



Figure 1 Grote Marktstraat in 2016 (Wikipedia, 2016)

DE GROTE MARKTSTRAAT

An unsuccessful example of Shared Space?

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Preface

Before you lies the Bachelor Thesis “De Grote Marktstraat: an unsuccessful example of Shared Space?”. It has been written for the Bachelor of Civil Engineering followed at the TU Delft. I would like to thank my supervisors Dr. Ir. Alexandra Gavriilidou and Dr. Ir. Yufei Yuan for the guidance and support during this process by giving insightful feedback. Also, I would like to thank the fellow students for their weekly feedback.

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Summary

Since 2013 the inner city of The Hague was a Shared Space area. This means an area where most traffic regulations are dropped and individual responsibility should cause more cautious behaviour, resulting in higher objective safety. It was a pedestrian area where cyclists were the guest. In 2020 the local council decided to ban cyclists during shopping hours in most of the city centre. De Grote Marktstraat is just outside this area and has since gotten more through travelling cyclists. The users of the street complain about feeling unsafe and not having a clear traffic situation. The municipality still has not agreed on a way to solve these problems.

The aim of the original design of de Grote Marktstraat has always been based on the pedestrian. It was meant to be an international shopping boulevard. Despite this, the cyclist has always had its part in the design by a deeper lying strip functioning as a cycling path.

As the street is directly in line towards or from the Central Station of The Hague, it is an essential part in the cycling network. There are some parallel routes, however those do not facilitate a comfortable route for the cyclists, causing them to prefer de Grote Marktstraat.

The deepened strip in the design that was mentioned before is designed for the cyclist, which causes the cyclist to claim this space as their own. Legally, this part is not a cycle path and may be used by both cyclists and pedestrians.

To solve these issues, three redesign options are considered. One in which the situation is clarified by a red cycling path, one in which the cyclists are banned during shopping hours and an alternative route will be realised and one in which the alternative route will be realised while also removing the cycling strip, making the whole surface be on one level.

Afterwards these options were evaluated by the criteria of the position of the users, clarity of the situation, attractiveness of the shopping area, enforcement and costs. This led to the third alternative being preferred. Cyclists should get an attractive alternative route, causing them to avoid de Grote Marktstraat during rush hours. At the same time the removing of the cycle path should lead to pedestrians using the full width of the street, which then causes the cyclists that still use the street to slow down.

This research is limited to the evaluation of the traffic situation in de Grote Marktstraat itself. Therefore, it is recommended for future research to look into the optimal alternative routes for the cycling network by doing an extensive analysis of the network and the surrounding streets.

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1. Introduction

In this chapter, an introduction to the research topic is given. Afterward, the setup of this research project will be explained stating the main- and sub-questions for this research. Then, the approach of this thesis will be explained with the structure of the report.

1.1. De Grote Marktstraat

Since 2013, the city centre of The Hague was a big Shared Space area (Regts, 2019). In short, a Shared Space area is an area where most traffic regulations are dropped and individual responsibility should cause more cautious behaviour, resulting in higher objective safety. The idea was that cyclists are accepted as guests and should responsibly find their way among the pedestrians in the shopping area (Regts, 2019).

In 2019, an initiative was submitted by the VVD in The Hague to reconsider this configuration and to remove the cyclists from these streets during opening times of the shops (Regts, 2019). In 2020, this initiative was accepted and in a certain part of the inner city, cyclists are no longer welcome during shopping times (Haas, 2020). In the pre-advice letter to the local council of The Hague is stated that cyclists and pedestrians still do not get used to each other's presence and complain about it a lot (Haas, 2020). Also, shop owners complain about the "shopping experience" being worse because of the cyclists.

For the largest part, the city centre of The Hague has a cyclist ban during shopping times. De Grote Marktstraat still has the Shared Space concept, while at the same time it has become an even more important cycling route. The complaints, however, have not stopped and the municipality seems to have lost faith in the Shared Space concept.

1.2. Problem description

As de Grote Marktstraat gets so many complaints, the municipality of The Hague is looking for a way to increase the perceived safety of pedestrians and cyclists. While the municipality is looking for a solution, part of the local government wants to realise a cycle path with zebra crossings to increase safety. Alderman van Asten (D66) does not agree and refers to existing research stating this is not the solution (Bree, 2021).

The goal of this research is to increase the insight in the current situation in de Grote Marktstraat and the occurring problems and see if the Shared Space concept is optimally used or what could be improved. Afterwards, the aim is to make a recommendation to the municipality of The Hague for an optimal solution to reduce or even solve the problems.

1.3. Research questions

This situation with its problems leads to the main question for this research:

“Which redesign could best solve the traffic safety complaints in de Grote Marktstraat?”

This question is relevant, as the municipality gets a lot of complaints about feeling unsafe in the area. Part of the task of the municipality is not only to keep the people safe but also to make the city an attractive place to stay. This includes perceived safety, which is why a solution is needed.

This can be broken down into smaller questions to break the research up into different parts.

- What are the opportunities and challenges of applying Shared Space?
- How has de Grote Marktstraat evolved over the last 10 years?
- How has the concept of Shared Space been applied in de Grote Marktstraat?
- What impact has the Shared Space concept made on de Grote Marktstraat?
- Which design alternatives solve part of the safety complaints in de Grote Marktstraat?
- Which design alternative improves the situation best for all involved parties?

The first question will help to understand what the situation is and what it has been, including the design principles used in the last redevelopment. The second question explains what to keep in mind while using the Shared Space concept. The third question leads to a better view of how the concept has been applied and if it was applied correctly. This leads to the fourth question relating to the actual impact that has been made by applying Shared Space in de Grote Marktstraat. The next question will help gaining insight into available options for redesign and the last one evaluates the available options.

Understanding the answers to the sub questions will lead to a clear view on the situation in de Grote Marktstraat and possibilities to optimize the Shared Space design. Also possible is the conclusion that shared space would not work under the given circumstances.



Figure 2 Grote Marktstraat in 1980 (Dienst Stedelijke Ontwikkeling, 2021)



Figure 3 Grote Marktstraat 2020 (DenHaag.com, 2020)

1.4. Approach

In the first part of this bachelor thesis, theoretical research will explain about the concept of Shared Space and mixing pedestrians and cyclists. From there, it will be clear what aspects need to be analysed before redesigning.

The second part will analyse the situation in de Grote Marktstraat and the way the Shared Space concept has been applied there. This way, a lot can be learned about the context in which it is applied and where the problem comes from.

In the third part, a few redesign suggestions will be made. These suggestions will be evaluated using a simple multi-criteria analysis. Based on this, suggestion will be made as to which way of redesigning de Grote Marktstraat can best solve the unsafe feeling of users.

1.5. Structure of the report

In the second chapter of this report the literature study will be written. Afterwards, in chapter 3, the analysis of de Grote Marktstraat will be explained. Chapter 4 will explain a few different design alternatives, based on the research done before. After which in chapter 5 will evaluate using a multi-criteria analysis. In chapter 6 all will be evaluated and suggestion will be made for a redesign, after which discussion and recommendation will be written.

2. Theoretical Base

In this chapter, the concept of Shared Space and the ideas behind it will be explained as well as key factors in streets with mixed use of (mostly) cyclists and pedestrians. Both perspectives will be reviewed and a few possible reasons of the low perceived safety will be explained based on recent studies.

2.1. The concept of Shared Space

The concept of 'Shared Space' areas are assumed to originate from the ideas of the late Hans Monderman, who was a traffic engineer from the Netherlands (Moody & Melia, 2013).

There is no internationally agreed definition of Shared Space, however both CROW (Dutch technology platform for transport, infrastructure and public space) and the British Department for Transport have both defined their own:

"Shared Space is a traffic concept, which focuses on multifunctionality (and with that the relationship between traffic safety and surroundings). The public space will be designed as "people space" rather than "traffic space"." (CROW, 2021)

"A street or place designed to improve pedestrian movement and comfort by reducing the dominance of motor vehicles and enabling all users to share the space rather than follow the clearly defined rules implied by more conventional designs." (DfT, 2011)

Despite there not being one clear definition, the ideas behind the concept are clear. When Hans Monderman was still the safety advisor for the province of Fyslân, he started figuring out a way to improve safety, while keeping or even improving the spatial quality of the area (Lutz & Foorthuis, 2011). The person and its behaviour should be the central theme and not the traffic. His hypothesis was that a new, different design would make drivers insecure, which would lead to them slowing down. This would cause pedestrians to move more safely, as they will be able to communicate better with the other users of the road (Lutz & Foorthuis, 2011).

