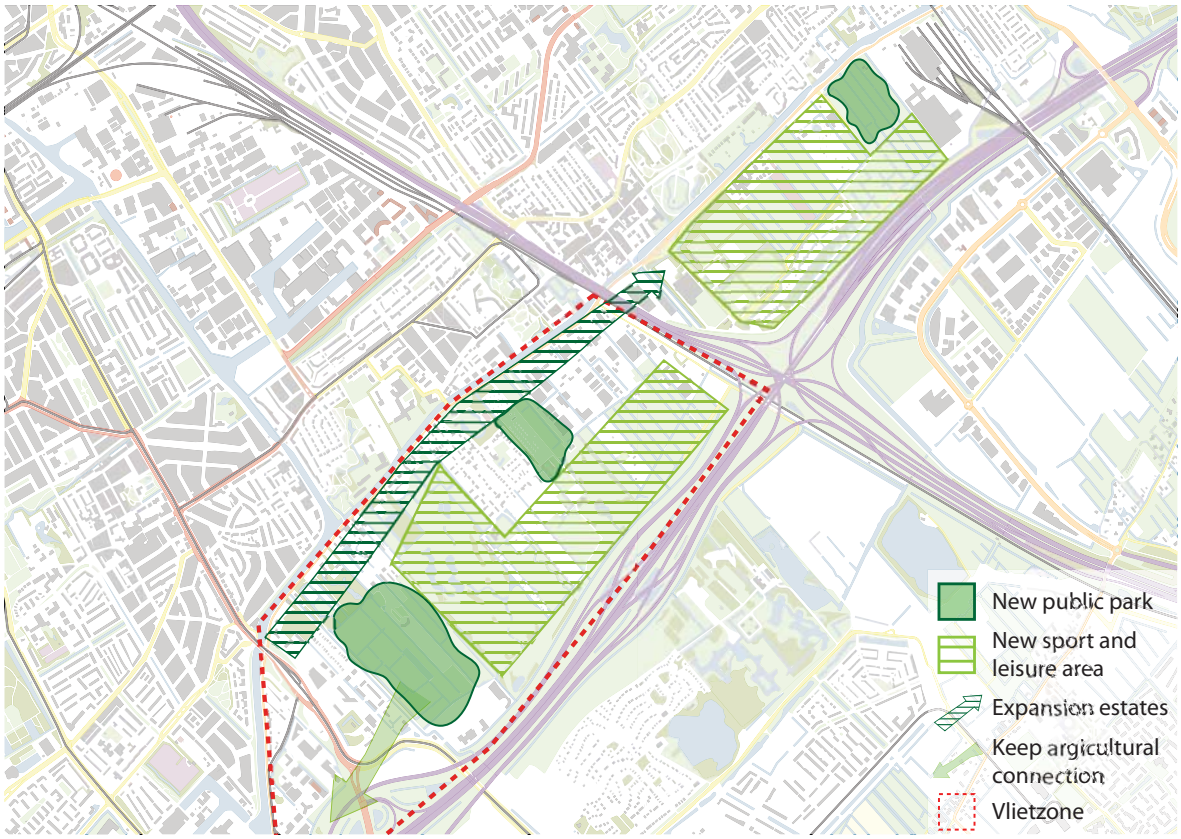
The combination of the regional and local systems is hard to make. The local system wants to connect to the city and the regional system wants a more agricultural approach. The local system is better for the inhabitants of The Hague, this because the added functions provide a better pull towards the city. Still the regional systems stay connected due to the largely green development of the activities.



Regional improvements and influences



Vlietzone and green structure



Local improvements and influences

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Water

Above I described the structure of nature and green zones. Another strong guiding element is water. In this subchapter I sketch the importance of water for the Vlietzone. And what scales influence the Vlietzone and on what level it has impact. Resulting in advise concerning on water management in the Vlietzone.

Region

The Largest scale the water has influence is the regional scale. The rivers 'Vliet' and 'Schie' are the central waterways that flowing through the heart of South-Holland together they form a connection between Rotterdam, Delft, The Hague and Leiden. The two rivers meet at the Vlietzone making the Vlietzone a centre due to their connectivity.

But both rivers are not equal, the 'Vliet' flows mostly next to the Vlietzone and continues towards Leiden. Because the river is not connected to major industrial areas the waterway is used for boating. The result is that small bridges and housing flank the banks and dikes, giving the 'Vliet' a green character. The 'Schie' is in contrast more to the 'Vliet' more orientated towards industrial and commercial shipping. It is the only water connection from The Hague to the Harbour of Rotterdam and to numerous industrial areas in South-Holland.

This means that the Vlietzone can both profit from quiet living next to the 'Vliet' and make use of its industrial qualities for business opportunities.

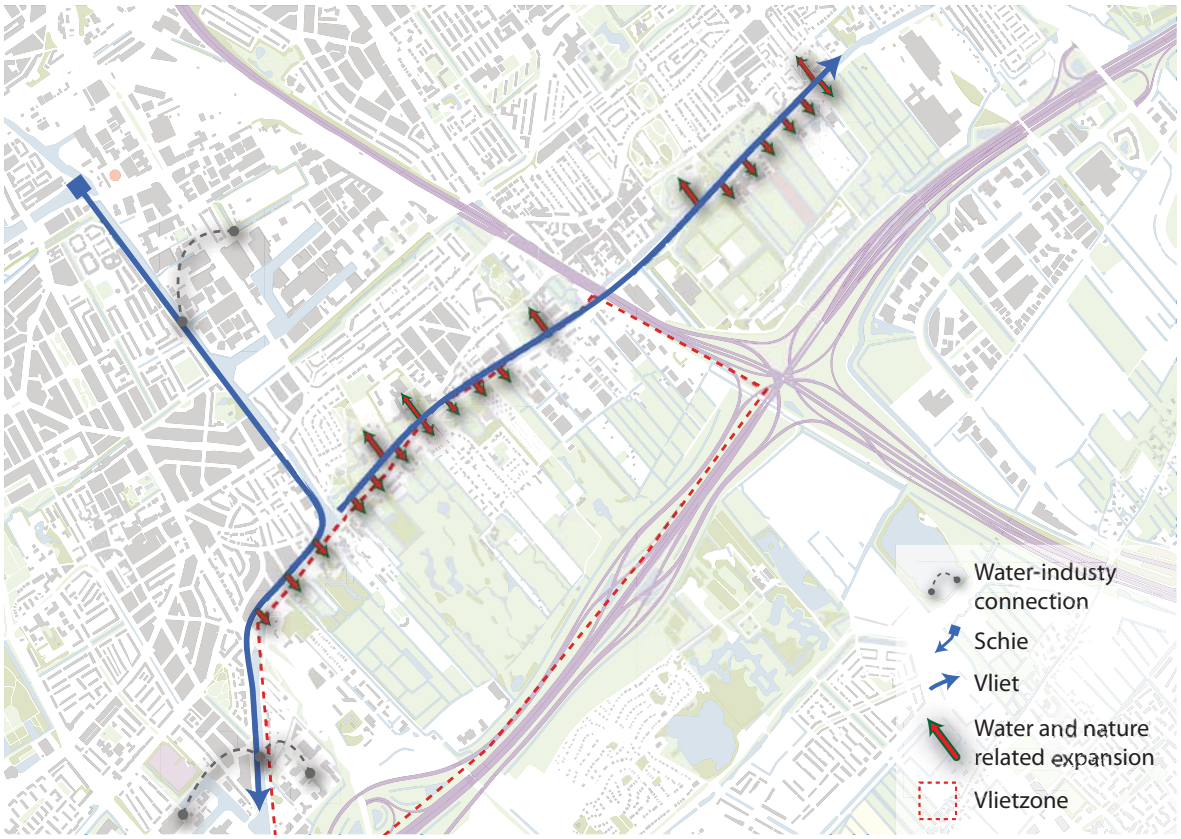
Local

The local effect the 'Vliet' has on Vlietzone is minimal, It enhances the quality of the houses next to the water, but is mostly a barrier between the Vlietzone, Voorburg and The Hague. Currently the industry in the Vlietzon is not supported by the 'Vliet'. But due to its barrier function this is not likely to happen.

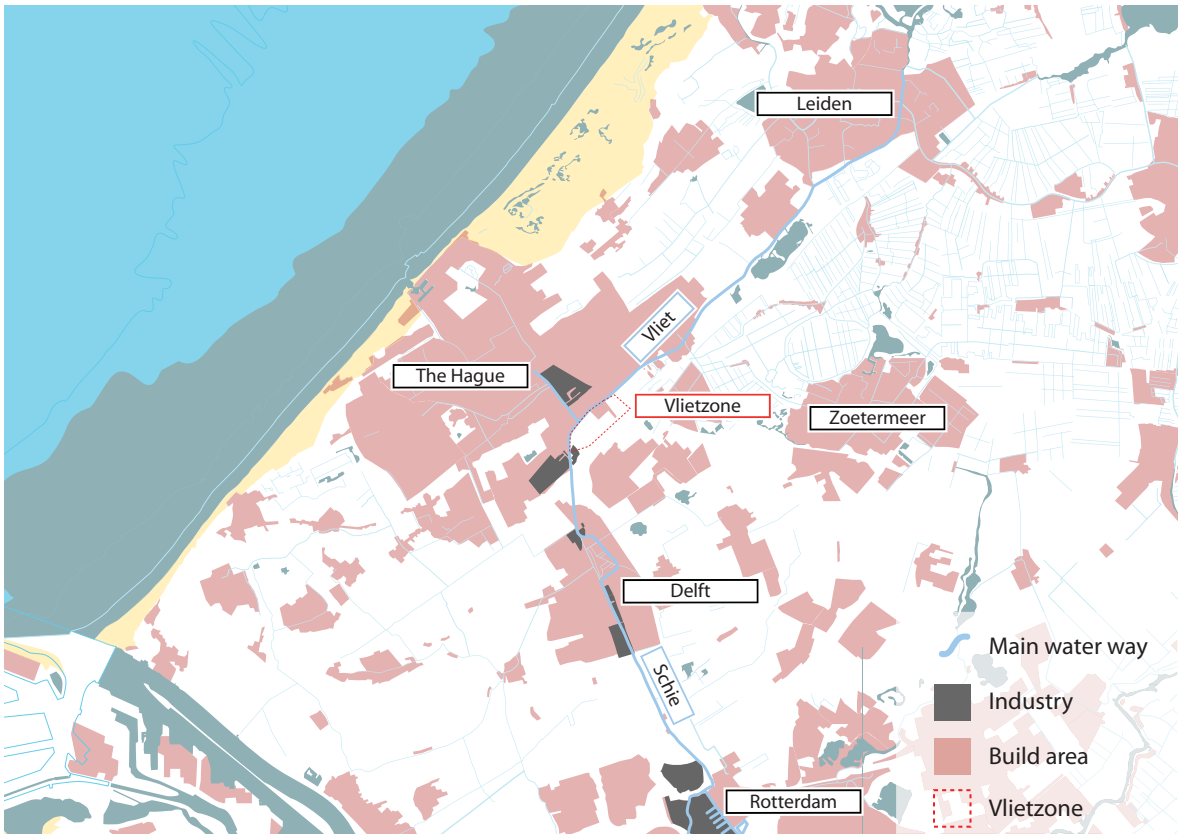
The local quality of the 'Vliet' is that it is mostly pleasant ant tranquil, adding more to visual quality than to functionality.

analysis and conclusions

To make the best use of the 'Vliet' is to provide living next to it. If in the future there is a lot of demand for industry related to water, the most southern tip of the Vlietzone can be transformed into a new harbour area. This will result in the least radical change of the area and still preserving the placid naturalness of the area.



Local improvements



Water structures South-Holland



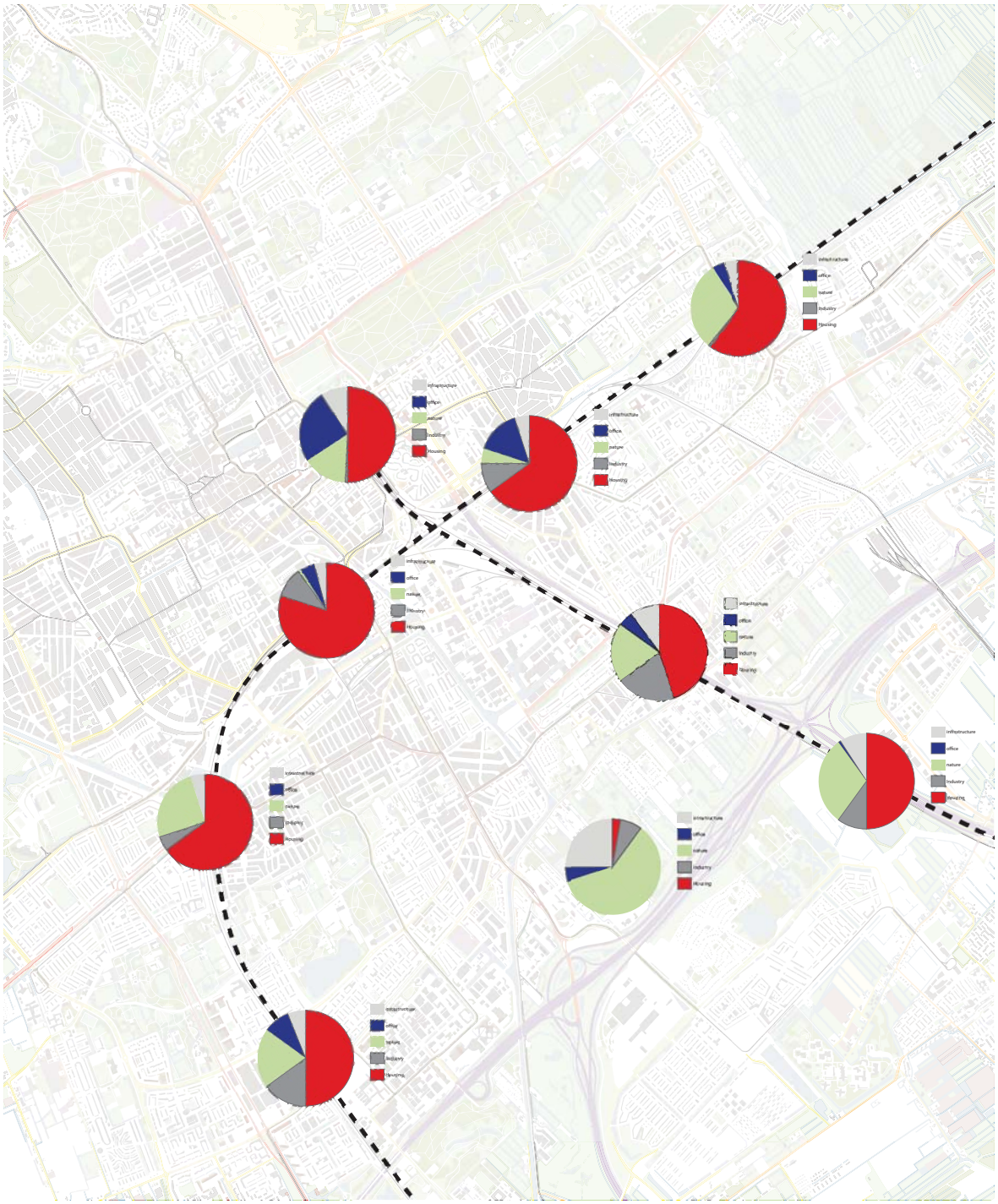
Water structure around the Vlietzone

9. Infrastructure

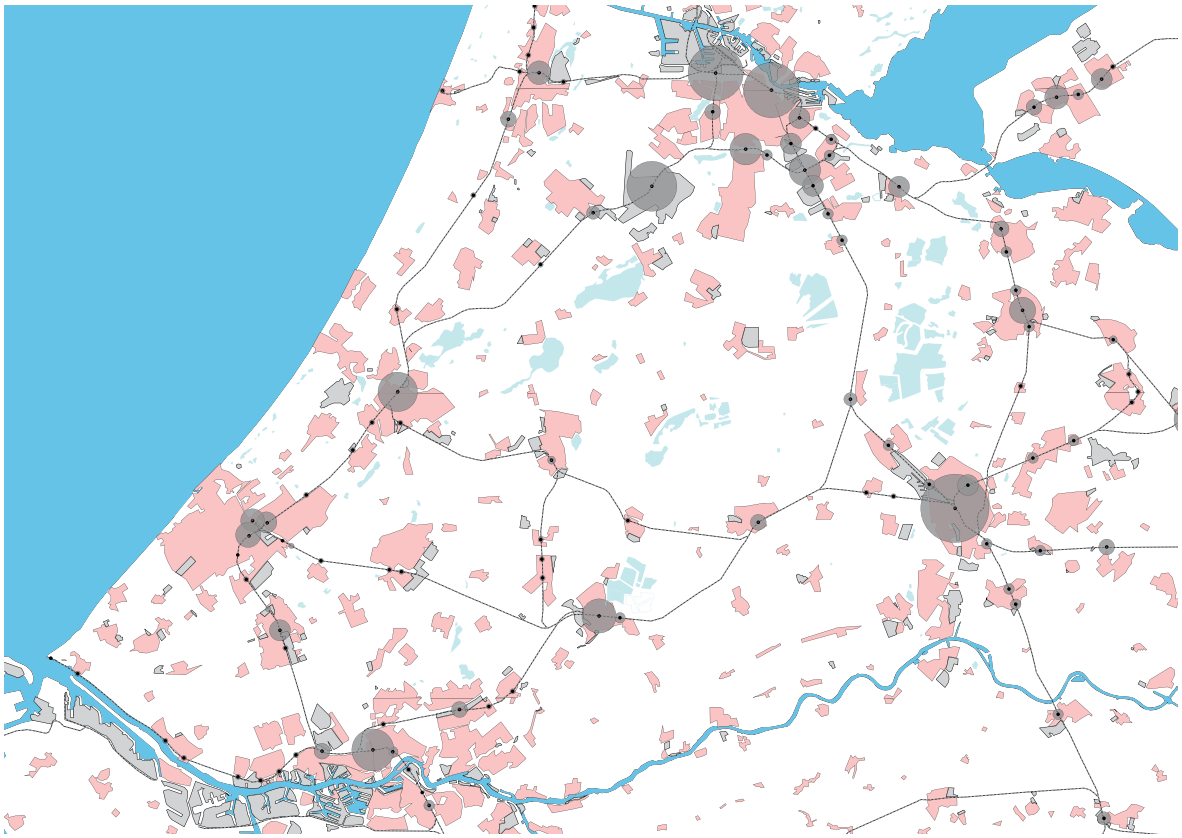
9

Randstad and local train connections

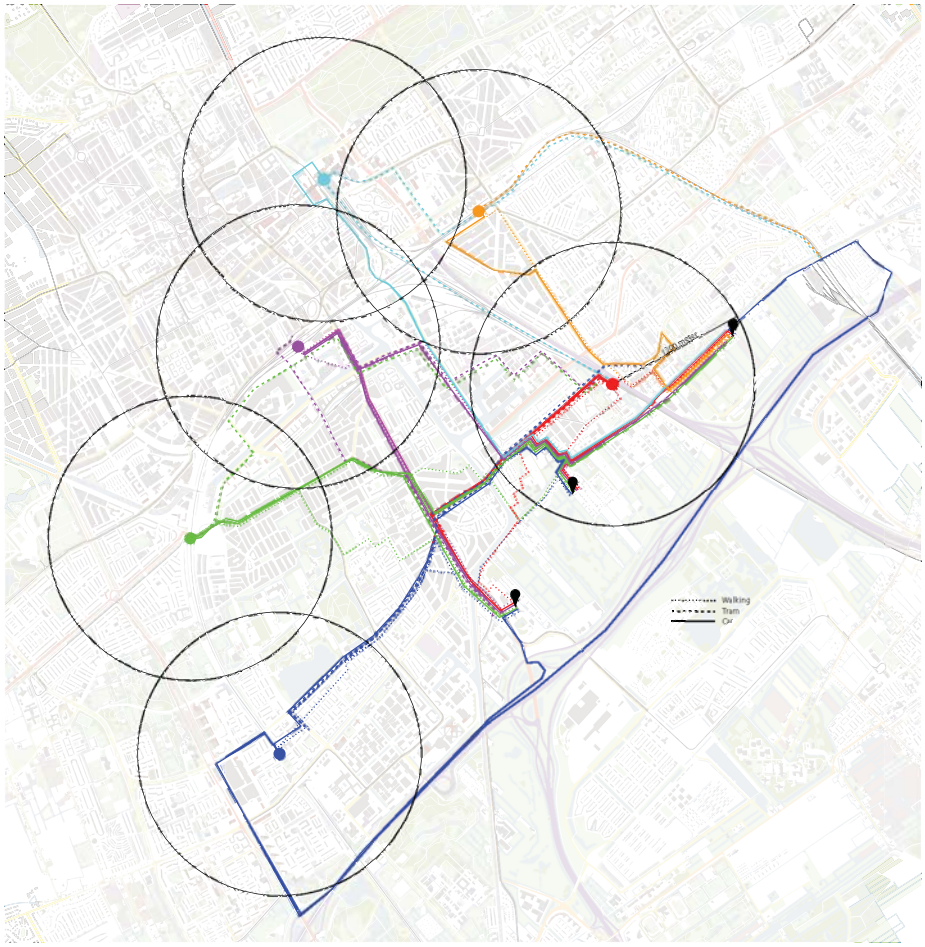
The Hague is well connected with 2 main stations, a substation and a local stop station. Both stations serve excellent connections to the Randstad including all the big cities, even an international train to Brussels.



