REVITALIZING THE HEART OF ROTTERDAM
INCREASING INNER CITY VITALITY IN A POST-WAR RECONSTRUCTED CITY

MASTER THESIS
ARD JAN WOLTERS

GRADUATION STUDIO URBAN REGENERATION
MASTER URBANISM TU DELFT

JULY 2013
REVITALIZING THE HEART OF ROTTERDAM
TOWARDS A VIBRANT INNER CITY

MASTER THESIS

Author. Ard Jan Wolters
e-mail. ajwolters@gmail.com
Student number. 4104439

Keywords
Inner city revitalization, urban vitality

Mentor team
Ir. J.A. Westrik (Urban Design)
Drs. H.J. Rosenboom (Spatial Planning & Strategy)
Ir. S. Steenbruggen (External committee member)

Faculty of Architecture, Delft University of Technology
MSc Architecture, Urbanism and Building Sciences
MSc track Urbanism
Graduation studio: Urban Regeneration in the European context
Graduation studio leader: Dr. ir. P.L.M. Stouten

This thesis is downloadable for free from the TU Delft library
website: http://www.library.tudelft.nl/collecties/tu-delft-
repository/

Delft, 1-7-2013

Cover image and backflip: Coolingsel in Rotterdam
source: Gemeente Rotterdam, edit by author
For my graduation I chose to study Rotterdam, the city where I currently live and enjoyed a large part of my education. Here I am experiencing daily urban life and observe interesting spatial complications which I wanted to delve deeper into in order to show my competence as an urbanist. After I had passed my first year of urbanism at the Delft University of Technology, I entered the graduation year with my bag of knowledge and my personal fascination, being public space and its influence on the image of the city. I would like to thank my mentors, John Westrik and Herman Rosenboom, for guiding me through the graduation year. Furthermore I would like to thank my girlfriend and family for the support they gave me during this graduation year.

Ard Jan Wolters
July 2013, Rotterdam
CONTENTS

Preface

1. Introduction 8
   1.1 Problem statement 11
   1.2 Project aims 20
   1.4 Research questions 21
   1.5 Relevance 22
   1.6 Methodology 23
   1.7 Thesis structure 24

2. Theoretical framework 27
   2.1 Introduction 28
   2.2 Literature review 28
   2.4 Conditions for inner city vitality 30
   2.5 Conditions for pedestrian quality 32
   2.5 Conditions for street quality 34

3. Spatial analysis 37
   3.1 Historical analysis 38
   3.2 City center policies and projects 46
   3.3 Public space projects 48
   3.4 Building projects 50
   3.5 Alternative buildings projects 56
   3.6 Definition of center 58
   3.7 Main spatial issues 59
   3.8 Car domination 60
   3.9 Fragmented inner city 64
   3.10 Lack of activity 68
   3.11 Lack of human scale 71
   3.12 Lack of attractive public space 73
   3.13 Conclusions 75

4. Comparable cases 77
   4.1 Comparable examples of boulevards in other cities 78
   4.2 References of public spaces in other cities 88

5. Vision 94
   5.1 Vision concept 94
   5.2 Extending city wide park+ride concept 98
   5.3 New parking and road networks 99
   5.4 Improved pedestrian connections 101

6. Design 105
   6.1 Improving Coolsingel 105
   6.2 Characteristics of Coolsingel 106
   6.3 Existing problems 108
   6.4 Design goals 110
   6.5 Concept 111
   6.6 Existing versus new profile 115
   6.7 Design proposal 116
   6.8 New terraces for leisure activity 118
   6.9 Relocation of trees 121
   6.10 Design aspects 122
   6.11 Impressions 127

7. Conclusions and Reflection 133

Bibliography 136

Sources 137

APPENDIX 1 - REVIEW PAPER 139
1. INTRODUCTION
Perhaps the most intriguing city in the Netherlands is Rotterdam. Situated in the Randstad conurbation, Rotterdam is the second largest city in the Netherlands, with a population of 617,424 (OBI, 2013) and has the fourth largest port in the world, which provides for 3% of the Dutch national income and 12% of the regional employment (Havenbedrijf Rotterdam, 2012). In 2013 the first phase of the second Maasvlakte port extension will be completed. When completed, this extension will add approximately 20% of volume to the existing port and as the only harbour in Europe it will provide room for the largest ships in the world. Since 2009 the city is also well connected by a high-speed train network to Schiphol, the main airport of The Netherlands, and to Antwerpen, Brussels and Paris. With this high-speed train the distance to Schiphol is merely 20 minutes and roughly 2.5 hours to Paris. These recent developments provide interesting economic perspectives for the city of Rotterdam. With strong regional and international connections, economic potentials are growing (EDBR, 2012).

In spatial terms, Rotterdam has had a rather different course of development compared to most other Dutch cities. The city center was almost completely wiped out by Nazi-Germany in the 2nd World War. Already during the war it became clear that the old historic Rotterdam was not to be reconstructed. Instead, construction of a new center with modernistic ideals was preferred, in which functions were mostly separated and the emergence of the automobile received great priority. Today we can see the results of the path that was chosen in the years after the war. The inner city is clearly structured, modern and rich in post-war and postmodern architecture.

However, Rotterdam is struggling with its image. The inner city is relatively vibrant during the day, with a large shopping center and a large number of jobs. However, as a result of the separation of functions, after working hours many people leave the center to go back to the suburbs of Rotterdam. This results in a rather abandoned city center in the evenings, except for a few nightlife hotspots. Is this the result that was intended? Or could the center of Rotterdam be improved, to become more than a functional place for shopping and working? If so, how can we improve the image of the city to attract more people and businesses to the city, in order to make the city more vibrant and alive during different times of the day and to increase its economic strength for the future? These questions are the driving forces behind the graduation thesis.

The research firstly is intended to investigate what the main issues of the inner city of Rotterdam are. Secondly, spatial criteria for improving the inner city of Rotterdam have been derived from literature study. Ultimately the goal is to find spatial solutions for the city center to become more attractive, which is necessary to attract more people and businesses, in order to become more lively and economically viable in the future. This master thesis consists of a problem statement, aims, research methodology, theoretical framework, a spatial analysis, a reference study, vision and design and lastly a reflection on the whole thesis.
1. Introduction

Map by author, based on European Commission (2008)

2.37h
2.59h 1.23h
0.40h
3.58h
6.38h

Completed
High Speed Train Network in 2020

Planned

Growth of the Port of Rotterdam
Source: Havenbedrijf Rotterdam (2013)

+24% € 114 mln
2007

+31% € 149 mln
2008

-3% € 144 mln
2009

+7% € 154 mln
2010

+27% € 195 mln
2011

+17% € 228 mln
2012

Position of Rotterdam in the Netherlands
by author, based on Openstreetmap

€ 154 mln
2011

€ 228 mln
2012

€ 144 mln
2007

€ 149 mln
2008

€ 154 mln
2009

€ 195 mln
2010

Source: Havenbedrijf Rotterdam (2013)
Rotterdam in 1930 and 2010. Source: Gemeentearchief Rotterdam and Flickr.com
1.2 PROBLEM STATEMENT

Rotterdam is a city with significant economic potentials. The new Central Station, the new port extension, the new highway connection to The Hague (A4, Midden-Delfland), all provide better connectivity and therefore interesting opportunities for more commercial activity, more jobs, more people. 

On top of that, research (PBL, 2011) shows that cities in the Netherlands are continuing to grow. CBS (2011) estimated that the population of the Netherlands will continue to grow until 2040. Most of this growth will take place in the Randstad area, whereas population in peripheral areas of the country will only decline. PBL (2011) predicts that the four large cities in the Randstad will continue to grow, but not at an equal rate. Due to their socio-economic strength, Amsterdam and Utrecht will grow faster than The Hague and Rotterdam, with 110.000 and 80.000 versus 55.000 and 45.000 inhabitants respectively (CBS, 2013; OBI, 2012). According to PBL (2011) a large percentage of growth is expected to exist of younger people who seek to settle in the city. This is combined with a continuous growth in the number of households. In Rotterdam the number of households is expected to grow by 25.000 until 2025 (PBL, 2011). Both of these trends demand a great number of new houses to be built in existing Dutch cities. These numbers also suggest that cities are becoming more important in the coming decades. However, as PBL (2011) and EDBR (2012) conclude, Rotterdam's growth rate is lower than that of Amsterdam and Utrecht because of the lack of attractiveness for higher educated people. One of the reasons is the lower attractiveness for living compared to Amsterdam and Utrecht (OBR, 2011; EBDR, 2012).

According to Marlet (2009) the increasing popularity of cities is mainly caused by the presence of good inner city facilities and historical value. The latter is where Rotterdam might fall behind with other Dutch cities, however, the modern style of Rotterdam might also be positively contributing to city popularity. In any case, according to research by IAB (2011), in their future scenarios, an attractive inner city of Rotterdam strongly determines the future economic strength of the city.

1. Economic viability of the city

Although the economic growth of the port of Rotterdam has been considerable in the recent years (Havenbedrijf Rotterdam, 2012) the city is still behind in overall economic development, compared to Amsterdam and Utrecht (OBR, 2011). The figure below shows Rotterdam is especially lagging behind in living environment, and prosperity of its inhabitants (OBR, 2011).

Research by the Economic Development Board Rotterdam (EDBR, 2012) states that cities are becoming more important as economic forces for the region, who attract people and businesses, which makes the image and attraction of the city of paramount importance for its economy. According to EDBR (2012), economic success of cities is determined by production factors (in particular employment) and consumption factors (housing, cultural, retail, leisure etc.). EDBR (2012) states that Rotterdam is lagging behind in its consumption sector and mentions the municipality has better opportunities to invest in consumption factors, for example an attractive housing stock and public space, 

Vitalityweb of the four major Dutch cities

The population of Rotterdam is expected to grow to 660.000 within 20 years. Source: EBI (2012)
than to invest in employment, since the latter is much more difficult to influence with policies. The EDBR (2012) also predicts that a better and larger housing stock and attractive public space will eventually lead to more employment, since more higher educated people would be attracted to live in the city. This should also lead to more businesses settling in the city as a consequence of a higher quality workforce.

Rotterdam is leading several other negative lists in the Netherlands. The city's population has the lowest educational level of all four major Randstad cities (OBR, 2013; diagram right). Rotterdam also has the highest poverty rate and highest unemployment rate (9.5%) of the four major cities (CBS, 2012). A higher educated population is one of the key factors for businesses to settle in the city. According to research by CBS (2011) higher educated people earn twice as much as lower educated people. Consequently they also spend more money on inner city facilities.

Current city policies are more intensely focused on attracting wealthier, higher educated, target groups to the city (Stadsvisie, 2007), in order to become more economically viable. This is however going at a slow pace because of the lack of attractiveness for that target group (EDBR, 2012). Rotterdam ranks 18th in the country on the subject of ‘attractive for living’ (Atlas voor Gemeenten, 2012); far behind the leading cities Amsterdam and Utrecht.

The EDBR (2012) states that the quality of the city center should be a priority, since this is where the image of the city is established. The EDBR (2012) continues that a strong and attractive inner city will grant much more economic spin off for the rest of the city and region: a good inner city works as a multiplier for the city economy.

2. Spatial issues of the city center

Before 1940 the center of Rotterdam was inhabited by over 80,000 people who occupied about 24,000 homes (Van de Laar & Van Jaarsveld, 2006). Today the now enlarged city center houses only 30,648 people in approximately 17,500 homes (OBI, 2013). If we compare the city center from before World War Two to the same area in the current situation, it now houses around 11,000 people in around 7,000 homes (OBI, 2013). This difference is recognizable when analyzing the city. The old historic city center was known for its vibrant urban life, both economically and culturally (Van de Laar & Van Jaarsveld, 2006). However, at the start of World War Two a heavy bombardment by the German Luftwaffe destroyed almost the entire historic center. During the war, plans were made for the reconstruction of the center. In 1946 the modernist plan of Cornelis van Traa was adopted by the Mayor and Executive Board. This moment marked the foundation of today’s inner city of Rotterdam. The old center was not to be reconstructed, instead it would be completely rebuilt with modern principles. Nowadays, the inner city experiences a number of issues as a result of the reconstruction plans, which are frustrating its image towards the public.

Domination of traffic boulevards created fragmentation of the city center

The wide traffic boulevards that were built after WWII gave priority to automobile traffic, like Weena, Coolsingel and Blaak. This resulted in a city center which is easily accessible by car. However, the

Higher educated population in 2002 and 2011

<table>
<thead>
<tr>
<th></th>
<th>Rotterdam</th>
<th>The Hague</th>
<th>Amsterdam</th>
<th>Utrecht</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>26%</td>
<td>34%</td>
<td>48%</td>
<td>51%</td>
</tr>
<tr>
<td>2011</td>
<td>36%</td>
<td>40%</td>
<td>57%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Source: OBR, 2013

Two examples of traffic dominance and barrier effect of main boulevards Coolsingel and Blaak. Source: by author.
Consequence is that these boulevards separate different parts of the city center from each other, making crossings difficult for pedestrians and creating borders between parts of the center (Gehl, 2007).

Separation of functions has led to a dull image and lack of mixed activity
The modernist plan of Van Traa also resulted in a center with mostly separated functions. Several concentrated streets were designated to be shopping streets or office streets. Just a few neighborhoods around the shopping and business core were designed to be mixed with residential units, much less than in the historic situation (Van de Laar & Van Jaarsveld, 2006).

For years, the city center has been an area with low housing densities. It has always been a predominantly business- and shopping area. The partial separation of functions has led to quiet shopping streets in the evenings and somewhat bleak monofunctional office areas (Gehl, 2007), rather similar to American ‘downtown’ city areas. This resulted in a rather negative image of the city center as being ‘dull’ and ‘empty’ (Hoogstad, 2011; image top right). Many central streets are quiet outside working hours, because of the monofunctionality (i.e. shopping or business) (Hoogstad, 2011; image top right). This makes shopping streets like the Lijnbaan and Koopgoot feel unsafe and dull in the evenings.

On top of that, due to the economic crisis the vacancy of office buildings in the city has risen to 14% (EIB, 2012), 6% above healthy vacancy levels, which is resulting in increasingly unused spaces in the city center (Kouwenhoven, 2012; image right). The effect of this is worsened since the parts of the center that are monofunctional office areas become even more quiet due to rising vacancies. This raises the question how these buildings can become less dependent on one function.

It should be noted that recent policies of the municipality are propagating a turn around of the monofunctionality. As a result, in the recent decade, a number of residential projects have been built or planned to increase the mix of use in the city center and make it more lively. It is also being stimulated to make street plinths more diverse and active during the whole day, in order to increase liveliness and mixed activity. This is a slow process of improvement, which is very dependent on the economic situation, but also on the attractiveness of a location for new functions to settle.

Low population density is an important contributor to lack of liveliness, but new investments in mixed used streets are less significant due to crisis.
Only 5% of Rotterdam’s population lives in the city center (EIB, 2012), whereas other Dutch cities like, for example, Amsterdam have about 10% of the total population living in the inner city (Stadsonwikkeling, 2012, see next page for a comparison). The consequences of the low amount of inhabitants is related to the separation of functions. The inner city areas that are populated are often not mixed with the shopping areas and business district, which reduces liveliness and activity in those streets outside working hours. This problem has also been recognized by the municipal planning department. Since 2008 the city policy is actively stimulating growth of the inner city population, but this process is going at a slow pace (EDBR, 2012, next page, image top).
**Population density: Rotterdam vs. Amsterdam**

The center of Rotterdam has a much lower population density of 6,321 inh/km² compared to Amsterdam’s 10,451 inh/km². If Rotterdam’s density were the same as Amsterdam’s, its center would have about 50,271 inhabitants (some 20,000 more).

**Growth of inner city population 1994-2011**

The number of inhabitants in the city center is growing at a rather slow rate. Source: EDBR, 2012

**Production of new inner city dwellings 2000-2009**

The number of built housing program in the city center between 2000-2009. The graph suggests the growth is not significant. Source: EDBR, 2012
Former urban planner from the Vancouver municipality, Larry Beasley, advised Rotterdam to be built at least for 50,000 new inner city inhabitants, in order to drastically increase activity and vitality. This huge assignment is however in jeopardy since the economic crisis started. Apartments are still being built, but prices are relatively high, and the economic recession and quite low attractiveness to live in the city center hold back the growth of the inner city population (EDBR, 2012). On top of that, the number of residential mixed-use building projects that are now being developed is dropping drastically, because of the recession. This means the chance to drastically increase the number of inhabitants in the center within the next decade is not significant. This raises the question how to increase liveliness and activity in the meantime.

Along with this, more and more facilities in the center are in difficult economic circumstances because of a reducing amount of customers. This is partly due to the economic recession and partly due to the changing market towards online sales (Brakman & Witteloostuijn, 2012; image bottom left). It is expected however, that online sales will never substitute physical shopping. Increasing attractiveness of inner city facilities and public space can still attract new people to the center (Gehl, 2007; EDBR, 2012). This is an increasingly important task for cities in the future, since the increasingly online society demands cities to be more innovative and attractive, in order to make them interesting for people to visit and stay. Chances are to make shopping more of an attraction, something special beyond internet shopping. Therefore it is vital to offer something extra in the city center. According to Jan Gehl (2010) public space improvement strategies can drastically improve the quality of residing in city centers, which creates more incentive to visit the city and stimulate shopping and leisure activity.

