



Spatial design interventions to enhance the positive experience  
of the bicycle network from the viewpoint of the cyclists

# CYCLE-FRIENDLY AMSTERDAM

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**DESIGNING FOR CYCLISTS IS NOT  
A PROBLEM, IT IS A CHALLENGE**



# PREFACE

## Personal note

During the process of the formulation this thesisplan, I have had the opportunity to re-think about what cycling in a city like Amsterdam really means to me. Cycling in Amsterdam is so normal, that you don't really think anything of it.

For a long time I thought the reason I cycled a lot was due my irritations towards the public transport. Rather than recreational, cycling was a functional way of getting around.

For four whole years, during my bachelor at the Hogeschool van Amsterdam which is located at the Amstelstation, I cycled roughly 24 kilometers every day. Nevertheless, also quite some Amsterdammers ridiculed me for cycling such a long distance getting to classes. But... Nothing could beat my trustworthy bicycle in time... And also in enjoyment.

Not only did the long cycle trips wake me to get ready for class (which was of course very useful), for four years I have been able to experience the development of a part of the city through different times, situations and seasons. I learned how this part of the city moved and what was happening at every corner of the street.

Cycling in Amsterdam... It really is a serious matter. However, it is also a thing I can enjoy at any moment. And that is what makes cycling in Amsterdam so attractive to me.

## Title clarification

My thesis has the title 'Cycle-friendly Amsterdam'. However, worldwide the term 'bicycle-friendly' is known and commonly used to describe how well a city is involving the opportunities of the bicycle instead. And although becoming more bicycle-friendly certainly is a good start for a city, to me, the word is incomplete and incorrect. Being bicycle-friendly means to me exactly as it states: being friendly for the bike. The bike does not necessarily need to have an owner. Therefore, when a city tries to become more bicycle-friendly the focus should be more about the material side: providing for the bicycle only. Think about a nice parking space where the bicycle will not suffer due lack of maintenance.

With being cyclist-friendly a city would still not be there. A cyclist is an owner of a bike. However, the owner does not always need to use the bike, but instead should get the chance to.

A city which focusses on being cycle-friendly is finally there. Being cycle-friendly can only happen in combination of a bicycle and a cyclist and cannot stand alone. Designing cycle-friendly is to design for the action of cycling and not for just the bike or the cyclist. Instead of going halfway, cities should strive to become more cycle-friendly, in which the experience on the road of the cyclist on the bicycle stands central.

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# THESISPLAN





*Free way for the cyclists at the Stadionweg in Amsterdam (2016)*

# 1. BICYCLE CAPITAL AMSTERDAM

The Netherlands is globally associated with bicycles, which is what makes this country so unique in the world. As a representative, not for nothing is Amsterdam often referred to as the bicycle Capital of the world. With around 881.000 bicycles, compared to 800.000 residents (Noordhoff atlasproducties, 2015, p. 136-137), bicycles can literally be found everywhere in the city. And with a main bicycle network of 513 kilometers of bicycle lanes (Noordhoff atlasproducties, 2015, p. 136-137) Amsterdam has a base network the city can be proud of (Figure 1 - Fietzersbond, 2015).

## Development

Though as rich of bicycles Amsterdam is now, this was not always the case: Amsterdam has a strong history of bicycle infrastructure developing through the past decades. With the rising of the car between the 50s and 70s Amsterdam, just like any other city in the world, started to facilitate for the car more than the bicycle. "Dutch policy makers expected that utilitarian bicycle use would disappear in favour of moped and car use. At the local level this was not different. [...] the concept of the car-governed city received most attention. Still, there was no real anti-bicycle policy. On the contrary, cyclists were still being considered as traffic participants with equal rights. In Amsterdam a "laissez-faire" policy [a policy that allows businesses to operate with very little interference from the government] (Merriam-Webster, 2015a) developed in which all transportation modes – the bicycle included – were taken into account. [In other countries] policy makers and the press actively and consciously reinforced the image that the bicycle was an unsafe, old fashioned and shabby way of transportation. [...] After 1975 bicycle use began to increase and continued to do so until the mid-1980s. This can be largely attributed to developments at the local level. The "issue-chemistry" of traffic safety, energy supply (the oil crises [1973]), environmental pollution, urban liveability, economic recession and car congestion raised and

connected by local neighbourhood groups resulted in increased policy attention at the local level. The articulation of Traffic circulation plans, bicycle plans and bicycle policies were the result. Local initiatives diffused to the national level. Budget deficiencies and societal debates on energy and environment stimulated reconsideration of previous traffic policies. Due to local initiatives the bicycle was rediscovered. This was possible because bicycle use [in the Netherlands] had remained rather high and because cyclists were still being accepted as normal full-fledged traffic participants" (Bruheze, n.d.).

With the convincing of the success of the bicycle it was able to make a comeback, making Amsterdam (as representative of the Netherlands) so special today (see figure 1 - Amount of bicycle trips through the years). Through history, Amsterdam has taken a leading role in making cycling as attractive as possible and it is still at the top. Today, Amsterdam is able to promote its bicycle history and future to the outside world as one of the most successful ways of making and keeping cities more vital.

## Current situation

The current bicycle network Amsterdam holds is unique in the world. Almost everywhere one can find routes specifically reserved for cycling. However, the network still is not as complete as it could be and still lacks in the experience

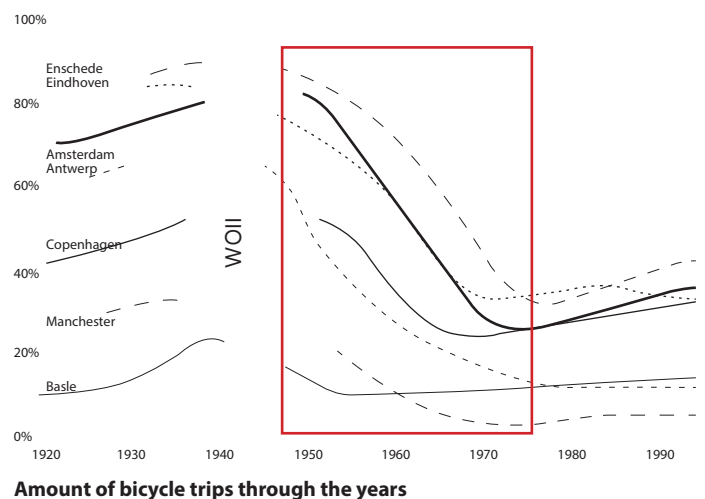


Figure 1 (Bruheze, n.d.)

from the cyclists point of view. Figure 2-5 show both positive and negative aspects of the cycling experience in Amsterdam, often the lack of space reserved for cycling is an issue. Especially in relation to diversion space in case something is blocking or more room next to other infrastructure modalities would make cycling feel more safe. Next to that, in the past years the bicycle as a solution has been a hot-topic in Amsterdam again: the role of the car in the city is questioned and cities want to become more vital again. The answer? Bicycles! The bicycle is seen as the solution for cities all around the world to tackle sustainability and traffic issues. Amsterdam takes a leading role in this perspective and continues to develop its bicycle system in many ways. Nevertheless, Amsterdam is criticized for its highly praised bicycle system as well.

A lot of criticism is even actually based on its success: “[...] the city finds itself a victim of its own success with biking programs” (Stone, Z., 2013). The critics note the big issue that “Amsterdam is currently tackling a problem most cities can only dream of having: It has way too many bikes.” (citylab, 2015). The critics take on Amsterdams chaotic bicycle problem direct: “The Dutch prize their pedal power, but a sea of bikes swamp their capital” (NewYork times, 2013). They see the thousands of bikes scattered around the city, the lack of parking spaces and the feeling that there simply are too many cyclists. Critics seem to frame cycling as something that is not a positive thing to the city. In response to the article of New York times (2013), StreetFilms (2013) made a video with comments of international local cycle experts in Amsterdam. “The success is a challenge, it is not a problem. We are already talking about the next level where we are going to make parts of the city car-free.” (Woudenberg, M. van, in StreetFilms, 2013). Responses to the many articles from locals make one thing clear: “the extensive bicycle use is a challenge to provide for, but it is way easier than to provide for cars” (Lange, M. de, in Streetfilms, 2013).

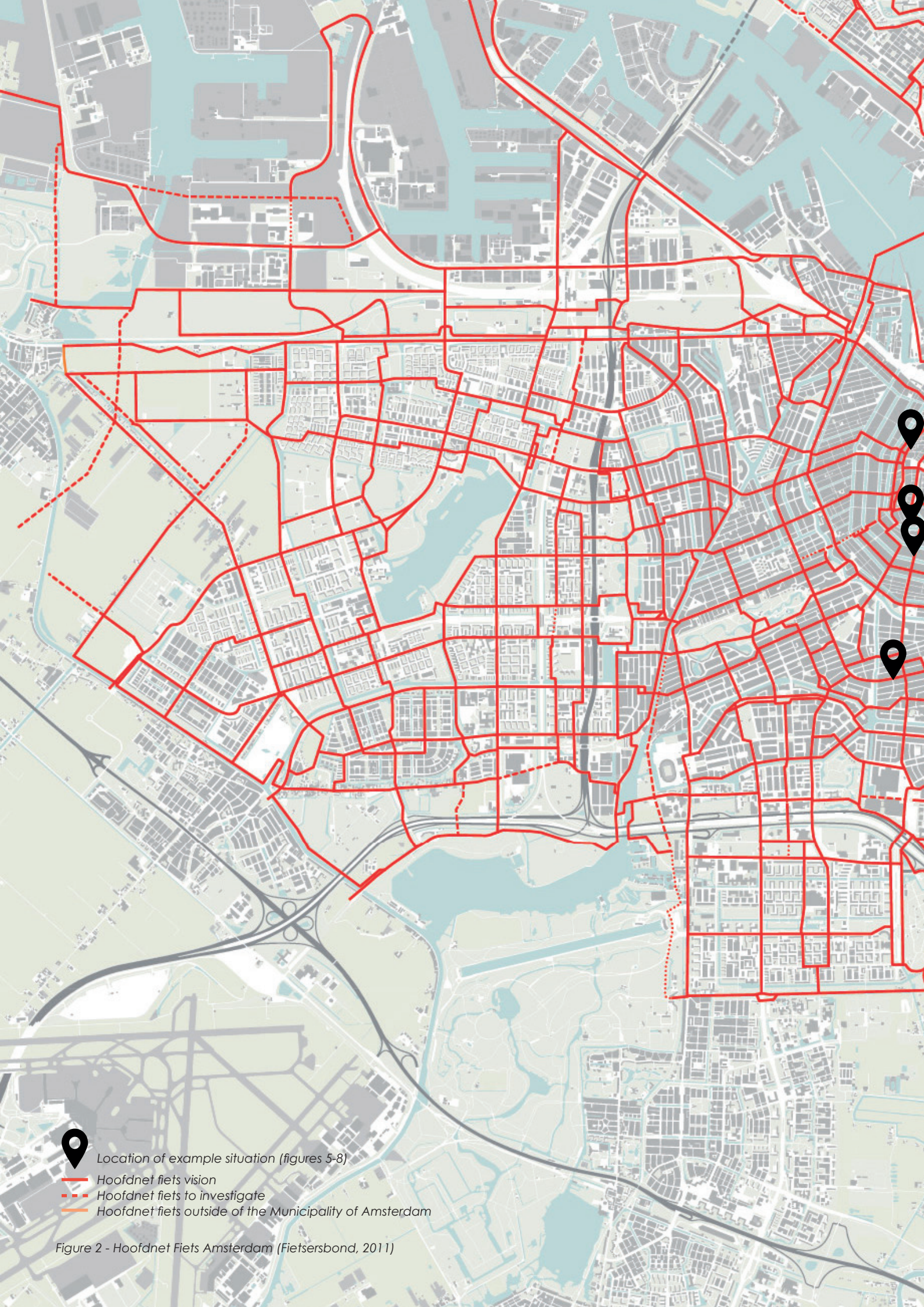
**“THERE WILL NEVER BE TOO MANY BIKES IN AMSTERDAM, THERE ARE TOO MANY CARS AND SCOOTERS IN AMSTERDAM. THAT’S FOR SURE.”**

(Cutler, H. in Streetfilms, 2013)

#### **A cycling city, where the cyclist is the visitor**

Whether critics are taking things out of context or not, there is a correct sense that Amsterdam does have a challenge it needs to take care of. However, the problem will not be solved by pointing at the cyclists. Who says that there is no space left for the cyclist needs to look further: there is not enough space for the cyclist provided, but it is certainly there. Also the Municipality of Amsterdam states (Gemeente Amsterdam, 2013, p. 60). that the historical city streets of Amsterdam are often too small to facilitate for public transport, cars, cycling and pedestrians and therefore in certain streets a priority for a specific type of infrastructure should solve this issue In their policy, the Municipality of Amsterdam, also states that normally compromises are made to facilitate both residence and movement functions causing neither to function properly, causing most of the accidents in traffic as well.