Local stations and their public transport use



Randstad train network and train activity per station



Stations and their connection with the Vlietzone

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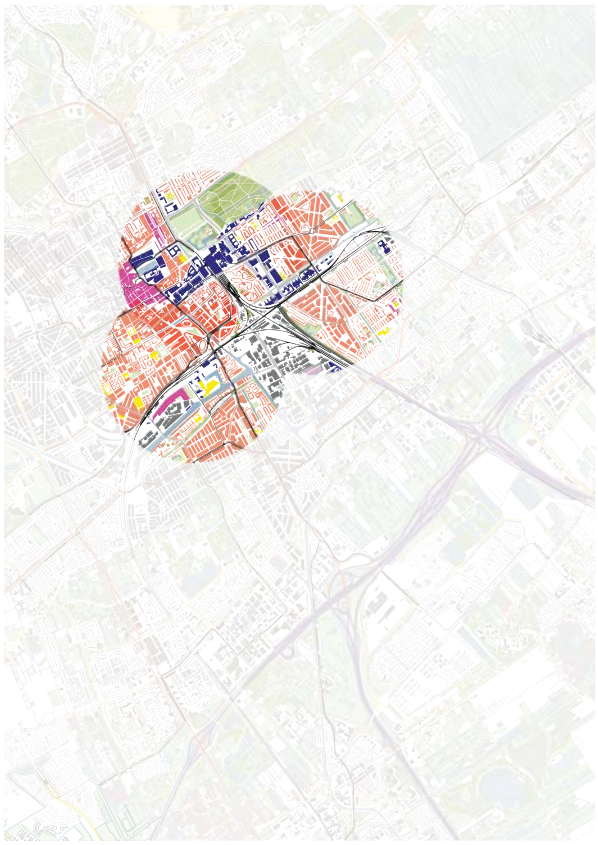


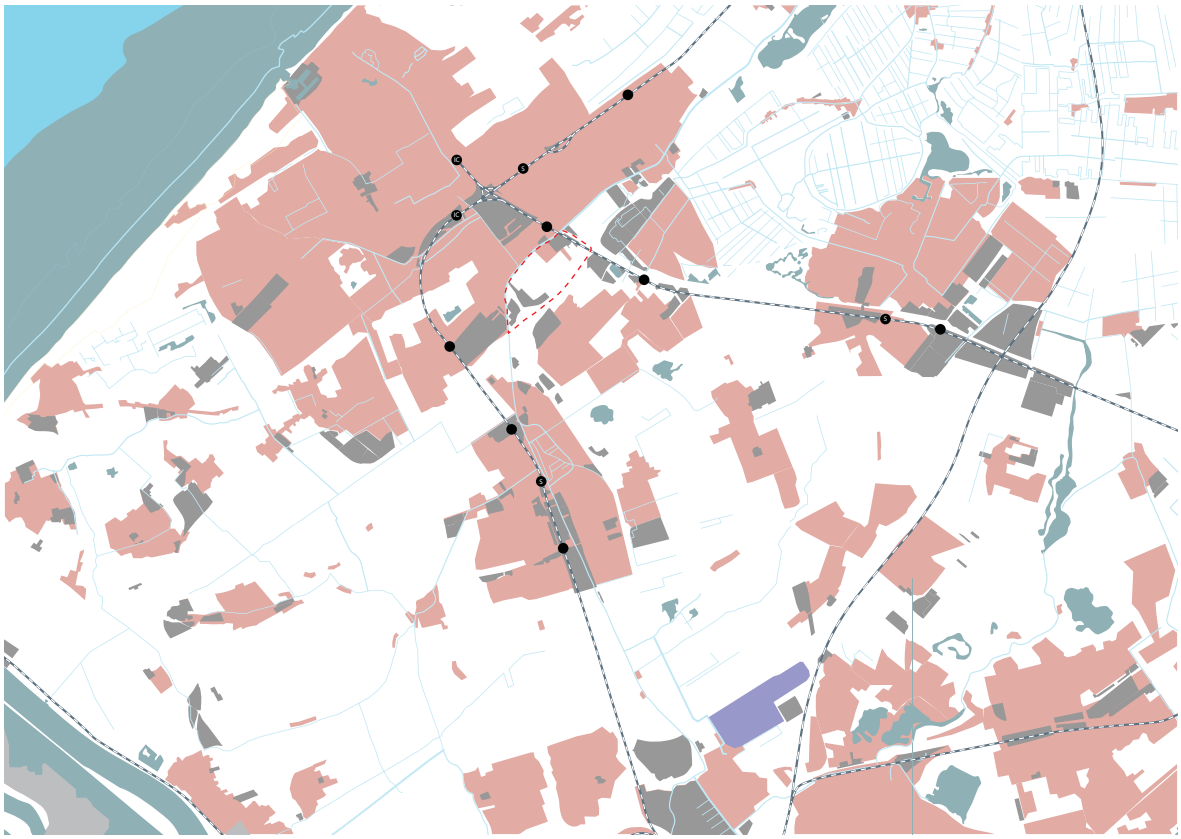
Main stations in The Hague: The Hague CS, The Hague HS and Laan van NOI



Secondary stations in The Hague; Rijswijk and Voorburg

Stedenbaan

The Stedenbaan is an excellent addition to the rail system serving locally as well as regionally connecting Rotterdam and The Hague with an extra connection. In the future The Hague is planning to add two lines to the Randstad rail. The lines 1 and 11 will form a new connection from Scheveningen to delft, crossing the international zone, city centre and the vlietzone.



Local train stations

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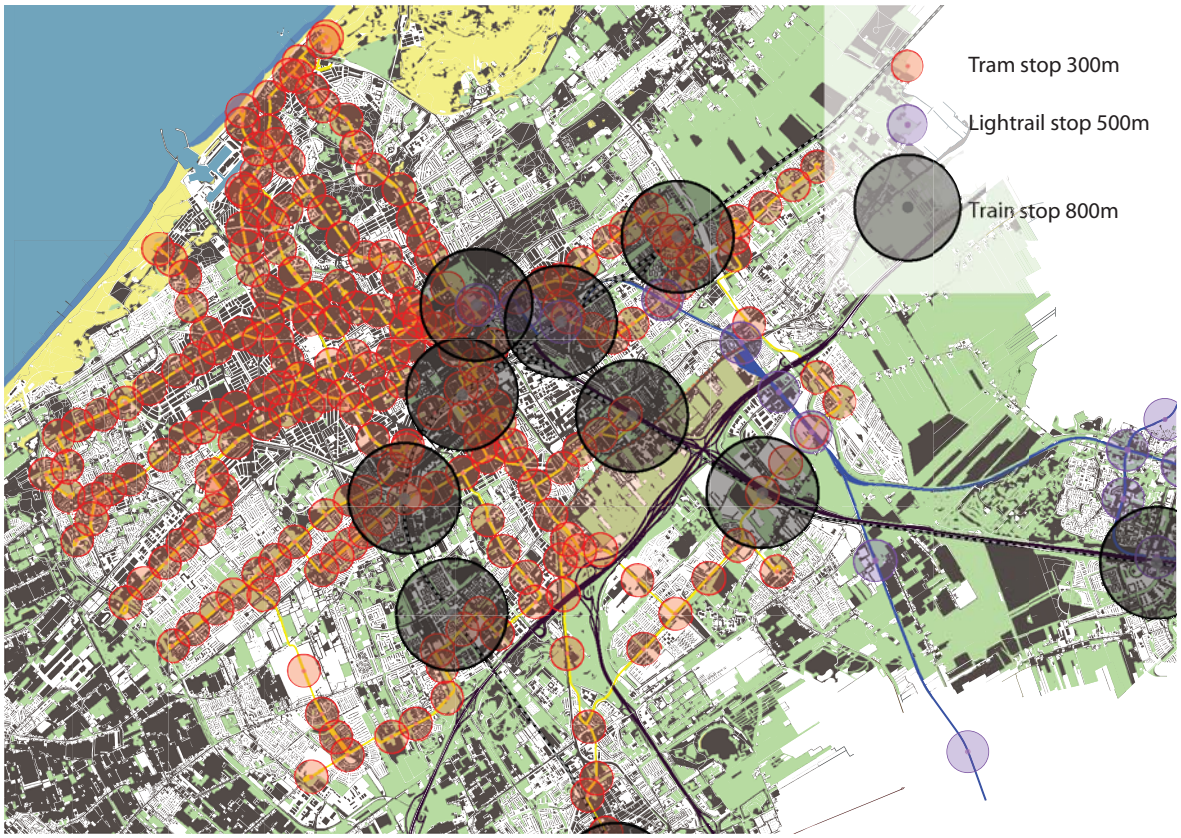
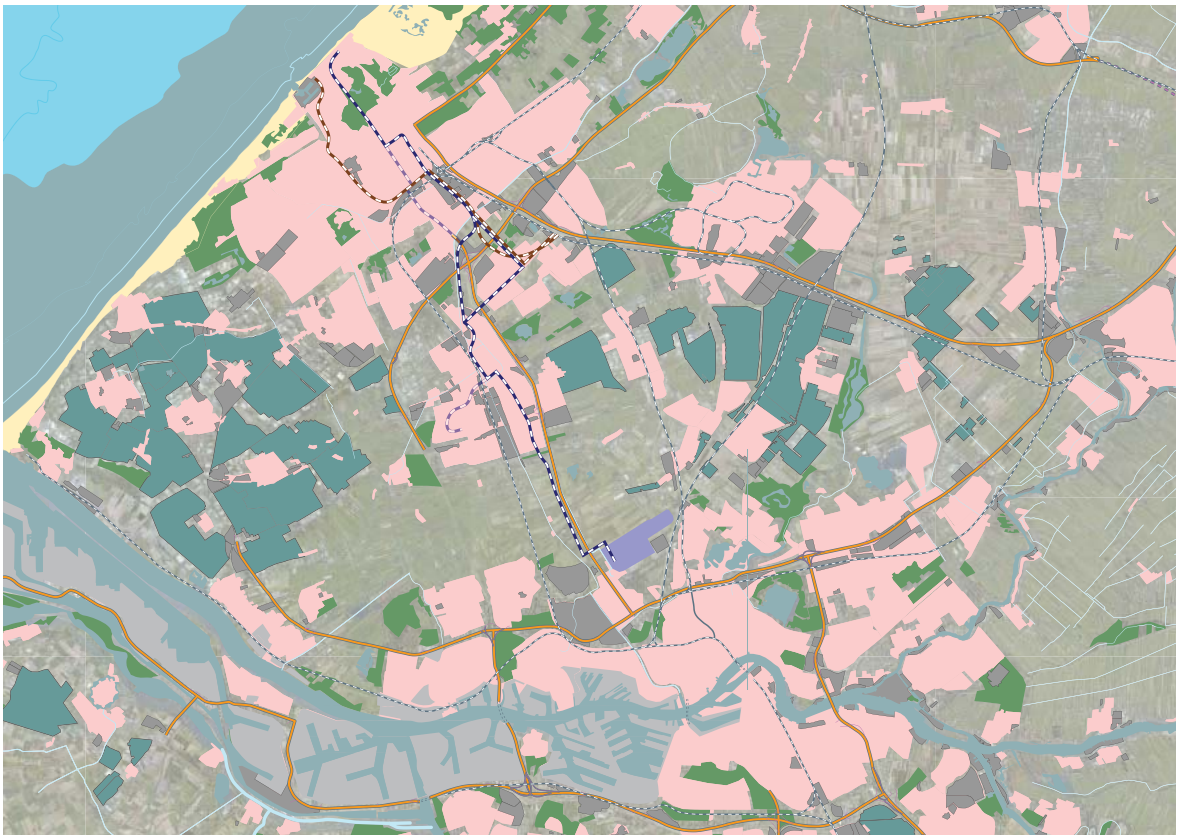
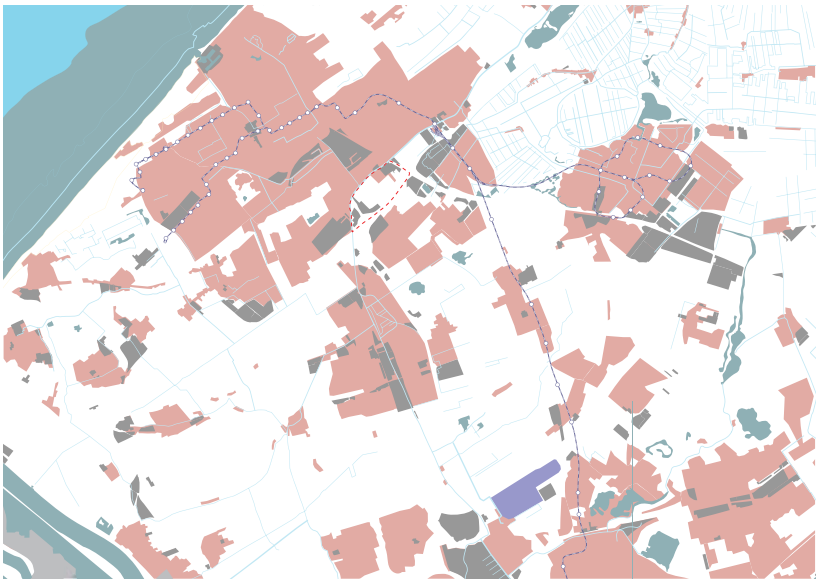


Tram, Train and Randstadrail lines and stations



New route for tram line 1 (blue) and line 11 (brown) through the Binckhorst and Vlietzone toeards Delft and Ypenburg.



Randstadrail and stations



Randstadrail and 800 meter radius around the stations, showing area of influence



New proposed connection connecting Scheveningen and TU-Delft

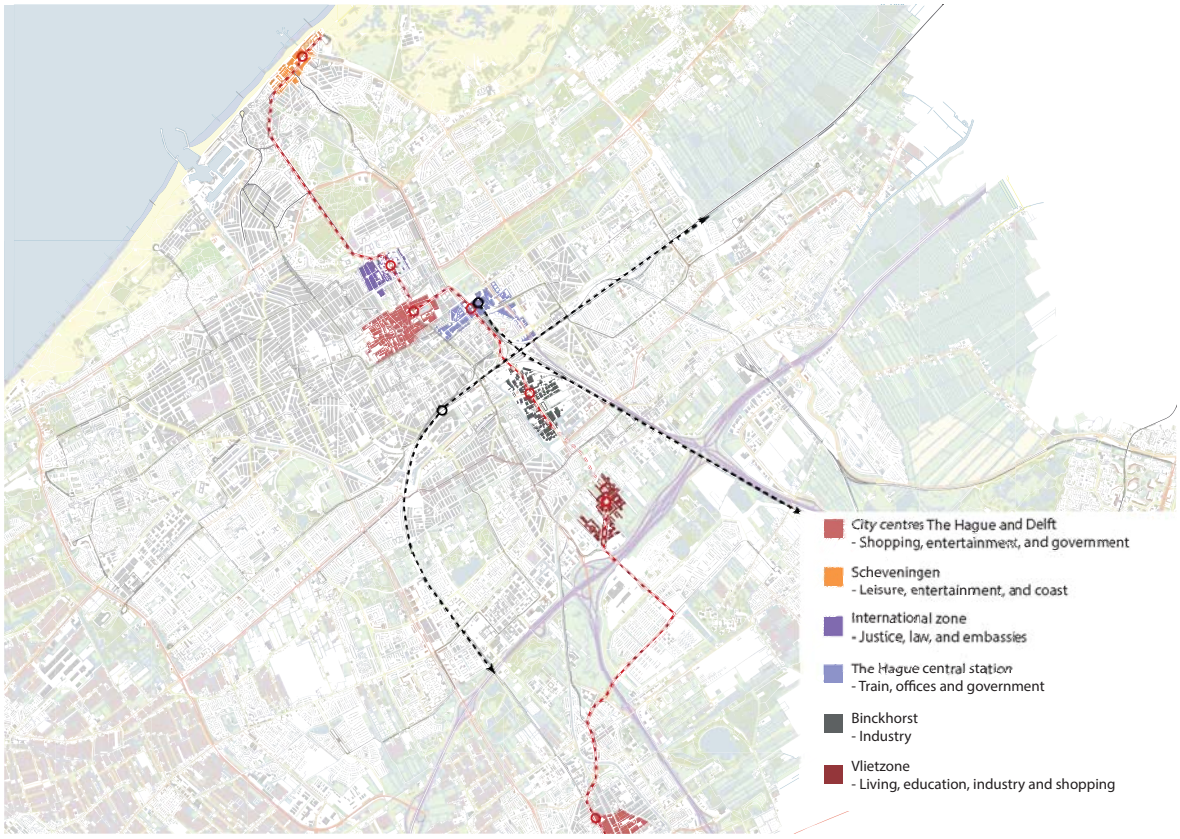
9

Rotterdamsebaan

The new connection to the city central ring levitates pressure from existing roads and directly connects Rotterdam via the A13 with The Hague city centre. This will become a road comparable to the A12/ Utrechtsebaan. Also the A4 will have access to this road making the Rotterdamsebaan one of the most important roads entering The Hague



Introduction of the Rotterdamsebaan within the Vlietzone



Connectivity of the new Rotterdamsebaan with lightrail focused on TOD nodes



Rotterdamsebaan long proposal



Rotterdamsebaan short proposal

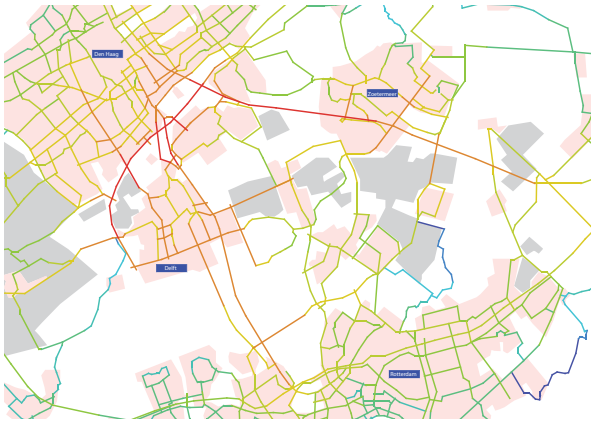
9

Conclusion

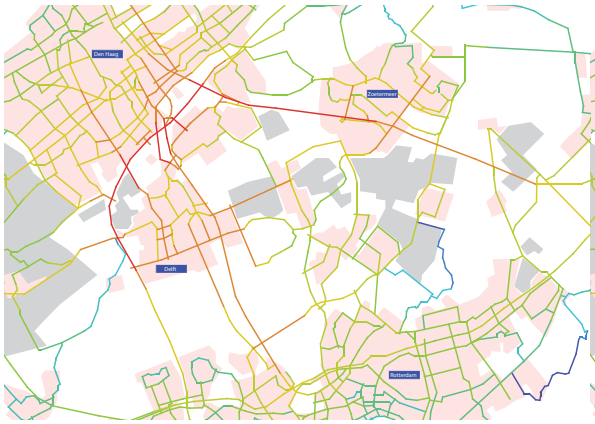
The current infrastructure, car as well as public transport, in and around The Hague is of high quality. Most of the local public transport is oriented parallel to the cost and lacks good regional access. The Vlietzone and the Rotterdamsebaan provide an opportunity to develop an better regional connection.

Car oriented the city centre is very hard to access. Also here the Vlietzone and Rotterdamsebaan provide a solution.