Kenniscentrum Shared Space defines five principles of Shared Space (Lutz & Foorthuis, 2011):

1. Focus on the people: large parts of the public space in cities and villages are not used for quick and efficient transport. These places can be designed as public space, improving social behaviour and adding lots of functionalities to the area. The car does not have to be removed, but should drive slowly, making interaction possible.
2. Own responsibility: users should assess the risks of the situation themselves. Interaction with other users of the space is needed to lower risks, which leads to shared responsibility. This responsibility will no longer be regulated by traffic signs and rules.
3. Active involvement: Shared Space is about planning, designing, deciding and using. Local government, professionals and inhabitants should actively work together to come to an optimal design for the space.
4. Space with quality: the concept of Shared Space does not have strict design or traffic rules. It aims to achieve an optimal design within the context of the area, which is only possible if the different stakeholders actively cooperate in the design process. The only strict rule is that there are no traffic lights.
5. Shared functionality: the different groups of users should be able to use the area for different functions in an optimal design of a Shared Space area.

2.2. Mixing pedestrians and cyclists

In a recent study of about fifteen shopping streets in the Netherlands where cyclists were allowed, the CROW studied the self-regulation between cyclists and pedestrians (CROW Fietsberaad, 2022). In this study, they recommend a first version of a step-by-step guide for evaluating an existing situation or designing a situation for new plans.

In the first step, the position of cyclists is evaluated. This is done by evaluating the position of the road section in the network of the cyclists as well as evaluating if mixed use is possible and desirable from the perspective of the cyclist.

The second step is evaluating the position of the pedestrian. Determine whether people stay in this area or they use it to get somewhere else. Evaluate to what extent vulnerable groups use the area and research the intensity of pedestrians (in pedestrians/hour/meter). Then evaluate if mixed use is possible and desirable from the perspective of the pedestrian.

The third step is evaluating the first two steps and determining what the most optimal mixing situation is. After this decision, the design can be made with the right safety measures.

In the figure below, these steps are visually represented. In step 1, it needs to be determined whether the road section is part of a main cycling route. In step 2, areas with functions to stay are distinguished from the other areas. Then indicational intensities (in pedestrians/hour/meter) are given for what types of solutions should be chosen.

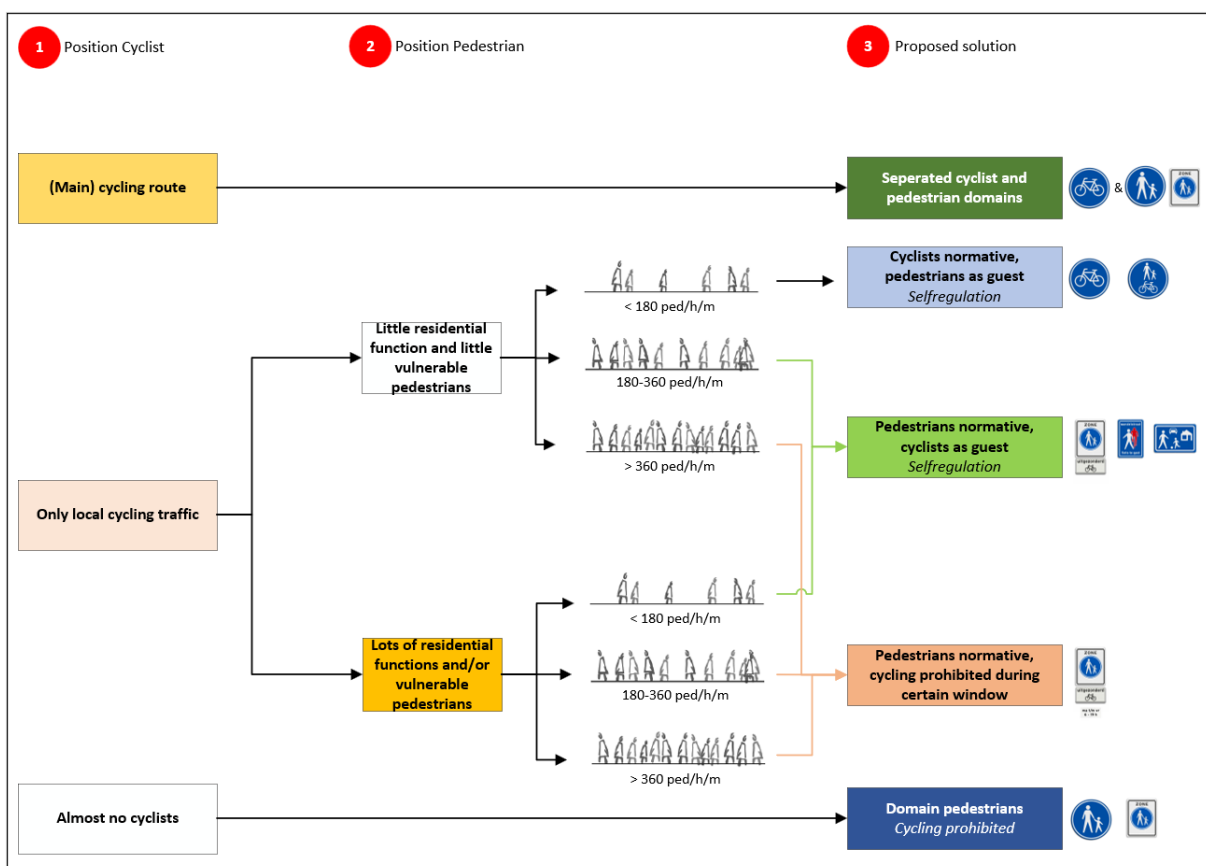


Figure 4 Step by step guide to mixed use streets, translated from (CROW Fietsberaad, 2022)

2.3. Different perspectives

As multiple evaluations of these types of streets have been done, more insight is created in behaviour of cyclists and pedestrians. Below a summary of a few key findings of recent studies.

2.3.1. Pedestrian perspective

The report of CROW Fietsberaad states that the behaviour of pedestrians is mostly influenced by their perceived safety (CROW Fietsberaad, 2022). Multiple studies show that pedestrians feel more unsafe when it is not predictable where and when they can expect cyclists, when the distance of passing is small and when they are passed with high speed (Goudappel Coffeng, 2017) (Mobycon, 2018). These higher speeds are likely to become more regular with the increase of e-bikes.

The hinder which pedestrians experience also seems to depend on the goal for which they are walking. Pedestrians who want to travel from A to B seem to experience less hinder from cyclists than people who are shopping (CROW Fietsberaad, 2022).

The study from The Hague shows that when there is no clear indication of a cycle path, people tend to use the whole width of the road (Goudappel Coffeng, 2017). When there is a clear division in the road, even with the whole road on the same level, pedestrians tend to walk near the side of the road.

2.3.2. Cyclist perspective

Cyclists tend to experience more hinder from pedestrians when they find a street a logical part of a cycling route (CROW Fietsberaad, 2022). If cyclists want to move from A to B, they will do it via the most logical route and preferably as fast as possible.

Different studies show cyclists slowing down when the pedestrian density gets higher, until the point where they experience too much hinder. Under these circumstances, cyclists consider a parallel or alternative route, which is shown in the figure below.

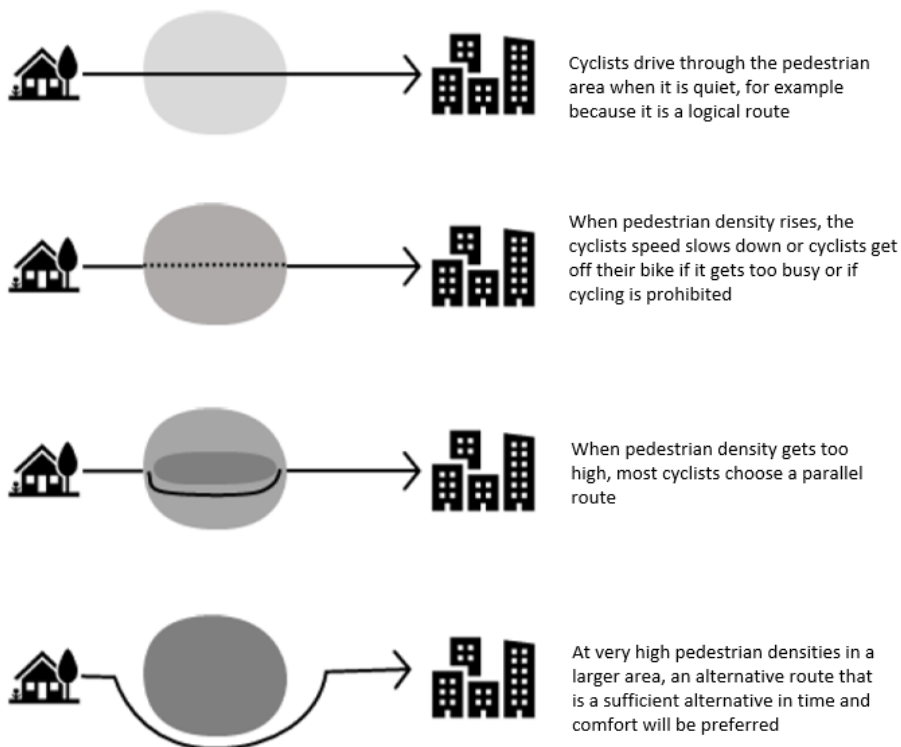


Figure 5 Cyclist behaviour based on pedestrian density translated from: (CROW Fietsberaad, 2022)

3. De Grote Marktstraat

In this chapter, an analysis of the problem will be made. De Grote Marktstraat will be analysed based on its original design, place in the network and purpose for the different users. The way the Shared Space concept is applied in the current design will also be evaluated.