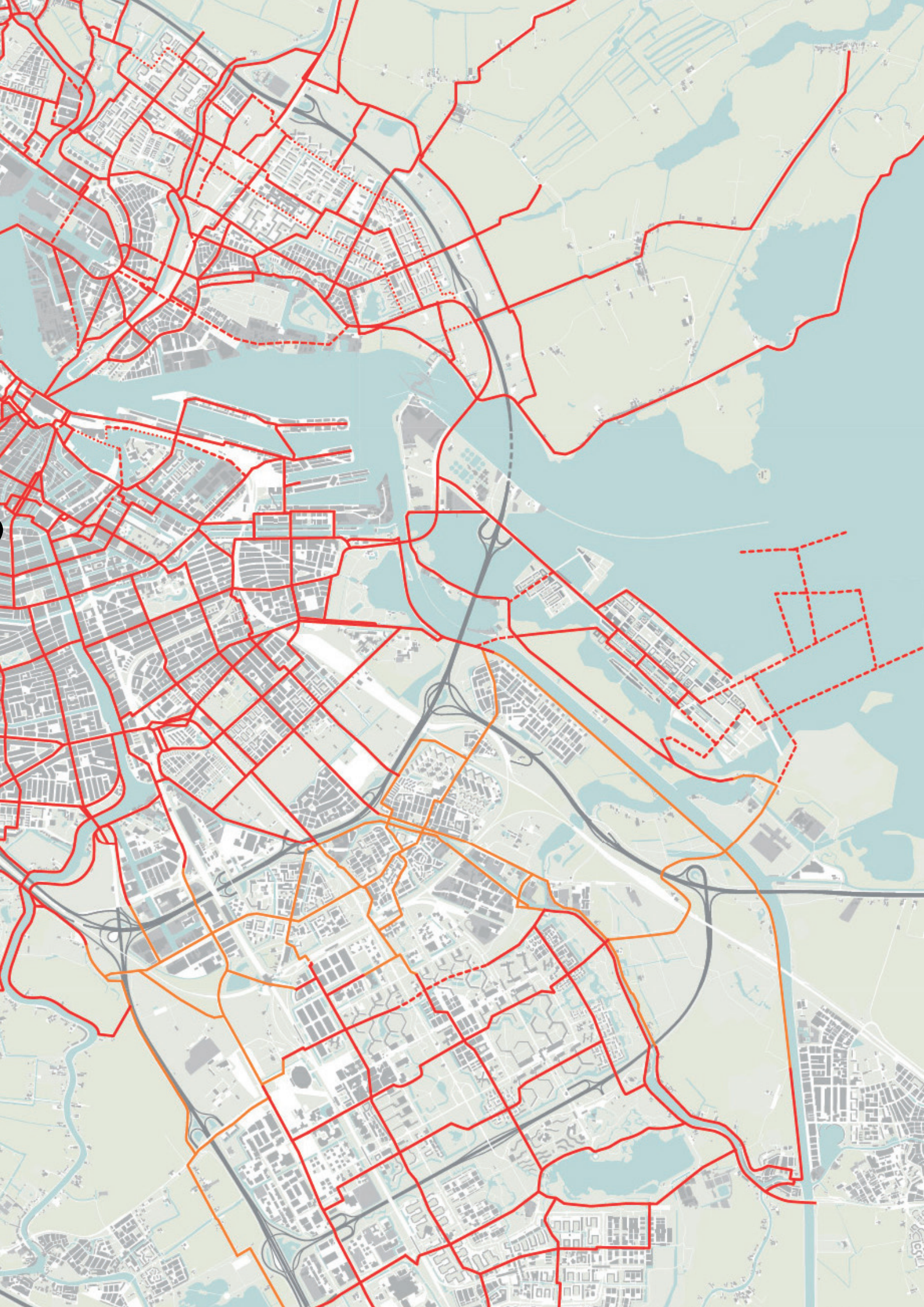
By appointing a plusnet for every type of modality (public transport, cars, cycling and pedestrians) a clear priority is set. The Municipality makes clear that a plusnet does not mean that the other modalities can simply be taken out, they still need to be facilitated and it is not their goal to separate the different modalities from each other since “the busy city streets are the enjoyable streets of Amsterdam” (Gemeente Amsterdam, 2013, p. 60). The Municipality urges: “Important considerations in favour of the physical reconstruction of streets should provide for plenty of room for customization. Due to the historic nature of many streets, but also by the presence of for example trees



Location of example situation (figures 5-8)

- Hoofdnet fiets vision
- - - Hoofdnet fiets to investigate
- Hoofdnet fiets outside of the Municipality of Amsterdam

Figure 2 - Hoofdnet Fiets Amsterdam (Fietzersbond, 2011)



and the available width, an appropriate design needs to be provided in each street individually. Hard criteria on, for example, the separation mixed functions of traffic or the minimum width of pedestrian and cycle paths are often in the way of this customization and will therefore not be determined" (Gemeente Amsterdam, 2013, p. 52). One can wonder though, for example, a cycle path of 2.5 meters outside of the city centre can have the same quality of the plusnet as a cycle path of 1.8 meters inside the city centre. The Municipality does provide us with five typologies of streets (1. residential street with few public functions and without continuous traffic, 2. visitor street with many public functions and little continuous traffic, 3. City streets with many public functions and a large amount of continuous traffic, 4. flow street with few public functions and a large amount of continuous traffic, 5. traffic artery without public functions and a large amount of continuous traffic) which they have recognized, but fail to include what value the providing of these typologies have and how a design can or should be implemented (Gemeente Amsterdam, 2013, p.60). The specific criteria of the plusnet are left vague and can still be (too) widely interpreted to provide an (as evenly as possible) qualitative bicycle network.

Amsterdam was originally never made for cars or large public transport, only neighbourhoods created after the second World War were able to provide sufficient space for all modes of transport. As understandable as it is, in the historical parts of the city, the cyclist is (literally) pushed away by the 'need' for cars and public transport next to the door. Although Amsterdam is seen as a bicycle-friendly city, one can wonder why the cyclist is still a visitor in many places. Amsterdam still tends to look through the eyes of the car driver and public transport, but the city may need to find the opportunities in a vision of the city through the eyes of the many cyclists it holds.

### **The gaps in the network from a cyclist point of view**

In the Netherlands, discussions about the importance of becoming more cycle-friendly and the role of the other ways of moving through and staying in the city are increasingly questioned. Amsterdam can be proud of her bicycle network, however practise shows there are still enough gaps to be found that cyclists experience. The gaps cannot always be recognized from the city- and network scale, and only become very evident at the street- and eye-level of the cyclist.

A cyclist is someone who experiences the bicycle network at eye-level, and one should not forget that they are on a bicycle. Cyclists are very flexible in moving around, they can decide where they get on their bike and where to get off. Cyclists can often get to areas in the city more easily than pedestrians, car drivers or people using public transport. However, its flexibility also comes with a weakness: vulnerability. As the cyclist is so flexible in moving around, it is often put on a lower importance when there is a lack of space for other modalities which need (or do they?) to share the bicycle network. In contradiction, with the increase of cyclists there is a question of making a choice when it comes to assigning space (Gemeente Amsterdam, 2013, p. 60).

The most obvious gaps in the bicycle network are made evident by the traffic safety and clearly shows how vulnerable to cyclist still is: a majority of 56% of all serious injuries in traffic happen to cyclists (Noordhoff atlasproducties, 2015, p. 136-137), however surprisingly 60% of those injuries happen 'one sided' (Gemeente Amsterdam, 2011; Gemeente Amsterdam 2015). 'One sided' injuries are those that do not happen with other driving traffic, and are caused by issues like bumping into oddly designed curbs, bumping into parked cars (opening doors) and other permanent issues in the direct environment. It is important to judge by each specific (problematic) location if the balance with

other traffic is lacking or if the designed surroundings are lacking quality for cycling.

In recent discussions (Pakhuis de Zwijger, 2015; 2016) cyclists and policymakers have come together to debate about the future of Amsterdam and other Dutch cities. Both parties make clear that some things still have to be done, some quicker than others. While policymakers try to get negative numbers down (traffic safety, travel time, etc.), cyclists also point out the dangers that still occur in the city while cycling. Both parties need to keep coming together in order to bring experiences and solutions together.

Spatial implications within the bicycle network are not yet designed for the cyclist and that is something that should not be part of Amsterdam, as the Capital of cyclists.