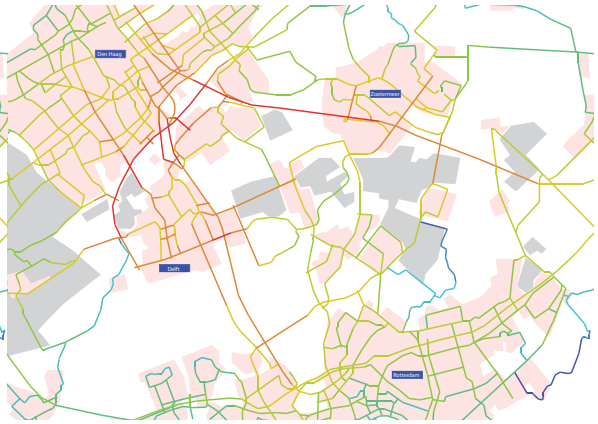
These linkages of modes of transport make this location ideal for experimentation with transit oriented development.



Best integrated road network between Rotterdam and The Hague

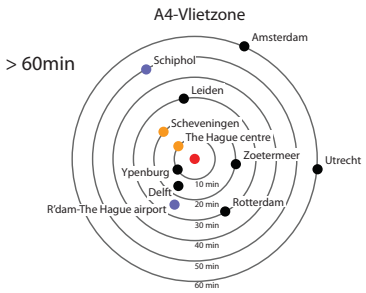


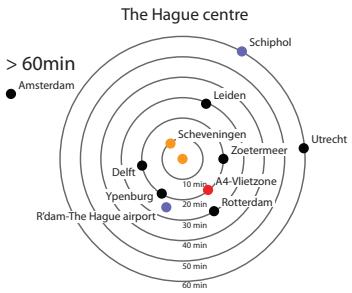
In addition with Rotterdamsebaan and A4 extension

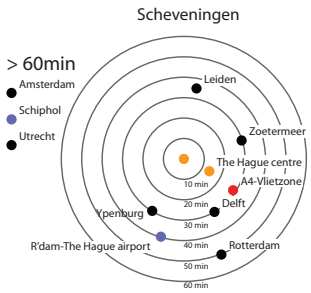


In addition with Rotterdamsebaan

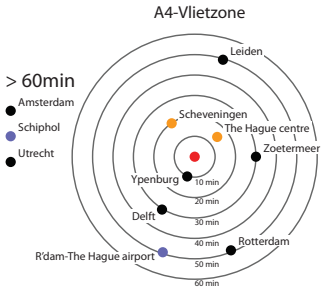
Automobile accessibility

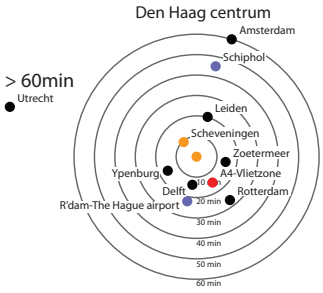


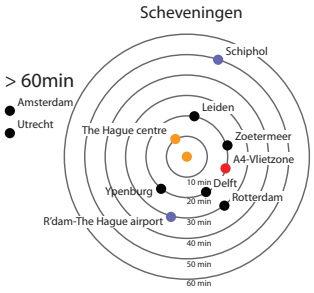




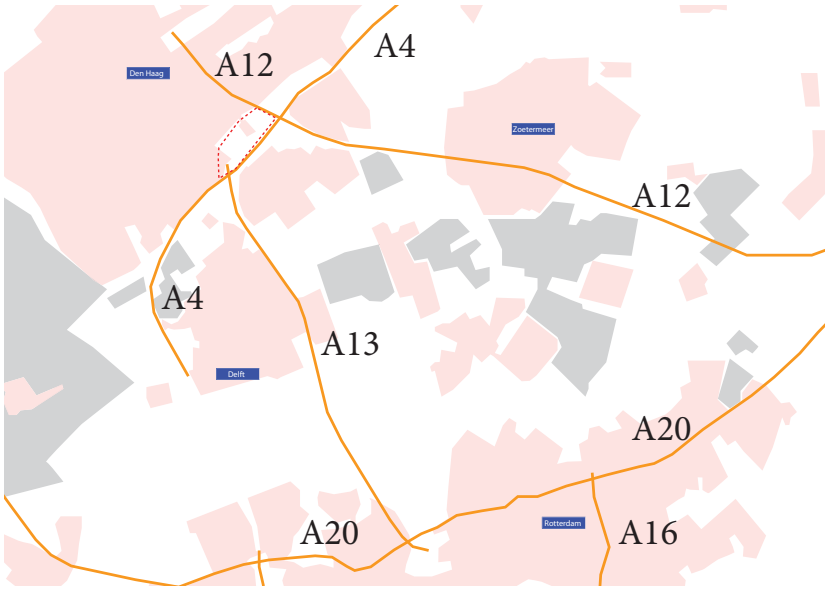
Public transport accessibility



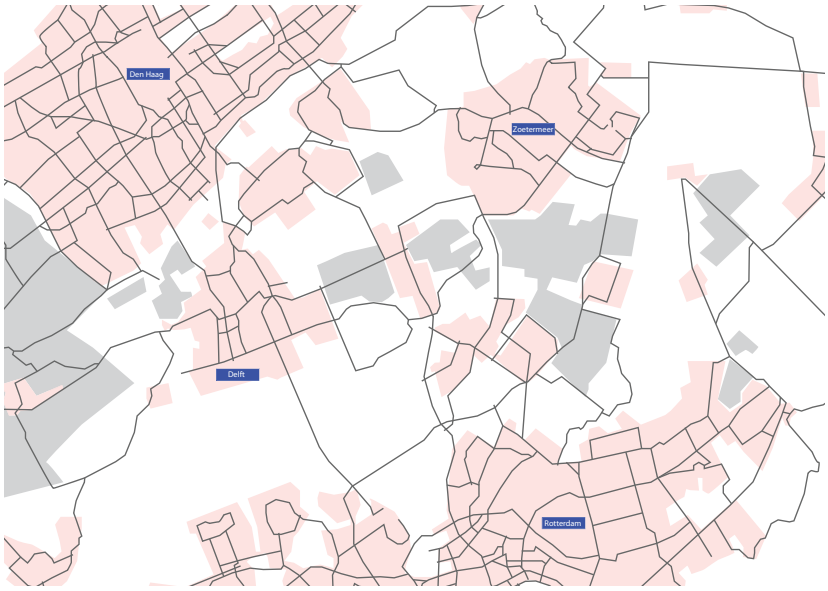




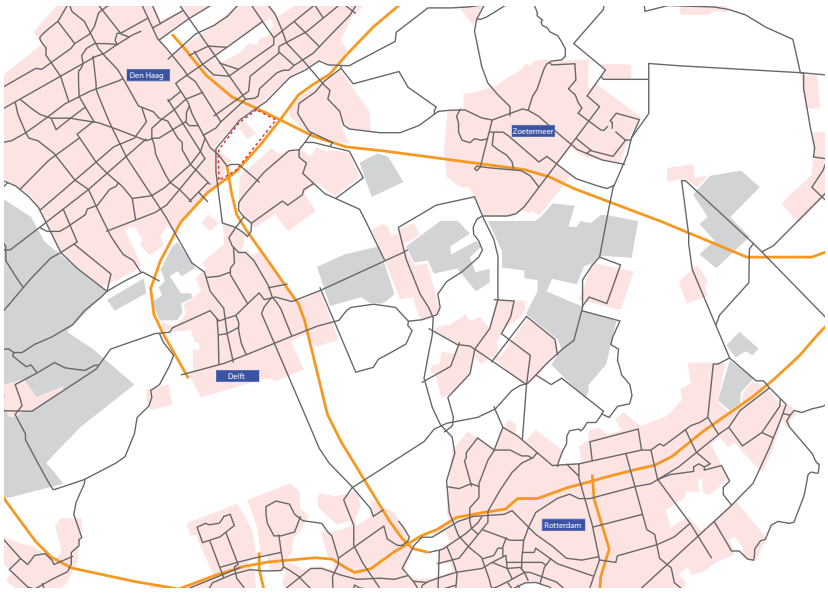
Current transit time from the local centres to the important nodes in the Randstad, by public transport and car



Highways between Rotterdam and The Hague



Local roads between Rotterdam and The Hague



Highways and local roads between Rotterdam and The Hague

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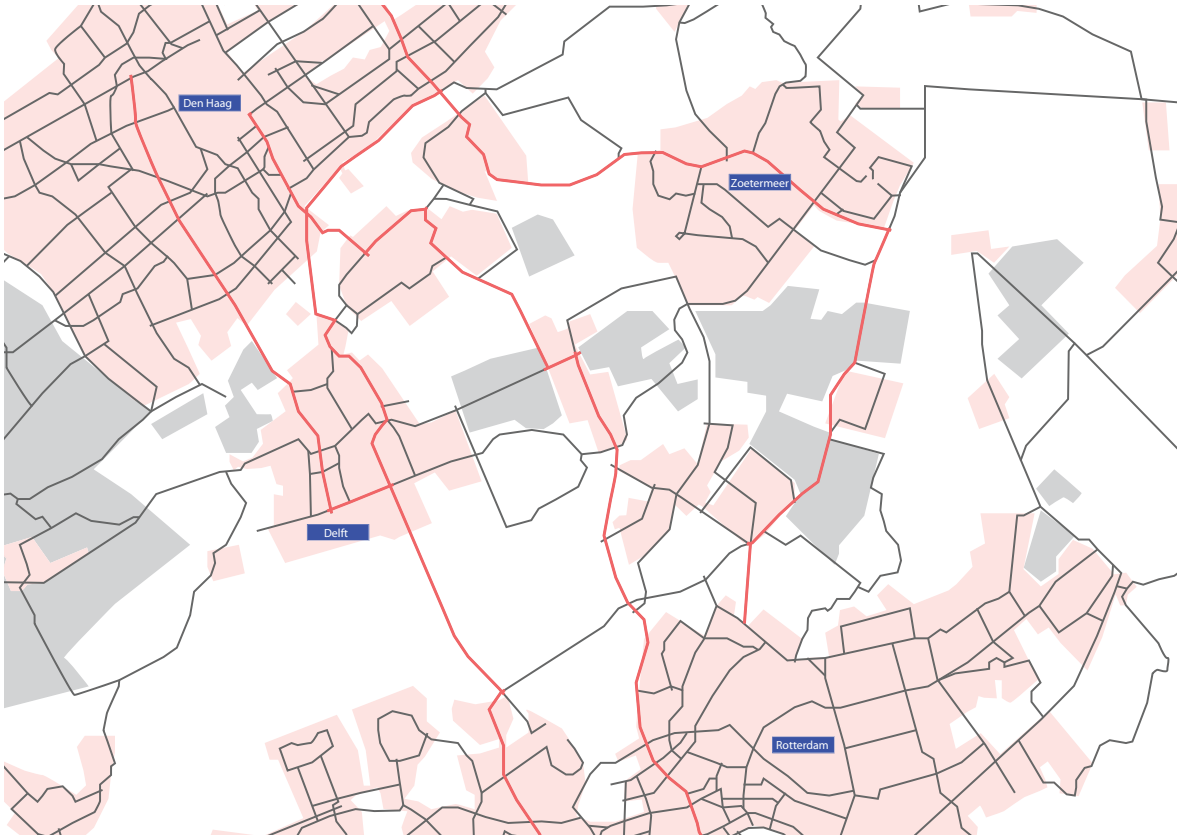
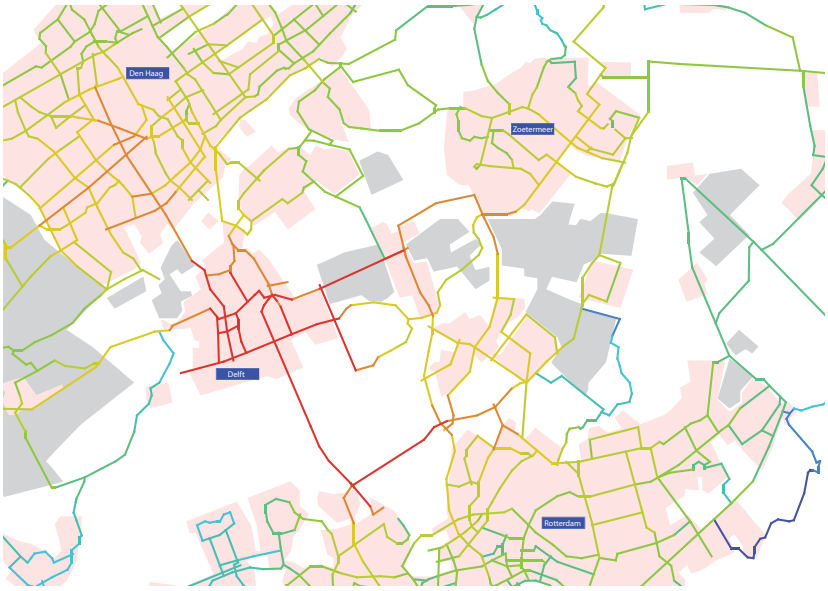
Most important and best connected roads in The Hague



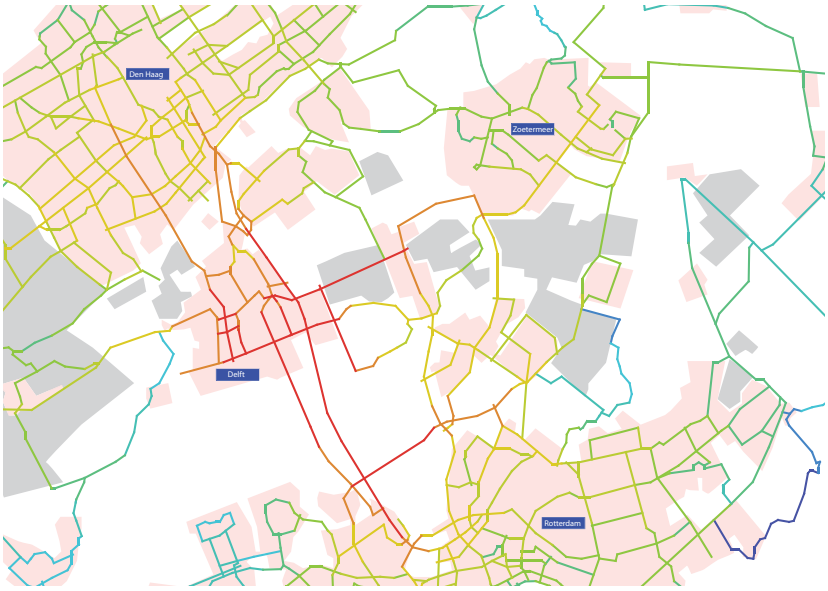
Most important and best connected roads in The Hague with the Rotterdamsebaan added



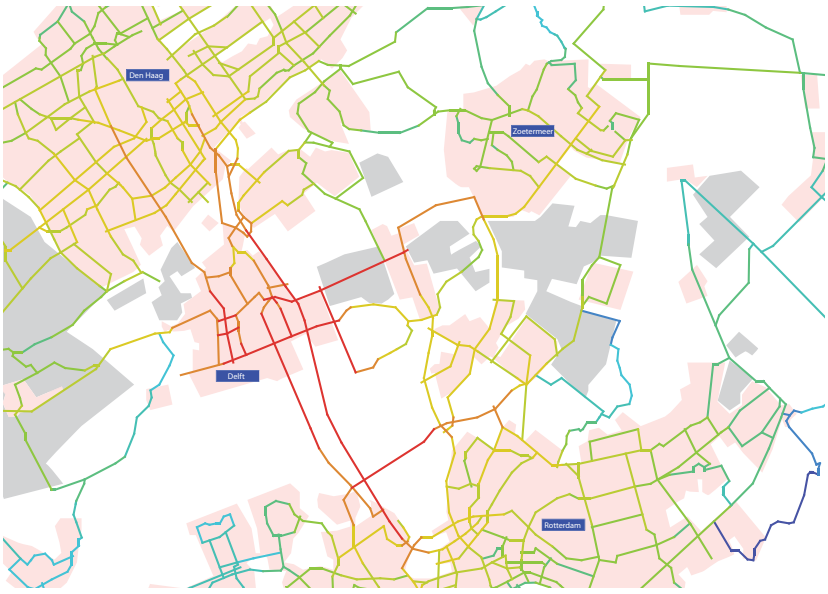
Local connections between Rotterdam and The Hague



Best integrated roads between Rotterdam and The Hague



Best integrated roads between Rotterdam and The Hague with A13



Best integrated roads between Rotterdam and The Hague with A13 and Rotterdamsebaan

10. Scenarios

10

Chapter organisation

This chapter contains the ideas in what direction the design process will lead and what I expect to achieve as final result. The first subchapter will describe the long term scenario forming. The second subchapter is dedicated to the local key intervention and its design.

Future scenarios

As we have seen from the current research is that the Vlietzone has 3 major influences. First of these is the housing. Growth of the city demands expansion. As second we have the economic factor. The current office park might expand but also local and surrounding industries put pressure on the Vlietzone. Last we have the regional green structure and its local green structure, together with the local theme park 'Drievliet' the area can become an green entertainment area. On top of this is a large road, train and public transport system that needs to grow and needs more connections. Further research will show what scenario will be the most suitable for the Vlietzone.

Living

This is the first of the possible solutions. As the municipality grows with around 55,000 after 2025, new housing areas should be assigned. The Vlietzone can provide this, because of its size and location. The newly planned housing together with the existing housing and facilities can make of this area into a working neighbourhood.
We have seen that the current urban expansion in this area is relatively meagre. The size of the area developed is but a fraction of the surface area of the Vlietzone. The space available is large enough for more development. The current plans from the municipality add another 6500 houses to the area. With the current size this means that the area will have a density of 20 houses per ha. This is a very low density and further research will indicate if more housing is needed to create a functional neighbourhood.
From the demographics we concluded that in the future there will be a large demand for one and two person housing units. As both groups have various wishes and demands, planning and research will determent the effects on the design
The need for better accessibility of the area and the expansion of the A4, by parallel road, demand integration. An interesting tool for this is transit oriented development (TOD) (Appendix A). The target group for this area needs easy access to daily functions, job access and entertainment, provide by The Hague city centre, as well as good public transport. This public transport is currently under supported and only available at the edge of the area. Not only does it not connect to the area, it skips the areas around and behind the Vlietzone. Connecting to these areas may provide enough support for a new transit line.
automobile use is less important, but accessibility is now really bad and needs to be improved. No new connections to the highway are needed, but the current situation is more a detour. With a more focus on living the highway is a con instead of a pro. In this scenario the noise and sound pollution from the highway should be countered.

Economy

The third possibility for this area is to develop it into a new economic centre. There are multiple scenarios possible, but the enormous size of the area can mean that differ types of economic functions can be situated here at the same time. The mixed-use has as affect that different sectors can profit from each other.
An important factor in the development of the economic sector is accessibility. The proximity to the highway means this area is ideal for regional connection by automobile and truck. The down side it that the current connections to the highway are not sufficient to support an increase in traffic. Infrastructure in the area needs to be in proved as well as the connectors to the regional scale.
Not only accessibility buy car needs to be improved to attract businesses. The public transit network is also an easy and fast way to connect to the region, making it possible to attract different types of employees and businesses. The proximity of Schiphol and the Rotterdam harbour make the location also attractive.
Due to the restructuring of the Binckhorst a lot of companies from this area have to be relocated, within The Hague, to keep job availability. A lot of these companies are water orientated. The Vliet canal can support those companies inside the Vlietzone. Together with the existing industrial building focused on transport, office, knowledge and research this area can further develop. Making the Vlietzone into an area for work, focussed on producing, selling, distributing and research orientated industries to provide jobs and knowledge for the city of The Hague.