3.1. Historical analysis

In order to understand the design choices that have been made in the last redevelopment, the history of the street should be considered. This can give insight into the reasoning behind these choices and possibly explain why they worked better in the past.

In 1996, de Grote Marktstraat was closed down entirely for car- and bus traffic as a new tram tunnel was being constructed. Construction of this tunnel went on until 2004, while over this period the street was redesigned temporarily multiple times. After these construction works, the ambition was born to redesign the street and make it an attractive shopping street (Dienst Stedelijke Ontwikkeling, 2021).

In “Binnenstadsplan Den Haag”, the municipality states they aim to develop the city such that it is the best shopping city in the Netherlands (Gemeente Den Haag, 2010). De Grote Marktstraat is an important factor in that ambition and therefore it should be redesigned as a shopping street of international quality. Pedestrians should be at the basis of the design and get space to shop in peace. A design should be made with as much unity as possible.

Looking at the initial plans for this design of de Grote Marktstraat could give an insight into the thought process behind the current situation. In the project document published in 2009 it is stated that the idea is to make de Grote Marktstraat the calling card of the city (Gemeente Den Haag, 2009).

This document also tells that the cycling route was a point of discussion. After which was decided that the cycling route should be maintained.

In the initial programme of requirements four main requirements are stated (Gemeente Den Haag, 2009):

- The design of the street needs to be adjusted to pedestrians to reinforce the position of the street as most important shopping street
- A through route for cyclists in the street with a distinguishable cycle path and foot path
- The street is appointed as main route for emergency services. An obstacle free zone of 6,5 meters is required
- De Grote Marktstraat needs to offer space for events

It is mentioned in the project document that plans were to close down the street for cyclists during shopping times, while this has not happened (Gemeente Den Haag, 2009) (Dienst Stedelijke Ontwikkeling, 2020). In these initial plans an alternative cycling path via de Gedempte Gracht / Gedempte Burgwal would be realised to offer a parallel alternative.

In 2015 this was re-evaluated as there were already some safety concerns. After this evaluation, the municipality decided on informing cyclists about their expected behaviour (maximum speed of 15 km/h) in de Grote Marktstraat (Dienst Stedelijke Ontwikkeling, 2020).



Figure 6 Grote Marktstraat 1992 (In de buurt, 1992)



Figure 7 Grote Marktstraat 2004 (Velthoen, 2004)



Figure 8 Grote Marktstraat 2015 (Musterd, 2015)

3.2. Network analysis

Important part in analysing the problems in de Grote Marktstraat is its place in the cycling network of The Hague. As explained in chapter 2.3.2., cyclists tend to use a route that seems like the most logical to them. They will also experience more hinder from pedestrians on those logical routes.

To see whether de Grote Marktstraat would be a logical route for cyclists, a closer look is needed at the allowed cycling routes during the day. As the municipality of The Hague bans cyclists in most of its city centre during shopping hours, less cycling routes will be available during the day.

In the next figure, the cyclist situation in the city centre is analysed. The red roads are cycling routes outside of the pedestrian area. The yellow routes are areas where can be cycled 24/7 within the pedestrian area and the green area is the pedestrian area.

Important note is the location of The Hague Central station relative to the city centre and its cycling routes. As can be seen, de Grote Marktstraat is the street that runs directly towards the Central station from West to East. For most West-East/East-West movements by bicycle, de Grote Marktstraat seems to be the main option. De Gedempte Burgwal/Gedempte Gracht runs parallel to de Grote Marktstraat, however the cycling facilities in these streets are worse. Both are narrow with parking on the streets, which makes it more attractive for cyclists to choose the existing cycling path in de Grote Marktstraat as logical part of their cycling route to the Central Station.

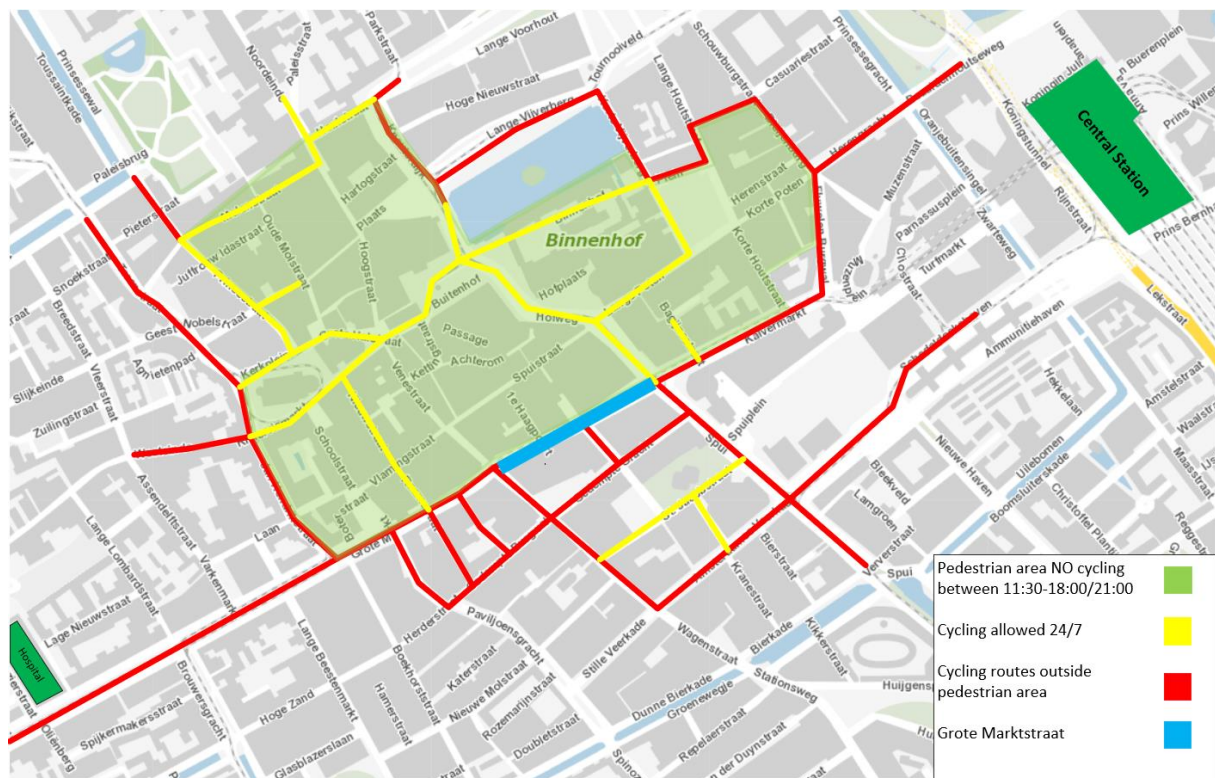


Figure 9 Cycling routes during shopping hours

3.3. Current situation

This part of the analysis will look into the way the current design is set up and which design principles are used.

As discussed in chapter 4.1. the municipality of The Hague wanted its design to be based on pedestrians enjoying their shopping experience. However, they also wanted to maintain the through route for cyclists. In the design of the current situation, a separate cycling path is designed to guide cyclists and pedestrians during the busy hours. However, there is no literal mention of “Shared Space” in the original design documents, the design goals line up with the concept. Later publications of the municipality do literally refer to de Grote Marktstraat as a Shared Space.