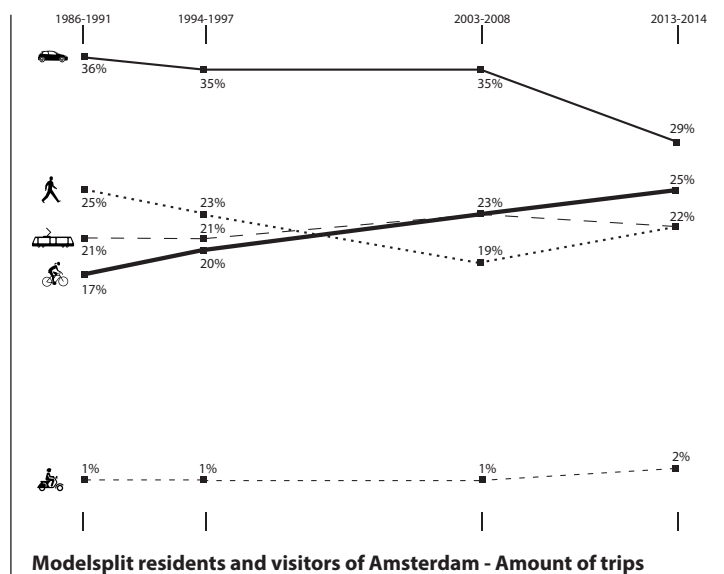
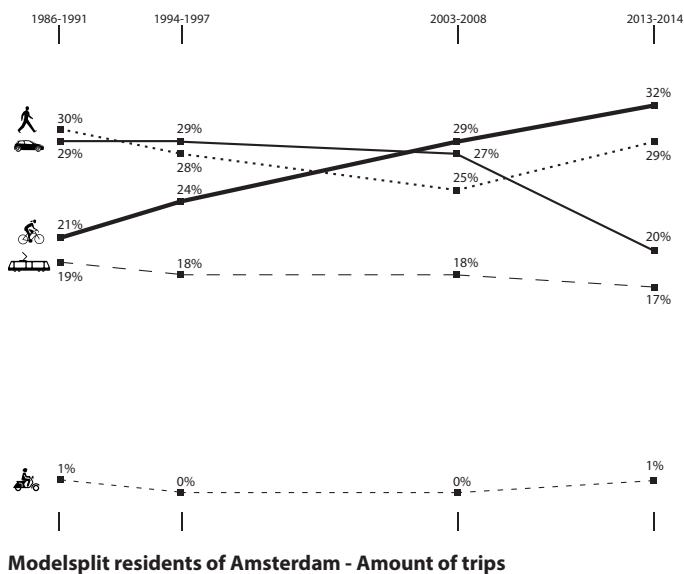
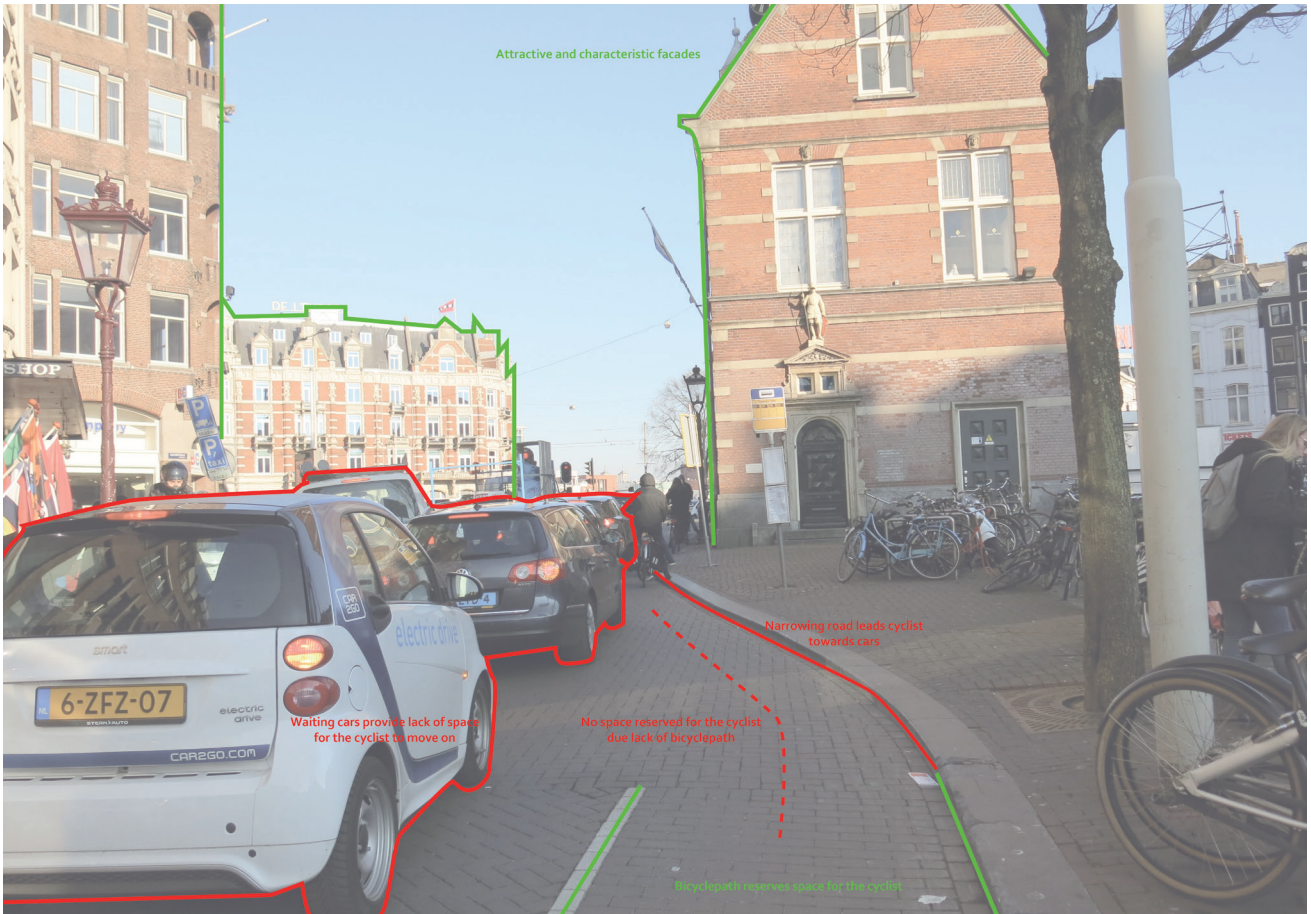
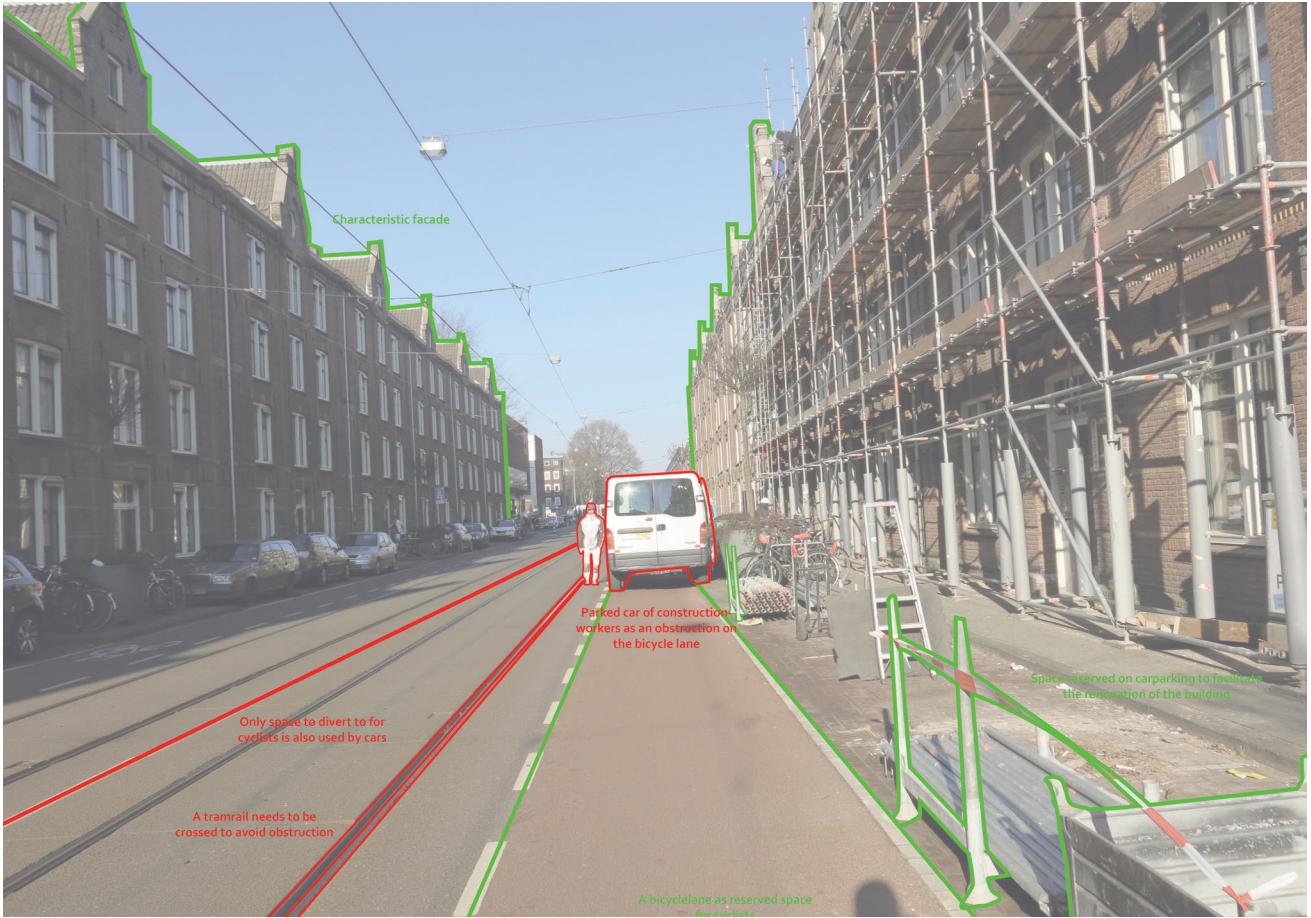
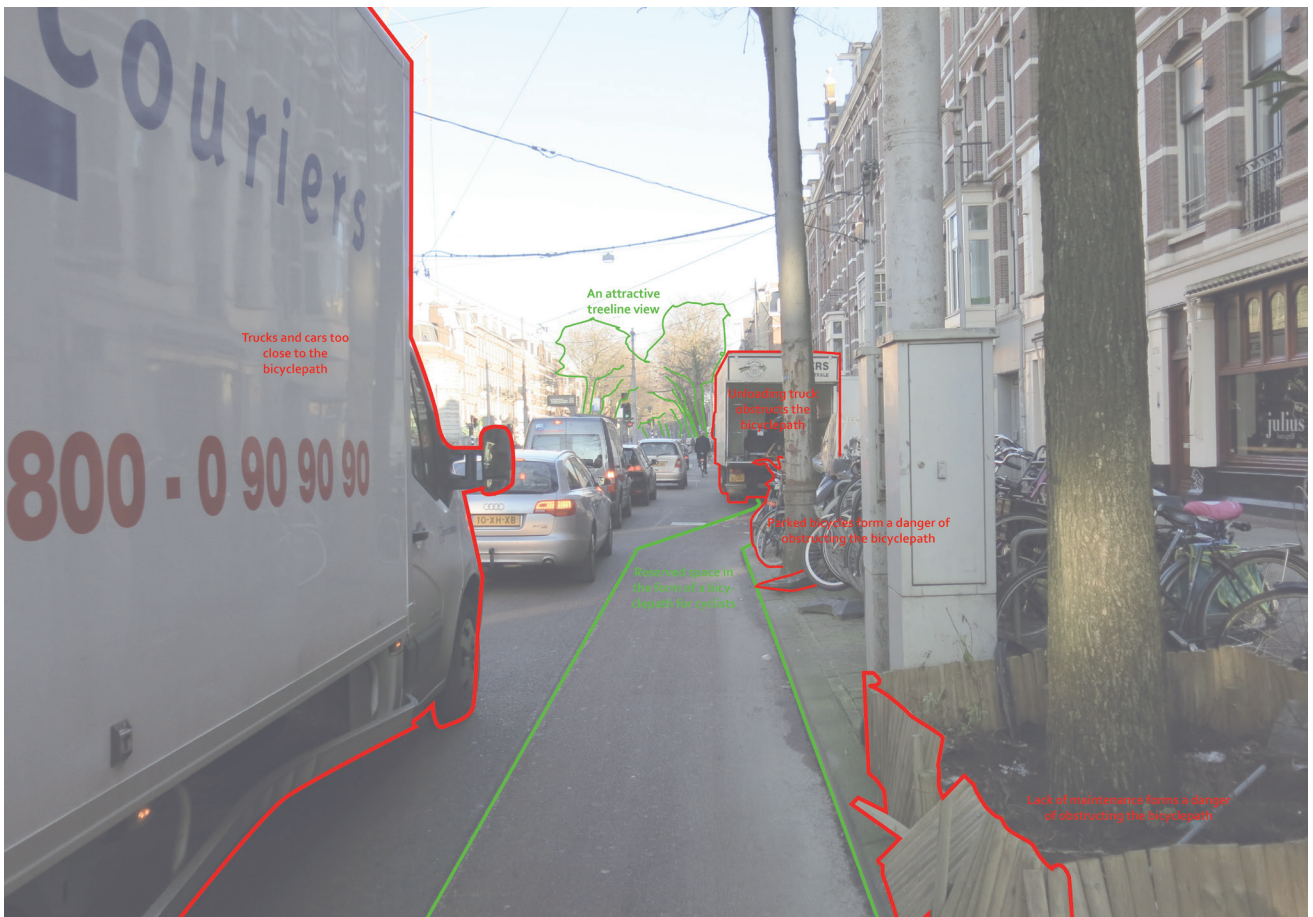
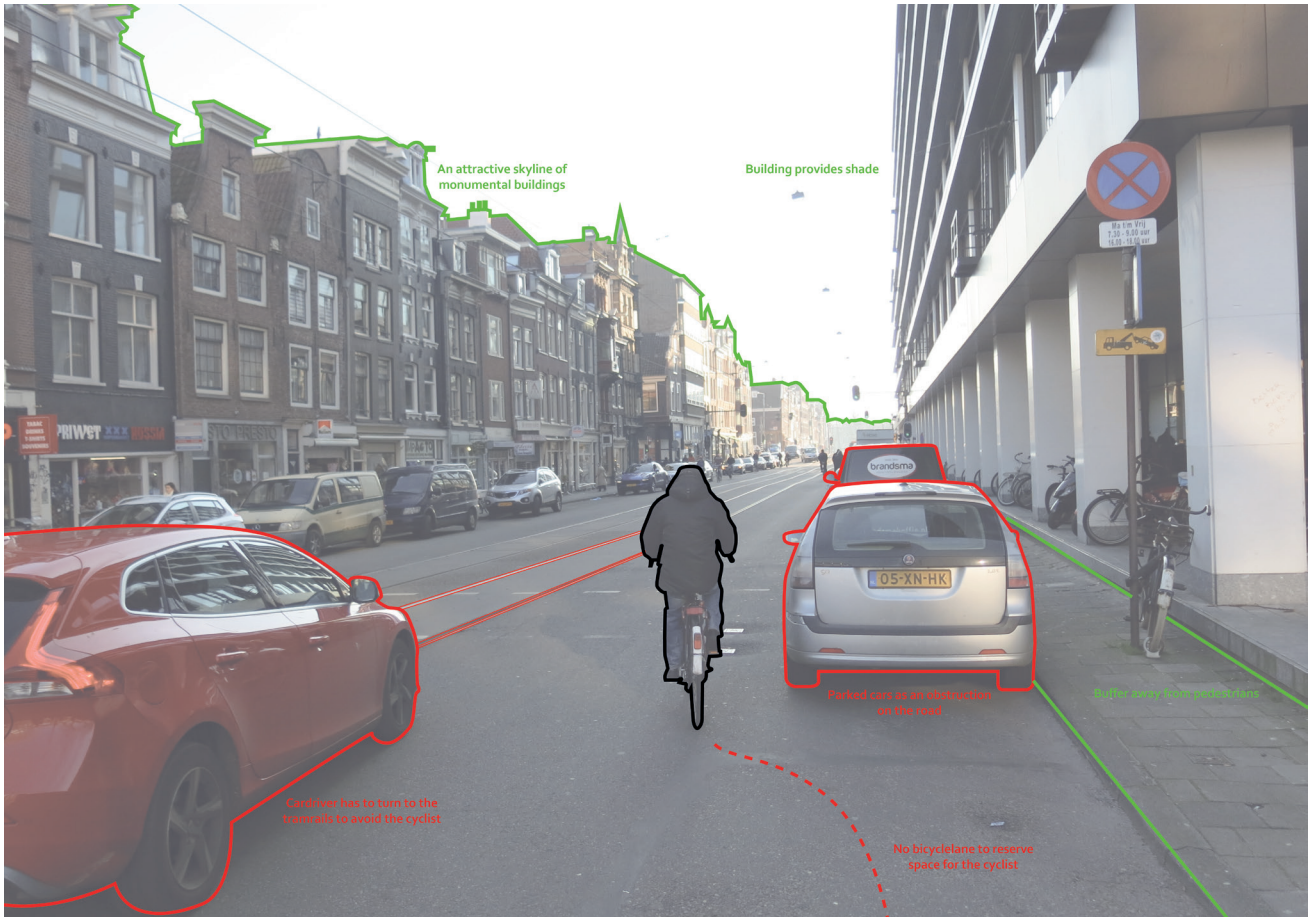