Illustration of new housing expansion



Illustration of new international and knowledge expansion



Illustration of new nature expansion

10

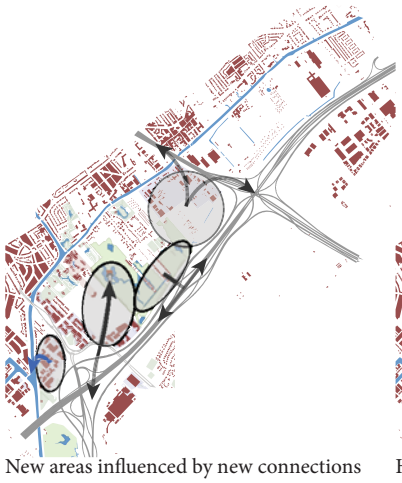
Green structure

The areas surrounding The Hague have different character, but most of them are large agricultural lands. These lands are assigned as protected natural areas by the fifth memorandum spatial planning. These areas part of a larger blue and green structure flowing through the provinces of Zeeland, North- and South-Holland. The connection of these areas into the surrounding cities is used to improve the quality of city life and recreational needs.
The Vlietzone area is situated between these green structures, forming a connector from a top down perspective. The green nature of the area itself has also the opportunity to attract the inhabitants from the surrounding cities. With the current local entertainment and functions the area can be a provider for recreational activities. Current the fragmentation of the area has an off-putting effect. The solution is to unify the green fragments and create an area for multiple activities. Attracting cyclers and pedestrians for a tour through the area, making public parks for recreation. Making the Vlietzone accessible for everyone and shedding its secluded and private nature. (Pitstra et al., 2009)
Water in the area is now scarce. The Vliet canal is the only, but important body of water. Preserving this is a must, not only for the economical use it has, but for recreational purposes also. A large body of water can improve wildlife in the area and at the same time improve recreational possibilities.
The green and blue nature of the Vlietzone makes it an ideal area for a mixed use of nature, sport, and leisure. At the same time wildlife can come back to the area, bringing nature closer to the city.

local design choice

In the following chapters each of the three chapters will be described in more detail, focussing more on the external influences and local effects. From these scenarios one is chosen as the most likely and interesting as basis for a design project.

The 3 different scenarios are split up in; the provincial green corridor, the municipal housing extension and the international regional node.



New areas influenced by new connections



Housing expansion areas



New green and educational expansion

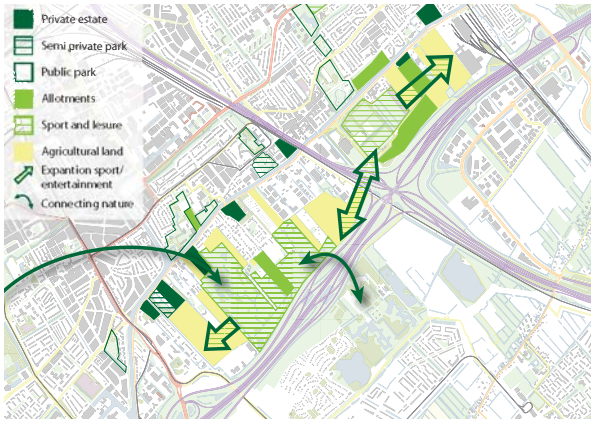


Possible key intervention areas

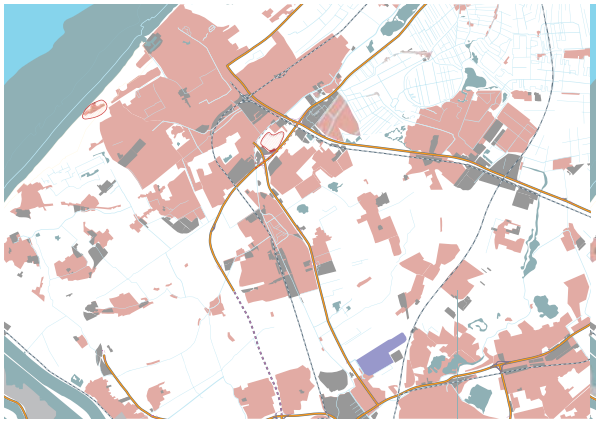
10

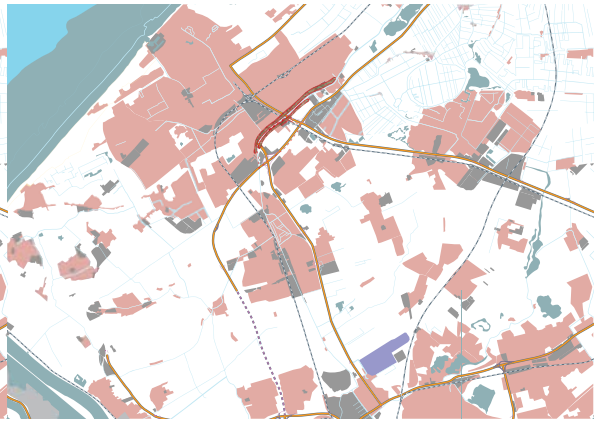
Provincial green corridor

One of the possible futures is that development in The Hague stays at a very low level and all the large planned expansions will be cancelled. From this point on the Vlietzone is not a good contributor to The Hague, but it can become this. The province of South Holland is looking for an opportunity to connect the regional green structures. This means that most of the Vliet-zone will be transformed in parks and leisure areas for the region.



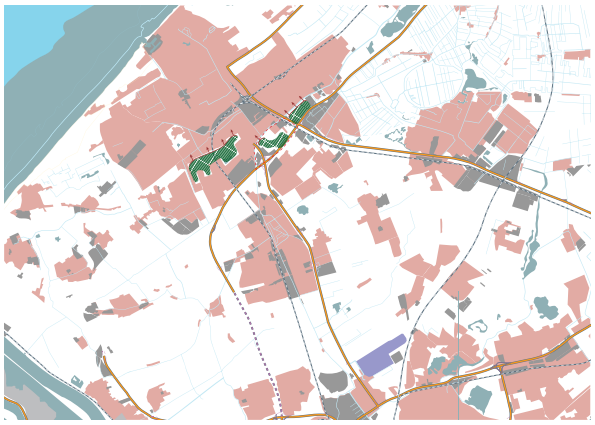
A local green connections and influences

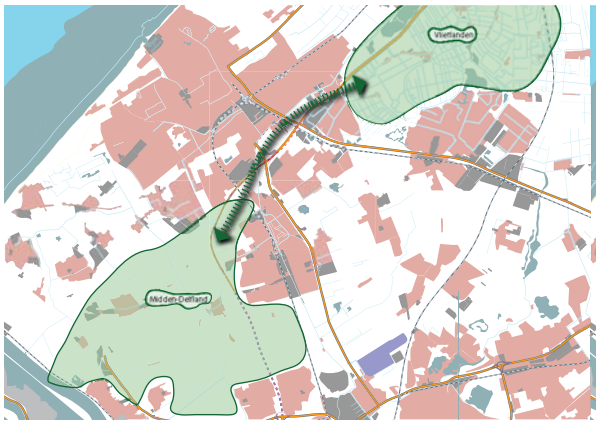

Zones for international housing


Estates and green living

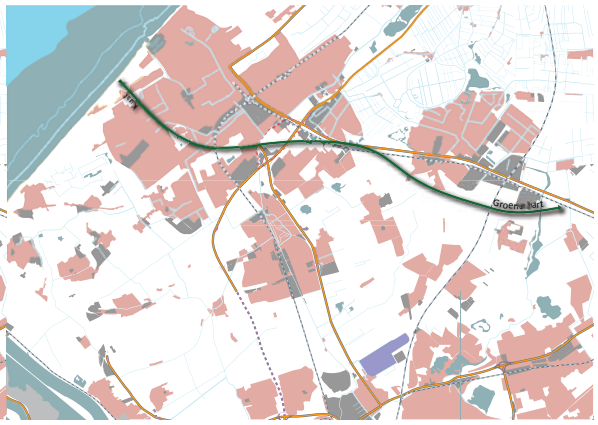


Green connection with TU-Delft and agricultural development

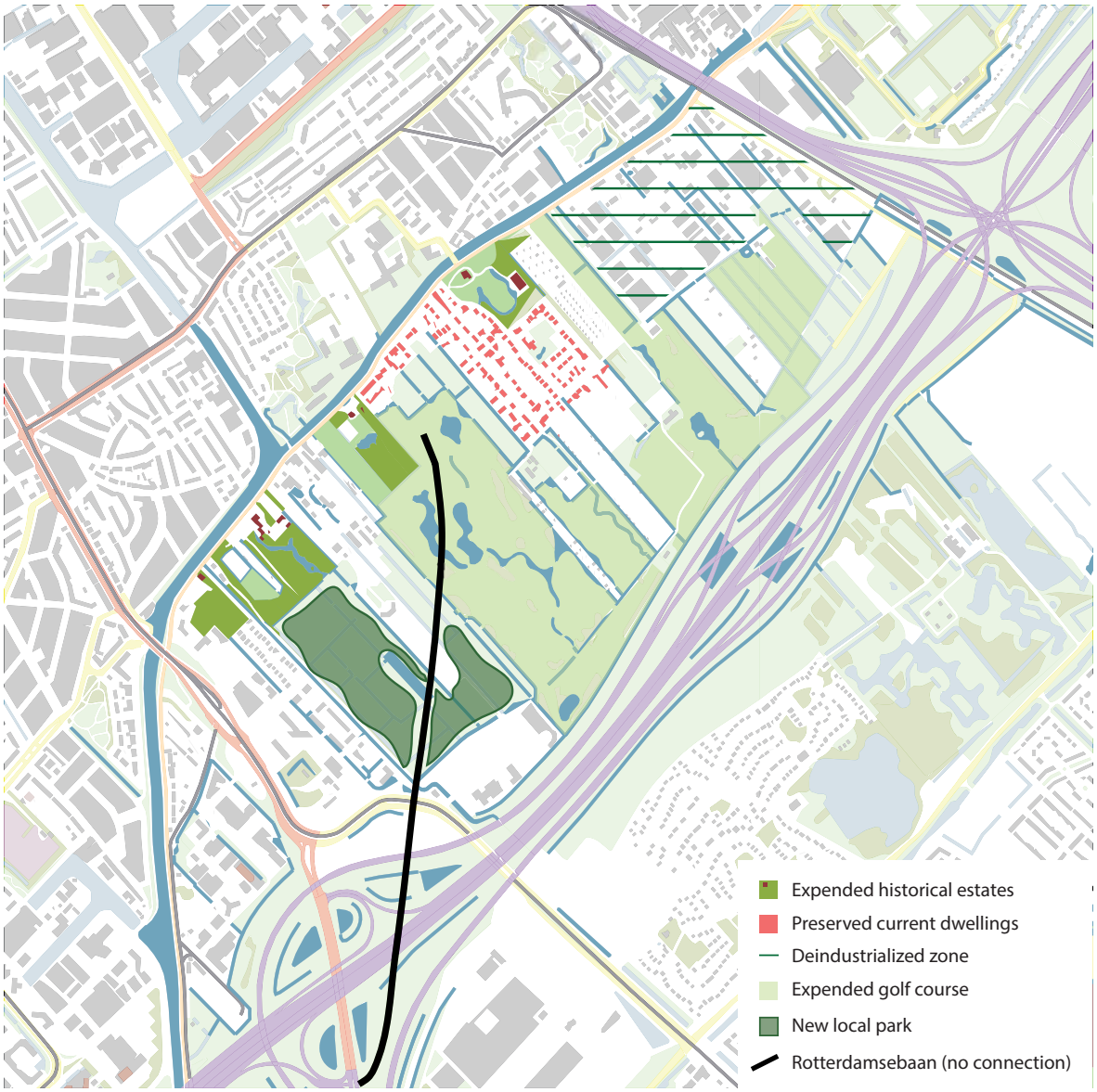

Sport and recreations zones ant the edge of The Hague



Green connection through the Vlietzone



Connection Coast and Green heart

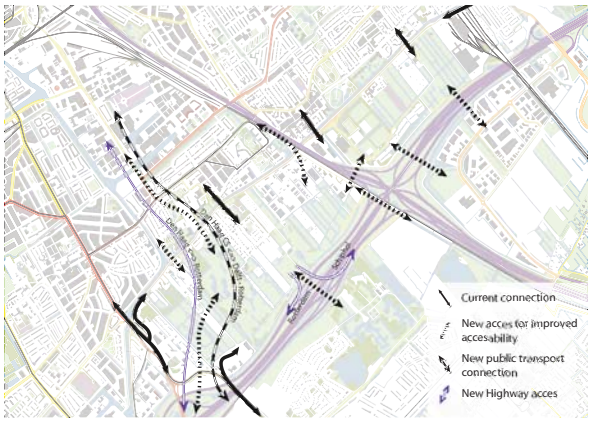


Development of the vlietzone as a provincial green corridor

10

Municipal housing extension

A second possibility is that the growth within The Hague continues and the municipality decides to lift the current building stop in the Vlietzone. At this point the need for new housing is so high that the only action left is to completely build up the Vlietzone with 12.000 new houses. This will drastically transform the Vlietzone. The new neighbourhoods will demand a lot from the local road system and highway. Creating fewer opportunities for leisure in the area transforming the Vlietzone into another VINEX area only locally related to The Hague but not contributing to the regional quality.



New road and Randstadrail connections



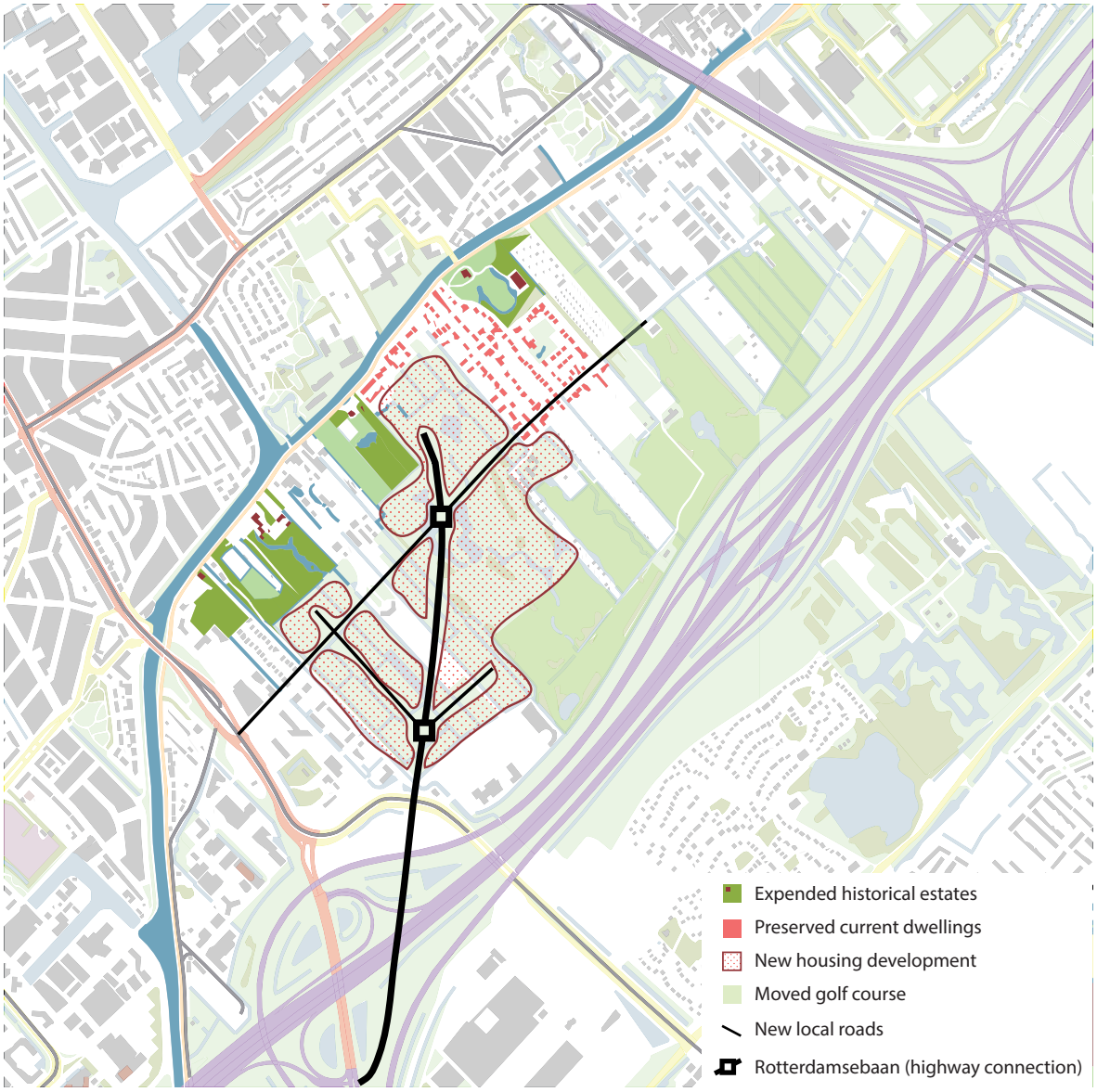
The Hague development zones alogn a central core from Scheveningen through the city cnetre and the Vlietzone



Most development areas numbered from 1 to 6



Most important housing areas numbered from 1 to 7



Development of the vlietzone as a municipal housing extension

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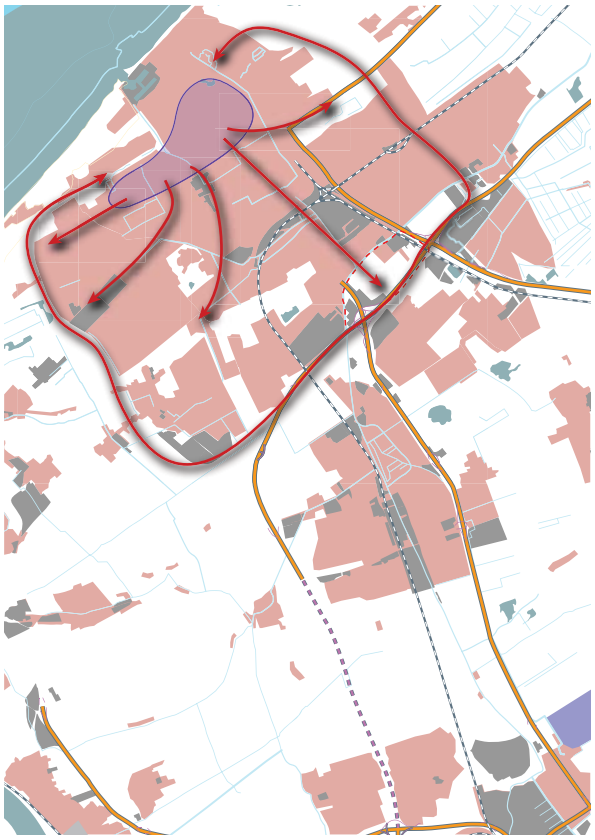
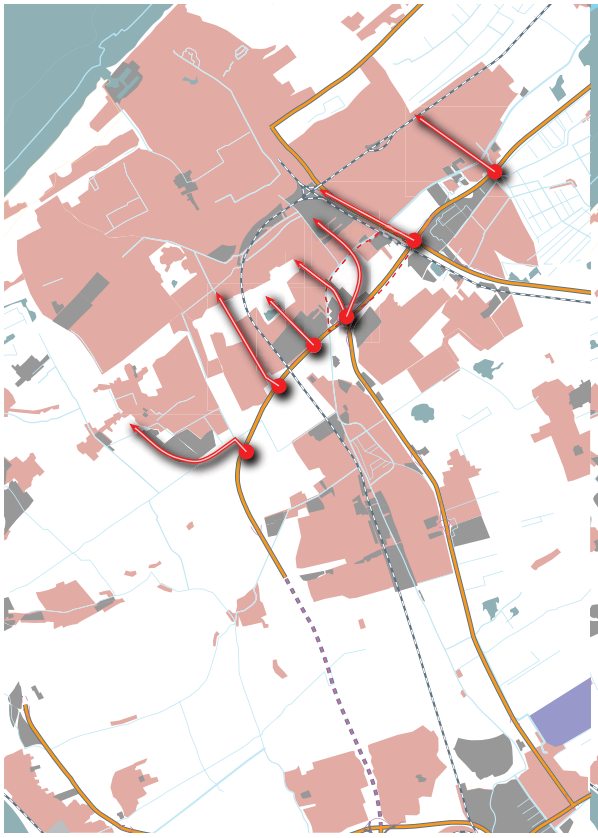
International regional node

The final possible scenario is a mix of functions supported by the wish for the municipality to become an international city of peace and justice, the usage of the knowledge corridor and the improved connection and regional possibilities with cooperation with Rotterdam.