- Lack of human scale and attractive public space to attract more people and invite them to stay longer in the city center

In recent decades, to densify the monofunctional urban fabric and increase the image of Rotterdam as an architecture ‘postcard’ city (Gehl, 2007), many large scale and high-rise buildings have been constructed, which do not contribute to the human scale on the street. These large buildings result very much in a windy and shadowy environment and many of the high-rise are without proper plinth functions, resulting in boring groundlevels and non-attractive windy and shadowy public spaces. This created an environment less attractive for humans to stay in. IAB (2011) concluded: Rotterdam has breathtaking architecture and should be proud of that achievement and build on the ensuing reputation. However there is a lack of cohesion between the beautiful architecture. There is too much focus on architecture and not enough on urban design and on the human scale. The city does not need projects, but places. Real ethnographic understanding is needed. How do the residents, businesses and visitors want to use the spaces between the buildings?

The need for smaller scale, human friendly buildings and public spaces is rising. Buildings that interact with the groundlevel contribute more to the life on the streets (Gehl, 2000). Attractive, comfortable and sunny public spaces contribute very much to lively streets and activity in the city center. The need for improving important public spaces in Rotterdam is still very much present.

The public space overall lacks quality, which has negative effects on the image of the city (EDBR, 2012; Gehl, 2007). Especially public spaces like the main boulevards Coolingsel and Blaak are lacking quality and form large barriers in the city center (Gehl, 2007). The local government has implemented policies (Binnenstadsplan, 2008) to improve the quality of public space in the inner city, also known as ‘The City Lounge’. Many parts of the center have been improved since this policy was introduced. However there is still a lot of work to be done in this field. For example, the main boulevard Coolingsel is the central boulevard of the city, but is mainly used by through traffic and does little to contribute to attractive spaces for people to stay (Gehl, 2007). Pedestrian spaces in the city overall lacks the quality and human scale to invite people to stay longer and recreate (Gehl, 2007). In recent years, spaces like the Lijnbaan shopping street and the Meent have been improved. We can see a drastic improvement in use of the street, especially in the Meent, which is very much a mixed street. This example confirms the added value of an attractive public space.

Keeping in mind that the number of residential/mixed-use buildings in the center will not drastically increase in the next decade, the quality of public space to invite people to stay longer in the city center, will be vital to increase activity and liveliness in the inner city.

SUMMARY

With an expected growing city population, growing number of households and an optimal international position as a port- and services city, Rotterdam has many potentials to become more lively and economically viable. However, the inner city image and quality are lagging behind to benefit optimally from this perspective. The city center defines the attractiveness of the city towards the public, and is therefore of vital importance for the economic strength of the city. The center of Rotterdam, however, is dominated by wide traffic streets which separate parts of the city center. On top of that, very central streets in Rotterdam are still monofunctional places which lack the diversity of use to stay lively during the whole day. Governmental interventions to increase liveliness in the center are in process, but since the economic crisis it has become very difficult to drastically increase the number of mixed-use buildings and add residential housing to increase activity in the streets.

This is why another focus is necessary to increase liveliness and activity in the city center. The opportunity lies in the lack of attractiveness of the public space. Many places of potential in the city center lack the quality and human scale that is necessary to invite people to stay and create the dynamics of people interacting with each other. Attractive public space can increase the amount of visitors and extend the period of residing in the city, which is good for commercial and cultural facilities. Eventually, good quality and image of the city center is vital for attracting new people and inhabitants, businesses and investors. If nothing is done, Rotterdam might lose the competition between Amsterdam and Utrecht, and stay behind in socio-economic perspective.

This raises the question how to achieve a more vital and attractive city for people to stay, live and work, in order to attract new people and businesses and become more economically viable. In spatial terms; what are the spatial conditions that are essential for a city to be vital and attractive? This thesis is intended to find out.
Coolsingel

Blaak
Car traffic is dominating main streets.

Automobile received priority in reconstruction plan after WWII.

Lower educational level of inhabitants.

Lower population prosperity.

Low city attractiveness.

Spatially, large scaled buildings often have poor relation with groundlevel and cause inhuman environments.

Socially, lower population and prosperity lead to lower educational level of inhabitants.

Human scale in main streets is lacking, contributing to low city attractiveness.

Car traffic dominates, indicating automobile received priority in reconstruction plan after WWII.
1. Introduction

- Lack of good and attractive public space for people to stay and recreate
- Businesses prefer higher educated population
- High education population
- Higher educated prefer Amsterdam and Utrecht
- Not enough jobs for higher educated
- Negative city image
- Low city attractiveness
- Monofunctional streets, quiet & unsafe evenings
- Low amount of inner city inhabitants
- Partial separation of functions in reconstruction plan after WWII
- Former lack of public space investments
- Small inner city housing program
- Lack of activity and liveliness
1.3 PROJECT AIMS

The general aim of the project is to do research into solutions for improving the quality and image of the inner city of Rotterdam. The purpose of this is for the inner city to be able to attract more people and businesses, which is necessary to increase inner city vitality and economic viability in the future.

The main research aim is to identify, through literature, the spatial factors that improve the image or quality of the inner city. This aim contributes to the body of knowledge at the university relating to conditions for city quality and what can be achieved in socio-economic aspect by the implementation of those conditions.

The main design aim is to identify weak spots in the urban structure and to make a smart design proposal for a crucial weak spot in order to achieve maximum effect of improved city quality.

INCREASING INNER CITY QUALITY + ATTRACTIVITY THROUGH SPATIAL CONDITIONS

TO INCREASE THE IMAGE OF THE CITY

TO INCREASE THE CHANCE THAT NEW PEOPLE AND BUSINESSES WANT TO SETTLE IN THE CITY CENTER

IN ORDER TO INCREASE INNER CITY VITALITY AND ATTRACTIVENESS

AND CREATE A MORE VIALBE CITY ECONOMY
In order to perform the research a main research question is defined. This question is then divided into different subthemes that support the general research. The goal for this project is to find solutions to make the city center of Rotterdam more attractive for people to live and work in, in order to make it more lively and economically viable in the future.

The main theoretical issue is in this thesis is to identify, through literature, the spatial conditions that are essential to city vitality and attractiveness. The spatial research into Rotterdam is intended to find, through analysis, weak spots in the urban structure, where these spatial conditions are missing. The first subquestion will be examined through literature from Jane Jacobs (1961), Allan Jacobs (1993), Gehl (2010), Montgomery (1998), Lynch (1981), see chapter 2, theoretical framework. The second question will be examined through mapping analysis of Rotterdam. The third question will be answered through a reference study of comparable cities like Copenhagen. The fourth question will be answered by the method of research by design in order to find spatial solutions for the inner city of Rotterdam.

Main research question:

What key urban design interventions can improve the inner city image of Rotterdam, in order to become more attractive for potential new people and businesses?

Subquestions/themes:

1. What are the spatial conditions for inner city vitality + attractiveness?
2. What are the key issues in Rotterdam concerning inner city vitality?
3. What comparable examples exist for improving inner city quality in other cities and what can be learned from them?
4. How are the conditions for inner city quality and the conclusions derived from the comparable cases applicable in spatial design interventions in the inner city of Rotterdam?


1.5 RELEVANCE

This master thesis tries to contribute in both societal and scientific debates. It intends to contribute to the knowledge, discussion and identification of urban issues. It also intends to contribute to societal demands for a more attractive urban environment.

Societal relevance
It is relevant for society in general to be able to achieve a more attractive inner cities that have a stronger city economy and vibrant city life. The case of Rotterdam is especially relevant since it lags behind in many social aspects. Poverty, crime and unemployment are at the highest rates of all major cities in the Netherlands (Atlas voor gemeenten, 2012). The city also has the lowest amount of higher educated people of the four major Dutch cities (EDBR, 2012; COS, 2011), which asks for governmental action to reverse this prospect of Rotterdam and its inhabitants. One of the things we can do is to invest in the city image and quality of life (EDBR, 2012), which is one of the tasks of the urban designer.

Rotterdam has an inner city that lacks liveliness and attractiveness compared to other cities in the Netherlands (Atlas voor gemeenten, 2012). This has created a rather negative image of the city within a large part of the Dutch population. Considering Rotterdam’s strive for economic growth and quality of life, it is important for both the city and its inhabitants to invest in a better inner city image. The current inhabitants of Rotterdam also benefit from better public spaces and more liveliness in the city, as it increases their quality of life. Furthermore inner city retail and leisure industries are in need of impulses for their businesses, which requires a better image of the city for a good investment climate.

Academic relevance
This research project intends to provide a systematic overview of spatial conditions to increase inner city quality and vibrance. The debate on city quality in Rotterdam has constantly changed since Word War Two, and will continue to change in the future as well. This research and design project can provide more objective guidelines for improving urban quality in Rotterdam. The research can further show objectively where the city is lagging behind in quality. The design should then provide practical proof of the theoretical findings from this research.

Malaise woningmarkt houdt aan
donderdag 11 oktober 2012 10:06

DEN HAAG (ANP) - De situatie op de Nederlandse woningmarkt is in het dente kwartaal verder verslechterd. Het aantal door NVM-makelaars verkochte woningen daalde met 17 procent tot 18.664 ten opzichte van dezelfde periode vorig jaar. Daarmee vormt het - samen met het eerste kwartaal van dit jaar - de slechtste driemaaandperiode sinds het begin van de crisis 4 jaar geleden. Dat heeft de Nederlandse Vereniging van Makelaars donderdag bekendgemaakt.

October 2012, www.elsevier.nl

Vitale metropool of sfeerloos tochtgat, dat is de kwestie

Nrc, 14-10-2011

'Zwaar weer voor horeca en detailhandel'

AMSTERDAM - De horeca, detailhandel en de bouw blijven dit jaar en in 2013 in zwaar weer verkeren. Dat concludeert ING woensdag in een kwartaalsrapport over bedrijfssectoren.

En de binnenstad bloedt ook al leeg

Newspaper article NRC by Brakman & Witteloostuijn on declining inner city facilities, 23-06-2012

june 2012, www.nu.nl
1.6 METHODOLOGY

Research methods
Firstly I performed a literature study into spatial criteria for city vitality, street quality and pedestrian quality. Secondly I studied other cities’ examples of successful inner city transformation.

1. Identifying spatial criteria for inner city quality from theory, see theoretical framework.
2. Identifying good examples of these conditions in other cities.

The second part of the research consists of an analytical part. This part forms the analytical framework which together with the literature study feeds the body of knowledge towards the design phase.

1. Analysis of city history, developments in the last decade and government plans for the city
2. Mapping analysis of the city center on the main spatial issues
3. Identifying weak spots in the city center; places lacking conditions of inner city quality and street quality

Design methods
The design phase consists of incorporating the evidence from the theoretical framework and spatial analysis into a design for a specific location in the city. The information derived from the research part was needed in order to find the weak spots that can be solved. The literature study also served as guideline for the spatial design proposal.

The design consist of a general spatial vision for the city center of Rotterdam and a more specific design solution within that vision to demonstrate how the vision can be implemented on the lower scale. This solution is for a weak spot in the city fabric, where conditions for urban quality are lacking.

For design feedback I interviewed two professionals from the architectural design office De Zwarte Hond in Rotterdam. They provided me with new insights into the organization of the public space of my final design case, Coolsingel.

- Design goal: to create a spatial vision for the inner city of Rotterdam, based on criteria for inner city vitality.
- Design goal: specific urban design proposal for one location, visual design solution
1.9 THESIS STRUCTURE

MAIN RESEARCH QUESTION
What key urban design interventions can improve inner city quality in Rotterdam, in order to improve the image of the city center and become more lively and economically viable?

SUBQUESTION 1. What are spatial conditions for inner city quality + attractiveness?

SUBQUESTION 2. What are the key issues in Rotterdam concerning inner city vitality?

SUBQUESTION 3. What comparable examples exist for improving inner city quality in other cities and what can be learned from them?

SUBQUESTION 4. How are the criteria for inner city quality and the conclusions derived from the comparable cases applicable in spatial design interventions in the inner city of Rotterdam?
1. Introduction
2. THEORETICAL FRAMEWORK

This chapter contains the findings of the literature research performed during the graduation period. These findings are the guidelines for the spatial analysis and design proposal. They form the backbone of the master thesis.
2.1 INTRODUCTION

This chapter contains the findings of the literature research performed during the graduation period. These findings are the guidelines for the spatial analysis and design proposal. They form the backbone of the master thesis. First some important definitions mentioned in this theoretical framework are explained in this introduction.

Activity, vitality and diversity
Activity is very much the product of two separate but related concepts: vitality and diversity (Montgomery, 1998). ‘Vitality is what distinguishes successful urban areas from the others. It refers to the numbers of people in and around the street (pedestrian flows) across different times of the day and night, the uptake of facilities, the number of cultural events and celebrations over the year, the presence of an active street life, and generally the extent to which a place feels alive or lively’ (Montgomery, 1998).

According to Montgomery (1998), it is possible to generate more vitality, at least for particular slots of time, by programming events and activities to occur in the streets, buildings and spaces. However, in the long term urban vitality can only be achieved where there is a complex diversity of primary land uses and (largely economic) activity. ‘The simple truth is that combinations of mixtures of activities, not separate uses, are the key to successful urban places’ (Montgomery 1998).

This means that the key to sustaining diversity lies in there being, within easy travelling distance, relatively large numbers of people with different tastes and proclivities (Montgomery 1998). In other words, a relatively high population density. The tendency is for larger, more dense settlements to be the ones that can maintain diversity.

2.2 LITERATURE REVIEW

The theoretical framework on which this project is based is described in this chapter. To answer the main research question a theoretical framework of reknown research has been composed and put into a literature review study. The results of this review is a set of conditions for urban quality, both in the scale of neighbourhood attractiveness and inner city image. This chapter shows a summary of this literature study and offers insight into some of the conditions for making a good city. In the appendix the full review paper can be found.

Review paper abstract
Due to decades of post-war modernist reconstruction and the suburbanization trend, some inner cities in Europe are now facing the issue of a lack of liveliness and attractiveness. Since World War Two, these inner cities, like Rotterdam in the Netherlands, have a much smaller population base to sustain inner city commercial and cultural facilities. This resulted in more quiet streets during long periods of the day. It also caused the closing of many amenities, leaving only the larger (flagship) stores and cultural facilities behind. Modernist planning principles for the post-war reconstruction of many city centers resulted in car-dominated centers with a strong separation of functions, which led to a fractioned inner city without the necessary mix of functions that is required to reach a lively city (Salingaros, 2000). This reduced diversity and dynamics of inner city life, which caused a degradation in the reputation of many inner cities. These problems were recognized decades ago by Jane Jacobs (1961) and Jan Gehl (2010), who both observed car-domination of city centers, caused by modernist planning ideas with a decrease of the human scale in mind.

This research explores the spatial conditions required to achieve lively and stronger inner-cities. These conditions will serve as guidelines to possible spatial interventions regarding my thesis. Several acknowledged researchers in the field propagate that inner cities at least need mixed-used streets with a diversity of uses, and public spaces that have a clear focus on the human-scale (Gehl, 2010; Jacobs, 1961; Montgomery, 1998). One of the outcomes is also the need for a higher population density to sustain and mutually support surrounding amenities and public life and to create a fine grain in developments, always keeping in mind the human scale.

Conclusions
Several conclusions regarding the conditions for vital city life can be made. Much attention has been payed to the (s) diversity or mixture of uses in city streets (Jacobs, 1961; Montgomery, 1998; Jacobs, 1987).

Diversity seems to be the vital word for city life to be successful. Diversity is something you can arrange physically, but it is preferred that it spontaneously grows for it to be authentic and to be able to add to the city coherence (Jacobs, 1962; Salingaros, 2000). Planning diversity seems to be a lot harder, but the given conditions can be included in urban plans in order for it to develop gradually over time. This is not a case of quick turnaround. City diversity is something of the long term. Jacobs (1961) mentions two different types of mixed use diversity that interact. On one hand there are the primary uses: Offices, housing, shopping facilities, educational facilities and recreational facilities. These primary uses function as the main people attractors. A mixed-use area should contain at least...
theoretical frame

The relation between outdoor quality and outdoor activity; higher quality results in more optional and social activities of people, which increases public life on the streets.

Source: Gehl (2010)

One of the solutions is to intensify the inner city fabric by increasing density of buildings, inhabitants and functions. Research (Jacobs, 1961; Gehl, 2010; Montgomery, 1998) states that proper densification can have many advantages for a city. Higher density provides more support for commercial and cultural facilities, more vibrant nightlife, more jobs in the vicinity of the inhabitants, social control, etc. (Jacobs, 1961). On top of that, higher density intensifies the use of existing public transport and slow-traffic networks and make them more efficient in relation to car-traffic (Gehl, 2010; Rérat, 2012).