Figure 3-4 (Brondata Amsterdamse Thermometer van de Bereikbaarheid, 2015)







Figures 5-8: Example locations in Amsterdam where the positive cycling experience can be questioned

## 2. RESEARCH QUESTIONS

### Research questions

Amsterdam is one of the most representative city in regards to bicycle-use, and with a growing amount of cyclists it is of great importance to continue invest in the attractiveness of cycling in the city. Amsterdam already has a basic bicycle network, however gaps can still be found and become very evident at the street- and eye-level of the cyclist. In order to keep up with the growing amount of cyclists and minimizing the gaps in the bicycle network clear spatial interventions need to be reviewed. This, in order to make use of the full potential of the bicycle network of Amsterdam. The following main research question is the focus of this thesis:

### **WHICH SPATIAL DESIGN INTERVENTIONS ARE ABLE TO ENHANCE THE POSITIVE EXPERIENCE OF CYCLING FROM THE VIEWPOINT OF THE CYCLISTS, IN THE CURRENT CONTEXT OF CONNECTION ROUTES BETWEEN AMSTERDAM NIEUW-WEST AND THE RIVER AMSTEL?**

With this research question the relation between different types of streets and cyclists, on both city- and streetlevel, are taken into account. This exploration to spatial design interventions will provide a new viewpoint (that of the cyclists) to existing knowledge.

The results of this research are based on the context of Amsterdam, however the spatial design principles may be applicable to other (Dutch) bicycle cities. These cities are, just like Amsterdam, working on enhancing the cyclist-friendly bicycle network since the network of Amsterdam can be seen as a representation of others.

In order to answer this question this thesis is structurized by the following, each using their own methods, subquestions:

- *What are spatial criteria which can influence the positive experience of different types cyclists and how do they relate to each other?*
- *How do the eight connection routes between Amsterdam Nieuw-West and the river Amstel relate to the bicycle network and how are they characterized?*
- *Why are specific locations experienced negatively to (certain) cyclists and how can a spatial design intervention enhance a positive experience?*

The research questions and final products are elaborated further on in the following chapters.

### Scope

This research explores if and how experience could be a technical design factor on the topic of the 'bicycle network'. The design locations used to underpin this research are focussed on the eight different connection routes from Amsterdam Nieuw-West and the river Amstel. These routes have been chosen after reflecting on (first part of) the study of the structure of Amsterdam, as well as personal preferences. Existing situations are reviewed, while situations for improvement are redesigned.

### 3. AIM

To develop an urban design approach where spatial design interventions focus on the improving of a positive cycling experience

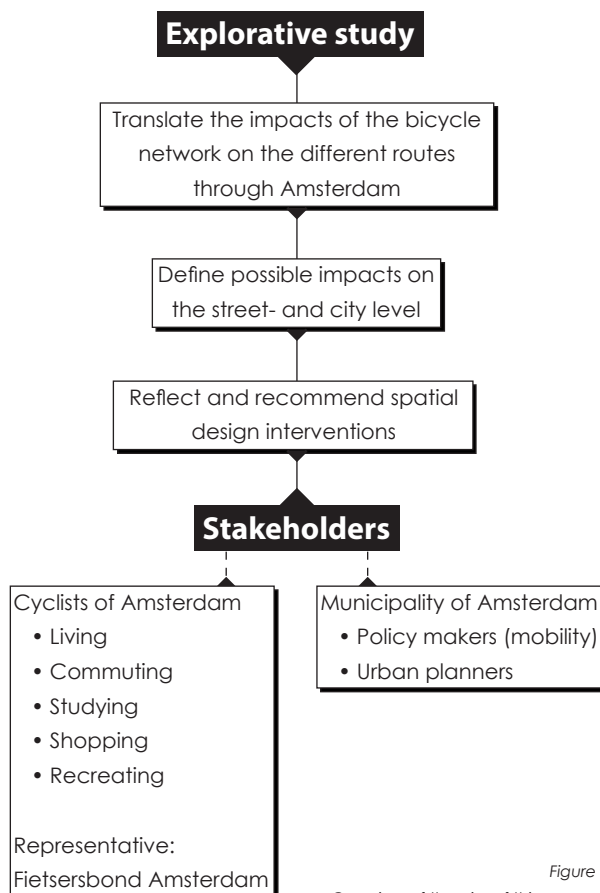


Figure 9  
Overview of the aim of this research

#### Explorative study

In this explorative study it stands central to see what specific interventions in the bicycle network have an impact on the (positive) experience of the cyclist in Amsterdam.

It is the aim to pick a limited amount, to keep the study feasible, of representative locations spread around the eight different connection routes between Amsterdam Nieuw-West and the river Amstel where the bicycle network can still improve significantly. The study is a multi-level study comparing the impact of interventions the street-, neighborhood- and city-level. At the finalization of this study, interventions are recommended or discouraged to encourage the positive experience of different types of cyclists.

#### Stakeholders

This research aims at two main stakeholders: the

cyclists and the Municipality of Amsterdam.

As this research is taking on the viewpoint of the cyclists, it is important to reflect whether (other) cyclists agree with the criteria on what an positive experience of the bicycle network is and how they are spatially interpreted. By involving the Fietzersbond the involvement of cyclists in Amsterdam can be limited to being feasible for this study as the Fietzersbond is a representative of cyclists (in Amsterdam).

The recommendations, as final products of this study, are mainly directed towards the Municipality of Amsterdam. The policymakers and urban planners/designers of the Municipality are important as a reflection of the outcomes. Important is to see what and how the Municipality could do something with these recommendations in their policies and possible designs.

## 4. APPROACH

This research makes an aims to answer the main question: 'Which spatial design interventions are able to enhance the experience of cycling from the viewpoint of the cyclists, in the current context of the connection routes between Amsterdam Nieuw-West and the river Amstel?'. To answer, the three sub-questions (figure X - Research framework) form the base of this study and each have their own final product and methods.

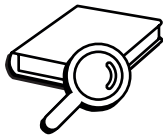
The general approach of this study is a parallel reflection of all three sub-questions in which the theory reviews and case studies are continuously reflected to each other.

A further elaboration on the approach is given on each of the sub-questions and their final product in the following pages.

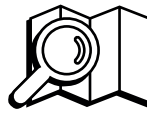


Figure 10 - Overview of possible focus locations

**WHICH SPATIAL DESIGN INTERVENTIONS ARE ABLE TO ENHANCE THE POSITIVE EXPERIENCE OF CYCLING FROM THE VIEWPOINT OF THE CYCLISTS, IN THE CURRENT CONTEXT OF THE CONNECTION ROUTES BETWEEN AMSTERDAM NIEUW-WEST AND THE RIVER AMSTEL?**



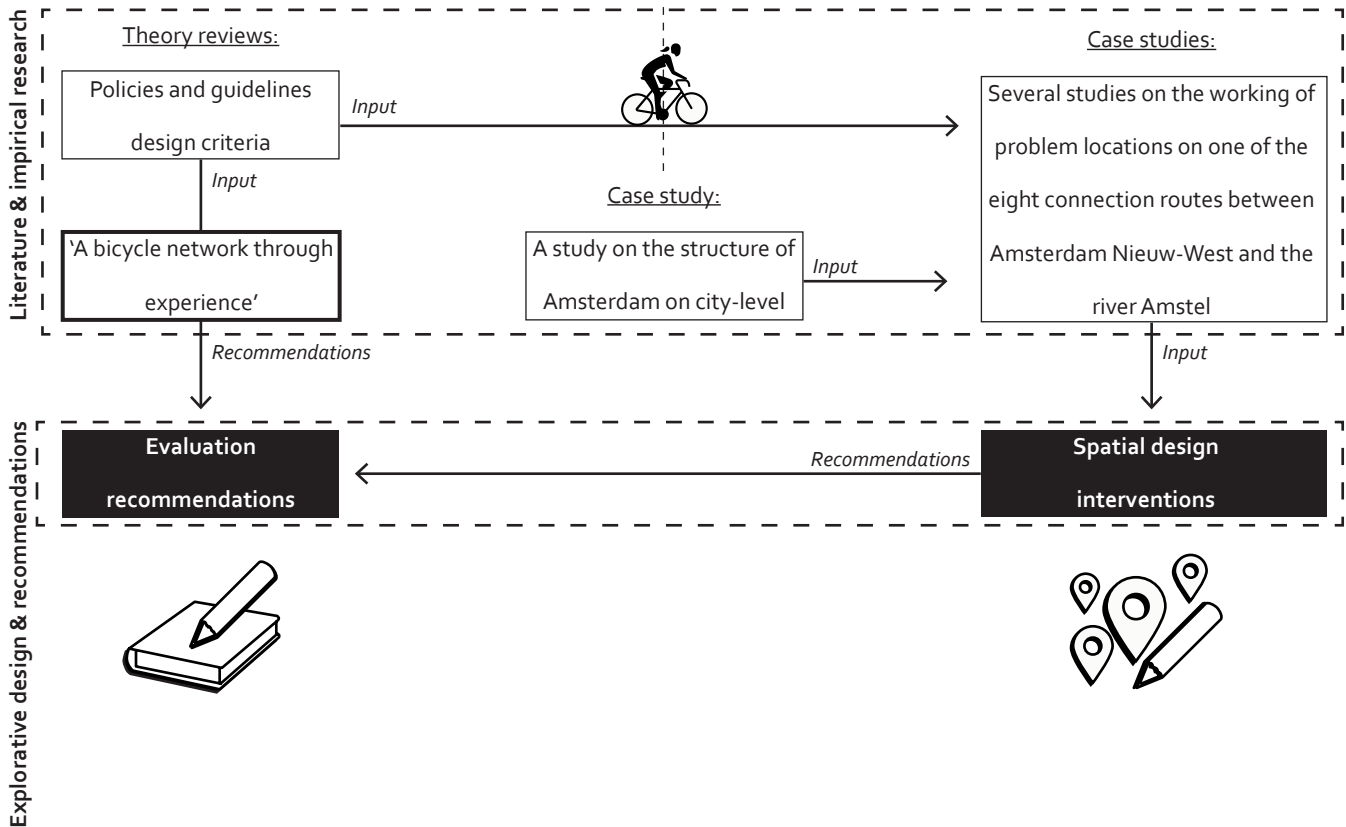
What are spatial criteria which can influence the positive experience of different types cyclists and how do they relate to each other?