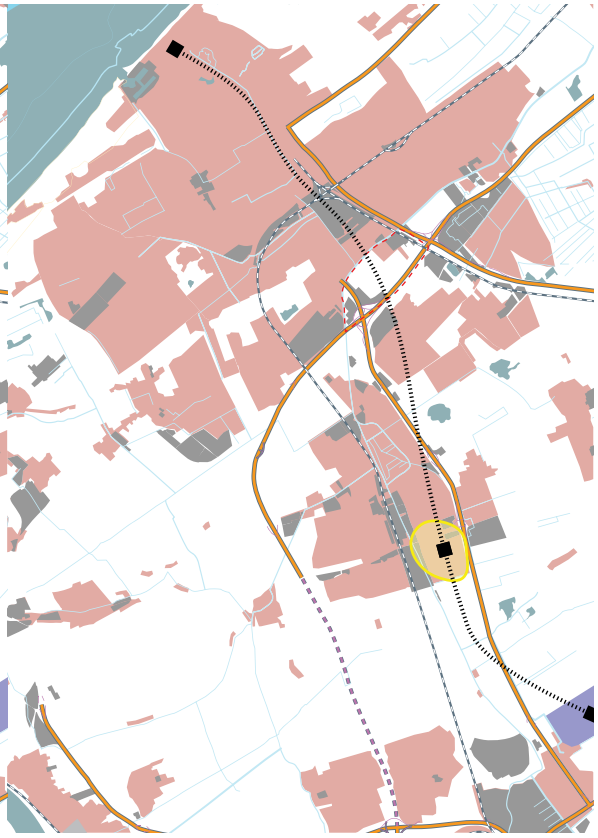
This scenario is a mix of housing, industry and educational possibilities. This mix makes it ideal for TOD and interesting design possibilities.



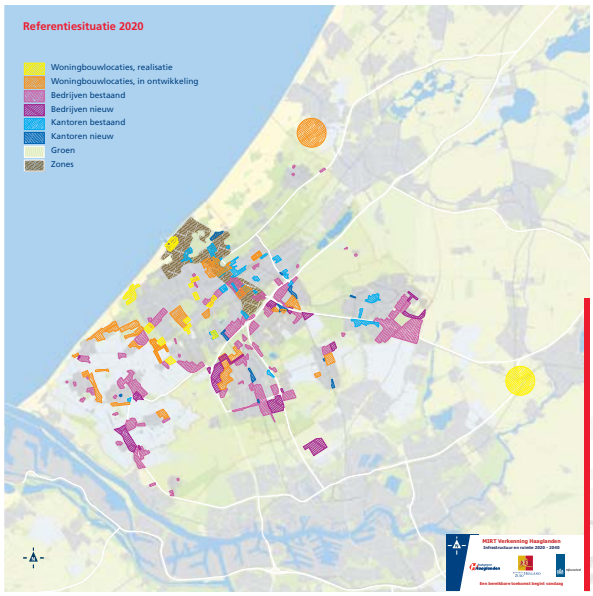
Making the international zone accessible



New gates and entrances into The Hague



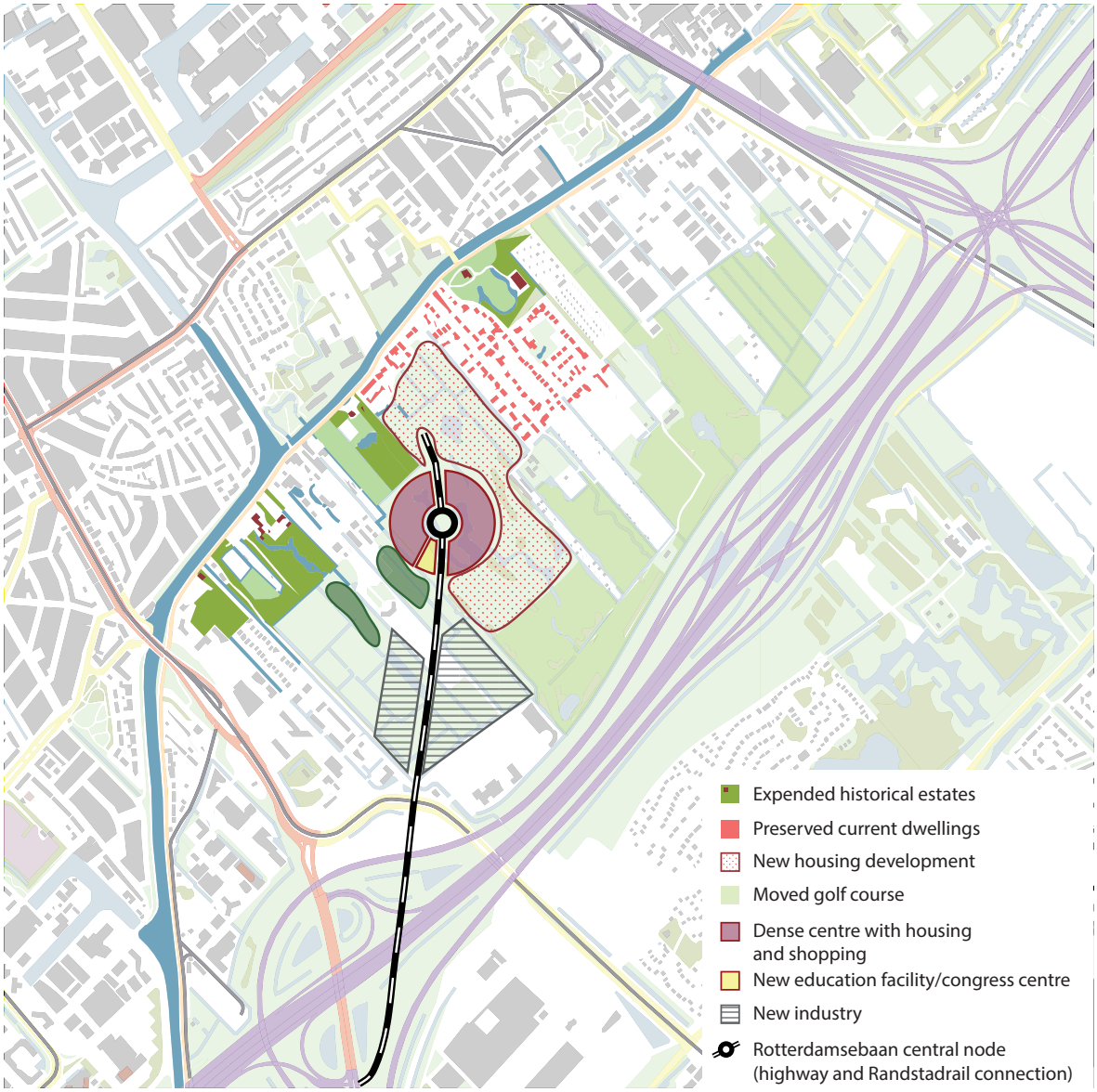
Connecting Scheveningen, TU-Delft and Rotterdam Airport



Development scenario for 2020



Educational corridor from Delft through The Hague to Leiden



Development of the vlietzone as an international regional node

10

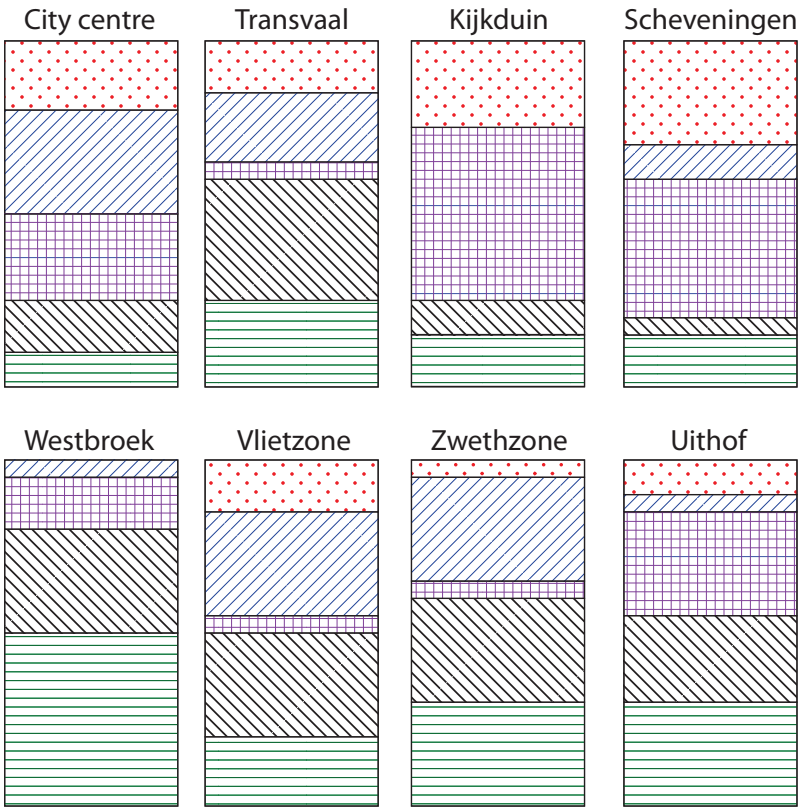
Conclusion

With the different governmental institution all wanting something different from the Vlietzone no clear future is set by any of them. The possible functions do also not determine what type of scenario is best for future use after 2020.

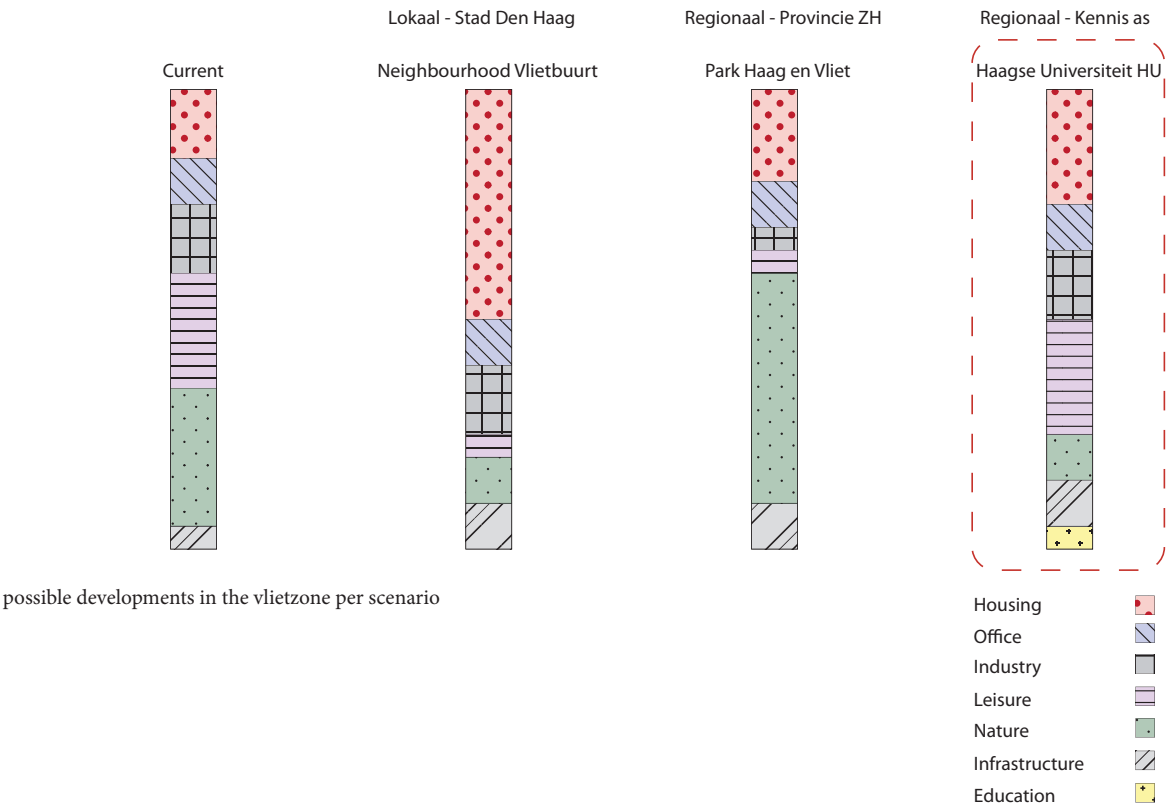
The next factor what opportunities provide the Vlietzone to the region? Because of the new infrastructure artery and public transport options a transit oriented development based design is the best suited for the area.

The best use of TOD principals is provided by the international option. The mix use program suits best with TOD and cam make the most interesting design options.

Focus of fuctions per key project



Program per city development zone



possible developments in the vlietzone per scenario

11. Design

11

Design (De Vliet entrée)

Scenario choice

In the previous chapters the 3 possible scenarios have shed light on the possible future of the Vlietzone. But the uncertainty of the current economic climate and the reluctance of real estate managers for investment in development and the collapse of the building sector make it even harder to predict the future living climate. From the many possibilities, choices and no clear future I as an urban designer have to choose this future.

We have seen that the province of south Holland has set eyes on Vlietzone to make this area a green corridor for the regional landscapes, bringing parks, sports, and leisure to The Hague. Using this scenario to exploit the current natural qualities of the area and remove all polluting industries. But the lack of contribution to the city of The Hague makes this scenario less attractive.

The second scenario focuses on housing. The city structure plan of 2005 and the population data from the Central Bureau of Statistics (CBS) stated large population growth in the Netherlands. The municipality of The Hague has named the Vlietzone as one of the largest development sites for the construction of the needed houses. This gives the possibility for transit oriented living, but lacks the interests of mixed use and this monotonous land use would not add quality to The Hague and the Vlietzone

The last future scenario is based on the wishes from the municipality and the city region The Hague – Rotterdam. The international characteristics and interests of The Hague and the exploitation of international law and justice within the city form great opportunities. Connections with universities in the surrounding cities of Delft and Leiden promise new opportunities.

From the 3 stated scenarios there is only one that has the potential to become an integrated design oriented towards transit oriented development (TOD). The choice falls to the international orientated scenario. The mix of functions leads to an interesting mix of facilities and opportunities. Mixed use is one of the main attributes in TOD and the location with its new connections to the city and the region provide ample opportunity to make an interesting design not like many existing in the Netherlands.

Functions and attributes

Designing an TOD oriented development for the Vlietzone is more than assigning densities, but also the appropriate housing types, industries and other mixed functions. The international oriented scenario is a mix of living working and education. Within this scenario better accessibility of this area determines the housing types, social economic classes and new opportunities.

With better accessibility more options of development are made available. The further development of the knowledge industry in the Vlietzone is a great opportunity for job and education opportunities even more so in combination with Shell Rijswijk. These new industries and the focus on law and justice from the municipality of The Hague make also new educational facilities possible.

New entrance

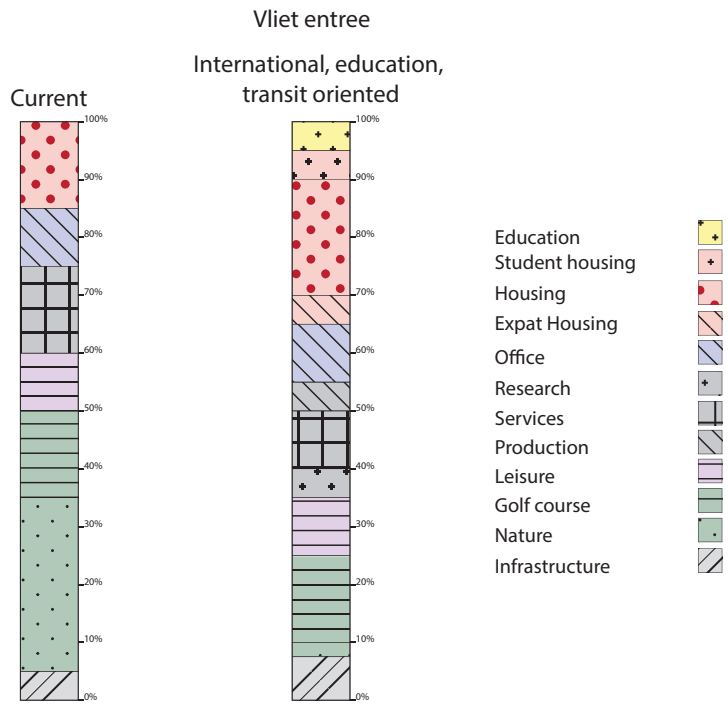
The Vlietzone has a unique position in relation to The Hague, Rotterdam and Scheveningen. It forms one of the best access ways into the city, with the old connection and new Rotterdamsebaan. This new access road runs through the heart of the Vlietzone, resulting in a better access into the Vlietzone itself and making the Vlietzone an entrance to The Hague.

The Vlietzone will become a counterpart to Scheveningen, meaning that Scheveningen can be seen as the end of The Hague whereas the Vlietzone can be seen as the beginning of the city. As the new entrance the focus of the design will determine the quality the Vlietzone will get. But it should be design as a new city entrance comparable to the current Utrechtsebaan.

High quality public transport

With the new road connection comes also the ability to introduce public transport in the Vlietzone. Currently the Vlietzone has some tram connections, but is lacking high quality public transport. This is about to change with the redirection of two tram lines 1 and 11. Both will connect Scheveningen, The Hague centre, the Binckhorst, the Vlietzone with station Ypenburg and Delft and its universities.

The Hague as currently a strong network of tram, light rail and train and this new line wil form a strong east-west connection, which is currently missing. Which will provide the Vlietzone with an central node in a strong network.



Functions within the Vlietzone, current and future plans



3D location impression on a google earth map

11

Housing

Increase in connectivity with the high quality public transport in the area greatly improves the access from Delft, Scheveningen, The Hague Central station and Hollandse Spoor and thereby also Leiden, makes the Vlietzone a location for student housing. These students can make use of the public transport to reach the Universities in Leiden and Delft, access the business and law studies in The Hague or use the new campus and congress centre in the Vlietzone.

With the international character of The Hague and nearby industries make the Vlietzone also an attractive location for housing oriented towards expatriate employees and other international housing purposes. The current housing is already focused on high quality living and this can be expanded on.

Third housing opportunity is of course the housing of the new in habitants for the city of The Hague. The expected inhabitant growth can somewhat be absorbed by building in the Vlietzone. This is a mix of families and young urban professionals divided in 1 and 2 person apartments and family row housing.

Industry

With the new highway connection 'Rotterdamsebaan' into the Vlietzone opportunities for transport arises, so also the possibility for regional industries to settle next to the highway. The Vlietzone harbours already a large amount of service facilities like storage boxes, wholesale and DIY-retailers. These functions will have a better regional access cause of the Rotterdamsebaan.

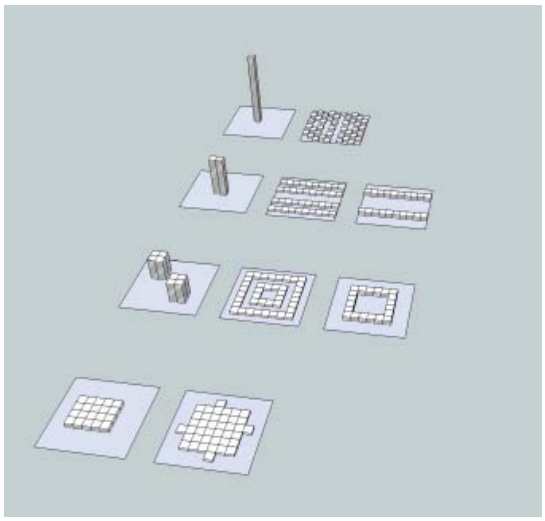
This new connection also allows knowledge/research industries and some production industries to settle at the edge of the city. These new industries will provide job opportunities for the new inhabitants. Together with Shell Rijswijk these industries can profit from and provide for the regional educational facilities.

Education

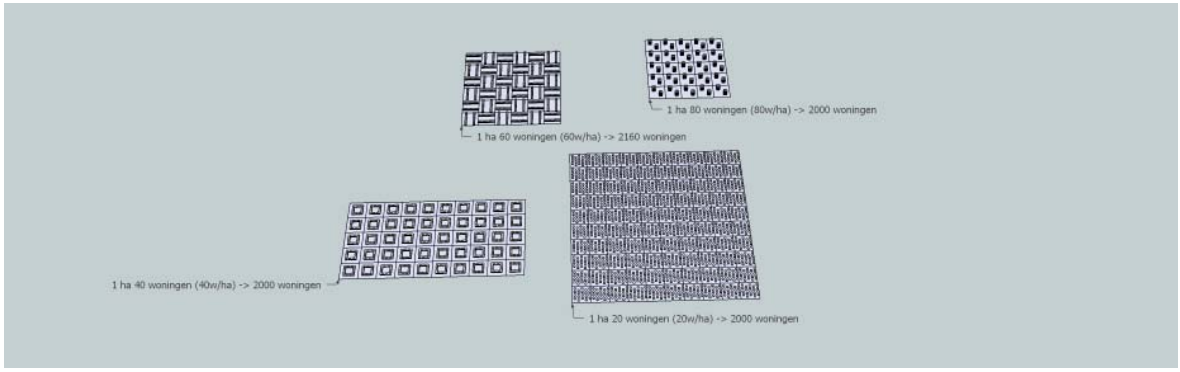
The Hague is a city surrounded by the smaller cities Leiden and Delft, both with esteemed university. While The Hague has no university it has international law and justice offices all around the city and also the international court of justice and the Yugoslavia tribunal.