However, the city needs an attractive public space to be able to attract people to live in the center (Gehl, 2010). Without this, intensification of the city structure is futile, as no one will come to the city.

Related to the public space, there is much attention towards the pedestrian scale or the human-scale of the city (Jacobs, 1961; Gehl, 2010). Writers like Jan Gehl (2010) and Jane Jacobs (1961) advocate the public life on the streets. This is where activity is taking place and where the city shows its face. According to Gehl (2010), walkability of the streets and inviting bicyclists are key to provide good city life, since people are the ones who bring life to the city, not cars (Gehl, 2010). The scheme next page (bottom; Gehl, 2010) shows Gehl's criteria for good pedestrian life, which provide good conditions for public space quality. According to Gehl (2010; see scheme next page, top), the relation between outdoor quality and outdoor activity is very clear; higher quality results in more optional and social activities of people, which increases public life on the streets.

Streets should be designed carefully, taking into consideration the conditions of Gehl (2011) and Jacobs (1993) for making streets successful. The scale of buildings, the width and readability of the street, places to sit and enjoy the sun, the protection of pedestrians from traffic and the quality of the materials are a few of the things a designer should take in mind.

Lastly the coherence of the city is important for making a city vital. According to Saltingaros (2000) (10) good connections are important for making parts of the city integrated, and networks of different kind should support each other, not interfere.

In the review paper I tried to address as many conditions as possible which contribute to vital inner cities. However this is not a complete summary of all that is necessary for a city to succeed. Other factors like regional economy, political factors and social issues come into play when redesigning a city. Especially the latter is important since existing inhabitants of inner cities will not easily comply to changes in their environment. This subject requires additional research in order to be able to coordinate future developments in cities.
### 2.3 CRITERIA FOR INNER CITY QUALITY

This chapter is a summary of the findings from the literature review. One of the most renowned researchers in this field is **Jane Jacobs**, who in Death and Life of Great American Cities (1961) made a strong argument that cities need diversity of uses in order to be vital. Jacobs (1961) stated that four criteria are vital for a diverse and vital city:

- **1. Diversity**
  - a) Mix of uses per district and street
  - b) Different activities during the day
  - c) Existence of residential function

- **2. Permeability**
  - a) Short building blocks, frequent streets & crossings

- **3. Different building ages**
  - a) Fine grain of buildings with different ages

- **4. People**
  - a) High residential density
  - b) Concentration of people that use the street

According to **Jan Gehl** (2010) it is the people who make cities alive. Gehl (2010) addresses the importance of pedestrians and cyclists to city life. He stresses that ‘the potential for a lively city is strengthened when more people are invited to walk, bike and stay in city space (p.6)’. People physically active in public space are vital for city life. People in cars are not participating in street life (Gehl, 2010). His main criteria are:

- **1. Lively city**
  - a) Invite people to walk, bike and stay in city space
  - b) Social and cultural opportunities in public space, optional activities

- **2. Safe city**
  - a) Cohesive urban structure with short walking distances
  - b) Attractive public spaces
  - c) Variation of functions
  - d) Eyes on the street from surrounding buildings

- **3. Sustainable city**
  - a) Large part of transport is ‘green mobility’ (by foot, bike or public transport)
  - b) Safe and comfortable walking and cycling to and from public transport
  - c) Good public transport and public space

- **4. Healthy city**
  - a) Integrated bicycle and pedestrian networks in the city for public health increase

Montgomery (1998) has a very similar idea about city vitality as Jacobs and Lynch, but differs a little in the vocabulary and system. He mentions 25 conditions for making a city vital.

- **1. Activity**
  - a) Generating pedestrian flows and vitality
  - b) Seeding people attractors
  - c) Achieving a diversity of primary and secondary uses
  - d) Developing a density of population
  - e) Varying opening hours and stimulating the evening economy
  - f) Promoting street life and people-watching
  - g) Growing a fine-grained economy

- **2. Image**
  - a) Legibility
  - b) Imageability
  - c) Symbolism and memory
  - d) Psychological access
  - e) Receptivity
  - f) Knowledgeability

- **3. Form**
  - a) Achieving development intensity (density)
  - b) Zoning for mixed use
  - c) Building for a fine grain
  - d) Adaptability of the built stock
  - e) Human scale
  - f) City blocks and permeability
  - g) Streets: contact, visibility and horizontal grain
  - h) The public realm quality
  - i) Ease of movement by different modes
  - j) Green space and water space
  - k) Landmarks, visual stimulation and attention to detail
  - l) Architectural style as image

According to **Jane Jacobs**, who in Death and Life of Great American Cities (1961) made a strong argument that cities need diversity of uses in order to be vital. Jacobs (1961) stated that four criteria are vital for a diverse and vital city:
DETR & CABE (2000) put together a list of criteria for good urban design that has many similarities with the previous researchers. Seven main criteria are mentioned:

1. Character
   a distinct sense of place responding to local context

2. Continuity & Enclosure
   clearly defined, coherent, well enclosed public space

3. Quality of the Public Realm
   safe, attractive and functional public space

4. Ease of Movement
   an accessible, well connected, pedestrian friendly environment

5. Legibility
   a place that has a clear image and is easy to understand

6. Adaptability
   flexible and adaptable public and private environments

7. Diversity
   a varied environment offering a range of uses and experiences

When combining the criteria given by the different researchers we can divide them into large scale and small scale criteria. These criteria are used for the evaluation of spatial analyses of Rotterdam inner city and to provide guidelines for the design phase.

**Large scale**

a) Creating diversity of uses in streets
b) Different activities during the day
c) Generating pedestrian flows across the inner city
d) Developing a density of population
e) Creating good balance of different types of traffic
d) Easily accessible public transport
f) Integrated bicycle and pedestrian networks for public health and life on streets
g) Short building blocks and easy crossing of streets
h) Different types of public space for different groups of people
i) Good distribution of people attractors
j) Fine grain of buildings with different functions, ages and architectural styles for a strong sense of place or imageability

**Small scale**

a) Invite people to walk, bike and stay in city space
b) Safe, attractive public space with visual stimulation to create a sense of place, relating to the context
d) Different optional social and cultural activities during the day in public space to increase public participation
d) Frequent & easy road crossings and accessible public space
e) Clearly defined, easily understandable, well enclosed public space with continuity of street frontages and furniture
f) Transparent building facades and eyes on the street from surrounding buildings for street safety
g) Green and water for recreation
2.4 Criteria for pedestrian quality

Gehl (2010) explains the importance of the human’s perspective in public space. The city is a place to meet. Gehl propagates twelve quality criteria for a successful city landscape. These criteria are subdivided into measurable factors that are important in order to achieve a vital urban climate for pedestrian activity. These criteria are important for the smaller scale design proposal in Rotterdam.

1. Protection
   a) Protection against traffic and accidents - feeling safe
   b) Protection against crime and violence - feeling secure
      b1. Lively public realm
      b2. Eyes on the street
      b3. Overlapping functions day & night
      b4. Good lighting
   c) Protection against unpleasant sensory experiences
      c1. Wind
      c2. Rain/snow
      c3. Cold/heat
      c4. Pollution
      c5. Dust, noise, glare

2. Delight
   a) Buildings and spaces designed to human scale
   b) Opportunities to enjoy the positive aspects of climate
      b1. Sun/shade
      b2. Heat/coolness
      b3. Breeze
   c) Positive sensory experiences
      c1. Good design and detailing
      c2. Good materials
      c3. Fine views
      c4. Trees, plants, water

3. Comfort
   a) Opportunities to walk
      a1. Room for walking
      a2. No obstacles
      a3. Good surfaces
      a4. Accessibility for everyone
      a5. Interesting façades
   b) Opportunities to stand/stay
      b1. Attractive, functional edges/attractive zones for standing/staying
      b2. Supports for standing
   c) Opportunities to sit
      c1. Zones for sitting
      c2. Utilizing advantages: view, sun, people
      c3. Good places to sit
      c4. Benches for resting
   d) Opportunities to see
      d1. Reasonable viewing distances
      d2. Unhindered sightlines
      d3. Interesting views
      d4. Lighting (when dark)
   e) Opportunities to talk and listen
      e1. Low noise levels
      e2. Street furniture that provides ‘talkscapes’
   f) Opportunities for play and exercise
      f1. Invitations for creativity, physical activity, exercise and play
      f2. By day & night
      f3. In summer & winter

Vital criteria concerning pedestrian quality
source: Gehl (2010)

Next page:
Several examples of pedestrian/human quality on the street
source: http://gehlcitiesforpeople.dk/
Several examples of pedestrian/human quality on the street

source: http://gehlcitiesforpeople.dk/
2.5 Criteria for good street design

Street quality is further elaborated in Allan Jacobs his work. Jacobs (1993) is an expert in street quality and states that 'certain physical qualities are required for a great street. All are required, not one or two: accessibility, bringing people together, publicness, livability, safety, comfort, participation, and responsibility. Below are seven quality criteria for designing a good street that is pedestrian friendly.

According to Jacobs (1993), other qualities that contribute to good streets are the use of trees, clearly defined beginnings and endings of street, diversity in buildings, special design details like paving, benches and lights, places for staying, like plazas or terraces, accessibility for people, for example by transit and entry streets, not an extensive amount of parking places but just enough to protect pedestrians from car traffic, and lastly density and diversity of use which enlivens the area and the street, “bringing together different people for different purposes”

1. Places for People to Walk with Some Leisure
   This means wide and safe walkways for different paces and protection from cars by for example trees.

2. Physical Comfort
   This requires access of sunlight when it is cool, shade when it is hot. Also to be able to define the street both vertically and horizontally. There is a two (streetwidth) to three (buildings) proportion for a good definable street. Trees can offer good definition and help with shading and comfortable feeling.

3. Qualities That Engage the Eyes
   Visual complexity is required, but not too complex as to become chaotic or disorienting.

4. Transparency
   This means the transparency of the street edges, the buildings. Usually windows and doors give transparency and provides insight to what the building contains.

5. Complementarity
   Buildings are different but they express respect for each other, most particularly in height and the way they look. There should be a degree of coherence in the built structures.

6. Maintenance
   A street just has to be clean and proper in order to have quality.

7. Quality of Construction and Design
   Use of good materials is of the essence in street quality. Also more efficient for maintenance.

Seven criteria concerning street quality
source: Jacobs (1993)
2. Theoretical Frame

Lively public space in Oslo with physical comfort and qualities that engage the eye (water, boats, lighthouse)
source: Gehl (2010)

Qualities that engage the eye, where water meets land, inviting for people to stay. London
source: Flickr.com

Residential low-rise combined with high-rise. It is possible in Vancouver. It results in transparency and eyes on the street and many front door entrances towards the street.
source: Flickr.com

Qualities that engage the eye, greenery and coherent use of furniture and trees. All of which are in straight lines and clearly define the space to walk. In Ankara, Turkey
source: Flickr.com
This chapter contains the findings of the spatial analysis. The analysis starts with a brief history of Rotterdam, in order to create a better understanding of the current issues of the city. Secondly, there is a brief summary of municipal plans for redevelopment of the city center. Furthermore, an extensive mapping analysis of the inner city of Rotterdam is shown. This chapter concludes with the key problematic areas in the city, which have the best potential of being redeveloped.
3.1 HISTORY OF THE SPATIAL DEVELOPMENT OF ROTTERDAM

History of the development of Rotterdam

Rotterdam began with the damming up of the Rotte around the year 1270 (Van Jaarsveld and Van de Laar, 2004). Here the dike was high and it became a ribbon of development. This dike was the Hoogstraat, the ultimate heart of the city. The first building was limited to the Hoogstraat and Binnenrotte, the current marketsquare. In the 14th century the count granted fortress rights to the city, after which the Cool Vest (later Coolsingel), Blaak and New port were dug. Consequently the subsequent city boulevards primarily formed defenses of water. This allowed the city to expand within secure borders. Rotterdam was only surrounded by a stone city wall by the 16th century.

The new port areas outside the dikes, along the river, were dug in the 16th century when the herring fishery got underway (Van Jaarsveld and Van de Laar, 2004). Rotterdam began to flourish as a trading center for domestic and foreign trade with Flemish, French and German cities, thanks to the herring trade. In addition to increasing trade the Eighty Years War with Spain also started. Since Rotterdam was a strategically located place, the town was to be well defended. For this purpose, all-new defenses were built in the area outside the dikes between 1575 and 1616 (Van Jaarsveld and Van de Laar, 2004).

In the meantime, the trade also grew further, allowing the construction of a new merchant port. For this purpose Blaak and New Haven were taken in use as a port in 1576. Then the Haringvliet was constructed and at the beginning of the 17th century the Wijnhaven, Scheepmakershaven and Leuvehaven (Van Jaarsveld and Van de Laar, 2004). This large urban expansion brought the city towards the river and doubled the surface of Rotterdam (Wagenaar, 2011). By the end of the 17th century Rotterdam was the second merchant city of the Netherlands with approximately 50,000 inhabitants (Van Jaarsveld and Van de Laar, 2004). Rotterdam traded with the East Indies as well and had an establishment of the VOC in the city. The city slowly expanded with nurseries, companies and estates in the polders around the city triangle (‘stadsdriehoek’).

In the 18th century the economy stagnated in the Netherlands after which the population declined in Rotterdam, only to recover by the end of the 18th century. The city’s economy remained fairly intact in this difficult period, partly due to the major shipping industry. In the 19th century, the industrial revolution slowly started and the city had to deal with some large spatial problems. In 1850 90,000 people lived within the bulging historic city (Van Jaarsveld and Van de Laar, 2004). This caused disease outbreaks because most people did not own drinking water and therefore used the sewer canals, which were heavily polluted. In 1854 the city council decided to construct the water plan of Rose, which provided for the construction of new canals in a radius from the center by which the water management of the polders improved and made the city a lot cleaner. In addition, since 1880 sewers were constructed in the city and new wider streets were laid out in the Cool neighborhood west of downtown and north of the Goudsesingel (Van Jaarsveld and Van de Laar, 2004). These procedures secured the growth of the city.

The city modernized rapidly from 1870, which was reflected in...
the expansion of the port on the southern bank of the Meuse (Van Jaarsveld and Van de Laar, 2004). The natural location along a major river made Rotterdam very suitable as a port and the city knew how to exploit this with the construction of the New Waterway to accelerate the route to the North Sea and the construction of a major new port. To make the connection with the south bank of the Meuse, bridges were built. A railway was constructed across the Maas from Rotterdam to Antwerp, which ran through the city on an air track from 1877, at the location of the Binnenrotte (Van Jaarsveld and Van de Laar, 2004). Due to the strong industrial development of Rotterdam there was a large influx of immigrants from the province and causing severe housing shortage in the city. Therefore, in Northern Rotterdam streets were rapidly constructed within the existing plot structure, which was accessed by the street that runs along the dyke. For example, in the pattern of the existing landscape large urban areas such as the Old West, the Old North, Kralingen were built around the Old Town.

The port grew incredibly fast. In the late 19th century, the Rhine port in South was dug, followed by the Maashaven. The city grew quickly and attracted many immigrants. Between 1850 and 1940 the population increased from 90,000 to nearly 600,000 (Van Jaarsveld and Van de Laar, 2004). More neighbourhoods were built. The government left the housing to private builders, who often made complete construction plans for a portion of a polder or district (Van Jaarsveld and Van de Laar, 2004). However, there were also many small contractors who built houses in a short time to sell them with enormous profits. The quality of these homes was often poor.

The medieval polder structure determined to a large extent the shape of the urban landscape (Palmboom, 1987). The old ribbons were usually the main road in the city expansion, where facilities were focused. The plots were the cross streets with new housing. Sometimes a number of plots were put together to make a new main street or ditch (Palmboom, 1987). Narrow plots also had narrow streets and ditto houses. This can be seen in the Old West and parts of Kralingen and Crooswijk. Most houses were small and narrow to keep the foundations costs low. They were mostly inhabited by several families. These streets were widely restructured in the ’70s and ’80s, due to the narrow strips of buildings. Because long plots had various properties plans were often performed per plot or set of plots. The open system of plots and ditched was perfect to be urbanized in this manner. However, it was complicated to go through several lots, because of the different ownership situations (Palmboom, 1987). Therefore, in some areas there are are still too little cross-connections. For example, this problem still exists in the Old West.

Around 1900, Rotterdam had 300,000 inhabitants, an explosive growth compared to 1850. The city grew so fast that the municipality wanted to have more influence on the urban expansion. With the Housing Act the municipality gained more powers, and with this the first expansion for Rotterdam came in 1903, by G.J. de Jongh. The Housing Act obliged the municipality to strengthen the requirements for establishment of urban development (Van Jaarsveld and Van de Laar, 2004). North was now strongly framed by barriers of train tracks, waterways and the
unbridled growth of unplanned expansion areas. This combination made it extremely difficult to create a coherent urban structure for the planned expansion of the city. The expansion of De Jongh provided for a planned expansion on both the left and right bank of the Meuse and aimed to improve the transport connection between the expansion areas which had a low priority in the unplanned expansion period (Van Jaarsveld and Van de Laar, 2004). Now, there was more emphasis on wider streets and better quality and larger homes. This modern urban planning resulted in larger plans for neighbourhoods with good, spacious dwellings.