Despite there not being a clear definition of Shared Space, this separate cycling path does clash with the concept of Shared Space. By defining a cycling path, even if it is not coloured red, the designer has assigned certain parts of the space to certain users. Therefore, cyclists might feel safer on the cycling path and travel with higher speeds.

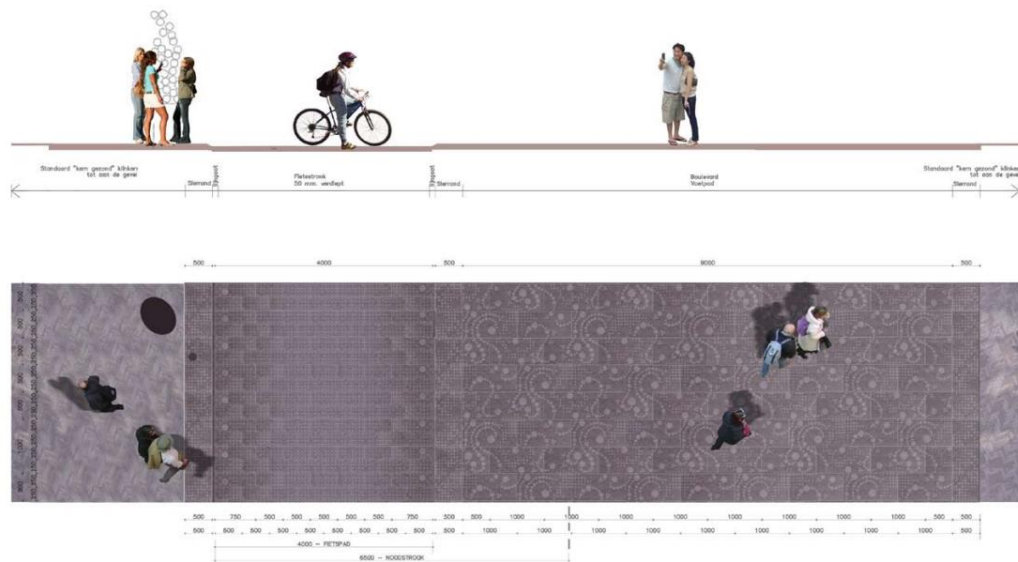


Figure 10 Cross-sectional design of de Grote Marktstraat (Dienst Stadsbeheer, 2012)

In 2018, a small part of the street has been slightly altered. This leveled the street from façade to façade, which can be seen in the image below. Observations state that pedestrians reclaim their space in this area and cause cyclists to slow down. While on the deepened cycling path, the cyclists claim their space by ringing their bell, shouting or cycling faster (Dienst Stedelijke Ontwikkeling, 2021).



Figure 11 Levelled surface in de Grote Marktstraat (Google, 2021)

The concept of Shared Space is based on as little traffic regulations as possible. This means that the cycling path does not have the typical red colour and there is no lining on the road. When entering the street, however, it is made clear that the street is a zone for pedestrians in which cyclists are allowed. After the Covid-restrictions were mostly lifted in 2021, the municipality decided to raise awareness of this situation by painting signs on the ground which can be seen in the image below (Ditmars, 2021).



Figure 12 Traffic sign and painting in de Grote Marktstraat (In de buurt, 2021)

Though the design choices regarding the cycling path could be doubted, the redevelopment in 2013 added a lot of spatial quality to the street, considering the street before building the tram tunnel as can be seen below. The choice of floor tiles makes the area feel whole and using large, impressive benches the metro entrances are less disturbing in the street view.



Figure 13 Grote Marktstraat around 1980 (Dienst Stedelijke Ontwikkeling, 2021)

A few conclusions can be made from this analysis. As the municipality has communicated that they want to achieve a Shared Space in de Grote Marktstraat when designing it in 2013, they seem to have only taken a part of the concept in consideration. The main idea behind the concept of Shared Space is creating alertness for the road users, making them slow down and make contact with the other users to avoid incidents. By creating a separate cycle path, the municipality facilitates cyclists claiming their domain in the street. This makes them able to cycle much faster and not having to interact with the pedestrians. These higher speeds are one of the factors why pedestrians experience unsafe feelings. It seems hard to understand why the municipality designed a cycle path, while not legally naming it a cycle path. This all causes users to not really understand what is going on. The redesign using Shared Space has, however, much improved the spatial quality of de Grote Marktstraat.

3.4. Traffic density

The number of visitors of the city centre of The Hague experienced a growth of approximately 15% over the period 2010-2020 (Dienst Stedelijke Ontwikkeling, 2021). Also, the choice for mode of transport changed and shifted more towards cycling and walking. The fraction cyclists within those visitors grew from 17% in 2011 to 24% in 2019 (Gemeente Den Haag, 2020).

Model calculations from the municipality expect further rise in the number of cyclists to approximately 18.000 in 2025 (Dienst Stedelijke Ontwikkeling, 2021). Also, the type of cyclists is changing, with the growing popularity of e-bikes that reach speeds up to 25 km/h.

Recent studies from the municipality gave insight into the traffic densities during a weekday and in the weekend. In the first two images below, cyclists are counted per hour and compared to the same type of research conducted in 2006 on the same day. It is clearly visible that the cyclist intensities have grown substantially. During peak hours on Tuesday, more than 1500 cyclists pass through the street.

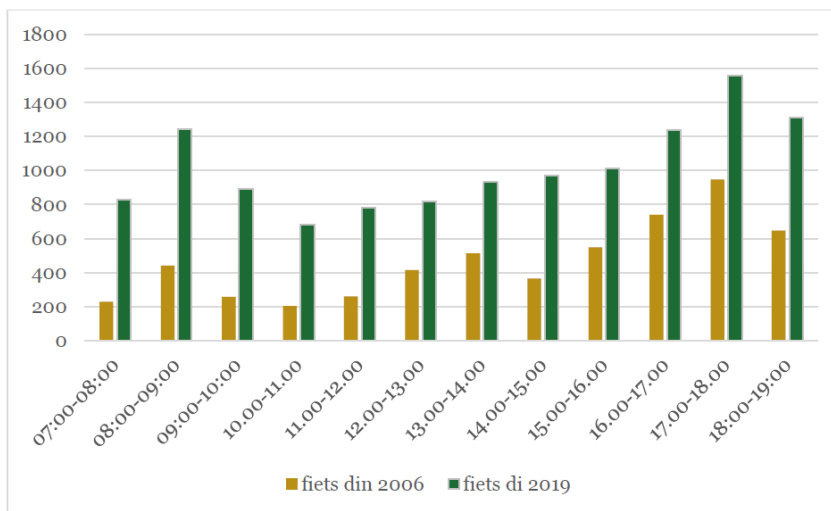


Figure 14 Cyclist intensity (pedestrians/hour) 2006/2019 Tuesday (Dienst Stedelijke Ontwikkeling, 2021)

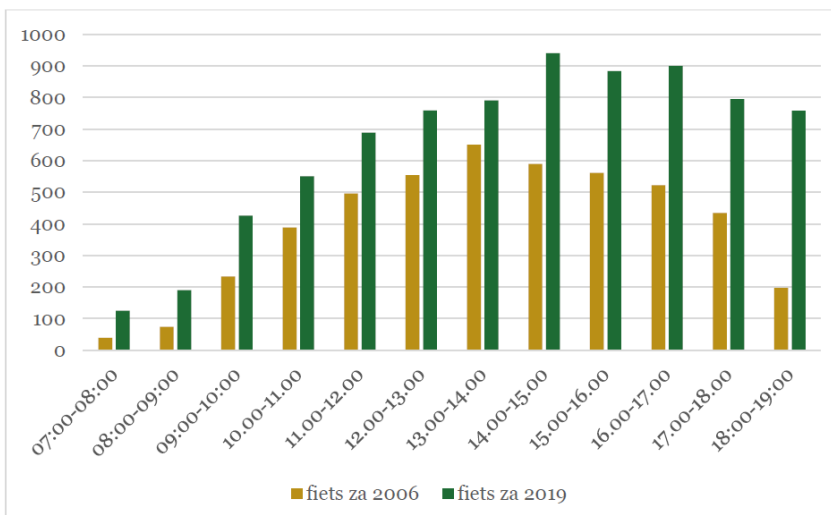


Figure 2 Cyclist intensity (pedestrians/hour) 2006/2019 Saturday (Dienst Stedelijke Ontwikkeling, 2021)

In the images below, cyclist and pedestrian density are compared from the 2019 study. The peak hours are set as 100 on the index and the other hours are adjusted to that. Interesting take from these indexes is that on Tuesday there is a clear morning rush hour and evening rush hour for cyclists. Also, the increase in pedestrians after noon stands out. On Saturday, peak hours are flatter and peaks for cyclists and pedestrians coincide more or less. Cycling traffic does not have morning or evening rush hours.