The current education that is taught within The Hague is at higher college of education (hogeschool) level. It can therefore be stated that The Hague lacks a university. Delft and Leiden provide ample opportunities for students, but The Hague can benefit from its own university, probably in in cooperation with Delft and Leiden, forging an educational axis through the South wing of the Randstad.

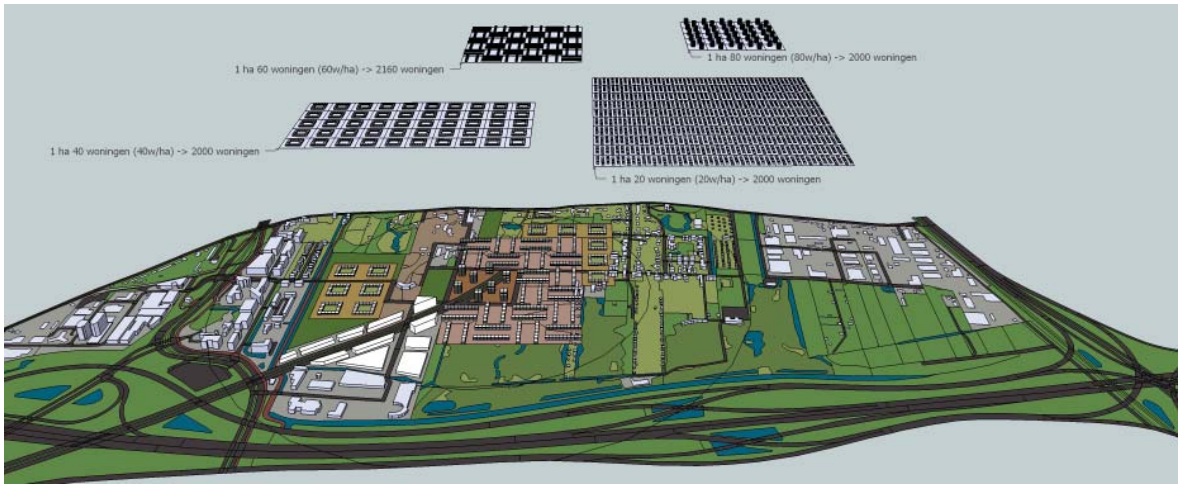
Currently The Hague does not have the space to construct a campus, but the Vlietzone has the connectivity and the central location to situate a faculty and a congress centre focused on international law and justice combined with business management and the knowledge industry.



Density study



Quantity study



Density and quantity implemented into plan area

11

Design confinements

The basis for a design flows from the demands and the main structural elements prior to development of the site. The orientation of the landscape, important or historical structures, events, heritage, and of course current important attractions form the other basis for the structure of the design.

The Vlietzone knows three major of these structural elements and several smaller important factors. Most important is the river the Vliet and the old road and estates lining the river. These historic structures give character to the Vlietzone and must be reserved at all cost.

The second is the natural orientation of the current plots within the Vlietzone. The borders formed by the Vliet and the A4 highway span large rectangular fields perpendicular to these roads. These have their beginning at one of these roads and end halfway inside the Vlietzone, meeting a field from the other end. This system creates an area of interconnecting fields of different lengths with different building types. Preserving this keeps the Vlietzone uniform and in contact with the historical value of the area.

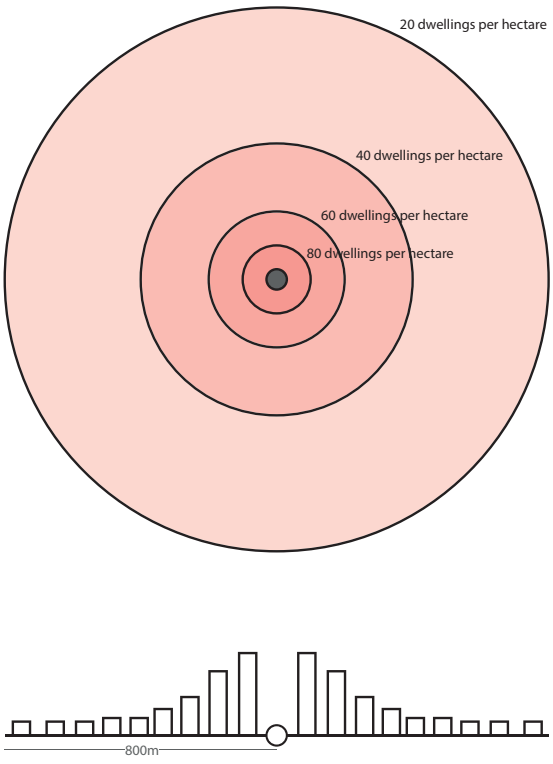
With the construction of the Rotterdamsebaan a new strange element is introduced into the Vlietzone. This diagonal line intersecting the perpendicular structure of the Vlietzone cannot be ignored; it should be used as a playful exemption to the rule but building placement can provide the integration necessary for an integral design.

The minor structural elements are divided into 2 categories; current build up area and leisure areas. The first category consists of an office park next to the current city entrance, a housing area inside the Vlietzone and an industrial area also inside the Vlietzone but next to the A12 highway and railway. Moving destroying or reorganizing will be difficult integrating into a design is the best possible solution.

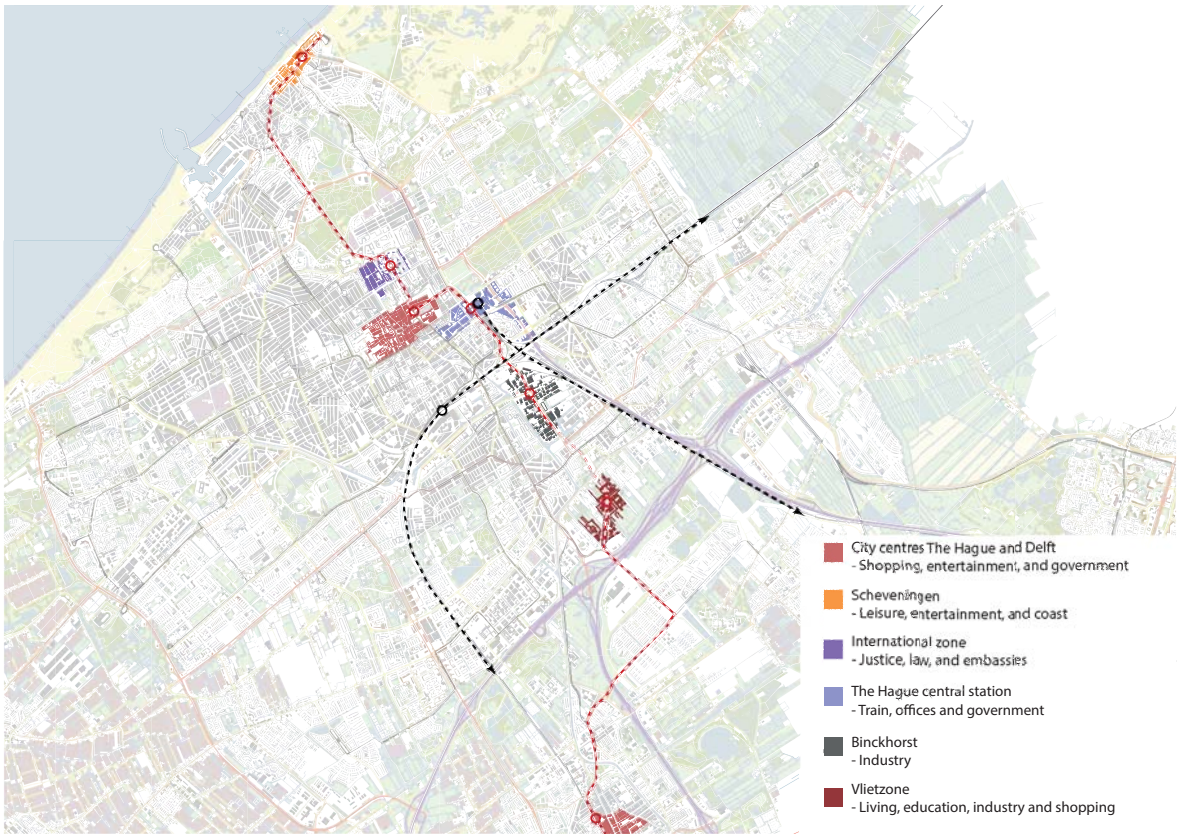
Second important structures are the theme park Drievliet and the local golf course. While the golf course has space to expand and relocate, Drievliet forms a bigger problem. The sound pollution from the park and its rides will for a nuisance for development. This can be combatted with high building to block sound or parks to do the same. Both shall be necessary to provide sound blocking and green areas for the new inhabitants.



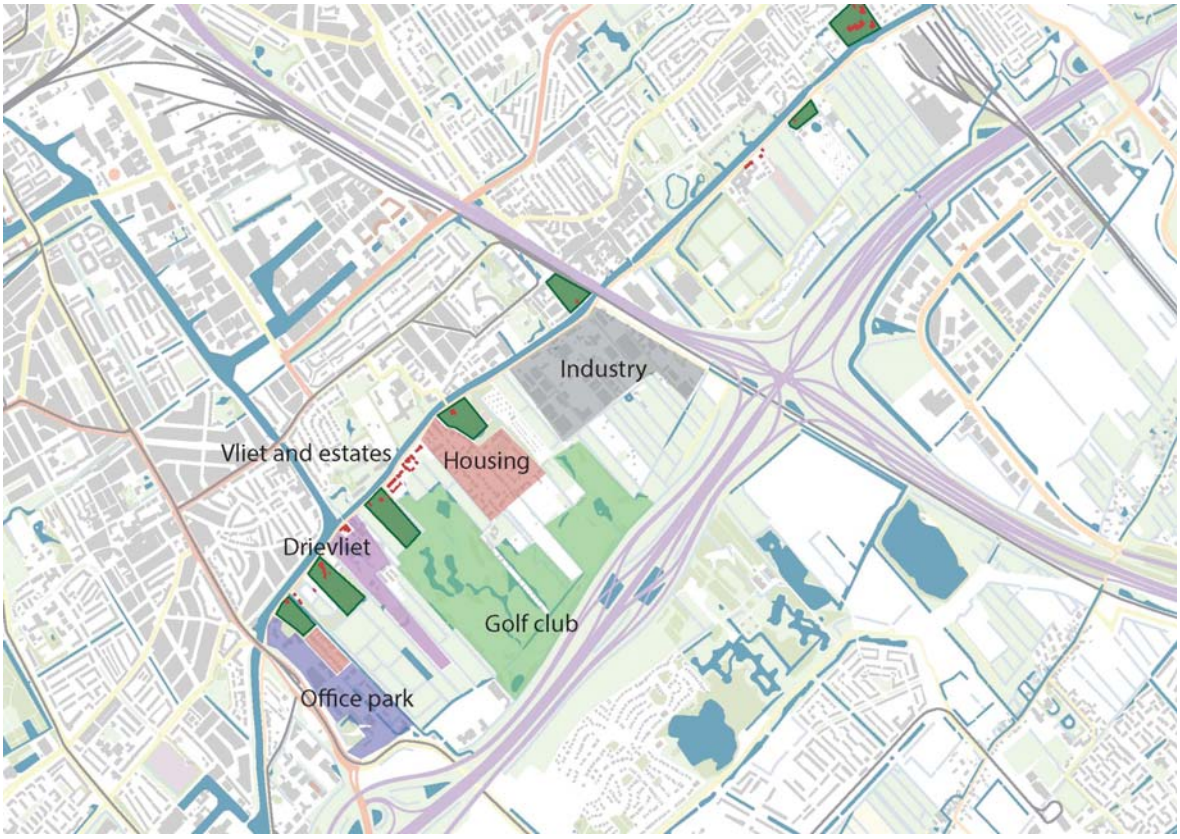
Orientation and function study



TOD density principle



Connectivity of the new Rotterdamsebaan with lightrail focused on TOD nodes



Important locations, functions and structure within the Vlietzone

11

Ordering and structuring

Morphology

The structure of the Vlietzone has dictated earlier development and has a strict repetitive order and symmetry. The fields that span between the Vliet and A4 all have a width of 100 hundred meters and a depth of 100 up to 1000 meters. Within this rectangle a grid of 100 by 100 meters forms a perfect base pattern for planning. Dividing this pattern in half will leave strips of 50 by 100 meters, that form a common housing block size frequently used for the expansions around the city centre of The Hague.

Density

With the underlining structure determined, density is the next important aspect of a TOD oriented design. At the heart of the TOD node the density is highest whereas the further the distance is from the centre the lower the density will be.

The density in the area will determine the amount of dwellings possible in the area. A study into densities and the space each take up has shown that it is impossible to house the state 7000 dwellings inside the Vlietzone without losing its character. A density of 20 dwellings per hectare (d/h) (mostly villas) will not even fit inside the Vlietzone, while a density of 80d/h will result in in a huge tower park. When the amount of houses is reduced to around 2000 an acceptable area can be filled with different densities and till keep the quality of the Vlietzone.

The new high quality public transport line and its stops have a range of 800 meters. Within this area density will vary, outside this the density will be quall to the surrounding city extensions. The density in the Vlietzone is currently 20 dwelling per hectare. Most of the houses are villas and historic row houses. With the new Rotterdamsebaan and the city entrance densities can become much higher. At the centre of the Vliet entrée densities will mimic dense city centre reaching up to 80 dwellings per hectare. Slowly the density will decrease to 60 and 40 dwellings per hectare after 100 and respectively 250 meters.

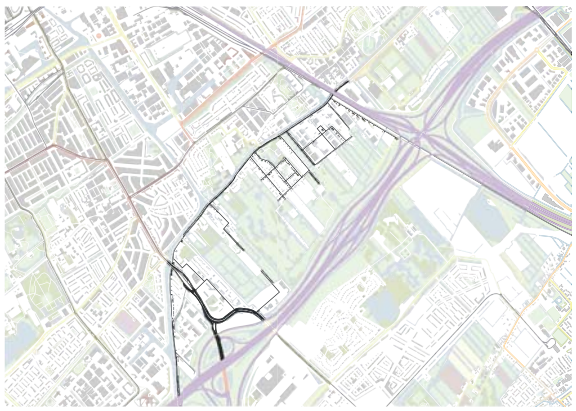
The amount of houses possible in de Vliet entrée is dependent on area size and density levels. The boundaries defined earlier mark out an area of around 50 hectare available for development. Inside the node densities will be at least 20d/h, but mostly 40d/h, resulting in a minimum of about 1500 dwellings. With the increased density at the centre the average density will be 50d/h (between 40d/d and 60d/h), resulting in 2500 dwellings constructed in the Vliet entrée.

Not only housing will be built in the Vliet entrée.

To make a mixed and transit oriented development design, shops houses and industry will be added in the mix. At the centre of the node small shopping facilities will provide services for the new inhabitants and the central area will be a congress centre and educational facility for regional attraction and local possibilities. Next to the highway new industries will create jobs.



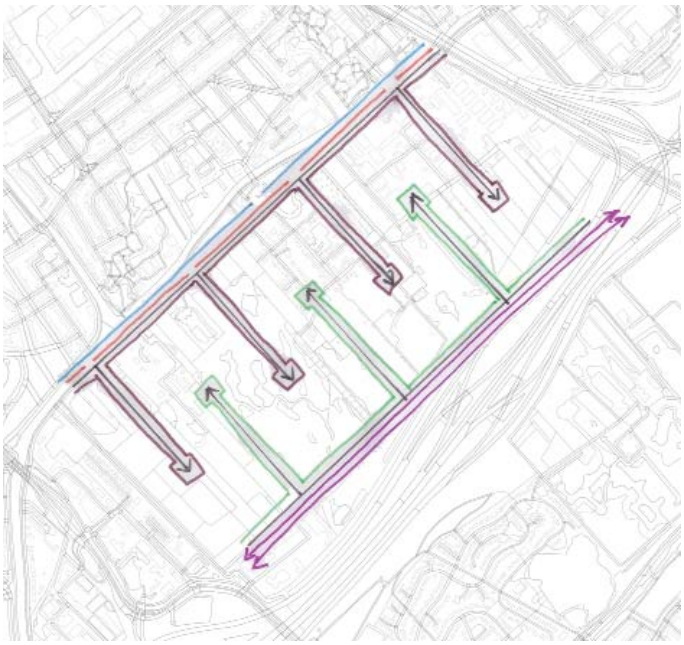
50m wide zones across the Vlietzone



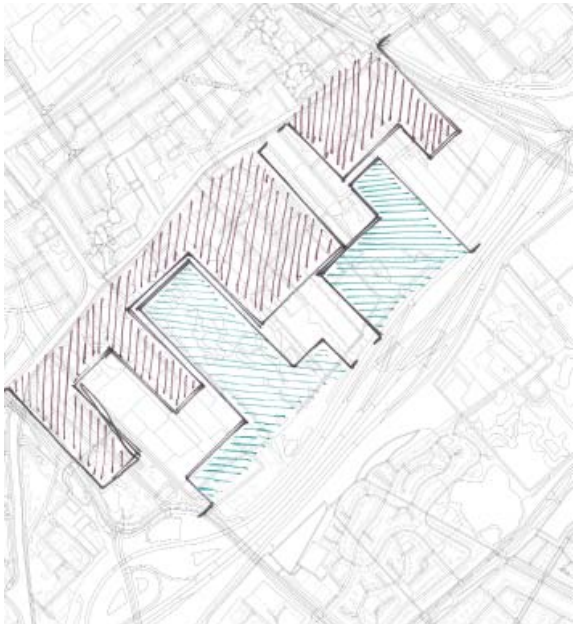
Current road structure



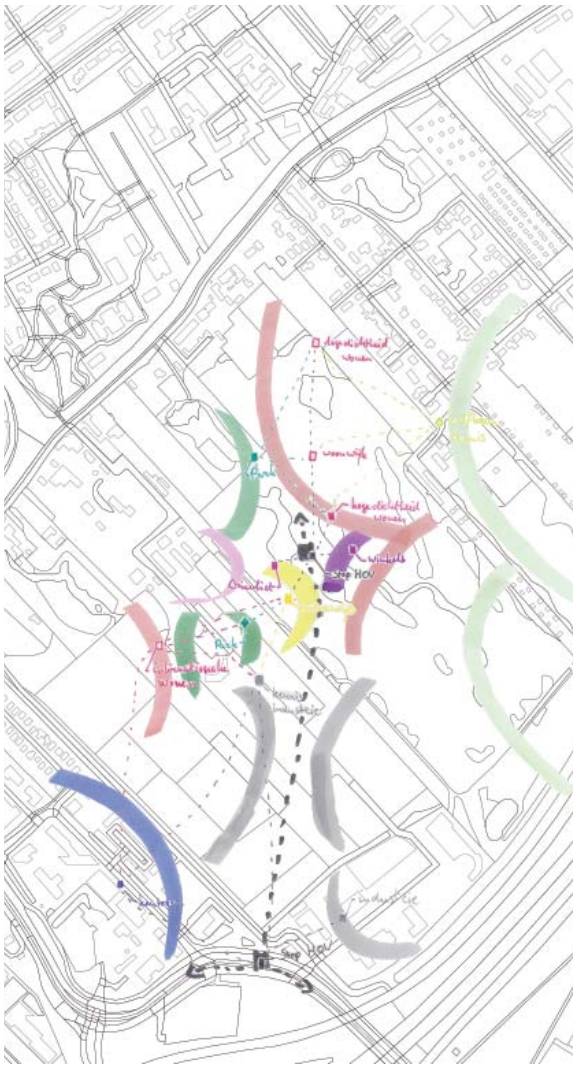
New road structure



Landscape orientation



Landscape structure



Function orientation

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Target groups

A design is not only a result of landscape and local and regional possibilities. It is also the type of inhabitants that form the style of the new plan. For a TOD based design multi-modality is important. Providing living qualities that attract different types of commuters and attractors to the area is a good way to achieve this. This plan focuses on four different groups of people each with his own demands and wishes. Below and to the right are those groups.

Students

The Region around The Hague as a large amount of educational institutions, these create a demand for student housing. Currently there is a shortage of student housing in the Randstad. The Vlietzone and the boulevard along the Rotterdamsebaan form an excellent location for student housing. The new public transport line provides easy regional access and is also at cycling distance from the city centre and educational facilities. This is ideal for de modal demands for the students.