Early 20th century in the North, the Hofpleinlijn was built as a railway to The Hague. This ended in the heart of Rotterdam, the northern tip of the city triangle, which thus had a central role in the city (Palmboom, 1987). The various railway lines in Rotterdam improved the accessibility of the city enormously. Because of the upcoming automobile and tramways, the Coolingsel and Goudsesingel in downtown were muted and transformed into city boulevards (Van Jaarsveld and Van de Laar, 2004). The cityscape changed radically. The Coolingsel was transformed into the main street of Rotterdam, and received buildings such as the new City Hall, the Post Office and the new congresshall. This shifted the focus from the center to the west, to the former western border of the city.

Many downtown streets were too narrow for cars and trams. Plans were made for traffic breakthroughs in the dense structure. One of these was the Meent, which was needed for a better connection between Coolingsel and Goudsesingel. There were more breakthroughs planned, but due to the First World War and the lack of money, it did not continue (Van Jaarsveld and Van de Laar, 2004).

Because of the severe shortage of quality workforce dwellings, after the introduction of the Housing Act in 1901 more and more initiatives were launched to build good planned neighborhoods. In South, after 1920, there was much more room for such initiatives than in North. The polders in South were still waiting to be cultivated. The architects Granpré Molière and Verhagen designed the new garden village Vreewijk on South, which introduced the garden city idea in Rotterdam (Van Jaarsveld and Van de Laar, 2004). This idea reflected the harmony between city and landscape. This movement arose as a reaction against the cramped historic city and 19th century shell of narrow streets and small houses. The poor living conditions associated with this inspired urban planners and architects of the garden city idea to create green and open neighbourhoods, with larger homes in a pleasant rural environment (Wagenaar, 2011). Space and tranquility were elementary for these garden cities. Later in the 1930s, also districts like Blijdorp were designed with a spacious and green design, but over there blocks were designed in a more urban fashion, with apartments stacked to 5 layers in a closed block (Mens, 2007). Vreewijk was mainly a village, with low buildings and individual houses. Moreover Blijdorp was designed with more functional architecture. Historicizing details were omitted and long horizontal lines were introduced in blocks. This was a response to the historicist design of the 19th century neighborhoods, while a logical consequence of the time when construction technology progressed and it became cheaper and faster to build blocks industrially instead of craftsmanlike (Mens, 2007).
3. Spatial Analysis

Grote Markt in 1930

Grote Markt in 1930

Hofplein in 1930
The Basisplan for Reconstruction

When Rotterdam was bombed by Nazi Germany in 1940, almost the entire center was in ruins. Only a few buildings were left largely undamaged, such as the town hall, congress and the post office. Some 27,000 houses were destroyed in 11,000 buildings (Wagenaar, 2011). The damage was so great and the economy was not strong, resulting in little enthusiasm for the rebuilding of the historic center. City Architect Witteveen was in charge of the reconstruction plan and wanted to analyze and solve a lot of problems from the pre-war situation (Steenhuis, 2007). He wanted to make breakthroughs for traffic to the city center. In addition, the narrow streets had to be lifted. The new town had to have a certain affinity with the historically grown town (Wagenaar, 2011; Man, 2007). The architecture was traditional, with historical facade details, but functional. Nevertheless, in Witteveen’s plan virtually no street was in the same place as before. As a matter of fact, a completely new city was designed with an emphasis on good infrastructure (Mens, 2007). However, the Rotterdam business sector saw no merit in the plan because it would be unworkable (Mens, 2007). They wanted a more flexible plan in which the architecture was not predetermined and looked more businesslike than the facade diagrams Witteveen drew (Steenhuis, 2007). Witteveen resigned, and his successor Van Traa proposed a new plan.

The new Basisplan for the Reconstruction in 1946 coincided with a major change in the urbanist perspective at that time (Palmboom, 1987). The New Objectivity, which for several years was reflected in the architecture of new Rotterdam neighbourhoods, made a breakthrough in the urban conceptions of Rotterdam. The need grew for a functionalist layout of the city and clearer separation of functions, elimination of historical references and more emphasis on infrastructure in a clear grid structure, green and openness of the town (Wagenaar, 2011). The modernist movement also did not start from the existing landscape structure, but considered every part of the city as makeable. This major break with the past is clearly reflected in postwar neighbourhoods like Pendrecht and Ommoord, where it is hard to find the original landscape structures. This principle is also largely reflected in the Reconstruction Plan for the city of Rotterdam.

With the wiping away of the old town by Nazi Germany, Van Traa got tremendous freedom to apply these new ideals widely and thus to give Rotterdam another face forever. In particular, the revulsion against the impenetrable Old Town and the poor in integrated connections between the neighborhoods and the city formed the basis for the Reconstruction Plan. There was revulsion against the large number of poor homes in the often poorly maintained historic buildings. After the war, the city center was almost completely used as tabula rasa for modernist planning by the urban planners of Rotterdam. Where Witteveen drew a plan for maintaining some historical lines in the city, this was completely thrown away by Van Traa.

The Basisplan sought functionality and openness. They had a clear and open downtown in mind, with a clear traffic structure in the form of a grid, wide streets and a shift of the shopping
1940 - Bombing in WW2 left the center almost completely ruined, except for the city hall, congress hall and post office, the opera (partly in ruins), church (in ruins), Bijenkorf (ruins) and a couple of other smaller buildings. The opera was destroyed after the war, although it could have been saved.

1965 - The shopping center is finished, large empty spots left.

1980 - The Weena (1) still empty - old harbour under construction (2)

2000 - Train tunnel under large part of the center reconstruction almost complete

Basisplan for Reconstruction of the city center by Van Traa (1946). Clearly visible is the linear approach of straight long lines, wide infrastructural lines, large building blocks and clearly assigned functions per district.

Image source: Gemeentearchief Rotterdam
center to the west, which finally made Coolsingel the central axis of the city (Palmboom, 1987). Flexibility of interpretation of blocks was paramount. The location of the building was not fixed. For each building initiative a place was findable in the Basic Plan (Steenhuis, 2007).

The traffic connectivity throughout the whole city was priority. Some compounds through the city could be thereby improved. For the traffic machine to function optimally, even more existing buildings had to be demolished. Some buildings that could have been saved, and large parts of the old town that could still have been restored, were still destroyed to make room for the new traffic infrastructure. The city then witnessed the demolition of the historic Municipal Theatre which was removed for the new Lijnbaan shopping street. The famous original 1930s Bijenkorf gave way to the new boulevard Blaak, and the new idea ‘window on the river which was to open the view from Coolsingel to Leuvehaven, an open view of the water (Van Jaarsveld and Van de Laar, 2004). In the 1980s the Maritime Museum was built here, which now still blocks a part of the so called window to the river. The wide thoroughfare, the Blaak, remains a barrier from the center to the Watercity. The idea of the City on the River in the Basic Plan is both not been reflected due to the diversion of the main dam of the High Street to the Boompjeskade and Maasboulevard and the introduction of the Delta Plan after the floods of 1953. The introduced delta height stated that dikes need be so high that it was forming a hindrance for the perception of the city on the river. Also immediately after the 1940 bombing, several rivers in the city were slammed with debris, such as the Blaak and New Haven, making the concept of city on the river less strongly present in the center even directly after the war.

The lively Hofplein after the war became a functional roundabout where with no room for the former cozy atmosphere and cultural entertainment. Parts of the city were arranged as shopping streets, while other parts were business oriented. Only some parts around the central axes were designated as mixed residential area. This meant the vast majority of the 80,000 inhabitants center after the war had to go elsewhere. This break with the past still has impact on the city today, in which central spots as the Lijnbaan, Coolsingel and Blaak still have to deal with functional separation and a dominating traffic machine.

At the same time the rigorous new plan for downtown was in stark contrast to the 19th century adjacent neighbourhoods. The traffic machine that was created closed hard on the neighborhoods around it, and meant further demolition of parts of the surrounding districts (Palmboom, 1987). This was sometimes done in such an unnatural way that a particularly unpleasant and messy situation arose in the Old North, where it was very difficult to connect two structures together. For example around the Hofplein the new urban structure ignores the original landscape and adhesion of two completely different structures has just caused more problems here, which are still unresolved (Palm, 1987). This phenomenon plays in several places along the edge of the reconstruction area. It shows that with the Modernist tabula rasa in the middle of a historic town, little relation between the two completely different parts was created.
New ideas about the city after 1970 and new plans for the future

After the modernist period, in the 70s there was a movement against the downtown that looked cold and businesslike. People now sought more fun and liveliness in the city (Van Jaarsveld and Van de Laar, 2004). Small scale was considered important again. The functional character made Rotterdam unattractive and human scale was mostly lost. Kiosks were built on Coolsingel and according to the new ‘compact city’ model, new housing was built to keep more people in the city, close to amenities and public transport (Van Jaarsveld and Van de Laar, 2004). Still blank areas were filled with mostly residential units. There was also more space for cultural facilities and restaurants scattered throughout the city, for example in the Oude Haven. Infrastructure was reduced slightly, for example by the tunneling of the railway Binnenrotte, creation of one-way streets and expanding pedestrian streets (Van Jaarsveld and Van de Laar, 2004). In addition, cycle paths were constructed for the safety of cyclists. The traffic machine was now safer and somewhat less prominent. However, there is still a large proportion of daily traffic through downtown today (Binnenstadsplan, 2008), of which the Basisplan still yields its influence.

In the 80s the idea of the Watercity came in motion, by which again the emphasis was placed on the relationship of Rotterdam with the river (Van Jaarsveld and Van de Laar, 2004). The industrial function of the inner city port was increasingly pushed back to the west, by the growing scale of shipping and the construction of the Maasvlakte. In the 80s this was the new urban challenge for the future. It started with plans for large-scale redevelopment of the Southbank and the Water City south of downtown. There was a lot of housing to come close to the town center amenities and public transport to match the compact city idea. Also a new bridge between North and South was necessary to develop this area. This laid the foundation for a massive urban transformation in South which is still going on to this day.

These developments in the former harbor area could largely come about from a tabula rasa, but unlike the Basisplan the focus now was more on existing qualities like the original form of the ports, historic warehouses, the Entrepot Building and Hotel New York. These buildings gave a specific character to develop the area and provided a reference to the past as a port. The urban plan aimed to create views towards the river as much as possible. An open and clear structure was a priority, just as in the Basic Plan, but now there was more emphasis on mixed use and mixing of small and large scale buildings. The traditional block regained more shape in these years and modern forms of these were introduced, which, for example parking under a raised ground level took place surmounted by a courtyard which was surrounded by apartments.

With the development of the Southbank the idea came strongly to build highrise in Rotterdam. After the period of smaller scale buildings during the difficult economic times in the 70s and early 80s people were, in mid 90s, again charmed by high-rise (Van Jaarsveld and Van de Laar, 2004). Rotterdam was looking for a new image to increase economic vitality, and ambitious high-rise fit well in this perspective. At the Weena and along the Coolsingel different high buildings rose from the late 1980’s. Weena was until the late 90s still a practically empty area that was still waiting to be built. This area in the reconstruction grid was crammed with tall office buildings and only one or two residential towers. The scale predominates in this area and is now perceived as cold. The high-rise buildings from this period are often characterized by a less favorable relationship between ground and building. Plinths are often largely closed to the public or non-transparent. In addition, the buildings often only have one function, such as offices or living.

At the beginning of the 21st century there will was a new high-rise wave, but now with lessons learned from previous high-rise and more attention to the use of plinths and mixed use at building and block level. Despite the considerable amount of residential towers that have been built, there is still a desire from the municipality for the city center to be more vibrant (Wagenaar, 2011). It is believed this can be achieved by further compacting high-rise, but also with smaller projects. Since the recent economic downturn after 2008, the large-scale risky projects lost popularity. The risks are economically significant. In 2013 there is still a number of major projects being constructed to densify the city, but it is expected that further densification will get on much slower.

The question now arises how the city can, in a smaller way, with less risk attached to it, be densified and enlivened further. These ideals are still the result of the legacy of the Basic Plan for Reconstruction. The municipality wants to work towards a center that is more compacted with people, from the current 31,000 (COS, 2012) to 60,000 in 2040 (DSV, 2012). All of this with the aim to make the city more vibrant and economically stronger and with more people close to amenities and public transport at the same time (DSV, 2012). Densification of the urban fabric plays an important role. The fill in of some unfinished areas in the center is one of the possibilities. However also some smaller infill locations are, especially in times of crisis, innovative solutions to continue to build the city towards an attractive place to be.
3.2 MUNICIPAL PLAN ANALYSIS

The municipality of Rotterdam released the City Vision (Stadsvisie, 2007) for the redevelopment of the city. It concentrates on different 'very important' projects, such as the city center (central district near the central station), the Lijnbaankwartier (shopping center), the water city along the river, and the stadium area. The idea is to improve the attractiveness of the city as a whole. The focus on different VIP projects makes it rather difficult to finance all of them together, especially since the economic crisis, which results in many projects being moved forward in time. The main focus is on the central business district around central station, in order to attract new businesses to the city with the new high-speed train connection. This is a good development for the city economy, however the area is still rather monofunctional, and not a very attractive environment for people to live and recreate in. Work is still in progress, so a good evaluation will be needed in the near future.

In 2008 the new Binnenstadsplan was released to improve the inner city quality and attractiveness. The main idea is that of a 'city lounge' with emphasis on public realm quality and creating an attractive atmosphere. One of the key interventions was to decrease traffic flows through the middle of the center (Coolingel and Blaak) and to keep as many traffic as possible around the center. New parking garages were projected (some of which are now under construction) around the immediate center to keep visitor parking away from the center. This strategy in principle is very logical, since the main traffic boulevards form a big issue, as stated in the problem statement.

However, the idea was good, but the continuation of the plan is less properly executed. The plan for example was to remove two car lanes from the Coolingel, to reduce car dominance. In the newest program of demands (PvE) for the Coolingel, this plan was already thrown away. Current plans for the Coolingel are mainly focused on program and on new pavement, not on reducing the car dominance, which is the main issue in the street (Gehl, 2007). The whole idea of less traffic through the city center is now endangered with the lower ambitions of the most recent plan for the Coolingel.

In other parts of the city center, streets like the Lijnbaan and Meent now have been redesigned according to the new Rotterdamse Stijl, which has done considerable good for the quality of the public space, and increased activity in especially the Meent is considerably present. This was also done in other parts of the Laurenskwartier, but large parts of the city still have to be redesigned according to this style.

After a period of stimulating many new large mixed-use building projects, the focus of the municipality should now be more on where it can actually make a difference: in the public space (EDBR, 2012). This can coincide with other smaller scale developments, which are lower risk and fit well in the existing urban fabric. The large scale developments do often not contribute to attractive public life on the streets, as Gehl (2007) stated about Rotterdam. However, at the moment new projects like the new Forum Rotterdam and Markthal, of which the latter is already under construction, are very large scaled projects which suck much of facilities and life away from the streets. More critical reflection on the use of these buildings in relation to the public street should be made before launching these kinds of projects. Perhaps these projects do add a lot of imageability and economic strength to the city, but the city should always maintain sharp focus on the quality of the life on the outside streets, not only on the program inside the blocks (Gehl, 2007).

The ambitions of the city are good, but progress is made at a slow pace since the financial crisis. The city needs to find momentum to focus on some key projects which can improve the overall image of the city. The city along the river is one opportunity and secondly the inner city public space quality improvement, since this is where the city really shows its face. That is why for this project I will focus on the inner city public space.
3. Spatial analysis

Internationally attractive city along the river, source Stadsvisie (2007)

Connected city, diversion of the main traffic around the inner city (Binnenstadsplan, 2008)

Creating inviting plinths in the city center. Red means continuous transparent plinths with functions. Yellow means mixed with private functions (Binnenstadsplan, 2008)

Cultural and leisure focus, the colored spots are different concentrations of culture, the lines are continuous shopping streets. (Binnenstadsplan, 2008)

Creating inviting plinths in the city center. Red means continuous transparent plinths with functions. Yellow means mixed with private functions (Binnenstadsplan, 2008)

Water city, connecting the inner city with the river Maas, upgrading riverbanks (Binnenstadsplan, 2008)

Internationally attractive city along the river, source Stadsvisie (2007)
This analysis shows the current public space projects in the city. A couple of projects are now in progress, like the Weena and Central Station square. In 2012 two major projects were finished, the Lijnbaan and the Meent public spaces. The last part of the Meent is undergoing a revamp in 2014. In 2011 the Karel Doormanstraat and Binnenwegplein were finished, both of which are of good quality now, with a lot of seating, quality greenery and good natural stone pavement. The lijnbaan public space has improved considerably, with new paving and added quality greenery and benches. If this quality is created for the whole inner city, the attractiveness would increase greatly. However, there is no financial power at the moment for many more large investments. The government should focus on a few key projects. The central boulevards for example are still in need of renewal.
3. Spatial Analysis

The new lijnbaan public space with new pavement, benches and greenery (image by author).