The number of cyclists during rush hour on Tuesday was 1550 cyclists/hour and on Saturday 940 cyclists/hour, as can be seen in the above graphs.

The amount of pedestrians during rush hour is not indicated in the study, however the 2006 study already counted an average of 120 and 150 pedestrians/hour/meter on a weekday and 185 and 255 pedestrians/hour/meter on Saturday (Dienst Stedelijke Ontwikkeling, 2021). In 2021 a sample test was done on a Friday at 13:30 in which 3600 pedestrians/hour were counted (Dienst Stedelijke Ontwikkeling, 2021). The width of the street varies from 20 to 30 meters, which would make somewhere between 120 and 180 pedestrians/hour/meter.

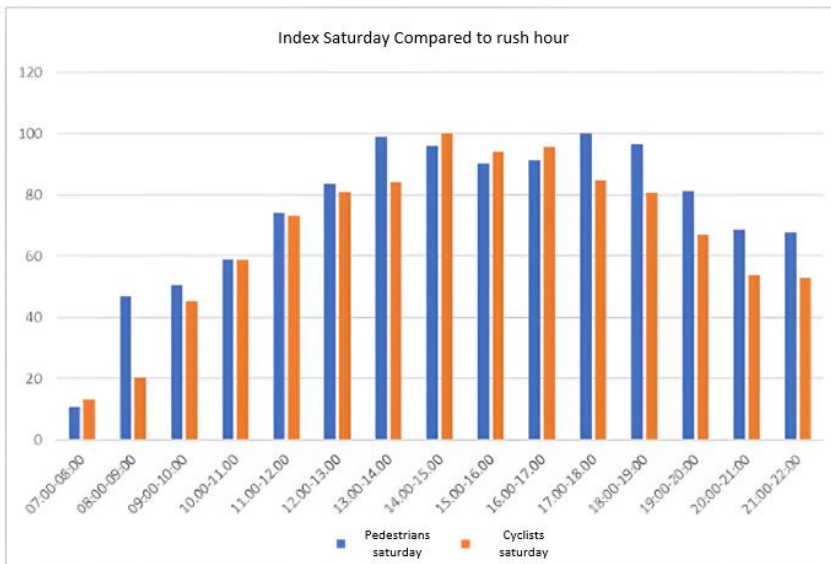


Figure 16 Traffic density index pedestrians/cyclists Saturday (Dienst Stedelijke Ontwikkeling, 2021)

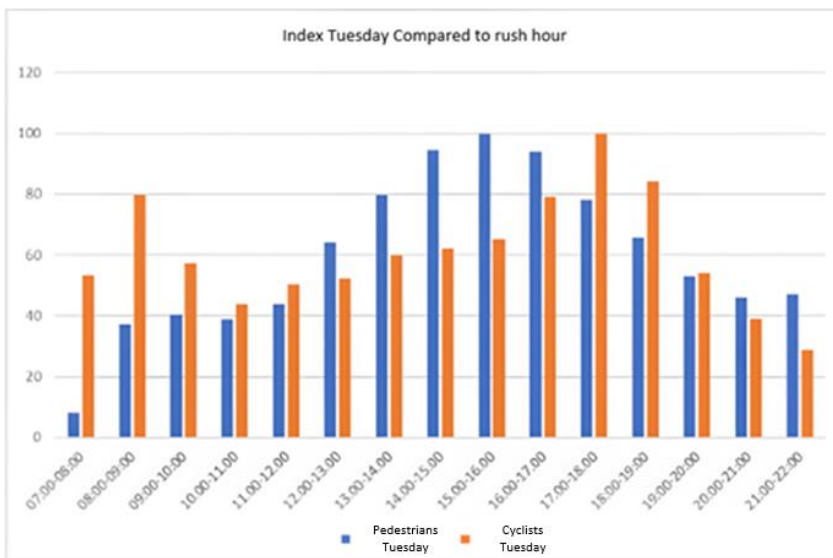


Figure 173 Traffic density index pedestrians/cyclists Tuesday (Dienst Stedelijke Ontwikkeling, 2021)

Assuming the counting on Friday afternoon can be compared to the “weekday” graphs, the 120-180 pedestrians/hour/meter would resemble 80% of the peak intensity. This would make the peak intensity on a weekday 150-225 pedestrians/hour/meter. The intensity of pedestrians during peak hours on the weekend are even larger. Following the guidelines of the recent CROW study explained in chapter 2.2., this area, with a lot of residential functions, would not be able to comfortably mix pedestrians and cyclists during peak hours. During the hours where pedestrian density is not that high, it would be possible to mix cyclists and pedestrians.

As also explained before, cyclists tend to choose a parallel or alternative route when this route suffices in travel time and comfort. As cyclists still do not choose alternative routes, it is possible that parallel streets like the Gedempte Gracht/Gedempte Burgwal are not comfortable enough or that cyclists still experience enough comfort in de Grote Marktstraat to keep using this route.

In short, looking at the numbers of pedestrians and cyclists passing during weekdays and in the weekend, it can be concluded that during peak hours there is no way to facilitate both through traffic cyclists and the shopping pedestrians at the same time. During the quieter hours, it is perfectly possible to let the users self-regulate and facilitate both the cyclists and pedestrians. Possibly, when parallel or alternative routes are available that are more comfortable, cyclists would avoid de Grote Marktstraat more during rush hours.

3.5. Accidents

This research is mostly about creating a situation that makes the users feel safe, as the municipality of The Hague gets complaints about an unsafe situation. It is, however, interesting to look into the actual accident numbers to see the result of this situation on the objective safety of the users.

During the period from 2018 until 2020, 16 registered accidents have occurred in de Grote Marktstraat. In seven of these cases, a cyclist or pedestrian was involved and in six of these cases someone was injured. It is possible that smaller incidents have not been registered and almost-accidents are also not taken into account. With seven pedestrian or cyclist accidents over a period of 3 years, the street may feel unsafe, but it does not result in a lot of heavy accidents.

Datum	Aard	Vervoerwijze	Ongevallen	Partijen	Slachtoffers	Doden
20180228	Eenzijdig	Bestelauto/ Bromfiets	1	2	0	0
20180410	Onbekend	Bestelauto/ Bromfiets	1	2	0	0
20180630	Onbekend	Bromfiets	1	1	0	0
20180918	Frontaal	Bestelauto/ Bromfiets	1	2	0	0
20181024	Onbekend	E-bike/ Fiets	1	2	1	0
20181120	Onbekend	Vrachtauto/ Overige	1	3	0	0
20181230	Voetganger	Voetganger/ Fietser	1	2	1	0
20190307	Onbekend	Motor	1	1	0	0
20190321	Voetganger	Fiets/ Voetganger	1	2	1	0
20190419	Voetganger	Fiets/ Voetganger	1	2	1	0
20190717	Onbekend	Fiets	1	1	1	0
20190902	Voorwerp	Personenauto/ Object	1	2	0	0
20191128	Voorwerp	Bestelauto/ Object	1	2	0	0
20191218	Voorwerp	Overige	1	1	0	0
20200310	Voetganger	Voetganger	1	1	0	0
20201112	Voetganger	Fiets/ Voetganger	1	2	1	0
		Totaal	16	28	6	0

Figure 184 Registered accidents 2018-2020 Grote Marktstraat (Dienst Stedelijke Ontwikkeling, 2021)

3.6. Different perspectives

With the different users in de Grote Marktstraat, different perspectives of users need to be considered.

The *cyclist's perspective* is aware of the traffic situation with the pedestrians in the street. At some parts in the street, the deepened cycling path is removed in 2018 and the paving is levelled from façade to façade. On these places, pedestrians cross the street more. The cycling domain that is created by the deepened cycle path is removed here, which makes pedestrians move freer and causes cyclists to slow down. On the cycle path cyclists claim their space by ringing their bell, shouting and cycling faster. Cyclists with a destination in the city centre seem more prepared to change their speed as their destination has almost been reached. Cyclists only cycling through de Grote Marktstraat to reach their destination seem less prepared to behave as a guest in the street.

From the *perspective of the pedestrian*, there is less focus on the traffic situation. Most pedestrians walk in a shopping street and is not as much aware of the cyclists as their focus is on the shops and each other. They cross the street to get to the shops on the other side and are focused on things in the shops. During rush hours it is even more chaotic, as pedestrians do not have a clear overview of the traffic situation, while cyclists are constantly driving by with, most of the time, higher speeds. All of this leads to pedestrians experiencing a chaotic traffic situation, while not being focused on this situation as they are in the street for shopping purposes.