Yuppies

After most students graduate he or she will get a well-paid job. While working in the region, they want to live close to the city centre. Their income allows for more luxurious housing close to public transport to access their regional jobs. Yuppies often preferring high density over low density when choosing their living environment.

Expatriates

The International employees work at the international offices, embassies, shell industry Schiedam and eventually later at the congress centre. The Location of the Vlietzone next to the highway allows them to keep using their automobiles while also provide opportunities for the use of public transport.

Families

The current growth of The Hague increases the demand for houses with a garden within or near the city. The Vlietzone Haags living is an excellent location for this; it has car access while not directly next to a busy regional connector. The location is very natural and has a good cycle connection to the centre of Voorburg. This together creates a good living environment for families.

The Hague

Above target groups focus on inhabitants living in the Vlietzone while commuting outwards. The location itself also functions as an attractor and a sub node in the regional network. The current lack of possibilities to switch transport mode make this node a low access node. The location allows for large range commuting which can attract people and functions towards it. Because it has a lot of passing through traffic it will function as a sub stop for people going home doing groceries or looking for entertainment. But also as a mediator or a central point to meet each other. This flow of people we create a counter flow to the target groups adding to the local quality within the area.



Student:

Housing type:

Small apartment

radius of action:

Local

City

Mode of transport:





Yuppie:

Housing type:

luxurious apartment

radius of action:

Region

City

Mode of transport:





Expatriate:

Housing type:

luxurious apartment, villa

radius of action:

Region

City

Mode of transport:





Family:

Housing type:

Normal house with garden

radius of action:

Local

City

Mode of transport:



11

Local design of the Vliet entree

The design area is structured by a grid. This grid is also divided into 4 different zones each housing their own type of dwellings and type of social economic living quality, based their needed modes of transport. These four neighbourhoods are named; International living, the boulevard, Vliet heart, and Haags Living.

International living

The aim for this area is the housing of employees form international businesses, study and law purposes. These people have most likely a high income and can afford quality housing. Therefore the neighbourhood consist of villas around 150m2 more affordable 100m2 row houses and luxurious apartments of 75m2.

Because expatriates are more car focused than public transport orientate, housing does not need to be next to the public transport stop. Instead an area close to a high way or provincial road is good enough.

By situating this area next to the office park and near the Vliet heart, job opportunities are close by. This will guarantee good access and because of the surrounding buildings and estates, with large natural areas, this location is a pleasant and secluded living area next to a busy node.

The boulevard

With the new Rotterdamsebaan a new access line into the area creates opportunities. The area surrounding the Rotterdamsebaan is suitable for development. The proximity to the highway, industrial area and office park makes this road an ideal development location for knowledge industry. Nearer to the central node housing can replace industry.

The new public transport line creates easy regional access, but due to the high car use of the Rotterdamsebaan the quality of housing will not be the best. The focus on student housing and medium apartments makes constructing high housing density possible.

Vliet heart

The Vliet heart is the central zone of the Vliet entrée. In this area the Rotterdamsebaan becomes a tunnel. On top of this tunnel is the central square, shopping facilities, public transport stop and the iconic congress and educational centre of the Vliet entrée. This area is well accessible by multiple types of transport and can therefore be used for multiple housing densities and social economical classes. In the centre high density towers will mark the core of the Vliet entrée surrounding the central main facilities. Surrounding this is a mix of large houses and some student appartments.

Haags Living

Behind The Vliet heart is space for housing opportunities. This expansion area is a mix of row housing and villas, connecting the new Vliet entrée with the existing houses in Park Leeuwenbergh. This fairly green living area is secluded from the highway and noise from Drievliet by parks. The estates on the other side and golf course opposite to that create a high quality living area for families and young urbanized professionals.

Plan realization

The design of the Vliet entrée is not a plan that is designed for immediate construction. It is a design solution for a possible future scenario and is meant as a guide for development after 2020, stated earlier in this document. This template for future development forms de key development project to further develop de Vlietzone. The most important Factor is the Rotterdamsebaan. This new road is a new artery for The Hague as well as the Vlietzone. By introducing public transport along the Rotterdamsebaan, in form of light rail, future improvements of the regional public transport is guaranteed. Therefor it is u must to build this light rail.

With this double mode of transit possibilities for the Vlietzone arise. The Rotterdamsebaan and the possibility of a local stop form an anchor to initiate local development. It is essential for the Vlietzone to start some development of the Vliet heart and the boulevard. The ring of apartments surrounding the Vliet heart forms an excellent starting point. These houses are not expensive and are focused on car as well as public transport. Also the student housing along the Boulevard can reduce the student apartment shortage for students in The Hague and Delft.

After the first realisation future economic and social development will guide the project. If the predicted growth and international law, in relation with education, grows within The Hague this location can grow in a centre supporting these functions. The plan provides room for an educational facility together with a congress centre. This plan also provides room for new housing development, but these locations are probably not necessary until 2040.

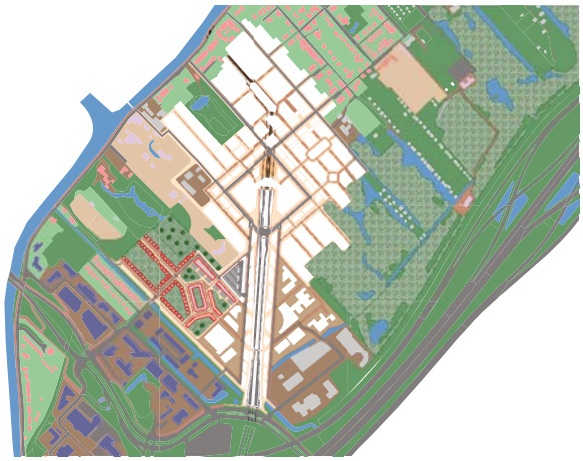


Vliet heart

houses	100 m2
luxurious apartments	75m2
student apartments	50 m2
Campus/congess centre:	
education	20000m2
Retail and schopping:	
shops	8000m2
parking	30000m2
houses	352
luxurious apartments	162
student apartments	166
total	680
area size	8.5 hectare
houses/hectare	80



Yuppie:
Housing type:
luxurious apartment
radius of action:
Region
City
Mode of transport:

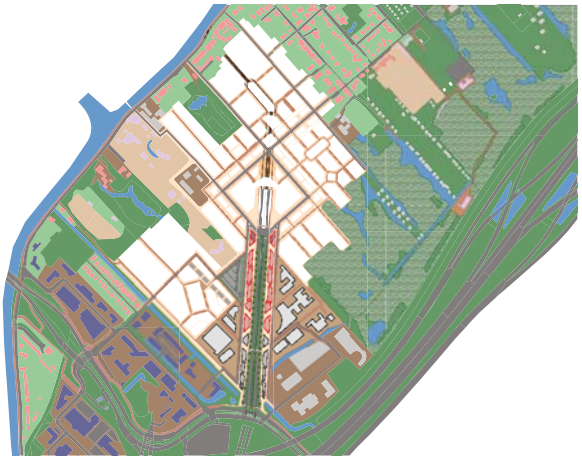


International living

Villas	150 m2
row houses	100 m2
luxurious apartments	75 m2
Villas	72
row houses	146
luxurious apartments	140
total	358
area size	9 hectare
houses/hectare	40



Expatriate:
Housing type:
luxurious apartment, villa
radius of action:
Region
City
Mode of transport:

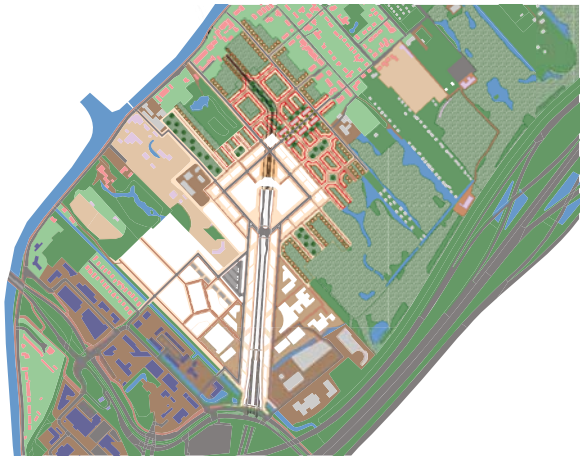


City Boulevard

houses	100 m2
student apartments	50 m2
knowledge industry total:	
research	13000m2
development	8500m2
services	21000m2
houses	215
student apartments	215
total	430
area size	12 hectare
houses/hectare	35



Student:
Housing type:
Small apartment
radius of action:
Local
City
Mode of transport:



Haags Living

villas	150 m2
row houses	100m2
student apartments	50 m2
villas	269
row houses	504
student apartments	260
total	1033
area size	20 hectare
houses/hectare	52



Family:
Housing type:
Normal house with garden
radius of action:
Local
City
Mode of transport:

11



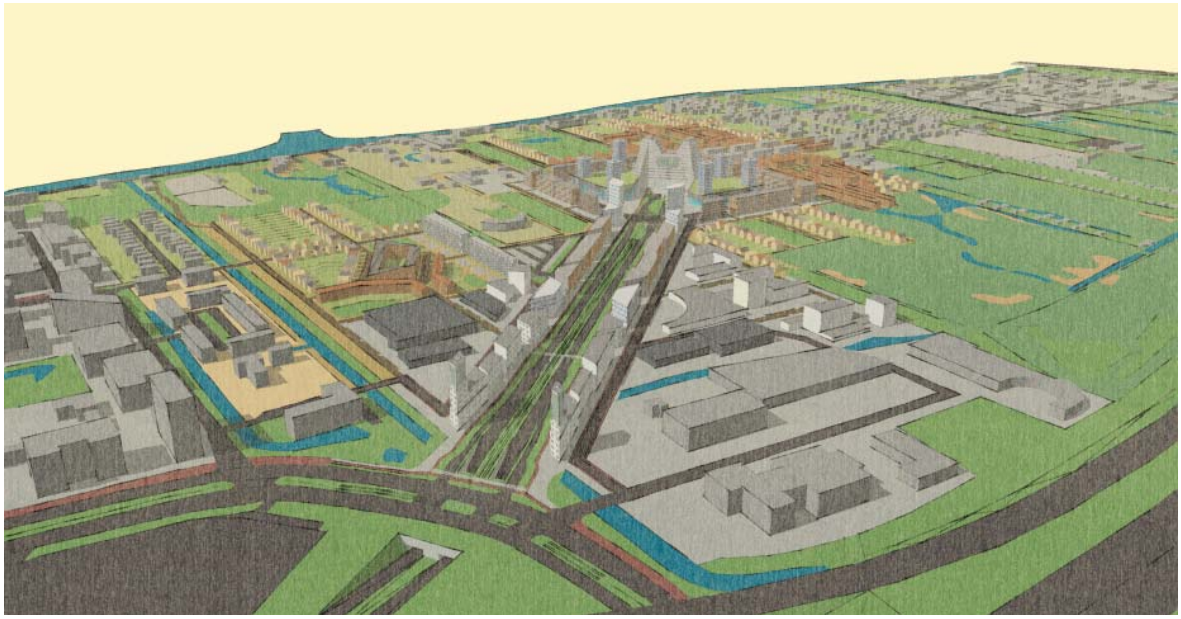


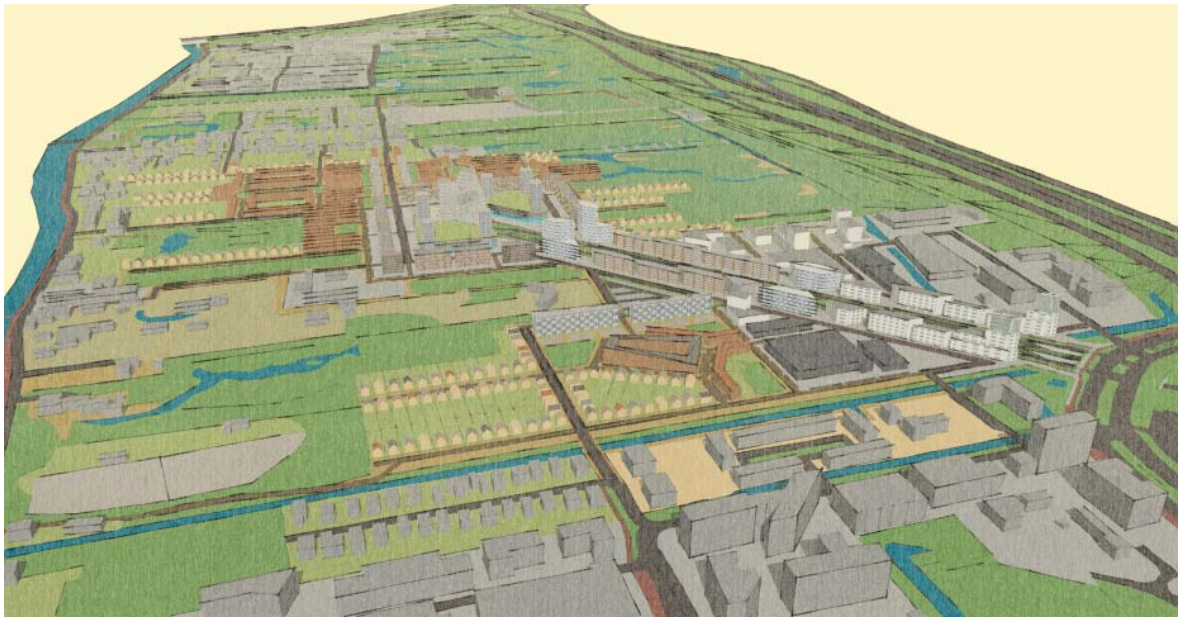
Vlietzone living

villas	150m2
houses	100 m2
luxurious apartments	75m2
student apartments	50 m2
campus	20000m2
shops	8000m2
parking	30000m2
industry	42500m2
villas	341
houses	1217
luxurious apartments	302
student apartments	641
total	2501
area size	50 hectare
houses/hectare	50

11


function
expat housing
student houseing
housing
shops
education
research industry
services
development







11



Location of show impressions



View of the boulevard standing south looking north



View of the boulevard standing north looking south



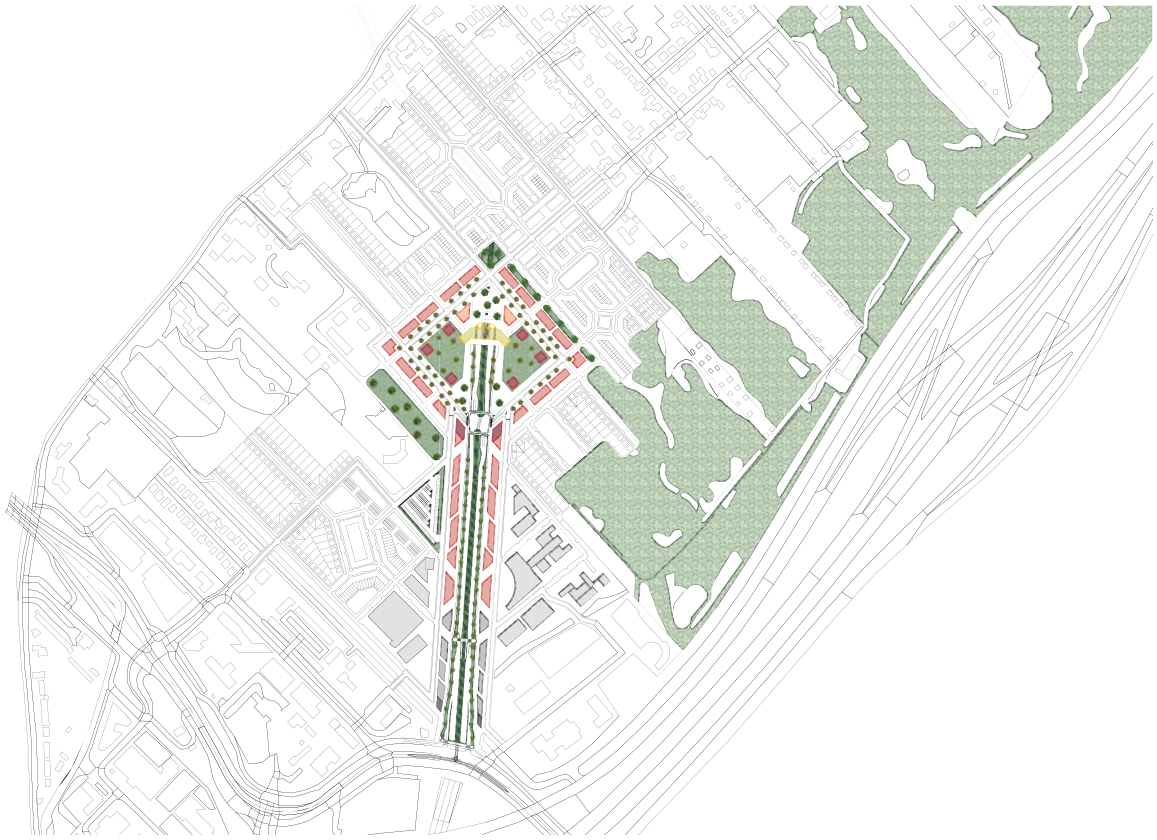


View of the Vliet heart at the park and plaza in the north, looking south. together with the new underground lightrail stop

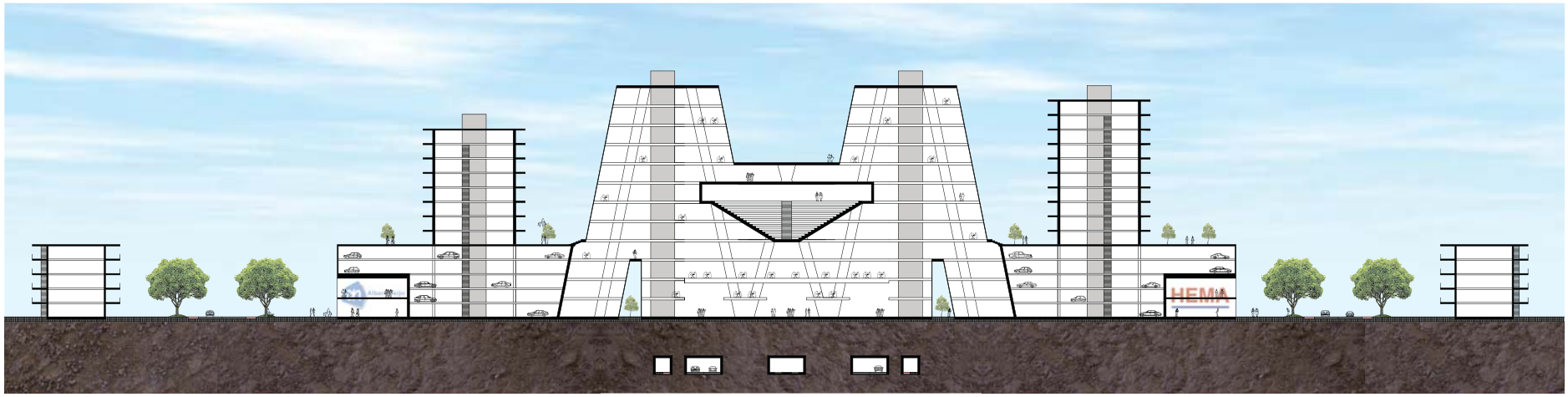
11



View of the Haags living area tovards the Vliet heart



Most important construction areas up to 2020



F Section of the Vliet heart displaying shops, housing and the congress centre/ faculty F’

12. Reflection

12

Introduction

With this graduation booklet almost finished as well as my graduation I use this chapter to look back on my earlier decisions, reflect on them and give comment. I will discuss my methodology and theory, analysis, scenario construction, the design and finally the goals achieved.

Methodology and theory

To construct a good design you need a basis of theory and methodology guiding your design process. My project is no exemption and tries to combine both for a clear guide. The theory was not the hardest part of this process. I am greatly interested in transit oriented development and find dealing with networks of infrastructure and easy guide for designing. The theory used in this graduation project could be a little thorough, but describes the basic needs for a TOD based design. Refraining from focussing on theory only made designing more important and kept the image of research by design more potent.

The Methodology used in all of this has a sound basis, but was only complete after a few months into the graduation process; this made it difficult to focus. Because my basis for research and what I wanted to research was not deveined early on a lot of time was wasted on research not practical or relevant to the subject. Even now the methodology is very broad. In the end I have switch in research direction and focus. Starting from a transit plan for the south-wing of the Randstad, to a transit based design at the edge of the Vlietzone. This is not an ideal process and the uncertainty and lack of focus caused my graduation process to delay and even halt at some points. I should pay more attention to define my goals and results and how to achieve them earlier on in the design process.