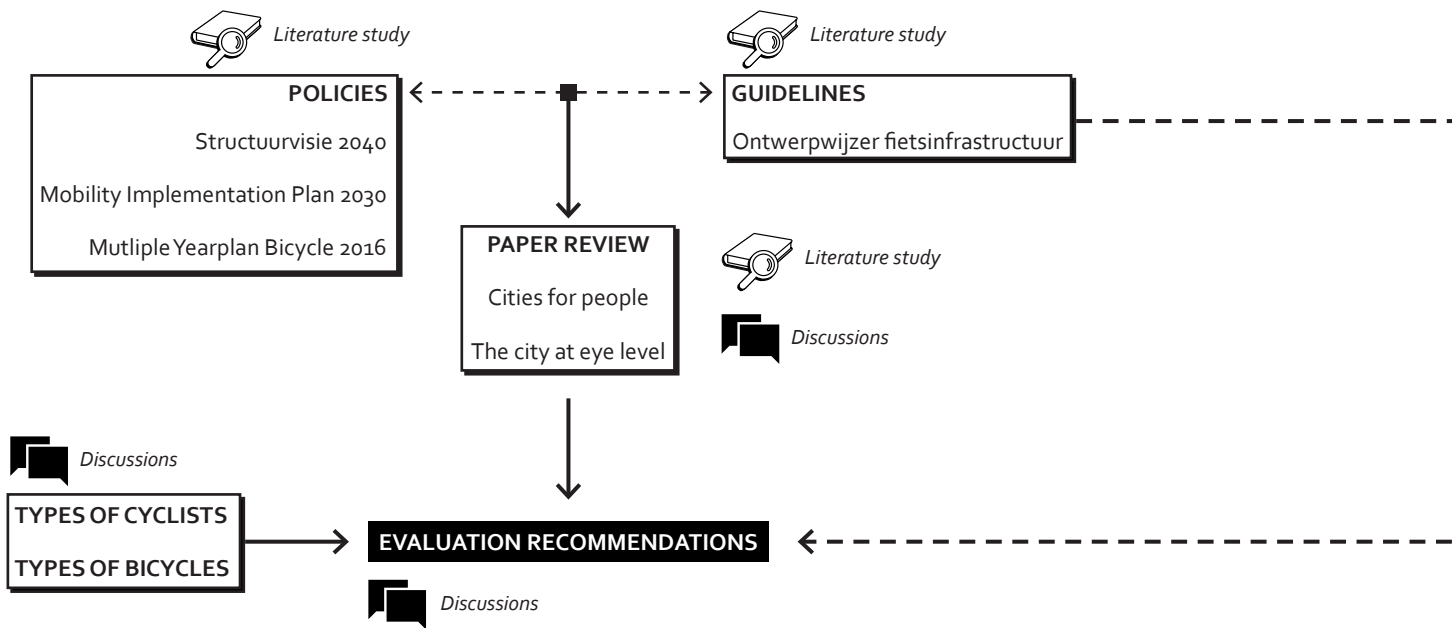


How do the eight connection routes between Amsterdam Nieuw-West and the river Amstel relate to the bicycle network and how are they characterized?



Why are specific locations experienced negatively to (certain) cyclists and how can a spatial design intervention enhance a positive experience?





### Evaluation recommendations

The question *'What are spatial criteria which can influence the positive experience of different types cyclists and how do they relate to each other?'* searches for both technical and emotional criteria for an attractive bicycle network. To answer, this question is divided in three types of reviews.

- One review is made on the comparison of stated design criteria in the design-guide bicycle of CROW (2006) and the Structural vision 2040 (Gemeente Amsterdam, 2010)
- A second review is made on what different types of cyclists (and their bicycles) Amsterdam could hold, and where these cyclists relate and differ from each other.
- A final review is made through a literature study, as part of a literature paper. The main sources that are used in this paper are *Ontwerpwijzer fietsinfrastructuur* (CROW, 2006), *Structuurvisie 2040* (Gemeente Amsterdam, 2010), *Cities for people* (Gehl, J., 2010) and *The city at eye level* (Stipo, 2016). All reviews are

reflected and compared with each other to get a broad view on the different criteria for an attractive bicycle network.

The three reviews are also compared and reflected between one another to see similarities or contradictions. The aim is to find the topics that need further elaboration on and which can be used as input and tested in design cases. As a final product, recommendations are given on (how to specify) spatial assesment criteria to enhance the experience of cycling in relation to the urban environment.

### Design recommendations

The sub-question *'How do the eight connection routes between Amsterdam Nieuw-West and the river Amstel relate to the bicycle network and how are they characterized?'* is answered by a literature and mapping study. The outcome of this question forms the underpinning of what the different connecting routes between Amsterdam Nieuw-West and the river Amstel mean to the city, as well as what they could mean for the city in the future.

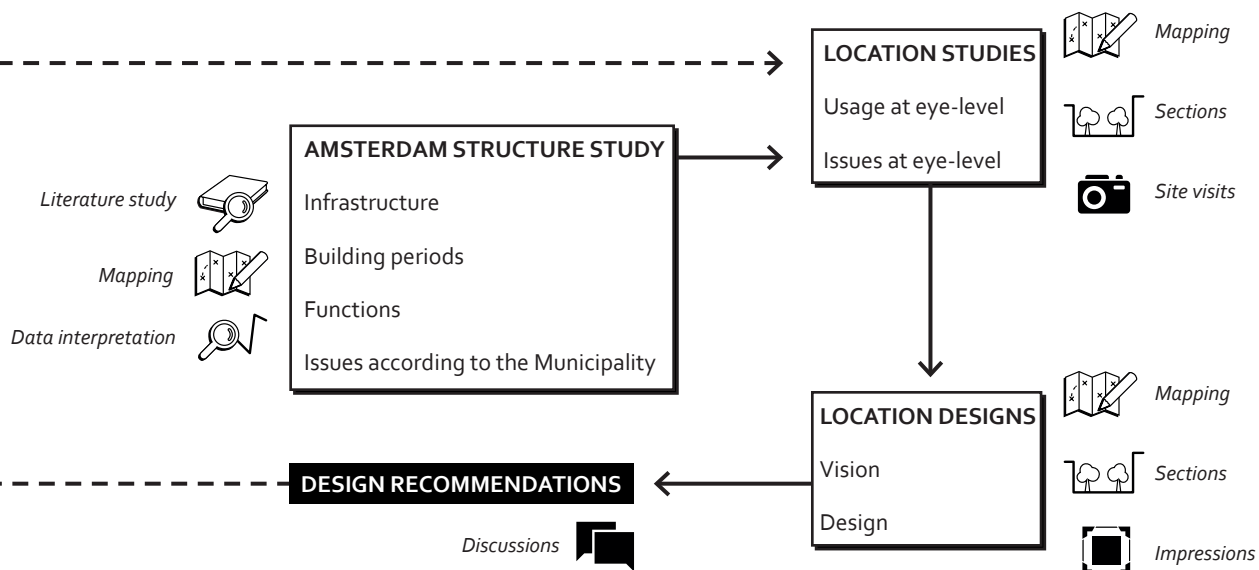


Figure 12  
The process and methods to get to the final products

The question 'Why are specific locations experienced negatively to (certain) cyclists and how can they be improved?' is answered by a continuous reflection on the criteria and the locations in practise of several design cases.

Design cases are picked by the current rational and/or emotional issues on the bicycle network. The cases should be representative for Amsterdam and can be found at other locations in the city as well. Naturally, the context of each location is different and that should be taken into account.

The methods used to analyse and envision the different locations are: site visits, impressions (photoshops and photos), gathering (existing) data, sketching and drawing of maps and sections and testing the assesment criteria found through the different theory reviews that have been made.

The designcases have the following aims to achieve:

- An exploration of possible (emotional) issues that can be found at the locations from the viewpoint of (specific) cyclists in relation to rational issues.

- An exploration of the implementation of spatial design interventions and their impact on the experience of (specific) cyclists and possible other objectives on street-, neighborhood- and city-level.

- Recommendations showing what interventions, and for which type of cyclists, enhance or discourage a positive experience on cycling.

## Planning

This research is conducted between February 2016 and January 2017. This thesis is assessed in five 'P' moments which are finalized with a report and a presentation for feedback.

The finished product at the P1 assesment is the introduction with a description of the location, the problemstatement, the relevance, the aim and the approach of this thesis.

The P2 and P3 assesment moments show a progress of the

work, which show the first conclusions of the research. From this moment and on a continuous reflection throughout the process is made on city- and streetlevel, and the recommendations as final products.

The P4 and P5 assesment moments reflect on the research and give concrete recommendations and conclusions on an overview of interventions for a positive experience of the bicycle network is taken from (different) viewpoints of the cyclists in Amsterdam.

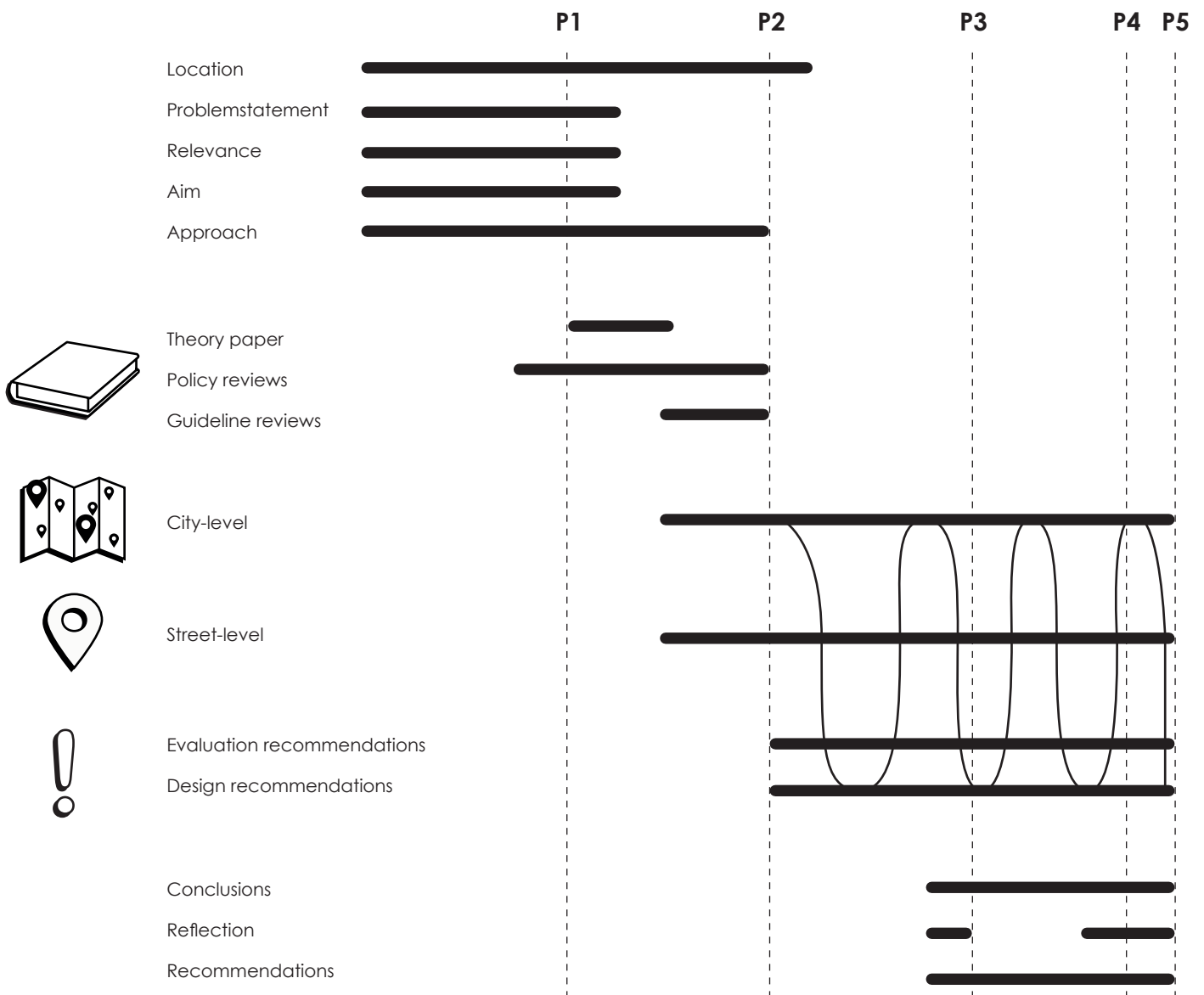


Figure 13 - Planning overview



## 5. RELEVANCE

### Scientific

Currently, a lot of investments are made into bicycle-friendly design all over the world. However, these designs still focus too much on rational objectives, like reducing the amount of accidents. There is too little focus on the actual users and how they experience their routes.