The new Binnenwegplein public space with new pavement, seating and greenery (image, Stadsontwikkeling, 2012).
3.4 CURRENT BUILDING PROJECTS

This map shows the current building projects and recently finished buildings. It is clearly visible in red that many projects have been finished in the recent years. Some larger projects like for example the Lijnbaanhoven and the Schiekadeblok have been postponed after the start of the financial crisis. These larger scale projects suffer from the financial situation and reluctance of investors.

The medical center is being restructured and the central station is completely being rebuilt and finishes in 2013. The Market hall is now under construction, just as the new office for the municipality. Furthermore there are a couple of residential projects, but not more than 1000 houses are being built right now.
3. Spatial Analysis

LARGE BUILT PROJECTS
2004-2007

**Waterstadtoren (2004)**
apartments 168
office space 3,500 m²
parking 180 places
height 108 m

**Montevideo (2005)**
apartments 192
office space 6,000 m²
horeca 1,800 m²
parking 273 places
height 140 m

**Ernst & Young (2005)**
office space 20,000 m²
parking garage 633 places
height 78 m

**Golden Tullip (2006)**
hotel rooms 113
height 45 m

**Coopvaert (2006)**
apartments 125
office space 2,350 m²
parking 300
height 104 m

**Witte Keizer (2006)**
apartments 107
office space 2,800 m²
horeca 230 m²
parking 140 places
height 70 m

**Hofdame (2007)**
apartments 213
retail space 2,600 m²
parking 345
height 35 m
LARGE PROJECTS UNDER CONSTRUCTION

- **Calypsy (2013)**
  - Apartments: 407
  - Office space: 4,800 m²
  - Retail space: 1,600 m²
  - Parking: 488
  - Height: 71 m

- **Hotel Intel (2013)**
  - Hotel (rooms): 213
  - Hotel (rooms): 280
  - Office space: 72,000 m²
  - Retail/horeca: 6,000 m²
  - Parking: 684 places
  - Height: 149 m

- **De Rotterdam (2013)**
  - Apartments: 240
  - Office space: 72,000 m²
  - Retail/horeca: 13,700 m²
  - Parking: 684 places
  - Height: 149 m

- **Centraal Station (2013)**
  - Retail space: 4,500 m²

- **100 Hoog (2013)**
  - Apartments: 152
  - Office space: 1,050 m²
  - Parking: 165 places
  - Height: 110 m

- **Groot Willemsplein (2013)**
  - Hotel (rooms): 159
  - Office space: 4,000 m²
  - Retail/horeca: 1,200 m²
  - Parking: 118
  - Height: 20 m

- **Blaakhaven (2013)**
  - Hotel (rooms): 228
  - Office space: 4,600 m²
  - Retail/horeca: 1,600 m²
  - Parking: 150
  - Height: 39 m

- **Markthal (2014)**
  - Apartments: 282
  - Office space: 8,000 m²
  - Retail/horeca: 2,600 m²
  - Parking: 1250 places
  - Height: 39 m

- **Dock21 (2014)**
  - Apartments: 21
  - Hotel (rooms): 140
  - Height: 25 m

- **Cool63 (2015)**
  - Apartments: 15
  - Office space: 5,100 m²
  - Retail/horeca: 13,700 m²
  - Height: 25 m

- **Stadskantoor (2015)**
  - Apartments: 95
  - Retail space: 7,000 m²
  - Parking: 128 places
  - Height: 130 m

- **First Rotterdam (2015)**
  - Office space: 55,000 m²
  - Retail space: 4,500 m²
  - Parking: 200 places
  - Height: 130 m
LARGE PROJECTS PLANNED (SERIOUS)

**Forum Rotterdam**
- Apartments: 60
- Hotel rooms: 100
- Office space: 12,500 m²
- Retail space: 3.000 m²
- Horeca: 2.000 m²
- Parking places: 3025
- Height: 60 m

**Domus Studenthousing**
- Student apartments: 650
- Retail space: yes
- Horeca: yes
- Height: 70 m

**Stuyvesant Building**
- Apartments: 160
- Office space: 12,500 m²
- Retail space: 3.000 m²
- Horeca: 2.000 m²
- Parking places: yes
- Height: 165-180 m

**TOTAL 2004 - 2007**
- Apartments: 823
- Hotel rooms: 113
- Retail space: 2.755 m²
- Office space: 34.650 m²
- Horeca: 2.030 m²
- Parking places: 1871

**TOTAL 2008 - 2012**
- Apartments: 970
- Retail space: 18.470 m²
- Office space: 78.030 m²
- Horeca: 2.715 m²
- Cultural: 4.000 m²
- Parking places: 2423

**TOTAL under construction**
- Apartments: 1158
- Hotel rooms: 643
- Retail space: 40.450 m²
- Office space: 173.700 m²
- Horeca: 2.800 m²
- Parking places: 3025
What can be concluded from this analysis is that it is clearly visible how recent developments in the inner city are slowing down. New plans are rarely being made, or are very uncertain. Only three larger projects are being planned now, which is quite a low number compared to recent years. Due to the financial crisis, new big plans are being halted, the question is how can we continue to densify the city in order to reach the condition where much more inner city inhabitants can participate in inner city life? And if this densification process is being halted at the moment, how can we in the meantime make sure the city continues to improve its public space, in order to raise the quality of the inner city and improve its image to make future densification more feasible?

TOTAL ADDED PROGRAM 2004-2015

- 2951 apartments
- 756 hotel rooms
- 61,675 m² retail
- 286,380 m² office
- 7,545 m² horeca
- 4,000 m² cultural
- 7319 parking places

2951 = about 5,300 inhabitants
1,73 inhabitants / dwelling in center (EBI, 2011)
3.5 ALTERNATIVE BUILDING PROJECTS

‘PLUG’ ROTTERDAM

This map shows the plug projects set in motion by, among others, studio Hartzema. These small projects are designed to fill small gaps in the urban fabric of Rotterdam and is meant to be adding residential quality on the small scale. This is not about large numbers of houses, but together with the large scale projects these plug buildings add to the diversity of the city, and slightly increased density of residents in the center, which is a good according to the criteria for inner city quality. The plug projects are relatively easy to build, since financial risks are much lower. Emphasis is put on the fact that Rotterdam needs more smaller scale buildings, adding to the diversity of the built form of the inner city.
The total potential of plug projects combined with other densification possibilities is shown below, studied by studio Hartzema (2011). The total program is around 30,000 houses, which could double the amount of inhabitants in the city center. However, the skyborn option for adding layers to existing buildings seems to be a very difficult typology to realise, since existing inhabitants may object to this kind of densification. Plus, it would cause new problems with parking and shade in the existing neighbourhoods.

It is preferred to use infill locations to ‘finish’ the uncompleted urban fabric, and to intensify the existing urban structure. Transformation is also a very viable option, since this means that some vacant office buildings become used again, adding to the diversity of the respective street and increase activity there.

Demolition is not preferred, since it means loss of existing historical context and architectural value. Improving the quality of existing buildings by renovation would be a better option if we take the criteria for city quality into consideration, since the value of older buildings is considerable, especially in Rotterdam.

We should take into consideration that because of the economic recession, the potential of most these projects is much lower. It is largely a future potential to indicate the possibilities of the inner city space. In the meantime additional measures for increasing inner city vitality should be searched.
To be able to focus on the key issues of the inner city, it is necessary to define what exactly the real city center is. The area in which most ‘city’ functions are situated is shown in the map below. This is where main public transport, shopping, culture and horeca come together. This does not mean this area is completely mixed. This will be further examined in the next paragraphs. However, the definition of the center is based on the most important activities, proximity of attractors and pedestrian flows. It should be noted that the Kop van Zuid center area was left out of the ‘real center’. This area is considered center by the municipality, however it is situated more than 1 km away from the ‘real center’ and does not have close pedestrian relation with it. This is an important criterium according to Gehl (2010) and Montgomery (1998) for an area to belong to the center. By taking this confined area as the real center, we can do more precise analysis into the problematic areas.
In order to find the most problematic zone in the inner city that is lacking the criteria for inner city quality it is necessary to analyze the city center of Rotterdam through a mapping analysis.

The key issues from the problem statement will be analyzed in the next paragraphs. These are:

1. Dominance of car traffic
2. Fragmented center
3. Lack of activity in central streets
4. Lack of human scale
5. Lack of quality in public space

These main issues are measured according to the criteria derived from the literature study. With these analyses some of the most important weaknesses and opportunities of the city center can be determined, in order to generate a vision for development.

### Large scale

- Creating diversity of uses in streets
- Different activities during the day
- Generating pedestrian flows across the inner city
- Developing a density of population
- Creating good balance of different types of traffic
- Easily accessible public transport
- Integrated bicycle and pedestrian networks for public health and life on streets
- Short building blocks and easy crossing of streets
- Different types of public space for different groups of people
- Good distribution of people attractors
- Fine grain of buildings with different functions, ages and architectural styles for a strong sense of place or imageability
- Green and water for recreation

### Small scale

- Invite people to walk, bike and stay in city space
- Safe, attractive public space with visual stimulation to create a sense of place, relating to the context
- Different optional social and cultural activities during the day in public space to increase public participation
- Frequent & easy road crossings and accessible public space
- Clearly defined, easily understandable, well enclosed public space with continuity of street frontages and furniture
- Transparent building facades and eyes on the street from surrounding buildings for street safety

Scheme of criteria that have to be taken into consideration while analyzing the main issues of the inner city. (By author)
Large amounts of traffic are flowing through the inner city of Rotterdam. This is accommodated by the large traffic boulevards situated in the city and the ease of access to public parking garages in the city center. The image below shows that large amounts of traffic are only passing through the inner city, causing much traffic from which the center does not benefit. The large amounts of passing through traffic are disrupting the pedestrian connections between the different neighbourhoods in the city center. Cross connections are more difficult to make because of the large traffic boulevards.

Research from dS+V (2009) states that at least 60% of the car use to the center is from people living within 5 km from the city center. There is a huge opportunity to persuade this target group to use alternative transportation or use bicycling to get to the city center. The dS+V also introduced the system of park + walk which provides parking garages around the city center, from which people can walk towards the center without entering by car. This concept would be useful to integrate further across the entire inner city.
Parking and pedestrian streets

The proximity of parking garages makes it very interesting to reach the city center by car. In weekends this is the main reason for car traffic dominance in the city center. Most parking garages are close to pedestrian streets, which makes it easy for pedestrians to walk towards the shopping center. 

This is both a quality and a weakness of the city center. A quality for visitors, but a weakness for quality of streetlife in the city, due to the hindrance of the large amount of car traffic. While reducing the amount of inner city car parking garages will decrease inner city car dominance, it will at the same time be necessary to increase park + walk spots around the city center and park and ride on the edge of the city, in order to maintain a good connectivity to the center. This of course should be combined with good public transport, which is very well in Rotterdam, and good bicycle networks.
The width of Coolsingel traffic space results in non-human friendly spaces, where no public life is able to occur, without shutting down the traffic.

Car dominance causing Coolsingel to be an unattractive place with difficulty to cross the street.
3. Spatial Analysis

Blaak infrastructural supremacy shows the unbalanced role of the car in the inner city.

Tramway uses quite a lot of space which does not contribute to quality and attractivity of public space.
3.9. FRAGMENTED INNER CITY

The large boulevards, formed in the Basisplan after WWII, are mostly between 50 and 75 meters wide, providing a lot of space for car traffic to flow through. Since the wide streets take long to cross, pedestrian flows are less prone to be continued. This created fragments in the city, resulting in some difficult to reach parts of the city center. For example the Witte de Withstraat is very much a stand alone street, since the Blaak boulevard blocks large pedestrian flows to this street. The street is however very successful because of the specific historic and cultural qualities over there. Many visitors from outside the city do not recognize this street as a nice place to be, since it is largely cut off from the main flows. To extend the pedestrian flows towards this street would create a larger and more diverse network of pedestrian flows in the city center, which can strengthen the quality of visits to the center.
Crossconnections
Crossings are difficult to make because of the width of the boulevards. The different neighbourhoods are not well attached to each other because of this. This especially creates a border between the center and the water city, and between the Laurenskwartier, Lijnbaankwartier and Cool Zuid neighbourhoods in the center.
Feyenoorder Guyon Fernandez rijdt vrouw aan op Coolsingel

De speler is zo aangeslagen door het ongeluk dat hij donderdag niet aanwezig was bij de Feyenoord-training. Guyon Fernandez heeft inmiddels contact opgenomen met de vrouw en haar familie. In een reactie verklaart hij dat hij niet te hard reed en niet gedronken had. 'Op een of andere manier heb ik haar uit aan het publiek.', aldus Fernandez.

De gemeente Rotterdam heeft voor de actie op de Coolsingel gekozen, omdat de dubbele rijstroken daar extra gevaar opleveren. De PvdA wil het gebruik van de twee rijbanen van de Coolsingel opsplitsen; een voor automobilisten en de ander voor bussen en ander bestemmingsverkeer. Dit is een plan dat drie jaar geleden al door de gemeenteraad werd aangenomen. Een meerderheid van de Rotterdamse politiek wil maatregelen om de verkeersveiligheid op de Coolsingel te verbeteren. Aanleiding is het noodlottig ongeval van zaterdag waarbij een 73-jarige vrouw op een zebrapad op de Coolsingel om het leven kwam.

Blaak: Wide and busy traffic connection, which is difficult to cross. It takes a few minutes to cross the road and there are only a few crossings.

Coolsingel: crossings are rather difficult because of the width of the road (2x2 car lanes) and attention to tramways.
The analysis shows that, when taking into consideration the real center is where most of the current activities take place, the central boulevards Coolsingel and Blaak and Mariniersweg form the main problematic streets for continuity of connections between the inner city activity networks. Especially the Coolsingel, which is the barrier between the main shopping areas of the city center, is a problematic area in this aspect. Here at least three connections are difficult to make between the Laurenskwartier to the east and Lijnbaankwartier to the west.

The relevance to tackle this connectivity issue is especially present since every year accidents happen with pedestrians and cars because of the difficulty of crossing and the wideness of the roads, which makes them attractive for automobile drivers to drive faster, endangering pedestrians.
3.10. LACK OF ACTIVITY DURING DIFFERENT TIMES OF THE DAY

The lack of activity in some streets of the city center is mainly caused by a low diversity of functions, which could make the streets active during different times of the day. This analysis focuses on three known problematic streets, the Coolsingel, Lijnbaan and West-Blaak. Coolsingel is a mixed use street, although it lacks the residential function completely (note: the currently under construction ‘Cool63’ project will add 15 residential units to the Coolsingel). The Lijnbaan is predominantly a shopping street. The West-Blaak an office street. Both of them have no residential function and few leisure functions, making them less prone to evening pedestrian activity.

The Lijnbaan has many retail facilities, creating a lot of activity during the day. The Coolsingel is also part of this circuit, which provides some activity during the day, although crossing are problematic here.

Both the Coolsingel, West-Blaak and Lijnbaan have little cultural amenities, creating little activity during both day and night.

Coolsingel has horeca on the westside of the street, which is however the shadowy side of the street. On the eastside, there are less horeca places, of which only the northern part of the Coolsingel has evening activity. Lijnbaan has horeca on the northside, which is also active in the evenings. The southern part along 500m is completely without activity during the night. West-Blaak has only a few restaurants and a cinema for leisure activity along a streetlength of over 500 meter.

In terms of residential activity, all three streets do not meet this criterium for city vitality. There is virtually no residential activity present. It should be noted that the Lijnbaan and West-Blaak have quite some residential activity in close proximity, in contrary to the Coolsingel.
The maps show the position of housing in the inner city. Clearly visible is the vacuum of housing in the middle of the center, along the Coolsingel, Weena and Blaak boulevards. Also southwest along the park and medical zone there is a vacuum of housing. The riverbank is not very densely inhabited either.

We can conclude that, again, the Weena, Coolsingel and Blaak boulevards are problematic areas considering this criterium. With a few exceptions there is virtually no residential building along these boulevards. The Coolsingel at the moment occupies zero residential units. The Lijnbaan shopping street and Aert van Nesstraat at the crossing with Coolsingel also do not possess housing.
3.10. LACK OF ACTIVITY DURING DIFFERENT TIMES OF THE DAY

During the day large parts of the inner city are active. Some areas with just residential functions and office functions are not very active. The office street Blaak is not active and is located outside the main pedestrian flow area. At night the Blaak turns into a deserted area. The same goes for the Lijnbaan, which is very busy during the day, but at night it is not part of the pedestrian flow. The northern part of the Coolsingel is part of the nightflow, however the southern part, which is the busiest during the day, is quiet at night. This phenomenon is one of the main issues in the city center.