Analysis

For my graduation I have analysed loads of different data and information, using different methods and multiple types of analysis. This is the result of an unclear direction and methodology. The interesting this was that I learned a lot about the area even though it was not relevant to my project. This time consuming process must be more to the point in the future. This will leave more time for in debt research and easier design conclusions. The many analysis made during this graduation are still not 100% complete and some still lack a good conclusion. Although they give inspiration and guidance it will not always be clear for an outsider to understand the choices I made. Completion of a research and analysis with a conclusion need more focus in the future to better clarify my design decisions.

Scenarios

This seemed in the beginning a great idea to focus on. The many uncertain futures for the area and different plans for the Vlietzone made a scenario orientated design sound as a good idea. When this is combined with no clear goal, this will lead to an unstructured process. The scale of the project made it hard to define an edge to the project. I have to thank my mentor for keeping me focused and reminding me about the study area.

The current results of the scenario are a hastily assembled mash of information, quickly distilled to make a coherent story about the most likely possible futures. I have discovered that making an in debt research into three future scenarios in a very large area is a waste of time. A more quickly defined result, as I have now, is a better way of picking the most interesting and relevant scenario to develop into a design.

Design

It took a long time for my design process to begin. As I have described before most of the research and analysis took too long. This made the design process a fast track of quick decisions and the least amount of revisions. In the end this worked out quite well. The design has some week points, but has in my opinion a sound foundation and has interesting ideas to further develop upon.

I like the current design, but the fine tuning of the design cost greatly in the quality of this graduation booklet. The level of detail is in some areas a bit too high while others need more attention. This is of course the result of lack of time and my own neurotic behaviour to make this perfect. I think that a lot can still be done with the design and further guidelines must be set within the project to make the design complete. But the current result will suffice to convey my ideas in transit oriented development into a design suitable for this type and useful for the city of The Hague.

Summary

The main problem in my graduation process was the lack of direction. This resulted in a lot of work with no clear results. This affected me greatly and demoralised me much, resulting in a slowing down of the research and design process and even completely stopping the project for a few months. After a slow restart I finally got the mentor attention that I needed to narrow down my focus and begin designing. From this point one the process finally made progress and this booklet is the result of all of this.

In the end I am quite satisfied about the results. Merely because of the fast process of the last months and the design I made. In the future, as always with my projects, I must focus earlier and define a smaller area to work with. My main problem still is that I want to do all and do not have time for that.

To conclude

It has been a long graduation process, with ups and downs. The textual part of my graduation is not the strong part and I think that the design I made is interesting and inspiring. I hope you had a good read and found transit oriented development within a design an exciting subject in urban planning.

Sincerely,

Jomme Rooijakkers

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14. Appendix

Transit oriented development in contemporary transit society

A literature review focussing on the use, trends and planning mechanisms of transit oriented development in network cities.

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9th Graduation Lab Urbanism Conference

February 2nd 2012

Abstract – The change in urban form and movement has shifted from an automobile society into a growing transit society. Sprawl, due to growth, as led to congestion of road and highway, increasing distance and time to travel from peripheral neighbourhoods. The time spent and long distances travelled, made transit an attractive option instead of car commute. Not only housing sprawled, but the economical centres and job opportunities have too. Opening opportunities to combine living and work opportunities.

Arisen to the question on how we, as urban planners and designers, can solve the problem of growth, sprawl and economic growth toward transit. This paper answers the question of the influence of transit oriented development (TOD) on the cities cape, promoting the better use of TOD in current planning. This shows that TOD is a new and inventive tool for planners, governments and transit organisations. Aiming the main spear points on transit nodes with multiple transit connections developing High density, mix-use and attractive business climate.

To achieve this, cooperation with the actors is required, convincing the multiple parties in accomplishing the same goal. Financial investments and bonuses will stimulate developers. Providing regulations for transit corporations to extent transit, resulting in their involvement. Lastly allowing local incentives involves the neighbourhood and de local authorities. With these steps TOD can become an important tool for developing a transit based society

Key words – transit oriented development; transit; urban planning; transit network

The transit network society

The urban fabric has changed during the past century. Our abilities to travel faster and further have us enable to bridge the global gap of distance. The first networks started to arise in 19th century with city lighting. Those little, basic needs networks heralded the start of the larger networks. With the invention of the car came the first large network "take the garage, ... , this became a terminal of the road system."(Dupuy, 2008, p236) The network altered in the beginning of 1970-80. Electric automation of processes en network was the forefront of the new network. The global internet is nowadays the main network on the planet.

With the globalisation and travel changed our urban needs and wishes. "For brevity, we can simply point to the following issues. First, the emergence of automobile dependency and expansion of freeways allowed for further spatial growth and decentralization of the population." (Modarres, 2003, p845) Travel is currently the standard of living. Problems from this are that sprawl complicates travel distance and economic opportunities.

This paper focuses on this transit and how the developments of urban projects improve living quality and local, regional and world accessibility. With the focus on how living and transit, this paper tries to provide a solution at how transit oriented development (TOD) can improve connectivity and accessibility in a polycentric urban landscape.

The need to switch from car to transit is steadily promoted and grows in acceptance. Arising from this is the need to create projects that can combine living and transit in integral projects. Transit oriented development (TOD) is such a method. Starting about fifty years ago in the United States of America it now is widely used. It is now supporting projects all around the world.

With the growth of network related projects, this paper provides the answer to why we need TOD. Explaining what functions it fulfils, how it approaches problems and how it as solved transit oriented development in previous projects. Giving a better insight in solving the growth of cities. At the same time providing better transit access to everyone. Learning the actions and methods needed to make TOD work. Providing a basis for further research and usefulness in graduation projects.

Necessity for better use of transit in city planning

"Polycentric cities are no longer exceptions in the North American urban landscape." (Modarres, 2003, p841) This statement depicts the status of the contemporary city. The shift from the central place theory (Christaller, 1972) to the multi nodal urban fabric is an ongoing process. The traditional methods do not supply a sufficient level of satisfaction to handle the current trends in nodal society and city planning. The central business district (CBD) is still a centre for the congregation of transit, but the defusing of the economical fabric is forcing a different approach. Important factor in this all is that transit is a vital aspect. In this new polycentric landscape, the type of transit is depended on the economic capacity. (Modarres, 2003) In his article he makes a compelling case to implement better use of transit in polycentric cities.

Complementary to the previous statement has been the argument in 'Transit oriented development: moving from rhetoric to reality' (Belzer & Autler, 2002). They state that in the beginning of the 20th century many city extensions were connected by streetcar. Unfortunately this ended in the shifted with the advent of the automobile. Currently many cities across the United Stated have started using new rapid rail and bus connections. Therefore Belzer & Aulter claim; "the type of development known variously as transit villages or transit-oriented development is beginning to receive serious attention in real estate markets as diverse as the San Francisco Bay area, suburban New Jersey, Atlanta, Dallas and Chicago." (Belzer & Autler, 2002, p6) As a result, it is self-evident that TOD can be an upcoming method for revitalizing and restructuring the urban fabric.

At the other side of the world the Chinese cities with their current growth, has forced them to reorganize their transportation methods. Historical centres are at the present time reverting from housing to office, retail and governmental functions. With this ongoing process many citizens, formerly living at the centre of the city are now searching for new suburbs to live in. (Cervero & Day, 2009) This of course has resulted in longer commuting trips and increase in car use, with ecological damage as consequence. Cervero and Day argue that this is the reason that TOD is a great solution to the Chinese problem. Using the current railway and improvements to create mixed use zones and wider job accessibility.

"In other words, public transit could be viewed as an economic development tool for some inner city neighborhoods, whose residents' access to employment is restricted by their level of access to employment subcenters in the region." (Modarres, 2003, p848) Reduction of car use is an important development approach in many American cities, with San Francisco and Los Angeles as the leading cities in this shift from car oriented to transit oriented development. Focusing on three important rules.

As already named, the goal of TOD is the reduction of car use. Secondly it is trying to increase non motorized movement, focus on bike and pedestrians, improves the motivation to take public transport and reduces road traffic. Last, if the trip is motorized, make the distance and duration as short as possible and increase the occupation per vehicle. (Cervero & Kockelman, 1997) Motor vehicle transit is not the only focus. On its own this would never prove to make a sufficient design goal. A mixture of multiple types of transit and development strategies is needed to create integral TOD projects.

The vision behind transit oriented development

To approach TOD and create an integral design method multiple facets of development and transit are needed to solve this question. A simple explanation is that "Transit-oriented development (TOD) is a mixed-use residential or commercial area intended to maximize access to public transportation." (Holmes & van Hemert, 2008, p4) TOD is centred around public transport, utilizing the connective potentials to realize high-density development at its centre. Gradually declining densities are the result of the outward spread of the TOD, retaining an acceptable walking distance of a half mile (800 meters). The goal of TOD is to create a vibrant community that is focused on transit, accessibility and the reduction of automobile trips.

This is supported by Calthorpe who promotes the use of transit to reduce car use. A main difference is that he focuses more on the pedestrian. An important factor in his argument is that the pedestrian is the catalyst to encourage TOD. Calthorpe also promotes the idea of boulevards giving access to the commercial centres and multiple transit possibilities without cutting of the pedestrian. Beside the pedestrian friendly zone an important aspect is 'transit ridership' (Cervero, 2006;, DeCoursey & Athey, 2007) in a TOD zone. The influence of comfortable and safe transportation modes decreases the threshold for commuters to choose public transport. Cervero is going even as far as to state that the choice to use transit is a lifestyle. Those who follow this lifestyle want to live near mixed-use transit centres.

studies show that 52.3% switched from car use to transit use, when moved to a new home within half a mile (800meters) walk within a transit station (Cervero, 1993). Due to the named above "We must develop a new circulation pattern to match the new land-uses – one that accommodates the car as well as transit and that reinforces, rather than isolates, walkable places." (Calthorpe, 2002, p2) Designing for a pleasant climate for transit and pedestrians. But still "TOD is more of a concept than a reality. While TODs are generally nodal in nature, some settings, like Los Angeles, Arlington County, and Minneapolis, are pursuing TOD on a corridor or district scale or even as part of a regional strategy as in Portland." (Cervero *et al*., 2004, p445) TOD always wants to join transit with central development.

All of the authors reviewing, describing or promoting TOD agree to the principal ideas in a certain degree. (Renne, 2005) Names these factors, but starts to question the current value of TOD and if current projects are really TOD worthy. Naming 'transit-adjacent development' (TAD) (Renne, 2005, p5) as a more appropriate term for some 'TOD' project. In TAD the transit still exists, but the design lacks the relations. Where, as we now know that, TOD is an integral project between transit, mix-use, high density, walkable distances, and pedestrian friendly zones cooperating to decrease car use and increase transit, TAD lacks this fundamental integration.

As so many ideas about TOD and the implementation of it differ per project. Some say that throughout the United States not all have been a success. Projects that have been named a success do not specifically use TOD principals but are more TAD. The main problem TOD is currently facing is that there are no clear rules on what makes a TOD project success full. (Belzer & Autler, 2002) A common misconception is that a project, which uses a nearby station or are adjacent to different forms of transit, are transit oriented developed. As there are no guidelines, this can have a negative influence on real TOD projects. Projects that are not TOD can be labelled as such, reducing their relevance and appreciation in the planning and development business.

From their journal Belzer and Aulters' ideas behind TOD are becoming more clear and organized. Many of the above authors suggest that better a specific research is needed. Apparent is the question towards better statistical research and methodology. Describing what TOD can achieve and how to better communicate values to de different actors in creating new neighbourhoods.

Research methods for transit oriented development

In their text DeCoursey and Athey use their findings about TOD to give indications on why and how TOD can be implemented. Unfortunately failing in delivering a flowing article which results mainly in an enumeration of different solutions made by different cities and authors. While not very readable it gives a good summery on what TOD are made of and what is expected

But still "Many projects that fail to provide the full range of synergies and benefits made possible by TOD are proclaimed successes because there is no standard benchmark for success." (Belzer & Autler, 2002, p3) The question that arises is; how can the planning and development sector control standards and how can they provide arguments that underpin the value of TOD? A valuable tool is the method of researching TOD, the methodological aspect of testing the validity and possibilities.

In the article 'A TOD planning model to review the regulation of allowable development densities around subway stations '(Lin & Gau, 2004) they focus on Taipei metro system. Searching for the answer how to measure ratios of floor to site space (RFS) influencing transit ridership and local quality. The method chosen is distinctive for TOD. They use an analytical approach to solving problems, focusing on mathematical equations to solve local problems. The same method is used in (Cervero, 2006;, Shen, 2001) and many others. An advantage of this is that it is easily comparable with other projects. Secondly is this method communicable to the more statistical orientated real-estate and economic sector. In contrast other authors promote questionnaires for transit. Most important is that surveys are an important part, because they provide data that cannot be observed. (Loo, 2009)

The third well known method is case study. Promoting in the article 'Building transit oriented

development in established communities' (Hendricks & Goodwill, 2002) is solely based on this principle. More evident is this in 'Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects' (Cervero *et al.*, 2004). This survey of TOD projects is partially devoted to the relevance of case studies of the mayor TOD projects affecting the view on TOD. Finding the problems like financing, communication and legislative approval.

What is apparent from literature is that TOD areas can have multiple different arguments from multiple points of view. Therefore it is important to know whom you present to. Case studies are guides to use and learn from, surveys are to gain knowledge from the local population and mathematics are more focused on the economical aspect. Not only urban planners and designers need to be acquainted with these methods, also other profession need to be informed. "Seeing to it that policymakers and those in positions of influence are aware of these lessons and that outcomes are carefully and critically weighed is essential to constructively advancing the practice of TOD ..." (Cervero *et al.*, 2004, p464)

Transit oriented development in Practice

Transit oriented development has a high potential for use in cities and regions with a high amount of commuting. These regions having work and housing far away from each other and might profit from public transport opportunities. In this category are many cities that already have a lot of experience with TOD. Learning from their success can help new TOD to successfully develop.

One of the most spread out cities in the US is San Francisco. In 'The San Francisco Bay Area: The Challenge of Creating a Transit-Oriented Metropolis' (Cervero *et al.*, 2004) discuses the extend of TOD used in San Francisco, trying to combat the negative aspects of sprawl within the region. The San Francisco Bay Area has a long standing policy geared towards a better transit orientated region. This is a giant project with coordinated within 9 counties and dozens of transit and housing organizations. Overseeing all of this are a hundred governmental departments.

In cooperation with the metropolitan transportation commission and the bay area rapid transit (BART) they plan to better the transit accessibility. The first incentive was to pinpoint areas of transit and opportunity for investment. After this they introduced the 'housing incentive plan' which encouraged local authorities to develop high density housing. Granting financial bonuses for every bedroom that is created near a main bus and rail transit stops.

A third aspect was to allow local incentives near transit stops and stimulate them, resulting in an increase in transit ridership in that neighbourhood. But without investment from larger companies most development will not take hold. Therefore the region decided to include profit and non-profit developers. The profit organisations would build for the marked demand and the non-profit with the aid of legislative subsidy for affordable homes. The success of San Francisco is that through positive political approach and local incentives, developers are eager to exploit transit areas and promoting its use.
The other scale of the sector is Dallas, much smaller in size and different structure, it has also a differ approach to TOD. The recent construction of the light rail in Dallas has not a big history in TOD, but in the recent years this has changed. Evaluated in 'Dallas: Using TOD to Create Place and Value in a Sprawling Metroplex' (Cervero *et al.*, 2004). They give credit to Dallas area rapid transit (DART) for involving in; creating connections and making transit more easily. DART has gained the authority to build and develop station areas. Most of these projects are still transit adjacent. But the Mockingbird station is an exemption from TAD, therefore an example of a good TOD project.

That the Mockingbird station became a success has three reasons. The station has multiple connections. With as main connector the rail way, this is supported by a light rail connection and a rapid bus connection. Secondly a local mix-use of entertainment, commercial, office, housing and adjacent education facilities provides capacity to capitalize the multiple connectors. As third influence, the investments made by the new businesses and positive response from the Dallas authorities. These factors resulted in a project that from 1998 on has grown and has been invested in to increase its orientation towards transit ridership.

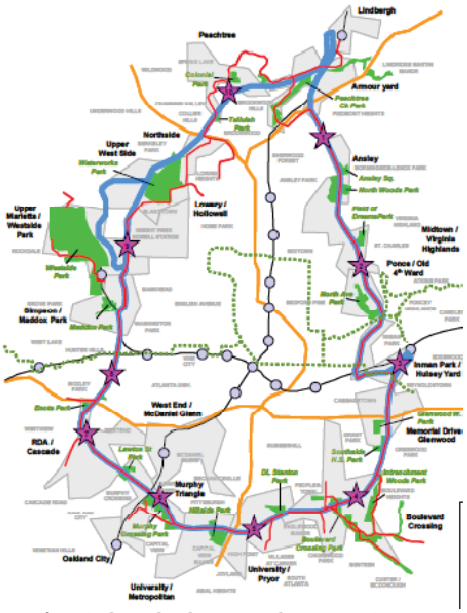

Figure from (Atlanta development authority, 2006)

Another recent started project is the Atlanta beltline. Not jet finished, this is a project that looks promising. Using the old industrial areas and rail tracks to create a light rail ring around the circle to activate the isolated areas. The places where the existing transit lines flowing out of the city intersect with this new line, new nodes will be developed, creating an intricate network. (Atlanta development authority, 2006) This TOD project in Atlanta might facilitate the use of TOD on an even larger scale.

Not all TOD oriented projects will have at first the desired outcome. A good example of this is the extension of the west rail in Hong Kong. Expectations were that 340,000 daily trips would be made. But after finishing the project only one-third of this number was reached daily. Only after lowering the transit fares started this amount to increase, effectively it over the following four years. Showing that not all TOD projects are successfully even in a transit oriented society like Hong Kong. More is needed that only a new transit stop.(Loo, 2009)

Conclusions

In the previous chapters we have discussed; necessity, vision, methodology and applications for TOD. From this we can distil the most common approach. We have looked at the multiple aspects of TOD so that we can finally answer our questions stated earlier.
We have learned that in the current network society there is a need for projects that build upon the demand for housing that is close to transit. This demand is the result of congestion from car orientated urban design of the previous century.

Second reason is the increase in size of cities. The peripheral extensions are too far away for pleasant commuting. TOD can solve this by creating central points, in a new or existing network, where jobs and housing are easily accessible by transit.

But planning an area focused on TOD is more that building next to a transit stop. There are a lot of details you need to pay attention on. Research into the area, Gathering data about current transit, trips, inhabitants, housing and job opportunities is the first step. After which case studies and survey can guide the project further.

In realizing TOD it is important that the leader in the project can guide governmental vision, transportation companies and real-estate developers towards the same goal. Supplying the area with financial investment and bonuses for developers. Whilst listing to local initiative and demands, to better involve the people living in the area. This will have as affect that the inhabitants of the affected area will take transit on their own initiative.

To conclude; “Transit-oriented development should be both place-based and market-oriented. It needs to work for communities and for people, for employers and for employees, and for all those who are keeping an eye on the future such as planners, civic and community leaders, and politicians.” (Belzer & Autler, 2002, p28)

From this paper I want to use the knowledge gained to better comprehend the A4-Vlietzone in The Hague. Using the information gained about TOD to guide my graduation project. Designing an extension of the neighbourhood as a better and a more on transit focussed; transit orientated development.

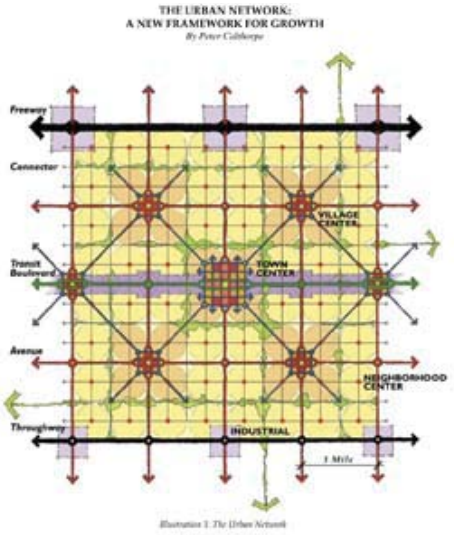

Figure from (Calthorpe, 2002)

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