It needs to be noted that the 6,5 meters of obstacle free zone needs to be maintained with as main reason that the street is part of the main routes for emergency services. Also, some shops are depending on the loading and unloading traffic driving through the street.

4. Design alternatives

As been made clear in chapter 4, a few problems occur in de Grote Marktstraat which cause people to feel unsafe. In this chapter, a few alternatives will be described to solve the issues in de Grote Marktstraat.

The main problems to solve which would improve the situation in de Grote Marktstraat are the traffic density during peak hours and the deepened “cycle path”. The first problem does not only impact the perceived safety of pedestrians, but also the traffic function of the street. The second problem mainly results in cyclists travelling with higher speeds and claiming a certain part of the space in which they are the guests.

In this report, a few alternatives that could solve the issues are described and later evaluated.

4.1. Separate cycling path

In this scenario, the deepened cycle path will be emphasized by the typical red colour of cycle paths in the Netherlands. This will also legally mark the cycling domain and should clarify the traffic situation for both cyclists and pedestrians. (Un)loading traffic should still be allowed during the assigned window and the route for emergency services will be maintained, which makes use of fences to demarcate the cycle path impossible. The cycling path will remain in the same place to ensure both. Besides the colour of the cycle path, the design of the street can be maintained.

This type of design will create a clear and understandable traffic situation with existing regulations. This makes enforcing the rules easier. The traffic flows have their own designated space, however crossing is a challenge for pedestrians. The position of the cyclist in the street will be improved.

This scenario would go against the principles of Shared Space and would be implemented to ensure the through route for cyclists along the edge of the city centre. Also, in the current situation during rush hours it has shown that pedestrians have to divert to the deepened “cycle path”. In this new situation they will not be allowed to anymore. The cycle path will probably affect the shopping experience.

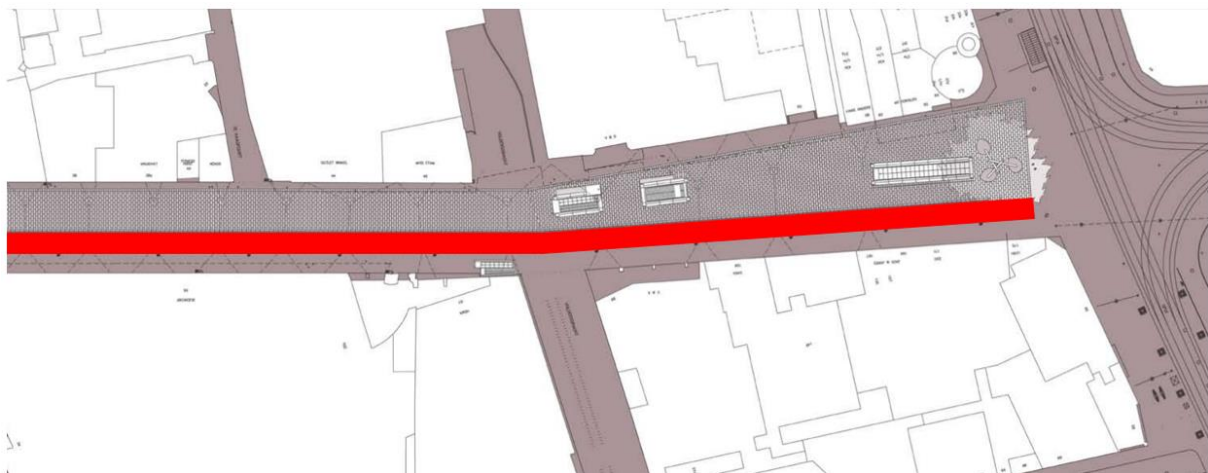


Figure 19 Plan view (map from (Dienst Stadsbeheer, 2012)

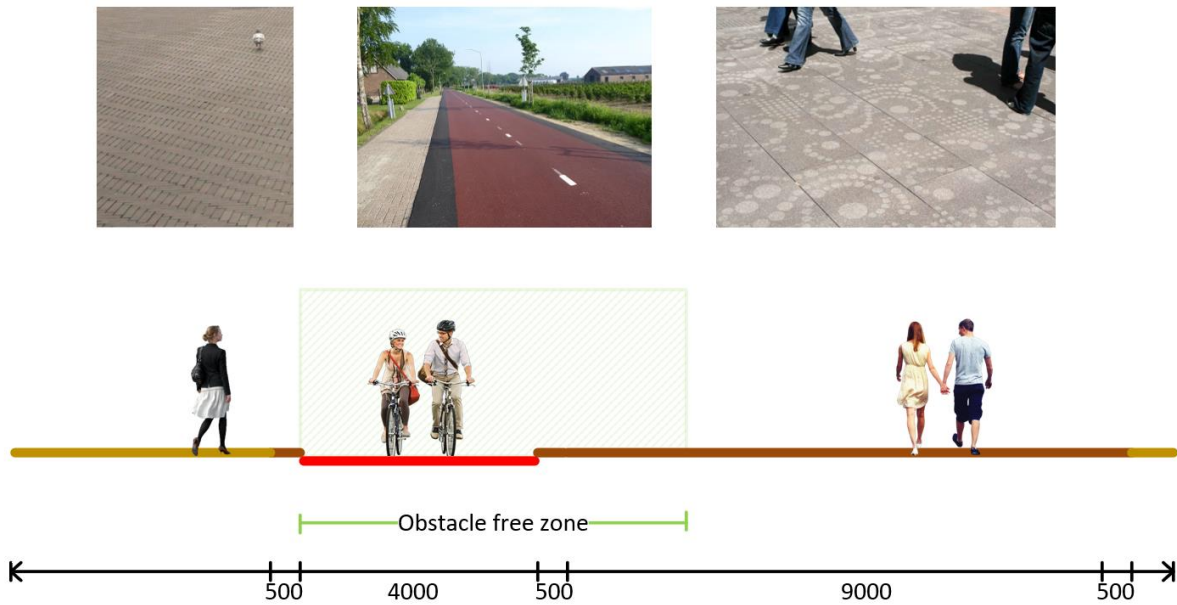


Figure 20 Cross-section design alternative 1; photo's: (Dienst Stedelijke Ontwikkeling, 2021), (In de buurt, 2018)

Crossing for pedestrians

One of the main difficulties in this type of design is the way to allow pedestrians to cross the cycle path. As the separate cycle path will allow cyclists to cycle more careless which will most likely cause them to drive faster, crossing will be more dangerous. Possibly, zebra crossings could help mark places to cross the path. It is still questionable how far pedestrians are willing to walk around for such a crossing. Pedestrians who are not willing to will probably just cross the cycling path, which would increase the safety risks. Also, during peak hours for pedestrians, there will be a constant flow of pedestrians wanting to cross the cycle path.

4.2. Window ban for cyclists

In this scenario, cyclists will be banned from de Grote Marktstraat during shopping hours. This means that cyclists are no longer allowed between 11:30 and 18:00 or 21:00 on Thursday when it is shopping night. This means that the current situation in the city centre will be expanded to de Grote Marktstraat. During peak hours, cyclists will no longer be in the street which means pedestrians get enough space to comfortably go shopping. During shopping hours, this street will be a shopping street which could live up to the desired status as international shopping boulevard.

Closing down the street for cyclists will cause cyclists to choose an alternative route. As concluded from the analysis, it is likely that the current situation does not offer a comfortable and comparatively fast alternative route. This means that in this scenario, an alternative route should be realised in order to facilitate the cyclists who are affected by these measures. This could mean that the original idea to redevelop de Gedempte Burgwal and Gedempte Gracht could be used. This can be seen in figure 22.

The users of the street might need some time adjusting to these new measures as they have to travel via another route during a certain time period. It does, however, help that the regulations will be in line with the rest of the city centre.

Enforcing the new regulations will cost manpower. The street can not be physically shut down for cyclists, as the route for emergency services needs to be preserved. Especially when the new regulations are just in place, enforcement will be important.