We can conclude that large parts along the Weena, Coolsingel and Blaak boulevards are problematic areas at night. Also the Lijnbaan and Hoogstraat, which are very busy during the day, are quiet at night. Pedestrian flows are completely different at night, meaning some of the streets are not used during the entire day, i.e. the Lijnbaan, Hoogstraat, southern Coolsingel and Blaak. They lack different activities during the day.
3.11. LACK OF HUMAN SCALE

Most of the buildings along the Weena, Coolsingel and Blaak are large grain typologies, which do not fit well with the criterium of fine grain of buildings. Large concentrations of large scale buildings cause windy and shadowy environments, not suitable for the human scale. Large grain also indicates a low amount of function diversity. This indicates that the street is less active during different times of the day, provides fewer ‘eyes on the street’ possibilities and has few entrances, which are criteria for street vitality.
Tall office buildings that have a bad relation with the ground level create boring environments for people.

Many large buildings offer little comfort for pedestrian, i.e. shadowy places without attractive facades.

Tall buildings provide lots of shadow and windy places. Not good for human friendly streets.
3.12. LACK OF ATTRACTIVE PUBLIC SPACE

Rotterdam has a very open urban structure, due to the modernist reconstruction plan. Only 29% is built and 71% is unbuilt, (including private open terrain). When compared to postwar-reconstructed Hamburg (34 – 66%) and Cologne (37 – 63%) (De Zwarte Hond, 2011) we see that Rotterdam is quite behind in this aspect. This leaves a lot of space unused or left as public space. The amount of public realm in the city is quite large, making it expensive for the city to maintain. The public space could be more concentrated to save money and to invest in more quality in concentrated spaces.

The large amount of public space is one of the reasons for the neglect by the municipality to drastically improve the quality of space in the past 30 years. Only since the Binnenstadsplan (2008) the municipality saw the importance of the public realm for the image and quality of the city. The question is how to improve the most important public spaces in the city, the places that are well used and centrally located.

Source: DeZwarteHond (2011)
Some streets are only used for parking and expedition. No qualities that meet the eye.

The Coolsingel is cluttered with bicycle parking, traffic signs, poles and streetlights, without any coherence.

Wide traffic zones without any greenery or quality that meets the eye are places nobody wants to be. They are unattractive environments for people.
3.13. CONCLUSIONS FROM SPATIAL ANALYSIS

From the spatial analysis the following can be concluded:

1. Traffic is not in balance in the inner city, cars dominate the image of the main streets.

2. Poor pedestrian connections between center fragments across main streets: city coherence is lacking, networks are fragmented.

3. Main streets are mostly not part of the evening activity: the function diversity is not strong enough

4. Public space quality is poor, especially in main streets.

Considering,
That the number of new building projects is rapidly declining. Investing in a larger diversity of functions and increasing residential density will be much harder in the coming years, because of the economic crisis.

In order to keep improving the spatial quality and vitality of the city, it is necessary to tackle both function diversity and public space issues. Public space, however, is not dependend on declining private investments. This means the biggest opportunities for improvement of city vitality, at this moment, exist in public space investments. Though efforts should be focused on key problematic places, which can provide maximum spin-off with public investments.

It is relevant,
to choose the central boulevard Coolsingel as the main design case, since this is where most of the inner city spatial issues come together, and where the city can reach maximum spin-off due to the fact that the Coolsingel is the most recognizable and remembered place in the city, which forms the heart of the city center.
This chapter contains comparable examples of boulevards in other European cities, which serve as reference for the design proposal for the Coolsingel in Rotterdam.
4.1 COMPARABLE BOULEVARDS IN OTHER CITIES

PARIS, AVENUE DES CHAMPS-ÉLYSÉES

The main avenue of Paris is 70 meters wide and primarily a street with high amounts of car traffic flowing through. It is also used very much by pedestrian traffic. The width of the street easily accommodates these together. The (1) pavements on both sides are a considerable 21 meters wide, while still leaving 2x 4 lanes for car traffic and two lanes of parking/taxiing/bus stops. (2) The width of the pavement provides room for terraces, benches, trees and car-parking entrances. (3) Every tree and street sign are placed in straight lines, which provides for an orderly sight. Car and pedestrian traffic are clearly divided here and each have their own valuable space, which makes this street work rather well.
4. Comparable cases

4.1 Comparable boulevards in other cities

1) Objects and trees placed in straight lines.
2) Terraces in the middle of the pavement.
3) Pavement structure accommodates the linear character of the street.
4) Trees are cut to provide sunlight on the pavement.
5) Terraces along the facade provide shelter and add life to the street.
6) Kiosk in the middle of the pavement blocks a part of the pavement.
The main street of Berlin is 60 meters wide and has been largely rebuilt after World War 2. The focus of the street is to give space to car traffic, which makes it less attractive for slow traffic. The side pavements are only 7 to 9 meters wide, which is quite small for a main street. (1) Pedestrians can however walk in the midsction of the street, which gives the street monumental character. Here two lines of (2) trees guide the pedestrians along the street. However, the midssection lacks some functions to make it a used space during the entire day. Also the wide roads make the midssection less attractive to reach.
Three lanes of traffic and a parking lane make it harder to cross the street in order to get to the green midsection.

The midsection is often empty because there is not much to do.

1) At some spots there is a terrace, belonging to a kiosk or a cafe on the other side of the street. This gives the space more use.
This typical green boulevard in Paris is 56 meters wide and contains a midsection with (1) green and recreational facilities, while also providing room for a market on the southern section. There are (2) bicycle lanes on each side of the midsection, protected by a car parking lane from the traffic lanes. The (3) midsection is very green and well decorated, with lots of benches, water features, good plantations and large trees to provide shadow during hot summer days. The addition of a market makes this place something extra. However, the pedestrian space along the building facades are very small, making this unattractive space to walk in.
4. COMPARABLE CASES

(1) Bicycle lanes protected by car parking. A useful solution.

(2) The market is a nice addition to the midsection, providing for intense use of the space.

(3) The midsection is decorated very well, with rather good quality green and robust seating objects.
The main street of Dublin has recently been redecorated to make more room for pedestrians and improve the image of the street. The street has two lanes of traffic, and a bicycle lane next to the side pavement. The midsection divides the traffic lanes and gives room for bicycle parking and trees, and to give shelter to crossing pedestrians. (1) In front of the Post Office another kind of pavement was used to mark this special spot, which created a kind of square where traffic was only divided by a subtle difference in level between pedestrian space and car space. It is intended to be used as a shared space.
1) In front of the post office the pavement is continuous, to improve the sharing of space with pedestrians and to create a special monumental atmosphere in this part of the street.

2) Small trees along the side pavement provide for a more green sight while leaving a lot of sunlight to reach the street.
This street in Barcelona is different to the previous streets because it contains a (1) separate bicycle way in the middle of the street. (2) On both sides of the street there is a wide recreational area on the pavements, providing lots of green, benches and even playgrounds. (3) A special kind of pavement lets grass come through the pavement for a more green sight. This street is located in a dense residential area in the center of Barcelona, which demands good pedestrian, children and cycling qualities.
1) A different kind of pavement for a greener sight of the street and requires low maintenance.

2) A separated bicycle lane to give safe passage for cyclists.

3) The green space is attractive to recreate in, while easy to maintain.
4.2 REFERENCES OF PUBLIC SPACES IN OTHER CITIES
4.2.1 COPENHAGEN

Other cities like Copenhagen offer valuable examples of public space use and lively places. Some ideas can be taken into consideration for design:

1. Colored and well defined bicycle lanes.
2. Greenery in a main street with seating possibilities on grass.
3. Terraces along important pedestrian flows.
4. Recreational values like water features, fountains and seating.
Some ideas can be taken into consideration for design:

1. Water can be used in summer for cooling feet, or as nice scenery to walk or cycle by.
2. Terraces that are permanently outdoors but sheltered from rain can add to life on streets, if transparent.
3. Steps can be useful for seating along water or interesting places
4. Walking along the water can be attractive
5. Robust seating combined with greenspace is of added value to the greenspace.
In New York, Times Square was restructured by removing car traffic from one side, which created a pedestrian only zone. This square is now even more the most crowded and popular place of New York. The added value is that this touristic spot in the city is now able to invite people to stay and sit and enjoy the scenery at a terrace or the outdoor theater. The reduction of car traffic was very successful to increase public life on the street here.
4. Comparable Cases
5. VISION

This chapter contains a spatial vision for the revitalization of the heart of Rotterdam, the Coolsgingel.
5.1. Vision Concept

Currently the city center is divided by main traffic streets which still causes car domination of the city center. One of the conditions for inner city quality is that car traffic and slow traffic users should be in balance with each other.

The concept for the inner city of Rotterdam is primarily to (1) introduce balance in the traffic situation. This is an important criterium according to Gehl (2010). The current traffic boulevards Coolsingel and Blaak will be downgraded into city streets, smaller streets with 2x1 lanes, which will be more easy to cross (Gehl, 2010). On top of that, the throughway function of the Coolsingel will be terminated. That means that in the future, no automobile can go right through the city center to get from north to south. (2) The concept is to go around the city center, following the ring road concept that was firstly introduced by the local municipality.

To facilitate this, there will be a larger need for parking places in the vicinity of the center, since it will be more difficult to enter the city. The concept here is to (3) expand the already introduced Park + Walk system by the municipality, by making new parking garages along the ring road structure, with a maximum of 10 minutes walk to a nearby public transport station or a pedestrian network that enters the city center.

It is important that these routes will be carefully designed, since they form the entrance to the city center for many people in the future. This is part of the design task in this project. Secondly, since the Coolsingel will be freed of its car domination, (4) a new plan is presented for the public space of the Coolsingel. This main boulevard is the new central public realm in the city, where many new opportunities can evolve from the removal of the through-traffic.

One of the key issues in redesigning the Coolsingel is to (5) improve the cross connections between the Laurenskwartier and Lijnbaankwartier, in order to improve pedestrian flows between the two parts of the inner city, and to intensify the use of the Coolsingel. The intensification of use of the street will be done by (6) adding recreational value to invite people to stay longer in the streetspace. This means the addition of horeca and seating next to visual stimulation in the public space. The new Coolsingel should be easier to cross and more inviting to walk along. (7) Another addition to the public space is the improvement of the bicycle system along the Coolsingel, and the addition of a running path which leads to the riverfront and to the Luchtsingel project north of the Coolsingel.

Lastly, (8) the Coolsingel will receive much more greenery and waterspace, by bringing the water back into the heart of the city, where it used to be in previous centuries. This will add a new identity to the Coolsingel, a new attractor for activities.

![Diagram showing traffic flow and integration of park + walk system](image-url)
6. Design Proposal

Current Situation
Car traffic dominance divides the city center
• Mainly parking inside center
• Few park + walk possibilities

Concept of Ring Priority
• Decreasing road hierarchy within the center
• Divert through traffic around the city center to start revitalization of the center around the Coolsingel

Current Situation
Car traffic dominance divides the city center
• Mainly parking inside center
• Few park + walk possibilities

Concept of P+W
• Cheaper parking alongside the ring structure in park + walk facilities
• Increasing price of inner city parking for visitors
Parking prices
According to research by Zadelhoff (2012), when prices of parking go up, fewer people will go to the center by car, and take public transport instead. The diagram below shows Rotterdam has the cheapest parking fee of the major cities, making it still quite interesting to enter the city center by car. This is confirmed in the diagram to the right, which shows that visitor rates have risen, in contrary to Amsterdam, Utrecht and The Hague. It is however important for local shop owners and for liveliness in general to at least maintain the amount of visitors, a decrease is not wanted. Therefore, in this vision, it is important that the new parking facilities along the ring structure will not be more expensive than current fees. However, to discourage people from parking on the inside of the ring, it is important to raise parking fees there. This makes good design of pedestrian routes from P+W to the city center extra relevant.

<table>
<thead>
<tr>
<th>Stad</th>
<th>Uurtarief in EUR</th>
<th>Stijging t.o.v. 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsterdam</td>
<td>4.65</td>
<td>49%</td>
</tr>
<tr>
<td>Utrecht</td>
<td>2.90</td>
<td>73%</td>
</tr>
<tr>
<td>Den Haag</td>
<td>2.60</td>
<td>64%</td>
</tr>
<tr>
<td>Leiden</td>
<td>2.47</td>
<td>88%</td>
</tr>
<tr>
<td>Rotterdam</td>
<td>2.45</td>
<td>70%</td>
</tr>
</tbody>
</table>

Source: Zadelhoff, 2012
Traffic collision Coolingsel from above. Source: flickr.com
5.2 EXTENDING CITY WIDE CONCEPT FOR PARK + RIDE

In order for the new inner city traffic system to succeed and to decrease the use of the car towards the city center, the city wide concept for Park + Ride should also be expanded with new park + ride locations to facilitate a large portion of the incoming visitors to the city center. These visitors come from the outside of the highway ring of Rotterdam, and are directed towards the park + ride locations, in which parking is cheaper than the Park + Walk locations in the inner city. From the Park + Ride locations the visitors enter the public transport system towards the city center. Therefore a strong public transport network is vital for the inner city. Extending the city wide park + ride facilities and public transport use is a sustainable way to improve travelling from and to the center, to meet the sustainability goals of the city.
5.3 NEW PARKING AND ROAD NETWORK

The park + walk locations will be strategically placed along the ring, close to the city center networks. Right in the heart of the center the automobile function is removed and replaced with new pedestrian quality. Improved public life can evolve here, with new opportunities for leisure and recreation. This will be the new heart of the city, right at the busiest pedestrian crossing of the city.
The park + walk parkings will cover almost the entire city. Around 6 or 7 new facilities will have to be built, to facilitate around 7,500 new parking places. This will free up space along the inner city streets as well. In the future the remaining street parking spaces will only be available for residents of the inner city.
5.4 IMPROVED PEDESTRIAN CONNECTIONS FROM P+W TO CITY FACILITIES

The routes from the P+W to the center should be very carefully designed following the conditions of the qualities of pedestrian streets. In this proposal the design for a new Coolsingel will be elaborated further.
6. DESIGN PROPOSAL

This chapter contains a detailed design proposal for one of the key places in the inner city of Rotterdam, the Coolsingel boulevard. In this street many of the inner city issues come together. The street is part of the vision for a new, less car dominant, traffic system.
6.1 IMPROVING COOLSINGEL QUALITY OF PUBLIC SPACE

The design goal is to create a new improved Coolsingel boulevard in Rotterdam, which contains the following criteria:

1. better balance in traffic. Reducing car dominance by removing two lanes and terminating the through road function on the southern part of Coolsingel.

2. improved connections between fragments of the city, intensifying the networks of pedestrians (shopping, horeca, recreation)

3. improved connections between center zone and park + walk

4. improved image of the boulevard through better public space
6.2 CHARACTERISTICS OF COOLSINGEL

Eastside of Coolsingel, showing many large scaled buildings. The city hall and old post office are two large monumental buildings. To the right the 17th century Schielandhouse is visible, the oldest building in the center. It has no address along the Coolsingel, but it is visible from the street, which is a quality.

Westside of Coolsingel. The monumental ABN Amro bank and Bijenkorf are prominent on this side. In the future the new FORUM building will rise above the bank building, as seen in the profile. There is a lot of Highrise along the street, providing much shadow on the westside of the street, which should be taken into consideration when redesigning the street.

There are three projects being built in 2013 along the Coolsingel. FORUM starts in summer 2013, adding massive volume to the street. Stadskantoor has already started, adding offices and housing close to the Coolsingel, which is a positive development.

Cool63 also adds some houses, offices and shopping. These three projects are spread out across the Coolsingel. It is still unclear what impact the buildings will have on the street, although we can suggest that Cool63 will make the northern part of Coolsingel quite more lively with new big Saturn shop, horeca and housing. The stadskantoor is situated one street behind Coolsingel, but can benefit from the close proximity. FORUM will add much program, however, it is unclear how many people the building might suck away from the streetscape.
6. Design Proposal

- Post Office
- Hilton hotel
- Cool63 (under construction, shopping, residents and horeca)
- Koopgoot
- Schielandhouse (monumental)
- WTC
Some of the key issues shown above. Car dominance, cluttering of streetspace and lack of quality in public space. Undefined ending of the street, and unattractive midsection with tramway.

The bottom image shows the monumental Post office building, which is underused at the moment, waiting for a shopping outlet to settle in 2013. However, the public space in front of it is also underused and quite shadowy because of the large trees in front of it. Considering Rotterdam has few historical buildings, perhaps this building could have a more prominent presence in the design for the street.
Horeca is mostly located along the northern part of Coolsingel. The southern part lacks evening activity.

Difficult crossings for pedestrians.

Bicycle network is working, but is also interfering with the pedestrian paths at some points.

The small kiosk buildings are blocking the smallest sidewalks, making it hard to read the street. Furthermore, some facades are not clearly defined, resulting in unused and unclear spaces.
Taking the conditions for inner city vitality and quality from the literature study into consideration for the design, I propose the following design interventions that comply with the criteria.

