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A sustainable transportation vision for the Cittaslow municipality of Alphen-Chaam



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Master thesis

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Preface

This report is the result of my master thesis research about the introduction of a sustainable transportation vision in the Dutch Cittaslow municipality of Alphen – Chaam. This master thesis is written under the supervision of Dr. Claudia Basta from the Land Use Planning Chair Group of Wageningen University.

This study gives an initial view of the challenges and opportunities the Cittaslow movement and the sustainable transportation paradigm pose for a rural municipality. The ultimate aim of this thesis is to support the municipality of Alphen - Chaam and local stakeholders in keeping implementing a sustainable transportation system in the municipality of Alphen – Chaam on the ground of its findings.

The report would not be here without the help of many people. Especially those who helped me to improve the English spelling and grammar of this report and all those who were willing to talk with me and give insights in the municipality of Alphen – Chaam. Also, I want to thank Claudia Basta for her supervision, advice and reading of this thesis report.

Enjoy reading it.

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Summary

The Cittaslow movement encourages localism, high quality of life and a unique local identity. An important part of the Cittaslow movement is slow mobility. This study focuses on the opportunities of a sustainable transportation vision for the Dutch Cittaslow municipality called Alphen – Chaam. Three goals are formulated for this study, namely (1) Unravelling the synergy of the concepts of Cittaslow and sustainable transportation, (2) Improving the current transportation system of the municipality of Alphen – Chaam and (3) visualizing these improvements. These goals are giving insights in the opportunities for the Cittaslow municipality to adopt the sustainable transportation paradigm and to do that the municipality of Alphen – Chaam is a striking study area.

The municipality of Alphen – Chaam is a rural municipality in the southern part of the Netherlands and has a rather simple regional road network. The regional roads are oriented North – South and connect the municipality of Alphen – Chaam with other large cities in the region. The North – South connection results in much transit traffic through the municipality of Alphen – Chaam, which causes much nuisances for the town of Chaam. Therefore minimizing the transit traffic is the largest challenge of the municipality of Alphen – Chaam. Other important characteristic of the municipality of Alphen – Chaam is its beautiful nature: the village is a place where people feel like finding a relaxed time. This results in many tourists, especially during the summer, which are an important source of income for the municipality.

In order to achieve the objectives listed above regarding a sustainable transportation system four types of trips are defined, namely, *transit*, *local*, *touristy* and *visiting* trips. The difference between touristy and visiting trips is the duration of stay. Tourists stay for longer than a day, while visiting trips do not last longer than one day. These four types of trips consist of the main structure of the analysis of the entire study. In it, the current transportation patterns are studied closely and are based on on-site observations, map analysis and several talks with local inhabitants. After the analysis the challenges will be tackled with a solution based on the philosophy of Cittaslow and also the sustainable transportation paradigm; in other words, the envisioned plan favours the slow transportation modes and whenever possible, discourages ‘fast’ motorized traffic.

The most interesting road of the municipality is the regional road N639 since most interesting challenges are caused by the traffic of the N639. These challenges cause much nuisances for the town of Chaam. These challenges are very important for this exploring study and result in several possible solutions up to identifying the best solutions for the N639. This result is part of a sustainable transportation vision for the coming 25 years for the municipality of Alphen – Chaam. Altogether the municipality of Alphen – Chaam could develop along the next 25 year towards a beautiful ‘slow’ municipality wherein sustainable transportation patterns are implemented.

Chapter 1 - Introduction to slow transportation

Encouraging localism, high quality of life and preserving unique local identities is the main mission of the Cittaslow movement (Mayer and Knox, 2006; Radstrom, 2011; Cittaslow Nederland, 2012). Many Cittaslow municipalities are improving their local situation by solving their own challenges according to the principles of the Cittaslow philosophy (Fischer and Van de Wiel, 2008; Midden - Delfland, 2011; Regio West - Brabant, 2012). An important part of the Cittaslow philosophy is to create, maintain and support the slow transportation network (Radstrom, 2011). The slow transportation network allows travellers to move slowly and safely through a Cittaslow municipality and enjoy the beautiful environment. The number of Cittaslow municipality is still rising (Cittaslow International, 2011).

Supporting 'slowness' is difficult in a world where everybody has a car and all facilities and networks are designed for efficient car use (Schiller et al., 2010). At this moment the Dutch Cittaslow municipalities are rather more focused on quality of life, tourism and culture than focused on improving the slow transportation network (Fischer and Van de Wiel, 2008; Midden - Delfland, 2011; Regio West - Brabant, 2012). Therefore the Cittaslow municipalities have to study the opportunities to transform their transportation network to a more slow transportation network so to support slow mobility, which suits among the criteria of the 'slow credo'.

One of the principles of the Cittaslow movement is to support slow transportation both for individual and mass transportation (Radstrom, 2011). Slow transportation exists out of two types of transportation: one relies on the human body as power source, while the second relies on mass transportation means e.g. busses and trains. Both limit 'solo' fast travelling and hence enhance sustainability (Schiller, et al., 2010). Transportation modes which are using the human body as power sources are cycling and walking. Walking is the most basic form of transportation: one can walk without any device. For cycling a bicycle is required. That is, in most cases, a small investment and affordable by the majority of people (Heinen et al., 2010). In fact the slow transportation modes are the basic transportation modes which are accessible for nearly everybody (Schiller, et al., 2010).