Amsterdam struggles with the limited space and other traffic modes causing compromises. Amsterdam is criticized for being a bicycle chaos. The chaos in the city is an arising topic (Bicycle Dutch, 2014; Citylab, 2015; Tagliabue, J., 2013; The Guardian, 2011) in Amsterdam and receives more and more attention. Amsterdam should take the leading role when it comes to designing through the experience of bicycle network, which could possibly give the flexibility in the limited space the city has while keeping the quality of the bicycle network high.

More often literature notes the importance of criteria on the experience of public space in relation to cycling (Akar, G. & Clifton, K.J., n.d.; Gehl, J., 2010; Pelzer, P. & Brömmelstroet, M. te, 2010; Pelzer, P., 2012), however these criteria are often not made spatial and are still unclear on when a criteria is met. Attempts to do this for pedestrians are already made (Gehl, 2010; Stipo, 2016), however this is still lacking for cycling specific. This thesis makes an attempt to clarify and formulate the different criteria to enhance the positive cycling experience of the cyclist.

### Social

With the bike being available in all shapes and sizes for anyone, no matter the age, background or other situation, it is a way of transportation that can still highly increase in popularity. Not only are bikes cheaper and (could be) faster than the car in the city, they get the people outside and active as well. The bicycle is, literally, accessible for anyone to use.

By getting on your bike, instead of in your car, lifestyles can change. Think about what an impact it can have on the health of the people, not only by getting more active but also by the improving the airquality that is still strongly being polluted by emissions of cars today.

By finding more motives to cycle, more people can get out on the streets and experience the city in an interactive way. Not only can they see, which is the car experience, they will also be able to smell, feel and hear the details of the city experience. And that is why the experience of cycling is one of the ways to motivate people to get on their bicycle.

Bicycles are everywhere in Amsterdam, and that is why Amsterdam is one of the most suitable location to conduct this research: everyone has an opinion about cyclists, whether they are one or not. And everyone has an opinion on how to make cycling more attractive.

## **Ethical**

The bicycle is used all over the world and is one of the most accessible ways of transportation in the cities. Globally the cycle network can still drastically be improved in both cities that have yet to or already have accepted the bicycle culture.

Amsterdam is one of the cities which has accepted the bicycle culture the most in the world. With its high accessibility and freedom of moving, cycling is becoming more and more popular. And now that Amsterdam is focussing on a more vital and sustainable city, the bicycle is one of the main topics that the city focusses on (Gemeente Amsterdam). The Municipality of Amsterdam envisions pedestrians and cyclists as the main traffic users in the innercity.

The bicycle has a zero emission, provides more direct interaction between people, brings back humanscale into the city and allows more room for living in the city. A further elaboration on how to make cycling more attractive, and therefore attract more people to use the bicycle, can only enhance this.

## **AMS institute**

As the aim of this thesis is to explore a new insight on what can make the bicycle network of Amsterdam more attractive through experience to its users, the cyclists, this thesis is very relevant to link to the AMS institute in Amsterdam. The themes that are focused on are mobility and sociotechnical spatialisation which the AMS, amongst others, focusses on as well. This thesis fits well into the topics of 'the connected city' and 'the vital city' the AMS uses.

This thesis is fully focused on Amsterdam, and as enhancing cycling is an ongoing topic in Amsterdam, the Netherlands and the world it is societally relevant.

The main research question 'Which spatial design interventions are able to enhance the experience of cycling from the viewpoint of the cyclists, in the current context of the connection routes between Amsterdam Nieuw-West and the river Amstel?' is interdisciplinary answered on spatial, social, technical and governmental grounds by reviewing both theory and practise and reflecting them with each other. Through existing data on the use of the bicycle network and newly gathered data during site visits, mapping, sections and impressions an integration of research by interpretation of data with criteria, principles and designs as recommendations to enhance the bicycle network.

This research aims at two main stakeholders: the cyclists and the Municipality of Amsterdam. As this research should take on the viewpoint of the cyclists, it is important to reflect whether (other) cyclists agree with the criteria on what an attractive bicycle network is and how they are spatially interpreted. The recommendations, as final products of this research, are mainly directed towards the Municipality of Amsterdam. It is important to reflect if, what and how the Municipality could do something with these recommendations in their policies.

All together, this thesis is solution-based and aims to explore spatial interventions to enhance the positive cycling experience.

**Scientific relevance**

SPATIAL DESIGN INTERVENTIONS TO ENHANCE A POSITIVE EXPERIENCE ON...

- Protection
- Comfort
- Delight

**Social relevance**

- Easy accessible for everyone!
- Getting people active!
- Freedom to move for everyone!
- Experience of cyclists!

HOW DO WE GET PEOPLE MORE ON THE BICYCLE?

**Ethical relevance**

HOW DO WE IMPROVE THE CITY OF AMSTERDAM BY ENHANCING THE CYCLE NETWORK?

- Sustainable city
- Vital city

**AMS relevance**

**LOCATION**

City of Amsterdam

**OVERARCHING THEME**

- Mobility
- Sociotechnical spatialisation

The 'Connected city' & the 'Vital city'

**(POSSIBLE) STAKEHOLDERS**

Municipality of Amsterdam

- Mobility policymakers
- Urban planners

Cyclists of Amsterdam

- Fietzersbond Amsterdam
- Individuals

**INTERDISCIPLINARY**

- Traffic planning
- Social planning
- Spatial planning
- Policy planning

**SOLUTION-BASED**

Spatial interventions

Figure 14 - Relevance overview of this thesis

## **2. EVALUATION CRITERIA**

# 1. CURRENTLY APPLIED DESIGN CRITERIA

## Bicycle policies by the Municipality of Amsterdam

Designing for a bicycle network has been going on for several decades in the Netherlands and there are already a lot of principles and criteria to work with. An example of this is the designguide for bicycle infrastructure (CROW, 2006) in which generic evaluation criteria are presented. The Municipality of Amsterdam has, as well, formulated several policy documents which go about the approach and evaluation of the designing for the bicycle network:

1. *Structural vision 2040*

2. *Mobility Agenda Implementationplan 2030*

3. *Multiple Yearplan Bicycle 2016*

The structural vision 2040 and the designguide for bicycle infrastructure hold criteria formulated which are properly to compare to each other. Although the Mobility Agenda Implementationplan 2030 and the Multiple Yearplan Bicycle 2016 are focussed on a smaller time period, both policy documents are generally more abstract than the structural vision and the designguide. That the policies of the smaller time period are more abstract, is due the new approach in which the Municipality states that there should be enough room for customisation as every street is different and set measures can be in the way of the design (Gemeente Amsterdam, 2013, p.60). By defining soft criteria (open to personal interpretations) only (the hoofdnet/plusnet bicycle is 'comfortable', 'quick' and 'safe') a constant quality of the network can be questioned. It is the question what criteria should be more strict (hard criteria) and which can be left open for interpretation (soft criteria) while keeping up the wanted quality of the network towards a positive experience of the cyclist.

On the following pages the Structural vision 2040 and the Designguide bicycle infrastructure are put next to each other. Soft and hard criteria are distinguished, while the formulation of the criteria are also reflected on. The criteria of the Structural vision 2040 will be shown on the right page, while the criteria of the Designguide bicycle infrastructure are shown on the left.

## Directness

### GOAL

Distance in kilometers

Distance in time

### TOOLS

Optimize average  
detour distance

→ Relates to 'mesh width' and  
'signs on the road'

Minimalize amount  
of crossings without  
cycle priority

Minimalize  
stopfrequency

→ Relates to 'green flow' and  
'awareness of waiting time'

Quick

GOAL

Kilometers per hour  
Pre-war: 12-15 km/h  
Post-war: 15-18 km/h

Max. waitingtime of  
30 seconds on average

Passing opportunities

TOOLS

Priority for cyclists on  
roundabouts

Priority for cyclists on  
crossings

A few crossings only

↓  
What is 'a few'?

Adjust trafficlighs

Min. cyclepath width  
1-way: 2,5m outside, 1.8m inside city centre  
2-way: 3,5 m outside, 2m inside city centre

Little car traffic on the  
mainnet bicycle  
(3000 per day)

Very specific

Comfort

GOAL

Prevent traffichinder

Findable destinations

Understandability

TOOLS

Minimalise meetings with cars and bicycles

Signs towards neighborhoods and attractions

Optimal use of spatial and landscape characteristics (form a mental map)

→ What about the conflicts between cyclists themselves?

**Extra criteria**

- Flatness

Attractive concrete  
Closed concrete

- Continuity

Priority  
Stopping  
Traffic conflicts  
Radius



Comfortable

GOAL

Flat and clean surface

No sharp turns or slopes

Recognizable routes

TOOLS

Good maintainance  
(snow, ice- and  
leaffree)

Sinusshaped treshold

Radius min. 4 meters  
Slope max. 1:10h

→ What about the width and length of the cyclelane?

Red asphalt

Signs

Logic connections

What is logic?

Enough waitingspace  
at crossings

Enough distance to  
the carroad

What is enough?

Safety

GOAL

Reduce conflicts with crossing traffic

Separating of traffic modes

Uniformal traffic situations

TOOLS

Reduce speed at conflict areas

Recognizable road categories

Minimalize crossing movements

Minimalize the density of car traffic

Reduce speed differences

Facilities recognizable for all traffic users

Bicycle facilities and crossing design solutions related to roads with cars and cyclists combined

Use of principles for the correct type of street

60% of the cycle accidents happen in one-sided conflicts in Amsterdam

**Extra criteria**

- Lighting
- Road continuity is visible
- Reduce one-sided conflicts
- Pillars, sidewalks
- Diverting possibilities

Traffic safety

GOAL

No red- and blackspots on the main network (strive)

No scooters on the bicyclelane

TOOLS

Comply to 'Sustainable safe' a.o. Cyclelanes next to main accessroads, cycle paths under circumstances

Cyclepaths in shoppingstreets (also residential access roads)

Safety strips (a.o. for parking)

Red asphalt

Is this all really achievable?

Where will this happen?  
Everywhere or on specific locations?

How does this stay safe for scooterdrivers? Carroads to 30 km/h?

This states the same, not in extra depth

Attractiveness → What is attractiveness?