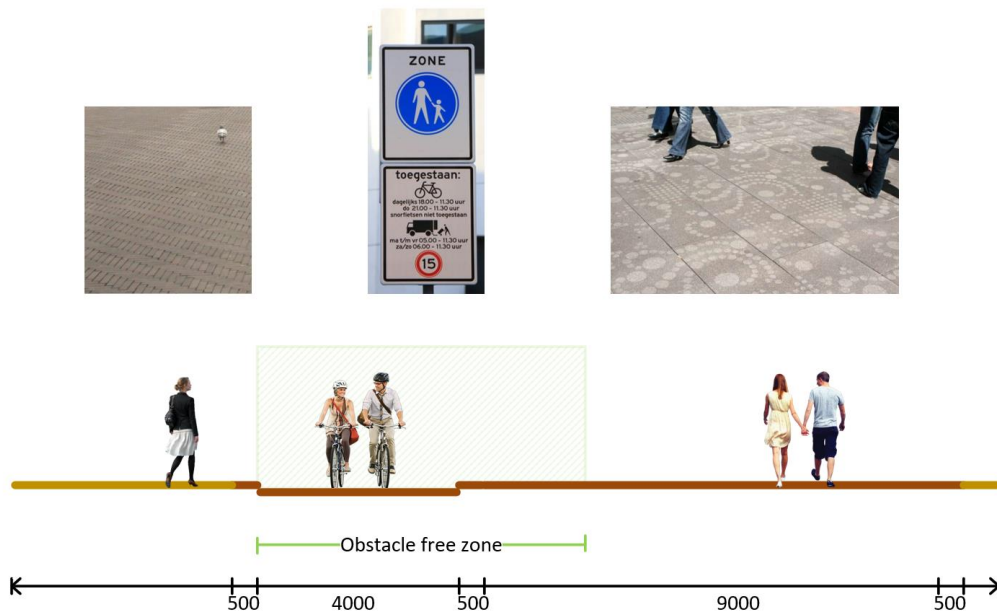


Figure 21 Cross-section alternative 2; photo's: (Dienst Stedelijke Ontwikkeling, 2021) (van Dijk, 2020)

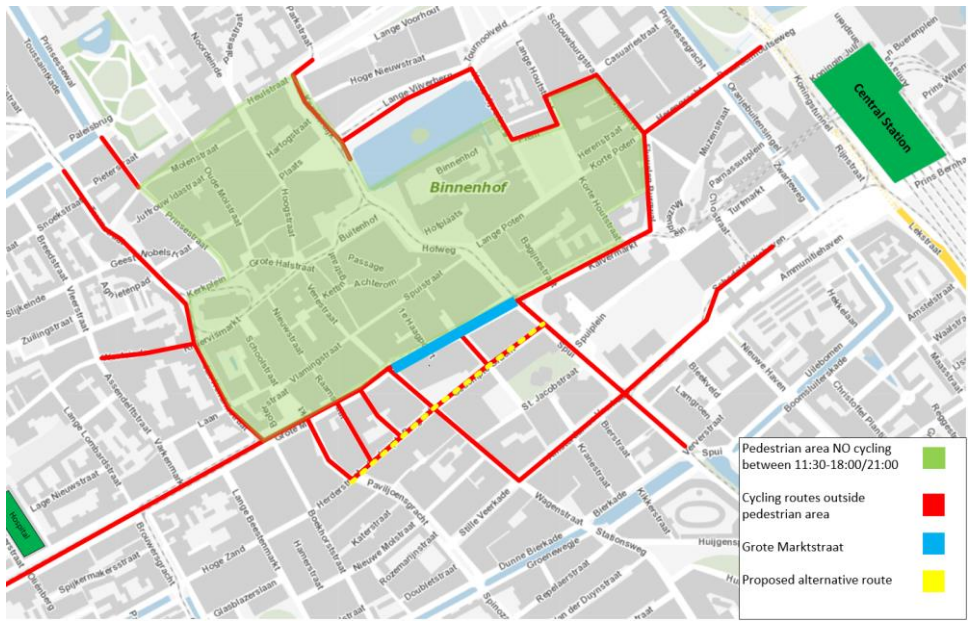


Figure 22 Alternative route options

4.3. Shared Space

In this alternative, the concept of Shared Space will be reinforced by removing the deeper lying cycle path and making the pavement one whole surface from façade to façade. This was already done in some small parts in 2018, which causes pedestrians to claim their space and therefore cyclists lowering their speed. As speed is one of the factors of feeling unsafe for pedestrians, this solution has potential to (partially) solve the problems. Another factor of feeling unsafe is not knowing where to expect cyclists and this would be increased by this solution.

To guide the users where to divert to in case emergency services or (un)loading traffic use the street, elements like planters and benches (which are mostly already there) can be used.

From the perspective of the cyclists this might be the scenario where, during rush hours, the comfort is so low that an alternative route will be chosen as shown in figure 5, paragraph 2.3b. In that case, just like in the scenario with the window ban, alternative routes should be evaluated and likely redesigned to facilitate the cyclist flow towards and from the Central Station. This could mean that the original idea to redevelop de Gedempte Burgwal and Gedempte Gracht could be used. This way, the self-regulating capacity of cyclists can be used to ensure a pleasant situation for the shopping pedestrians in the street. When this is not done, the peak densities exceed the comfortable densities for mixing cyclists and pedestrians according to the CROW and will probably cause more chaos.

The completely levelled surface adds to the spatial quality of the street as the street has even more of the “ballroom” idea from the original design in 2013. The design of the street stays the same, only the part where the cycle path was will be elevated.

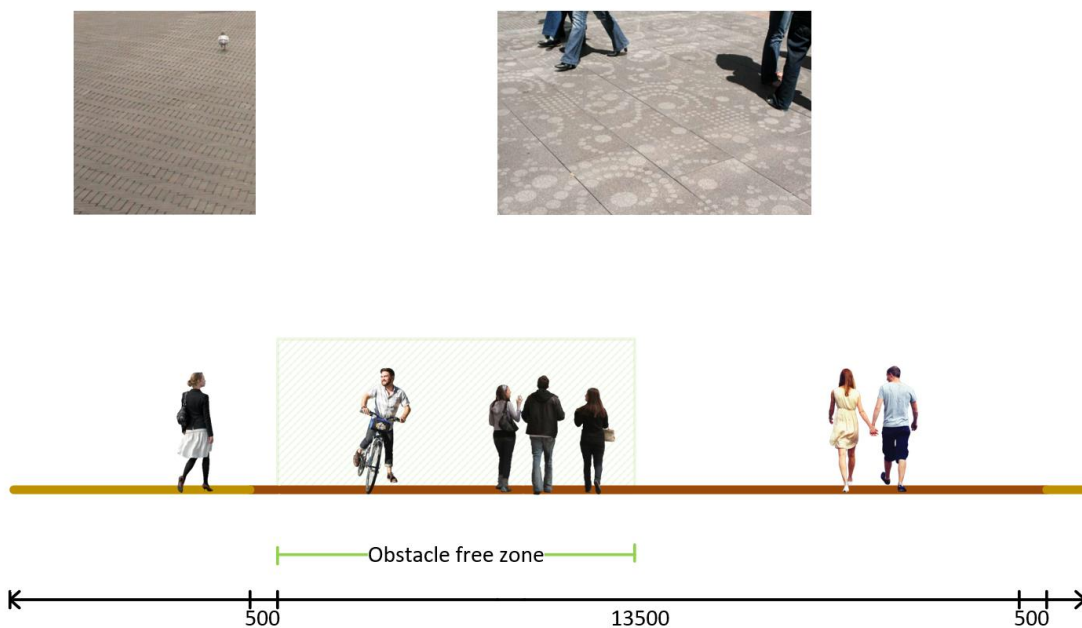


Figure 23 Cross-section alternative 3; photo's: (Dienst Stedelijke Ontwikkeling, 2021)

5. Evaluation

To evaluate the three alternatives, advantages and disadvantages of all three will be evaluated after which a simple multi-criteria table will give a simple overview of the strengths and weaknesses of the different scenarios.

5.1. (Dis)advantages

First, a quick overview of the alternatives will be given before comparing them in the multi-criteria table.

Variant Separate Cycling Path

Advantages of this alternative

- Creating a recognizable and clear traffic situation for everyone
- Clear reservation of space for each traffic flow
- Position of the cyclist – facilitating a through route
- Behaviour easier to enforce

Disadvantages of this alternative

- The foundation of the original plan was to create an international shopping boulevard, which will be transformed into a traffic artery for cyclists which forms a barrier in the middle of the street
- Cyclists feeling safe, therefore travelling with higher speed
- Space for the pedestrian is already small during rush hours, during which pedestrians can no longer divert to the shared deepened “cycle path”
- Shopping experience will be worse for pedestrians due to constant flow of cyclists

Variant Window ban for cyclists

Advantages of this scenario

- Traffic safety and comfort for cyclists on alternative routes during rush hours because the ban causes them to choose another route.
- Comfortable shopping and higher residential quality by banning cyclists during rush hours. This adds to the first goal in the original design of the pedestrian being the main focus and making an international shopping boulevard.