**In relation to large scale**

- reducing car lanes to give more space to pedestrians, bring balance to the street.
- improved cross connections between the Laurenskwartier and Lijnbaankwartier, in order to improve pedestrian flows between the two parts of the inner city, and to intensify the use of the Coolsingel.
- moving Stadhuis tramstop to the Aert van Nesstraat, making it better accessible for pedestrians, and activating the Aert van Nesstraat route towards the Lijnbaan shopping area.

**In relation to small scale**

- adding recreational value to invite people to stay longer in the streetspace. New horeca and seating next to visual stimulation in the public space. The new Coolsingel should be more inviting to walk and sit along.
- improved bicycle path along the Coolsingel, safe from car traffic
- improved bicycle parking system, away from the main street to prevent cluttering and improve understandability and continuity of the street. New concentrated places in the cross streets for bike parking.
- addition of a running path which leads to the riverfront and to the Luchtsingel project north of the Coolsingel, to increase public health and optional activities. This path can also be used for the marathon each spring.
- Greenery will be added to increase attractiveness of the space. The westside (shadowside) of the street will have trees, the eastside will have low greenery with seating edges providing for more sunlight to reach the streetlevel than in current situation. More sunlight will stimulate optional activities in summer.
- waterspace, by bringing the water back into the heart of the city, where it used to be in previous centuries. This will add a new identity to the Coolsingel, a new attractor for activities. The water can be used for cooling in summer, ice skating in winter, and can be covered with stands during events like the marathon and festivals.
- Kiosks will be removed to make the street better readable and clearly defined.
- A new building is added at the southern entrance of the Coolsingel, to mark the beginning of the street and to enclose the street in a better way.

**6.4 Design Goals**

**Large scale**

a) Creating *diversity of uses* in streets
b) Different activities during the day
c) Generating *pedestrian flows across the inner city*
d) Developing a *density of population*
e) Creating *good balance of different types of traffic*
d) Easily accessible public transport
f) Integrated bicycle and pedestrian networks for *public health* and *life on streets*
g) Short building blocks and easy crossing of streets
h) Different types of public space for different streets
i) Good distribution of people attractors
j) Fine grain of buildings with different functions, ages and architectural styles for a strong sense of place or imageability

**Small scale**

a) Invite *people to walk, bike and stay* in city space
b) Safe, attractive public space with visual stimulation to create a sense of place, relating to the context
d) Different *optional social and cultural activities* during the day in public space to increase public participation
d) Frequent & easy road crossings and accessible public space
e) Clearly defined, easily understandable, well enclosed public space with continuity of street frontages and furniture
f) Transparent building facades and eyes on the street from surrounding buildings for street safety
g) Green and water for recreation

*conditions for inner city vitality that are taken into consideration before designing, derived from literature study.*
6.5 CONCEPT

1. Changing street profile, removing through road at of Koopgoot adding new recreational function along the street and improve overall quality
   • changing Hofplein traffic junction into a less prominent one

2. Improving pedestrian connections across CoolSingel to strengthen the networks and pedestrian flows
2. Improving pedestrian connections across Coolsingel to strengthen the networks and pedestrian flows

3. Improving connections from Park + Walk to Coolsingel
4. Removing kiosk and clutter from public space to improve the pedestrian quality.

5. Introducing connection towards Luchtsingel project (see image next page), useful as connection to Park + Walk facility and recreational route. Adding water features to the Coolsingel, refering to the historical use of the street, and adding recreational value.
The newly constructed Luchtsingel, an elevated recreational route that connects station Hofplein with Central station. Source: ZUS

6. Improving + introducing new public meeting places across the whole street for widespread activity.
6.6 EXISTING VERSUS NEW PROFILE FOR COOLSINGEL

In the new profile, the cluttering kiosks and two car lanes have been removed, leaving more space for pedestrians and recreational value. By doing this, I was able to add the waterbody that can be used for different things. It can function just as pleasant scenery, as a recognizable place in the city, as waterstorage (it can collect rainwater from the surrounding buildings and streets), as iceskating track, or it can be drained in order to build stands for the marathon or other events in the city. In this way the space becomes multifunctional during different times of the year, creating space for optional activities (Gehl, 2010).

Furthermore, a recreational running path was added along the waterside, to increase the recreational possibilities in the street and make it more attractive for people to run along the water. This path follows the street towards the Leuvehaven, where it meets the river. To the north the path is connected to the new Luchtsingel bridge, making easy crossing to the North or Central Station possible. This is also useful for people who do not like to run. Next to the running track, a bicycle path is designed, a twoway path that is completely separated from car traffic and regular sidewalks, making it a very safe bicycle path.
The design consists of the large bodies of water, which give clear guidance to the pedestrian, but it also well crossable at 7 points. The beginning and end of the street are marked by a green entrance, with trees and low green. This is where the image of the street is first established. Quality of the greenery should be of high standard. The southern edge of the street is also marked by a new building, which could be placed there to make a better definition of the street entrance, and to add additional functions to the south of the street. With green roofs, this building adds to the quality of views from above, especially useful since there is a lot of high rise around.

On the north side, the street is marked by the round form of the Luchtsingel extension towards the Coolingsel. Here pedestrians can walk across the Weena without being hindered by car traffic. It can also be used to walk all the way to the Hofplein station, where in the future a new roofpark will be constructed along the former railway arch.

The water is quite maintenance free, and well usable for recreational purposes. People can sit along the steps of the water, or on benches close to the water with a view towards it.

The goal of the proposal is to give insight into the possibilities of the major amounts of space in the Coolingsel. With clear design choices, and good separation of modalities, the street can become a much more attractive place to stay in, which is necessary for the increase of activity and liveliness in the center.
In the design five spots have been assigned for horeca, of which at least four are able to have terraces on the street. The places are spread across the street, complementing the existing horeca. Terraces are people attractors, especially when sunny weather has arrived. Therefore most of the terraces are situated on the eastern side of the street, where most sunlight will reach the terraces.

The sun study to the right shows two of the new places for terraces and their sunlight admittance in March 21st and June 21st. It is clear that in March sun will reach the terraces only during the afternoon for roughly four hours. This is however one of the best spots in the street for early year sunlight. In June the spot is sunny almost the entire day.

On page 122, the northern part of the coolsingel is shown in sun study. It is visible that both terrace spots remain quite sunny in March during the afternoon. One of the conditions for this to happen is the removal of the excessive amount of large trees along this side of the street, causing much shadow in the summer. These trees can be replaced elsewhere, for example to greenify the Weena or other ringroads around the center.
6. Design Proposal

March 21st, 12:00
March 21st, 16:00
March 21st, 18:00

June 21st, 12:00
June 21st, 16:00
June 21st, 18:00
As stated, to increase the permeability of sunlight on the streetscape, it is necessary to replace large trees on the eastside of the Coolingsel. With this operation, new places for recreation will come to life during sunny periods along the whole eastside of the street. These are also places very suitable for terraces and different kinds of seating. To make the eastern side still green though, it is necessary to create low greenery, to keep engaging the eye of the pedestrian (Gehl, 2010).
TRAFFIC
To bring more balance to street traffic, the through way function has been removed, since this is the largest portion of traffic flowing through the street, never contributing to good street atmosphere. Between Aert van Nesstraat and Blaak, a pedestrian area has been created, partly shared with a tramway. This area is the busiest area of the street and therefore will mostly not become empty without car traffic present. Although it still is necessary to add more diversity of functions and uses to improve the activity during the whole day. The car parking garages are still accessible, making for a slower transition towards the final ringroad plan. After this plan is fully incorporated in the city, the parking garages can be used for inhabitants or employees only for example. This is not decided yet however.

PUBLIC SPACE CONCEPT
The concept for the public space is for the street to have green entrances, which gradually transit into waterbodies, with lots of opportunities for people to recreate. The key is for people to be able to enjoy the public space. Many seating opportunities have been added, together with terraces and sunny places without the interference of large trees.
GREEN
The green is spread out across the street, mostly in green beds along the pavement, with nature stone edges on which people can sit comfortably. The greenery is situated in straight lines as much as possible, to provide optimal sightlines and readability of space.

WATER
Water is used in two forms. One is the water body which is multifunctional as mentioned before, it can be used for events or just for sitting along the waterside. The other form of water is used under the tramway. The tramway crossed a very undeep body of water which adds reflections and dynamic views to the streetscape. Water can provide more quality than stone pavement under the tramway.
PUBLIC HEALTH
To increase opportunities for leisure and sports, I introduce a running track along the waterside in the Coolsingel design. This track is connected to the Luchtsingel in the north and the river to the south. It can also be used, together with the new cycling path alongside it, for the marathon each spring. The fact that the path is alongside the water makes it a nice attractor of people that like proper scenery in a very dense urban environment.

PUBLIC TRANSPORT
Public transport accessibility is one of the key criteria for a vital inner city. The tram remained in the plan, but the station of Stadhuis was moved south to the middle of Coolsingel, together with the Beurs station, which was moved south to Churchillplein. This activates both the Aert van Nesstraat and Churchillplein, while creating better public space on the spots of the old stations. Together with these measures, the tram from the Oldenbarnevelstraat was removed, to make place for better pedestrian quality. The new location of this tram is the wide street Blaak, which has a lot of space for this function, and can also be activated by it.
PUBLIC SPACE TYPOLOGY
There are two squares, Stadhuisplein and Beursplein, both with good horeca activity. They can also be used for events such as festivals. Mainly on the eastside I added new terraces for leisure activity on the street. Both ends of the Coolsingel are green environment with qualities that engage the eye (quality vegetation). The water body typology is a new one in Rotterdam. A place where people can touch the water and walk through it in summer.
OPENING THE VIEW
The view from the Binnenwegplein towards the monumental Schielandhouse is now being blocked by the large kiosk. To provide better sightlines and visibility of important landmarks, I removed the kiosk, of which the functions can be placed in the building that is discussed in the next paragraph.

DEFINING THE ENTRANCE
The entrance of the Coolsingel is not well defined by surrounding buildings. The street facades are not clearly understandable for people. That is why I suggest an addition to the plinths of two buildings on the eastside, adding a conservatory space which can be used as a lobby or shop. This will guide the pedestrian better alongside the street. On the westside I added a new building next to one of the remaining kiosks.

The kiosk is blocking the sightline towards the monument.

What to do with the incoherent left-over spaces?

As can be seen from this perspective.

In the proposal the monument is visible again, adding value to the pedestrian environment.

Make the facades straight, by adding plinths, and a new building to the westside in order to define the street better.
The removal of the Stadhuisplein kiosks provide a clear spatial connections between City Hall and the square (Gehl, 2010). The square pavement is also continued across the Coolsingel, marking the place that is the Stadhuisplein.

The addition of the waterspace provides interesting place to stay and recreate (Gehl, 2010).
The entrance of the Coolsingel is better defined by the new building in the center of the image. Combined with this the new straight plinth of the Robeco building and HBU building provide better guidance for the pedestrian (Montgomery, 1998).
Several bridges cross the water at Beursplein. Providing interesting sightlines across the Coolsingel.
A terrace can be placed in the water near the WTC Beursgebouw. This sunspot is very suitable for this kind of function.

The steps along the water are very suitable for recreational purposes. However, people can also sit on benches.
The new connection with the Luchtsingel provides good opportunities to cross the Weena easier towards the north or Central Station.

The northern end of the waterbody transfers into a green bed, on which people can enjoy the sun in the summer.
The running track follows a straight line towards the river. Here the view towards the river is emphasized. Trees can however disrupt the view. (work in progress).

Note that these impressions are work in progress, they do not show trees, pavement, people and greenery.
In this chapter conclusions regarding the thesis are made and a critical reflection is done on the academic process that was undertaken.
7.1. CONCLUSIONS

The conclusion of this project is embodied in the design proposal for Rotterdam. In order for the city to become more vital, which means active, lively and economically viable, different strategies need to be implemented. Firstly, strategies for upgrading and balancing public spaces in the city, need to be considered on a broader scale than just one street. One street can however make create large spin-off, as we can see in the Meent and Nieuwe Binnenweg in Rotterdam. Secondly, the city plan to make street plinths more active is a necessary intervention, which is however difficult to implement. Ownership, financial issues, local participation play a role in this process. For an urban planner, these processes take a long time and it is very dependend on economic forces. In my graduation project I did not focus on this issue. The further diversification and densification of the city is also a long term plan, which is very complex, since it also takes into account the growing need for sustainable buildings and life in cities.

In this project I tried to focus on what could be time in relative short time, that would be able to cause more spin-off for the surrounding city, and possibly for the better image of the city center. The proposal for the Coolsingel shows that with simple interventions, removing car lanes, creating more space for pedestrians, making waterscapes and adding greenery, a public space can become much more attractive. These interventions were largely derived from the literature study I performed earlier during this graduation year.

I wanted to find out what kind of spatial intervention could mean drastic improvement of the inner city, without really changing that much in the built urban fabric. For Rotterdam, the key intervention was to reduce car traffic dominance in the inner city. This is an ambitious plan, since people from Rotterdam are very much used to driving the car to the city center. This form of radical change, from a predominantly car city to a more equal city with all kinds of traffic forms, means a cultural change also has to take place. I did not have time to investigate further into the sociology of the change of urban mobility for residents of a city. However, it could be very interesting to find out what exactly invites people to leave the car at home. In the project I assumed by the numbers of Zadelhoff (2012) that when raising the prices for parking, people would not use the car to go to the center, instead they would use public transport or, in the case of this project, park the car around the city center. However, it could also cause people to completely stay away from the city center, perhaps even more so because Rotterdam at the moment does not have that pretty imageability to keep coming back as a visitor.

The plan still seems realistic, but the outcome is never certain. The fact remains that the Coolsingel, through upgrading public space, and giving pedestrians more space and places to stay, can become very much better place than it is now.

For future research I would recommend to do further research into the reasons why public space attractiveness is so important for residential functions to emerge in a city center and how a sustainable approach of public space can add to the quality of life in the city. In other words, how can we use public space for the benefit of the city, not only for attractiveness, but also for energy-efficiency, recycling of water and air, generation of energy in public space etcetera, all to make life in the cities better and to increase the economic strength of cities by making them independent from fossil fuels etc.
My approach for this master thesis can be described as complex. At the beginning of the graduation year, I was interested in many things relating to the inner city. I wanted to do research into compactness of cities, densification, intensification, and the role of public space in all this. The wide interests made my scope very difficult at the start. I had difficulty to focus on one matter. As the year progressed, and I gradually came to know more about the issues in Rotterdam, and the currently most relevant issues, it became more clear to me that I should focus more. I chose to focus on the direction of urban vitality, which is still quite a broad field. I learned that many researchers had written about this subject, which made it difficult to filter the vast amounts of information. All in all, the first 5 months of the graduation were quite a struggle to find what exactly I wanted to do research into, and what exactly I wanted to design as my final project. Since so many things in Rotterdam are relevant issues, for example the lack of quality in public space, low amount of inhabitants, large scale of buildings and low diversity of uses, all of these were interesting things to investigate into. Perhaps I should have picked one of these earlier in the graduation year as my focus, since I find it quite hard to capture all of them together into a manageable analysis. In the end, I think I tackled the problem, but I tried to solve it with a design solution mostly for the public space, while many of the other issues like diversity and population density were less taken into account in the final proposal. So in the end, the relation between research and design in my project was not completely continuous throughout the year.

In my graduation project I found that it is extremely difficult to tackle the huge issue of lack of urban vitality. Many factors play a role in urban vitality, as became clear in the literature research. I tried to focus on five key issues in the city, in order to tackle the problem more effectively. It is not possible to consider every aspect I derived from literature, so I focussed on what I thought were the main problematic spatial issues of Rotterdam, and tried to assess them using the criteria from the literature study. This worked rather well in the end, although it was much more complex than I thought at the beginning.

For the design I am quite satisfied I managed to solve most of the issues I discovered in one design solution. Although perhaps not all of the criteria for vitality were implemented, many of them were, making the design relevant as a possible solution for a key problematic area.

The problem in my graduation thesis is very much related to the studio Urban Regeneration in the European Context. The urban vitality issue is one of regeneration of an existing inner city. In my project I tried to create a strategy for city center regeneration through the reduction of car use, and increase of quality pedestrian space. The studio tries to find new strategies for urban regeneration and find what kind of urban design can contribute to the improving of existing cities.

The social context in which the project can be placed is that of a city that is in need of a better socio-economic position. The city seems to lose competition to Utrecht and Amsterdam if no actions are taken. Although the municipality is doing quite a lot recently to improve this socio-economic situation, my project tried to search for a more direct solution that could speed up the process of better imageability, and solve the most prominent issue of the inner city of Rotterdam, which is the car dominance and unattractive main street of the city. Both of which maintain the unattractivity for wealthier and higher educated to live inside the city center.