GOAL

Social security

TOOLS

Comply to requirements social security

Social security

GOAL

The cyclist is visible

Comply to the norm public lighting and 'safe living'

There is always an alternative route of comparable quality

TOOLS

Implement policy public lighting      Visualize bridges and tunnels

Visibility      Transparent plantation

- How does this relate to:
- day / night
  - Location of plantation
  - Density of plantation
  - Diversion possibilities

Visualize specifically for going underneath?

→ Safer due options? Or a design option?

How alternative is this option?  
When can a designer choose for this option?

## Coherence

### GOAL

Complete network

Complete routes

Adjust to movement needs

### TOOLS

Max. mesh width of about 250 meters

Cores and important facilities connected

Min. about 70% of cycle movements via cycle network

→ Is this the same for someone on an e-bike?

→ What is a core? When is a facility important?

→ Is this 70% on the main network for one cyclist to get to their destination? Where is the remaining 30% being cycled?

**Extra criteria**

- Recognizable

Route options (signs and concrete)

## Conclusion

Both the Structural vision 2040 and the Designguide bicycle infrastructure are divided in generally similar categories:

- *Directness/Quick*
- *Comfort/Comfortable*
- *Safe/Traffic safety*
- *Attractiveness/Social security*
- *Coherence*

In both cases, the criteria are either very hard or very soft. The soft criteria, meaning that they are very open for interpretation, and the hard criteria meaning that they can still be questioned whether they should count for every type of cyclists (see the following chapter).

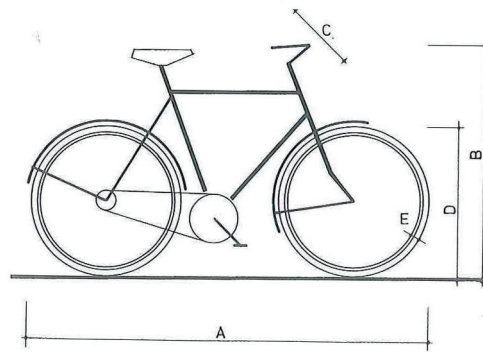
The theme 'attractiveness' is underdeveloped in both cases, while in the Designguide the theme is named and stating that attractiveness is a subjective criteria which will be different per person (p. ) it only includes social security as an achievable goal. The structural vision, although often referring to creating attractive public space, does not include any further definition. As attractiveness is an important part of the experience of the cyclist, this theme needs to be further elaborated on.

## 2. DIFFERENT TYPES WITH DIFFERENT NEEDS

One who has been in Amsterdam cannot help but notice the many different bicycles which are used to get around. Bicycles come in many different shapes and sizes which each deal with their surroundings in their own way. Next to that, with so many cyclists and so many different goals of their cycle trips, a city like Amsterdam cannot talk about the one typical cyclist of Amsterdam. In this chapter different types of bicycles and cyclists are named and categorized, in the further process of this research the characteristics of these types are compared to find the largest differences and which and why relate or contradict each other the most.

### Bicycles

The designguide for bicycle infrastructure (CROW, 2006) shows a variety of bicycles and dimensions showing how different bicycles can be. Missing in the overview is the cargo bike, which many cyclists in Amsterdam use to get around.



	Length (A)	Height (B)	Steerwidth (C)	Wheel size (D)	Bandwidth (E)
City bike	180-195	100-120	50-60	66-72	3,7-4,0
Racing bike	170-190	100-120	45-60	66-72	2,5-3,0
Mountain bike	170-190	95-110	60-65	66-72	4,0-5,0
Child bike	150-170	80-100	50-55	51-62	3,6-3,8
Laying bike	170-220	40-60	60-70	-	-
Cargo bike	380	95-120	65 (75 cargo)	-	-

Diagram showing the different measurements of different bicycles (CROW, 2006, p.40-41).

Added are abstract measures of a cargo bike which is missing in the current diagram.

### Cyclists


Cyclists can be defined by the goal of their cycling trip. In his book 'Cities for people' (Gehl, 2010, p.21) Jan Gehl distinguishes three categories in which people travel for:

1. Necessary activities
2. Optional activities
3. Social activities

Although his research is mainly based on pedestrians by foot, the categories are the same for cyclists.



**NECESSARY ACTIVITIES**




The scholar cyclist  
(<12 years old)

The highschool cyclist  
(12-18 years old)

Student cyclist  
(17> years old)


**SCHOOL-GOING**



Commuting cyclist  
(home to work)

Working cyclist  
(cycling while working)

**WORKING**




Daily activity cyclist  
(groceries, etc.)

Occasional activity cyclist  
(Dentist, doctor, etc.)


**REPEATING ACTIVITY**

**OPTIONAL ACTIVITIES**



Weekly activity cyclist  
(association, club, etc.)

**REPEATING ACTIVITY**



Racing cyclist  
(sportactivity)


Trip cyclist  
(local inhabitant)

Shopping cyclist  
(clothing, gifts, etc.)

Attraction visiting cyclist  
(Museums, events, etc.)

**RECREATIONAL**

**SOCIAL ACTIVITIES**



Tourist cyclist  
(not local, visiting for a temporary time)

Visiting cyclist  
(visiting friends, family, etc.)

**RECREATIONAL**

# 3. BICYCLE NETWORK PRINCIPLE CRITERIA FOR A POSITIVE EXPERIENCE AT EYE-LEVEL

## Abstract

*Cities all over the world are focusing on becoming more bicycle-friendly, by placing the importance of the car below the cyclist and the pedestrian. Over the past decades, we have been entering a bicycle paradigm where cycling has shown to be increasingly popular in cities. However, assigning space for the cyclist does not always show to be sufficient to make cycling attractive.*

*This theory paper reviews literature as an attempt to answer the question 'What are spatial themes which can influence the positive experience of different types cyclists and how do they relate to each other?'. The results of this review are a follow up and are complimentary to a previous policy and guideline review from governmental perspective, and will therefore look for the more subjective criteria which urban designers have explored to include the positive experience of pedestrians. The results will be used in a further research of formulating spatial design interventions to enhance the attractiveness of cycling from the viewpoint of the cyclist in Amsterdam.*

*The main sources that are used in this paper are the subjective inputs on the attractive bicycle network and public life in the Design guide bicycle infrastructure (CROW, 2006), Structural vision 2040 of Amsterdam (Gemeente Amsterdam, 2010), Cities for people (Gehl, J., 2010), The city at eye level (Stipo, 2016).*

*Keywords: Amsterdam, Bicycle planning, Cycle-friendly, Cycle-experience, Bicycle network.*

## Introduction

*Amsterdam is one of the most representative city in regards to bicycle-use, and with a growing amount of cyclists it is of great importance to continue invest in the attractiveness of cycling in the city. Amsterdam already has a basic bicycle network, however gaps can still be found and become very evident at the street- and eye-level of the cyclist. In order to keep up with the growing amount of cyclists and minimizing the gaps in the bicycle network, a design viewpoint from the cyclist could give new insight in how to approach the issues that still occur. This, in order to make use of the full potential of the bicycle network of Amsterdam. The question what spatial themes can influence the positive experience of cyclists and how they relate to each other stands central in this literature review.*

## Currently applied design criteria

Designing for a bicycle network has been going on for several decades in the Netherlands and there are already a lot of principles and criteria to work with. An example of this is the Design guide for bicycle infrastructure (CROW, 2006) in which generic evaluation criteria are presented. The Municipality of Amsterdam has, as well, formulated several policy documents which go about the approach and evaluation of the designing for the bicycle network:

1. Structural vision 2040 (Gemeente Amsterdam, 2010)
2. Mobility Agenda Implementation plan 2030 (Gemeente Amsterdam, 2013)
3. Multiple Yearplan Bicycle 2016 (Gemeente Amsterdam, 2012)

Although the Mobility Agenda Implementation plan 2030 and the Multiple Year plan Bicycle 2016 are focussed on a smaller time period, both policy documents are generally more abstract than the structural vision and the design guide. However, the structural vision 2040 and the design guide for bicycle infrastructure hold criteria formulated which are properly to compare to each other. That the policies of the smaller time

period are more abstract, is due the new approach in which the Municipality states that there should be enough room for customisation as every street is different and set measures can be in the way of the design (Gemeente Amsterdam, 2013, p.60). While comparing, common themes can be recognized: comfort, speed/directness, traffic safety and social security.

In both cases, the criteria are either very hard or very soft. The soft criteria, meaning that they are very open for interpretation, and the hard criteria meaning that they can still be questioned whether they should count for every type of cyclists (see the following chapter). Although open interpretations are not necessarily something negative, it could leave too much freedom to define what the actual quality of the bicycle network should and will be. More important even would be the strict criteria which do not explain why they state a certain amount and also not what should happen if the criteria cannot be met. An example of this would be the width of the bicycle lanes. In an optimal situation the structural vision 2040 (Gemeente Amsterdam, 2010) states that a one-way lane should be at least 2,5 meters wide, however... they also note that in the city centre a width of only 1,8 meters is sufficient. Even though it is understandable streets within the city centre are less wide, we have to question how the quality of the bicycle network can be comparable to each other In this way. A follow up question would then be: 'should the bicycle network be of comparable quality?'.

The theme 'attractiveness' is underdeveloped in both cases, while in the Design guide the theme is named and stating that attractiveness is a subjective criteria which will be different per person (p. ) it only includes social security as an achievable goal. The structural vision, although often referring to creating attractive public space, does not include any further definition. As attractiveness is an important part of the experience of the cyclist, this theme needs to be further elaborated on, and might even be the solution to a comparable quality where space lacks in the streets.

### The city at eye-level design perspective

Calls to design at eye level through the experience of the user have been increasingly made since the upcoming of the car. People thinking like Kevin Lynch (Lynch, 1960), Gordon Cullen (Cullen, 1961) and Jane Jacobs (1961) are the founders of thinking and designing from the life at street level. In the past decade Jan Gehl (Gehl, 2010) is an important name which can be added to this group of people. Also, this year Stipo (Stipo, 2016) published their book *The city at eye level* as another attempt to enhance the thinking and designing at eye level.

**“EVERYONE SHOULD HAVE THE RIGHT TO EASILY ACCESSIBLE OPEN SPACES [...]. WELL-DESIGNED NEIGHBOURHOODS INSPIRE THE PEOPLE WHO LIVE IN THEM, WHILST POORLY DESIGNED CITIES BRUTALIZE THEIR CITIZENS. AS JAN SAYS: WE SHAPE CITIES, AND THEY SHAPE US.” (GEHL, 2010, P.IX).  
“URBANITES EXPERIENCE THEIR CITIES IN WHAT WE CALL THE ‘PUBLIC REALM’: IT HAS A BROADER MEANING THAN JUST ‘PUBLIC SPACE’; IT INCLUDES FAÇADES OF BUILDINGS AND EVERYTHING THAT CAN BE SEEN AT THE EYE LEVEL. PLINTHS ARE THEREFORE A VERY IMPORTANT PART OF BUILDINGS: THE GROUND FLOOR, THE CITY AT EYE LEVEL. A BUILDING MAY BE UGLY, BUT WITH A VIBRANT PLINTH, THE EXPERIENCE CAN BE POSITIVE.”**

(Stipo, 2016, p.15)

While both explorers elaborate on the city at eye level, Gehl takes on an approach directed to movement and way finding and Stipo directs their approach more towards the plinth of the street.

As the main cause for the lack of designing in human scale, both

explorers (Gehl, 2010, p.3; Stipo, 2016, p.48) see the rising of the car as the main issue. They both acknowledge that before the coming of the car, cities had a better sense of human dimension. Another important cause was the changing planning ideologies, where a low priority was placed on “public space, pedestrians and the role of city space as a meeting place” (Gehl, 2010, p.3). Cities have been growing, and that will still continue. “The city is not only a functional environment, but also an environment of experience. [...] Now we experience [...] the shift from ‘making the city’ to ‘being the city’. New construction and areas of growth will persist, but the reinvention of existing urban structures will become more dominant” (Stipo, 2016, p.14-15). Although both explorers mainly focus on pedestrians in general, their sayings are applicable to cycling as an activity as well. Although cycling is currently a way to often move quicker through the city (Gemeente Amsterdam, 2013) cycling is also on such a human dimension (unlike the car or public transportation) that details in the street at eye level are almost as evident as that of a pedestrian. In order to think and design through human dimension, the explorers have formulated a diagram in which themes and criteria are standing central.