Disadvantages of this scenario

- Cyclists need to travel via another route between 11:30 and 18:00 than the rest of the day.
- It might be hard for pedestrians to get used to the new rules as at first they might not know when to expect cyclists.
- Enforcement of the cycling ban can not be done by blocking the road because of the route for emergency services. This would mean that it will cost manpower to enforce the new rules.

Variant Shared Space

Advantages of this scenario

- Pedestrians reclaiming their space in the street, lowering the speed of the cyclists in the street.
- The levelled surface adds to the spatial quality of this international shopping boulevard and therefore to the original design goals.
- Comfortably cycling through the street during quiet times (morning, evening/night), whilst uncomfortably during peak hours.
- Self-regulation which means no manpower needed to enforce rules. In quiet times cyclists use de Grote Marktstraat. During peak hours they tend to divert to alternative routes if there are comfortable and safe alternatives available.

Disadvantages of this scenario

- The design needs to guide pedestrians where to divert to in case emergency services need to pass. When not done correctly, passing the street gets less easy for the emergency services.
- The situation might not be understandable for all users. There needs to be clear communication to all users of the street informing them about the traffic situation.
- Comfortable mixing of both pedestrian and cyclist flows is not possible during rush hours according to the proposed CROW guidelines. This means comfortable alternative routes need to be realised to prevent causing even more problems.

5.2. Multi-criteria table

In the table below, a simple overview of the strengths and weaknesses of the alternatives are given. This will be done by six criteria of which the relevance will first be explained.

Position cyclist

Important in redesigning this street is that there will be a cycling route available from and towards the Central Station. This criterion evaluates whether the position of the cyclist improves relative to the current situation.

Position pedestrian

As the pedestrian was the main focus for designing this street in 2013, their position in the street should be evaluated. Most pedestrians have a destination somewhere in the city centre, therefore it is important that they can travel comfortably.

Clear traffic situation

As the traffic situation in de Grote Marktstraat is not clear to all users, this leads to part of the complaints. This criterion evaluates whether the traffic situation is easy to understand or if it needs good communication to make it clear.

Shopping Boulevard

This criterion is based on the original plans to make de Grote Marktstraat an international shopping boulevard. The alternative will be compared to the current situation and evaluate whether it can live up to the expectations of an international shopping boulevard.

Enforcement

Important part of introducing new regulations is enforcing these rules. This criterion will evaluate whether enforcement is needed and how much effort needs to be made to enforce the rules.

Financial

Especially for the municipality, the costs of the redesign will influence their decision. As there are no exact numbers of what the redesign alternatives will cost, an estimation will be made based on the amount of work that needs to be done to realise the new situation.

The given ratings for the different criteria in the table below are compared to the current situation. Two plusses means it improves a lot from the current situation, two minuses means it gets worse.

	POSITIO N CYCLIST	POSITION PEDESTRIAN	CLEAR TRAFFIC SITUATION	SHOPPING BOULEVARD	ENFORCEMENT	FINANCIAL	TOTAL
SEPARATE CYCLING PATH	++	+/-	+	--	+	+/-	++
WINDOW BAN FOR CYCLISTS	+	++	+	++	--	-	+++
SHARED SPACE	+	++	+/-	++	+	--	++++

Figure 24 Multi-criteria table

The multi-criteria table shows that scenario one prioritizes the position of the cyclist over the function as shopping street. Scenario two really improves the problem which is caused mainly during shopping hours. Scenario three is based on the concept of Shared Space, which is based on the idea of self-regulation. This makes the traffic situation even more unusual than it is, which needs good communication for everyone to understand. Both scenario 2 and 3 are ranked a bit lower on the financial criteria, as it involves the development of a high-quality alternative route.

Looking at the column with total scores (plusses and minuses counted), the scenario in which an alternative route for cyclists will be realised and the cycling path will be removed scores just higher than the alternative in which cyclists will be banned during certain hours. This has to do with the fact that, according to observations in the street itself and in other situations, self-regulation by cyclists will lead to the same outcome. The cyclists would likely prefer the alternative route in which they can comfortably cycle during the peak hours. This means that the strict enforcement that is needed in the second scenario will not be needed. The first alternative will break up the shopping area so much that it is the worst scoring alternative.

6. Conclusion

The research in this thesis aimed to identify a redesign option for de Grote Marktstraat which best solves the traffic safety complaints the municipality of The Hague receives.

The main research question for this research was as follows:

“Which redesign could best solve the traffic safety complaints in de Grote Marktstraat?”

As the design of de Grote Marktstraat is based on the Shared Space principle, it is important what the challenges and opportunities of this concept are, specifically when the main users are cyclists and pedestrians. It is found that Shared Space can lower the number of accidents by giving the road users more responsibility, however the effectivity of the design depends on the context. The three main factors in deciding whether Shared Space works are the function of the street in the cycling network, the purpose of visiting the street for all users and the traffic density. The CROW has proposed guidelines for the maximum comfortable pedestrian density per meter width of the street for which it is still possible to mix the pedestrian flow with cyclists.

Looking at the current situation in de Grote Marktstraat it is important to note that, after construction of a new tram tunnel underneath the street, the municipality wanted to develop an attractive shopping street. The core of the design was looking at the pedestrians, while the place of the cyclist in the street was kept in mind. The importance of cyclists in the street is further explained by the place of de Grote Marktstraat in the cycling network. In the current situation, where cyclists are banned during the day in most of the city centre, the street forms a direct route from and towards the Central Station of The Hague. This leads to high traffic densities. These high traffic densities have been growing during the last decade. The number of visitors to the city centre has grown by 15% during the period between 2010 and 2020. It is expected to keep on rising.

Looking at the Shared Space design in de Grote Marktstraat one thing stands out. While the design documents explain that the area is designed for pedestrians and cyclists are allowed as guests, the design features a lowered strip which is referred to as cycling path. The strip does not have the red colour or the legal status of a cycling path, however it is used as a cycling path by cyclists. During peak hours, the street is so full that pedestrians need to divert to this strip and that is when both cyclists and pedestrians experience most hinder. The cyclists are focused on the traffic situation and claim their space by ringing their bell, cycling fast and shouting. The pedestrians are in the street for mostly shopping purposes and are not completely focused on the traffic situation. This is where the dangerous situation appears. Due to the rising number of visitors, this problem is likely to increase as the traffic densities will increase. The Shared Space principle is not applied the way Hans Monderman originally invented it.

To solve the problems, a few different approaches are available. The traffic flows can be segregated by giving the cyclists their cycling path. Intensities can be lowered by offering cyclists an alternative route. Cyclists can be encouraged to use these routes by banning them from de Grote Marktstraat during the busiest hours or by using their self-regulating capacity on which the Shared Space principle is based. Lastly, the Shared Space design could be reconsidered by removing the cycling path and levelling the surface which makes the street less inviting for fast travelling through traffic.

Evaluating the different options by the position of the users, clarity of the situation, attractiveness of the shopping area, enforcement and financial criteria leads to one option being preferred. Lowering the traffic density by offering the cyclists an alternative route, possibly de Gedempte Burgwal/Gedempte gracht route which was already considered in the original design plans. Besides that, the Shared Space area will be improved by creating one levelled surface. This should lower the

cyclists speed as already observed in the small parts of the street where the surface is levelled. This would lead to more space for the pedestrians and a good alternative for the cyclists, however they can still use the street when the pedestrian densities allow it. If practice proves that this solution does still not work or intensities have grown so high that problems arise again, the (partial) ban of cyclists can be reconsidered.

7. Discussion and recommendations

This study has potential limitations. The traffic density numbers used are based on recent counts, however research already shows that these numbers are expected to grow. If the densities during the quieter hours rise too much, it is possible that banning cyclists from the street is more optimal to ensure the behaviour of the users. Therefore, it is suggested that a study will be conducted making an estimation for the number of visitors to the city centre in the upcoming years. The second limitation concerns the proposed alternative route. The limited network analysis does not include an in-depth analysis of the different surrounding streets that are possible alternatives. The suggested streets are based on the original plans from the municipality. It is recommended that a study will be conducted into the surrounding parallel or alternative streets which can be redesigned to find the best route. Lastly, it is important that the new situation is monitored closely. Not only can be learned from the new situation, it makes anticipating potential problems easier. Because a Shared Space is based on the behaviour of its users, there is an unpredictable factor to its design. If cyclists turn out to keep using de Grote Marktstraat, it could be necessary to introduce the ban after all.

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