ECONOMIC DEVELOPMENT BOARD ROTTERDAM (EDBR). (2012). The Economics of Beauty. Rotterdam


GEMEENTE ROTTERDAM. (2012). Rotterdammers maken de stad. Rotterdam: Stadsontwikkeling


ING ECONOMISCH BUREAU (2012). Kwartaalbericht Regio’s


ONTWIKKELINGSBEDRIJF ROTTERDAM. (2011) Economische Verkenning Rotterdam. Rotterdam: OBR
Spatial conditions for a vital inner-city
Towards a good inner-city life

Ard Jan Wolters

Abstract – Due to decades of post-war modernist reconstruction and the suburbanization trend, some inner cities in Europe are now facing the issue of a lack of liveliness and attractiveness. Since World War Two, these inner cities, like Rotterdam in the Netherlands, have a much smaller population base to sustain inner city commercial and cultural facilities. This resulted in more quiet streets during long periods of the day. It also caused the closing of many amenities, leaving only the larger (flagship) stores and cultural facilities behind. Modernist planning principles for the post-war reconstruction of many city centers resulted in car-dominated centers with a strong separation of functions, which led to a fractioned inner city without the necessary mix of functions that is required to reach a lively city (Salingaros, 2000). This reduced diversity and dynamics of inner city life, which caused a degradation in the reputation of many inner cities. These problems were recognized decades ago by Jane Jacobs (1961) and Jan Gehl (2010), who both observed car-domination of city centers, caused by modernist planning ideas with a decrease of the human scale in mind.

This research explores the spatial conditions required to achieve lively and stronger inner-cities. These conditions will serve as guidelines to possible spatial interventions regarding my thesis. Several acknowledged researchers in the field propagate that inner cities at least need mixed-used streets with a diversity of uses, and public spaces that have a clear focus on the human-scale (Gehl, 2010; Jacobs, 1961; Montgomery, 1998). One of the outcomes is also the need for a higher population density to sustain and mutually support surrounding amenities and public life and to create a fine grain in developments, always keeping in mind the human scale.

Key words – inner city, liveliness, city life, walkability, city streets, city economy, sustainability

1 Introduction
The post-war reconstruction of cities in Europe has been criticized by many for the way the automobile was prioritized in all new urban developments (Jacobs, 1961; Gehl, 2010). The very influential work of Gehl (2010) for example states that ‘Jacobs pointed out how the dramatic increase in car traffic and the urban planning ideology of modernism that separates the uses of the city and emphasizes free-standing individual buildings would put an end to urban space and city life and result in lifeless cities devoid of people’ (p.3). This planning ideology was very much applied to different World War Two-destroyed inner cities in Europe. It resulted in a number of cities, like Rotterdam, to have large infrastructures going through the city center, providing optimal car access, but reducing the pedestrian possibilities to walk easily between parts of the inner city. It also caused the city to be devided into several parts which received different functions. As Gehl (2007) states: ‘Rotterdam is a rather mono-functional and shopping-oriented city with predictable patterns of use: low level of evening activity, little pedestrian traffic outside the busy shopping streets’ (p.6). This lack of connectivity between city center fragments, and lack of life outside shopping hours, is a result of the planning principles of separation and mono-functionality (Salingaros, 2000; Jacobs, 1961). It is also a result of the lack of focus on the human-scale, as Gehl (2010) mentions. As architect Gehl (2010) states:

Achieving the vision of lively, safe, sustainable and healthy cities has become a general and urgent desire. All four key objectives – lively cities, safety, sustainability, and health – can be strengthened immeasurably by increasing the concern for pedestrians, cyclists and city life in general (p.6).

The purpose of the paper is to find the different conditions that make a city vital, as they have been propagated by various acknowledged researchers on the subject of city life and quality. This is done in order to construct a theoretical base for proposing design interventions in the city of Rotterdam, and which could also be applied to other similar cities dealing with the same kind of issues.

The next chapter firstly draws attention to the different aspects that contribute or are vital to city life. Further I will give my interpretation of these aspects and a critical evaluation towards the subject. Lastly conclusions are made and recommendations for the continuation of the graduation thesis.

2 Spatial conditions for a vital city
2.1 Diversity
One of the most renowned researchers in this field is Jane Jacobs, who in Death and Life of Great American Cities (1961) made a strong argument that cities need diversity of uses in order to be vital. As Jacobs (1961) stated:

This ubiquitous principle is the need of cities for a most intricate and close-grained diversity of uses that give each other constant mutual support, both economically and socially. The components of this diversity can differ enormously, but they must supplement each other in certain concrete ways. (p.14)

So the basic principle behind Jacobs’ idea about a good city is diversity. This means for one that streets should have more than one function, for example commercial and residential, which are then able to support each other. This would also cause the street to be active at multiple times of the day, not only during working hours as is the case with a commercial street. Jacobs (1961) furthermore divides four main conditions to make a city diverse:
1. The district, and indeed as many of its internal parts as possible, must contain more than one primary function; preferably more than two. These must insure the presence of people who go outdoors on different schedules and are in the place for different purposes, but who are able to use many facilities in common.

2. Most blocks must be short; that is, streets and opportunities to turn corners must be frequent.

3. The district must mingle buildings that vary in age and condition, including a good proportion of old ones so that they vary in the economic yield they must produce. This mingling must be fairly close-grained.

4. There must be a sufficient dense concentration of people, for whatever purposes they may be there. This includes dense concentration in the case of people who are there because of residence.

These four conditions are regarded as the most important point Jacobs makes. It is not guaranteed that every district of the city will reach the same amount of diversity and quality of life but with these four conditions a city should be able to reach its best potential (Jacobs, 1961). The combination of uses is necessary to spread daily activity in the street. Shops need residents to be economically viable, but also the people who work in the neighbourhood are a source of income. Both groups are there during different times of the day.

Many cities have a mono-functional business district, which, after working hours, is no longer used by people. This makes them dull and deserted in evening hours and weekends (Jacobs, 1961). The same phenomenon occurs in mono-functional shopping streets, which are only active during working hours. This calls for a better mix of functions in these problematic areas.

The second condition of diversity is that of short blocks and frequent streets (Jacobs, 1961). Frequent streets and short blocks permit the ‘cross-use of’ among users of a neighbourhood and are effective in helping to generate city diversity and vitality (Jacobs, 1961). Longer blocks can isolate streets from the urban fabric socially and economically, which also applies to dead end streets.

The third condition of city diversity is the mix of buildings that vary in age. Cities not only need old buildings in a high state, according to Jacobs (1962), but also some run-down old buildings, since these paid off buildings accommodate ordinary businesses which add to the diversity of the street economy and therefore attracts different sources of people.

The last condition holds the density of people, and in particular the density of residents (Jacobs, 1962). Local residential density adds to the city life and makes streets lively during longer periods of the day. People going in and out for groceries or walking to their office nearby generates different kinds of traffic during the day. So there are many of these types of traffic that contribute to city complexity and life. As Jacobs states, that concentration of people is ‘...the source of immense vitality, because they do represent, in small geographic compass, a great and exuberant richness of differences and possibilities’ (p.220).

Namesake and urban design professor Allan Jacobs (1987) also propagates the need for residences in a city district to be vital. He states ‘...I would stress more strongly the need for integrating places of residence with other uses’(p.113). Which is corresponding with Jacobs (1961) and Gehl (2010). He furthermore states that ‘we know all about mixed-use projects that consist of shopping and office activities, but we do not insist as much as we should on living-working-shopping mixes’ (p.113). Many European cities apply a good use of the mixed-use streets (Gehl, 2010), however the cities that were rebuilt with modernist principles lack that kind of quality.

Jacobs et al. (1987) also state ‘there must be an integration of activities -living, working, and shopping as well as public, spiritual, and recreational activities- reasonably near each other. The best urban places have some mixtures of uses (p.118).’

Uytenhaak (2008) says that higher densities can lead to a certain loss in quality of the urban fabric, but also adds to the city activity and dynamics and more efficient use of space. He adds that ‘cities have to be active, be full with people, functions, movements, without being cramped’ (p.14). It is the urban designer and architect who can contribute to this and the way a design fits these demands together.

Salingaros (2005) adds to the issue saying ‘there is nothing wrong with either high density or low density per se, as long as it is well integrated with other densities and is in the right place (not too much of the same thing’ (p.100). He rejects the suburban low density domination in American cities, but also resists the high density developments in downtown areas. Both destroy urban life on the street in different ways. Low densities provide no support for street amenities, but skyscraper densities suck people away from the street (Salingaros, 2006).

Montgomery (1998) has a very similar idea about city vitality as Jacobs (1961), but differs a little in the vocabulary and system. He mentions twelve conditions for making a city vital. These are development intensity, mixed use, fine grain, adaptability, human scale, city blocks and permeability, streets (contact, visibility and horizontal grain), public realm, movement, green space and water space, landmarks and visual stimulation, architectural style as image. These conditions roughly coincide with Jacobs, but also add a few more detailed aspects. About architectural style he mentions that it ‘is not unimportant for this also conveys meaning, shapes identity and creates image’ (p.113). This implies streets have to be designed carefully with architectural design as one of the carriers for successful street and city image.

2.2 Pedestrian life

People make cities alive (Gehl, 2010). Gehl (2010) addresses the importance of pedestrians and cyclists to city life. He stresses that ‘the potential for a lively city is strengthened when more people are invited to walk, bike and stay in city space (p.6)’. People
Physically active in public space are vital for city life. People in cars are not participating in street life (Gehl, 2010). He continues that "a city that invites people to walk must by definition have a reasonably cohesive structure that offers short walking distances, attractive public spaces and a variation of urban functions (p.6)."

According to Gehl this increases activity and the feeling of security in city spaces, which is also a condition for good city life. Gehl also calls for a sustainable city in order to be economically resilient and beneficial for the environment and therefore city quality. As Gehl (2010) mentions:

The sustainable city is strengthened generally if a large part of the transport system can take place as 'green mobility', that is travel by foot, bike or public transport. The forms of transport provide marked benefits to the economy and the environment, reduce resource consumption, limit emissions and decrease noise levels (p.7).

Gehl (2010) explains the importance of the human’s perspective in public space. The city is a place to meet. In Figure 1 Gehl propagates twelve quality criteria for successful city landscape. These criteria are all important in order to achieve a strong urban climate for pedestrian activity.

To sustain his argument for his criteria, Gehl (2010) states that regular city life surveys from Melbourne and Copenhagen are particularly interesting because they have documented that improving conditions for pedestrian traffic and city life lead specifically to new patterns of use and more life in city space. Gehl concludes that if better city space is provided, use will increase in large city public spaces, and individual city spaces and all the way down to the single bench or chair.

Jacobs (1961) also makes the argument for pedestrians. She adds that busy sidewalks ensure street safety, foster contact by bringing people together, and further assimilate children into society. Jacobs (1961) adds that in order to reach safe streets ‘there must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street’ (p.33). These eyes are not only pedestrian, but also come from the buildings surrounding the public space, therefore required to be transparent. Shops, bars, cafés and restaurants are required to attract people during the evening. Mixing work and residential functions assure that there are always people around keeping the streets safe with their presence (Jacobs, 1961).

On the subject of automobility versus pedestrianism Salingaros (2005) states that ‘automobiles are a tremendously useful mode of transport, but they must be accommodated without destroying the pedestrian urban fabric’(p.280). He continues that where this pedestrian fabric has been destroyed already it must be reintegrated. Salingaros (2005) also mentions we have to adopt a new philosophy of humankind’s relationship to nature and the environment in order to actually generate living cities. The human-scale, as Gehl (2010) mentioned it, is again on top of the discussion.

2.3 Street Quality

Street quality is further elaborated in Allan Jacobs his work. Jacobs (1993) is an expert in street quality and states that ‘certain physical qualities are required for a great street. All are required, not one or two: accessibility, bringing people together, publicness, livability, safety, comfort, participation, and responsibility (p.270). Jacobs (1993: 270) gives seven qualities that are required for a great street. I further elaborate on each aspect here:

1. ‘Places for People to Walk with Some Leisure’. This means wide and safe walkways for different paces and protection from cars by for example trees.
2. ‘Physical Comfort’. This requires access of sunlight when it is cool, shade when it is hot. Also to be able to define the street both vertically and horizontally. There is a two (streetwidth) to three (buildings) proportion for a good definable street. Trees can offer good definition and help with shading and comfortable feeling.
3. ‘Qualities That Engage the Eyes’, Visual complexity is required, but not too complex as to become chaotic or disorienting.
4. ‘Transparency’. This means the transparency of the street edges, the buildings. Usually windows and doors give transparency and provides insight to what the building contains.
5. ‘Complementarity’. This implies buildings are not the same but they express respect for each other, most particularly in height and the way they look. There should be a degree of coherence in the built structures.
6. ‘Maintenance’. A street just has to be clean and proper in order to have quality.
7. ‘Quality of Construction and Design’. Use of good materials is of the essence in street quality. Also more efficient for maintenance.

Allan Jacobs’ description of street qualities offers quite detailed information for achieving good streets, which is useful to investigate existing streets in the degree of compatibility with the required qualities and to find room for improvements.

According to Jacobs (1993), other qualities that contribute to good streets are the use of trees, clearly defined beginnings and endings of street, diversity in buildings, special design details like paving, benches and lights, places for staying, like plazas or terraces, accessibility for people, for example by transit and by entry streets, not an extensive amount of parking places but just enough to protect pedestrians from car traffic, and lastly density and diversity of use which enlivens the area and the street, “bringing together different people for different purposes” (Jacobs, 1993:292). All of these aspects require a good urban design that includes them for each single street in the inner city.

2.4 Urban Coherence

The urban image is one of the contributors to city vitality. As Gehl (2010) mentions, Venice has everything it needs to be successful. Carefully designed buildings, short walking distances, streets designed for the human-scale, and therefore is blessed with a highly imageable city (Lynch, 1960). About imageable cities Lynch (1960) states:

A highly imageable (apparent, legible, or visible) city in this peculiar sense would seem well formed, distinct, remarkable, it would invite the eye and the ear to greater attention and participation. The sensuous grasp upon such surroundings would not merely be simplified, but also extended and deepened. Such a city would be one that could be apprehended over time as a pattern of high continuity with many distinctive parts clearly interconnected. The perceptive and familiar observer could absorb new sensuous impacts without disruption of his basic image, and each new impact would
touch upon many previous elements. He would be well oriented, and he could move easily. He would be highly aware of his environment (p.10)

Venice might not be a city where one would orientate well, but it does meet all the other qualities of imageability Lynch mentions. People are persuaded to see the city as something complex, but inviting and challenging. Cities require good connectivity between parts of the city in order to be coherent (Salingaros, 2000).

Salingaros (2000) states that ‘contemporary rules for urban form, which reduce both complexity and connectivity in today’s cities, are not capable of generating urban coherence’ (p.291). He says further that ‘the urban fabric must be strongly connected on the smallest scale, and loosely connected on the largest scale. Connectivity on all scales thus leads to urban coherence’ (p.291). This means a city needs to be both complex and connected, which requires networks on different scales to connect in a different way, but always in coherence with each other. So pedestrian networks should be protected against large road networks, they should fit well into each other. As Salingaros (2005) says: ‘A city has to balance all these connections. Like in any other problem of competition, the larger/stronger connections have the advantage, and will naturally displace the smaller/weaker connections. There exist fundamental physiological and psychological reasons for why pedestrians require small-scale connections on the ground level. Unless protected, those paths are at risk from other, stronger networks.

This also applies to the mixture of uses in the city streets. The mix contributes to the coherence of the city, since it counteracts separation of different functions into different parts of the city, which do not strengthen or support each other (Salingaros, 2006).

3 Conclusions
Several conclusions regarding the conditions for vital city life can be made. Much attention has been paid to the diversity or mixture of uses in city streets (Jacobs, 1961; Montgomery, 1998; Jacobs, 1987). Diversity seems to be the vital word for city life to be successful. Diversity is something you can arrange physically, but it is preferred that it spontaneously grows for it to be authentic and to be able to add to the city coherence (Jacobs, 1961; Salingaros, 2000).

Planning diversity seems to be a lot harder, but the given conditions can be included in urban plans in order for it to develop gradually over time. This is not a case of quick turnaround. City diversity is something of the long term. On the other hand there is also much attention towards the pedestrian scale or the human-scale of the city (Jacobs, 1961; Gehl, 2010). Walkability of the streets and inviting bicyclists are key to provide good city life, since people are the ones who bring life to the city, not cars (Gehl, 2010).

Streets should be designed carefully, taking in mind the conditions of Jacobs (1993) for making streets successful. The scale of buildings, the width of the street, the protection of pedestrians and the quality of the materials are a few of the things a designer should take in mind.

Lastly the coherence of the city is important for making a city vital. According to Salingaros (2000) good connections are important for making parts of the city integrated, and networks of different kind should support each other, not interfere.

This paper tried to address as many conditions as possible which contribute to vital inner cities. However this is not a complete summary of all that is necessary for a city to succeed. Other factors like regional economy, political factors and social issues come into play when redesigning a city. Especially the latter is important since existing inhabitants of inner cities will not easily comply to changes in their environment. This subject requires additional research in order to be able to coordinate future developments in cities.

4 Recommendations for the graduation project
The findings of this paper will be taken into consideration for the final design project. The conditions for great streets will be taken into account in the analysis and possible redesign of the existing street network in the projectcity and can be used to search for weak spots in the existing streetnetwork.

5 References