Interestingly, the themes Jan Gehl states are quite similar to that of the Design guide Bicycle Infrastructure (Crow, 2006) and the Structural vision 2040 (Gemeente Amsterdam, 2010). Gehl (Gehl, 2010, p.238-239) categorizes the criteria by the following themes:

- Protection

1. Gehl notes here that protection is defined by the protection against traffic and accidents (the feeling of being safe). Not only does he say there should be actual protection for pedestrians, also the feeling of insecurity in traffic should be eliminated.
2. Protection against crime and violence give a feeling of security, says Gehl. Important aspects to this are a lively public realm, that there are eyes on the street, that there is an overlapping of functions during day and night as well as that

good lighting should be provided.

3. Lastly, protection against unpleasant sensory experiences like wind, rain/snow, cold/heat, pollution, dust, noise and glare provide protection for the pedestrian.

When it comes to cycling these aspects of protection are exactly the same as that of the pedestrians.

- Comfort

1. Gehl defines comfort in the sense of ‘opportunities’. The opportunity to walk is focused on the fact that there should be enough room to walk, that there are no obstacles along the way, that there is a good surface to walk on while being accessible for everyone, as well as interesting facades. For cycling, this point is easily to translate and shows the most commonly issues in the cycling network in Amsterdam (Gemeente Amsterdam, 2013).
2. Being accessible for everyone, is a more difficult task for cycling as bicycles come in many more different extreme sizes than pedestrians themselves.
3. The opportunity to stay is defined by edges, attractive zones for standing/staying and provides supports for standing.
4. The opportunity to sit is clarified by zones for sitting, while facilitating a nice view, sun and people. Good places to sit and benches for resting are also named.
5. The opportunity to see is further elaborated by reasonable viewing distances, unhindered sightlines, interesting views and lighting.
6. The opportunity to talk and listen is divided by low noise levels and street furniture that provides ‘talkscapes’. For cycling this could be a bit different, as talking happens during the activity and with that the cyclist is also expected to keep paying attention to the rest of its surroundings. The talkscape of a cyclist is generally two cyclists next to each other and it moves through the context of its surroundings.
7. Lastly, the opportunity for play and exercise is explained through invitations for creativity/ physical activity/ exercise and play, the differences between day and night and the differences in summer and winter. Of course, cycling is the activity for

exercise in case of the cyclists, the differences between day and night, summer and winter also become very evident during cycling.

- Delight

1. Delight is explained by a variety of topics in a less systematic way as protection (protection against...) and comfort (opportunities to...). Delight is explained by scale, where the buildings and spaces should be designed to human scale.

2. The opportunity to enjoy the positive aspects of the climate are briefly elaborated by sun/shade, heat/coolness and breeze.

3. And lastly, positive sensory experiences are provided by good design and detailing, good materials, fine views and trees/plants/water.

Although more simplified, Gehl is able to still touch a large variety of criteria which are important to understand the human dimension in a city. The themes and criteria of Gehl could form a proper base for further elaboration, as his formulation is very broad and open for interpretation which, for a consequent quality of the bicycle network is needed. The theme 'delight', as similar to 'attractively' (CROW, 2006), is formulated in a different systematic way as the other themes where (suddenly) designing the place seems to be most evident. The designing of a place should, like the criteria Gehl stated in the other themes, not be a criteria but a tool to achieve a certain level of delight.

On the contrary of a lack of defining what delight, attraction and experience is the publication of *The city at eye level* (Stipo, 2016) becomes an added value to the criteria (abstract and strict) CROW, the Municipality of Amsterdam and Gehl did give (CROW, 2006; Gemeente of Amsterdam, 2010; Gehl, 2010, p. 238-239).

In *The city at eye level*, amongst other themes, experience is a topic which the authors are not afraid to further elaborate on (Stipo, 2016, p.313-320). The authors right away show the importance of experience and define the approach of a positive experience through the following aspects:

**“WE ARE NOT ONLY RATIONAL BEINGS,  
WE NEED THE EMOTIONS OF THE CITY’S  
EXPERIENCE AS WELL.”** (Stipo, 2016, p.313)

1. The designer should focus on the life in and between buildings, as these spaces are more essential and relevant than the other spaces.

2. The city should be well-formed, distinct and remarkable. It is urged to improve the city on the topics of colour, texture, scale, style, character, personality and uniqueness (p.313). Of course, everyone experiences a place differently but it is a good attempt to formulate the aspects of it so that the designer can work on these points without overlooking them.

3. Small shops with open faces should be created to make users feel at home. The authors state that the allowing of movement between public and private creates interaction and meaning of which users can become attached to as part of the city they move and live in.

4. Walkability should be improved. Topics that the authors use to elaborate on this are density of amenities, street connectivity, the proximity to large green areas, regional accessibility and building design. “make interaction meaningful and comfortable and enhance the city’s quality of life.”

5. Creating great plinths is very important to the experience of the user. The authors note that, although only 10% of the buildings is the ground floor it determines the other 90% of the building contribution to the experience of its environment.

### Conclusion

Criteria used to enhance the design at eye level through the eyes of the pedestrians are very similar or could even be easily reformulated to fit that of the eyes of the cyclists. By reformulating the criteria, both the studies of Jan Gehl and Stipo become a strong added value to the enhancing of a bicycle network as well. In contrast to the *Structure vision 2040* of the Municipality of Amsterdam and the *Design guide infrastructure* by the CROW, the explorers of designing at eye level are able to

formulate their criteria more through the eyes of the user. All the studies show that there are criteria which can be formulated really strict in numbers. However, they also show that there are criteria which should be left open or cannot be formulated further in depth and therefore are left for wider interpretation by the designer. What is important to distinguish, is which themes and criteria should have the freedom of interpretation and also the reason behind it. Without a proper reason, but also without enough depth of the criteria, it is more likely that the design of the street becomes more of a compromise rather than an outspoken image of the city. By formulating the criteria in a strict way, but in a variety depending on the users, the designer as well as the evaluator (user) can become more aware of for who the specific part of the network is meant and what kind of experience is needed.

The common themes to influence the positive experience of different types of cyclists are:

- Protection: traffic safety, social security and the protection against (negative aspects of) the climate
- Comfort: Space, accessibility, place-making, way-finding, visibility, interaction, day/night

- Delight: Human dimension, life on the ground level, colour, texture, style, character, personality, uniqueness and interaction

It clearly shows that formulating criteria to design through delight (attractiveness/positive experience) are generally difficult to do as they are incredibly subjective and different for every user. Nevertheless if an attempt is made, as the explorers of The city at eye level (stipo, 2016) did, a broad focus can be initiated which can help the designer to further envision and visualize the street at eye level, as part of the larger (bicycle) network.

By further elaborating on for who one designs and how their objectives in a positive experience could reflect in a design on street level, the criteria for experience can be formulated a bit more in depth. Not only does the designer get a tool they can actually work with, the design can also be better evaluated in practise once it has been implemented.



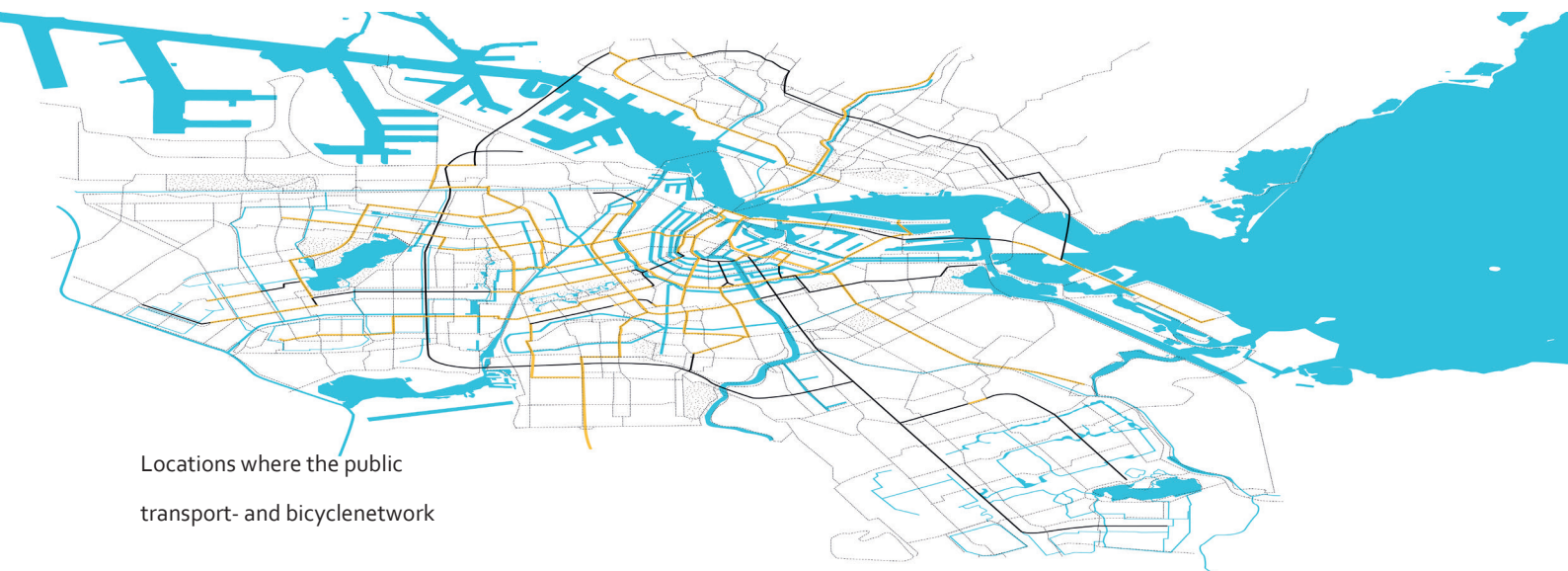
# **CITY ANALYSIS**



### Infrastructure

The different infrastructure modalities are compared to the bicycle network. Highlighted are locations where the bicycle network and the network of the other modality meet.

Important to notice is that most connection routes have a double function in which conflicts would be most likely to happen.



### Buildingperiods

The city Amsterdam was build in different periods since it was established. The main categories of these building periods are as followed:

1. The canals (before 19th century)
2. Within the 19th century ring (19th century)
3. Within the ring (until 1940)
4. Outside the ring (postwar)

A large part of the bicycle network lays ' within the ring', the ring indicating the current highway, but also up till where was build until the Second World War. Postwar neighborhoods were build for the car, as the car was widely introduced after this period. However, all pre-war neighborhoods (within the ring) originally were never build to be used by the car. It is in these areas where the bicycle network collides most with the car use.

### Functions

Throughout the city functions are spread. These functions should be connected to the bicycle network as well as possible in order to facilitate for as many people (cyclists) as possible.

Notable are the many shopping streets in Amsterdam West which form a network. In the postwar neighborhoods shops are quite scattered. Highschools and universities are scattered around the city, however there is a focus area from Amsterdam-Zuid towards the innercity. Greenareas can also be found all over the city. Notable is that only a few parks have the main bicycle network running through them.





Shops



Highschools and universities



Greenstructure

# **CONCLUSION**

### Possible design locations

Following from the city analysis, and personal preference, eight different routes will be focused on in the further process of this research. The routes are the main connections between Amsterdam Nieuw-West and the river Amstel. The main reasons why these routes have been chosen are:

- All routes connect the same areas with each other making them more easily to compare
- There is a variety within the different routes on their functions and in what context they run (parks, shopping streets, the border of the city, etc.)
- All routes have in common that they cross the highway in a certain way (over or under a the bridge of the highway)
- Half of the routes are a few of the most used routes in the whole city

Within the routes locations at eye level are reviewed and issues are addressed in explorative designs

### The next steps

Additional to the P2 presentation: Following this first part of the research, the criteria which have come to focus already are visualized in abstract principles. The Kinkerstraat is used as a testcase to further elaborate on the approach and activities to get to the final products of this research.

After the P2 presentation: A constant reflection is made between the reviewed criteria and possible designs.



Figure 10 - Overview of possible focus locations

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