Alphen – Chaam is one of the five Dutch Cittaslow municipalities and has some very interesting features. The municipality consists of two small towns (Alphen and Chaam), few bigger roads (mainly north-south trajectories); the overall size of the municipality is limited. The transportation patterns in the municipality of Alphen – Chaam are determined mainly by commuters, tourists and transit traffic (Alphen - Chaam, 2012). As a result, the current transportation flows do not correspond with the slow transportation principles of Cittaslow. To understand the principles of a 'slow' transportation network the sustainable transportation paradigm is very useful, because slow transportation is embraced by the sustainable transportation paradigm (Schiller, et al., 2010). Because of its relevance to slow transportation, the sustainable transportation paradigm is a very useful body of knowledge of this study.

This master thesis has three main goals. The first goal of this study is to unravel the possible synergy between the Cittaslow movement and current sustainable transportation paradigms. The second goal of this study is improving the transportation system and predominant transportation modes in the municipality of Alphen – Chaam in light of sustainable and 'slow' patterns approaches. The proposal to improve the current situation will be a comprehensive transportation vision, which draws upon theories and reference studies combined with the analysis of the study area. For this comprehensive transportation vision the sustainable transportation paradigm is the main theoretical reference. The third and final goal of this study is to visualize and create an overview of the possibilities to improve the slow transportation network in the Cittaslow municipality of Alphen - Chaam. This overview can be used as comparative reference by all other Cittaslow municipalities whose features are consistent with the specific case examined here.

This report starts with an introduction of the research goals, challenges, types of trips in the case study area and the main research question. After this introductory chapter the report continues with a theoretical framework regarding the choice of different transportation modes by the side of travellers. This second chapter gives insights in the most important aspects of transportation mode choice from a slow transportation point of view. This theoretical framework is applied to develop the next chapters, which start with a thorough analysis of the current situation. The thorough analysis of the current state is the basis to develop a plan for the future. This analysis is conducted in Chapter 3. After the current situation is analyzed, the next step consists of studying possible solutions for the identified challenges. Chapter 4 focuses on the possible solutions to tackle them Chapter 5 selects the best solution for tackling the challenges and forms the road map for the municipality of Alphen – Chaam. Chapter 6 is the conclusive chapter and consists of a discussion of the results of the analysis and proposed vision. This final discussion touches upon the unexplored possibilities and lessons learn from this study and provide answers to the main research question.

1.1 The Cittaslow movement and the sustainable transportation paradigm: some historical notes

The Cittaslow philosophy is formulated in the Cittaslow Manifesto:

"We are looking for "towns where men are still curious of the old times, towns rich of theatres, squares, cafes, workshops, restaurants and spiritual places, towns with untouched landscapes and charming craftsman where people are still able to recognize the slow course of the Seasons and their genuine products respecting tastes, health and spontaneous customs..." (from Cittaslow Manifesto)."

Sustainable transportation has been defined by Schiller et al. (2010, p. xxi):

"Sustainable transportation aims at promoting better and healthier ways of meeting individuals and community needs while reducing the social and environmental impacts of

current mobility practices. It attempts to achieve these through reducing resource inputs, waste outputs and minimizing transportation's often deleterious effects on the public realm"

The presented philosophies are formulated based on an entire different worldview, but have remarkable similarities. An overview of the Cittaslow movement and the sustainable transportation paradigm is given in this section. Cittaslow and the sustainable transportation paradigm originated from societal problems in relation to transportation patterns, urban development and social coherence (Schiller, et al., 2010; Radstrom, 2011). Although the signalled problems are quite similar, the Cittaslow movement and the sustainable transportation paradigm have two rather different backgrounds. The Cittaslow movement developed following the local initiatives of several small towns, while the sustainable transportation paradigm is well rooted in the scientific world. However, the issues signalled by the theoretical movement on the one side and the Cittaslow societal movement on the other are both oriented towards the implementation of the notion of sustainability within current transportation systems (Schiller, et al., 2010; Cittaslow International, 2011). As such, these movements are starting to engender tangible effects on the structure of cities, networks and the quality of life (Ponting, 2007; Knowles et al., 2008; Carmona et al., 2010; Schiller, et al., 2010) and constitutes the background of the present research.

Focusing on the 'birth' of the sustainable transportation paradigm, a transition of relevance to this study is the trend of people of moving from rural areas to urban areas. People move from the rural areas to urban areas because life is assumed to be better in urban areas than rural areas (Ponting, 2007). Urban areas offer jobs, housing and facilities, where in rural areas jobs and facilities are less or lacking. The moving of people happened at different moments in history and at different location on the world (Ponting, 2007). The moving took place, in massive terms, since the first industrial revolution in Europe (Ponting, 2007). Cities grew very rapidly since the industrial revolution and have become very large and land-use intensive. At this moment about 74,6% of the European people live in an urban areas (UNEP, 2001). It is expected that this value will rise to 82% and from then it stabilizes (UNEP, 2001). The transition had not only large impacts on cities: the consequences for rural areas (especially those close to a large cities) were equally dramatic (Carmona, et al., 2010; Radstrom, 2011). Rural areas are deprived of knowledge and facilities (Radstrom, 2011) and, consequently, become desolated and lose their function, facilities, attractiveness and identity (Radstrom, 2011). A second transition of relevance to this study is the 'hypermobility' which, according to Ponting (2007), started in 1894 with the introduction of the car. The introduction of the car changed transportations patterns dramatically due to the dramatically increased speed enabled by car mobility (Knowles, et al., 2008; Schiller, et al., 2010). The number of cars in Europe increased very rapidly after World War 2 (Knowles, et al., 2008; Schiller, et al., 2010). This technological development has had many spatial implications: the design and realization of roads for cars, the possibility for people to live further away from the city centre, and thus the need of parking places for cars within the urban environment (Knowles, et al., 2008; Carmona,

et al., 2010; Schiller, et al., 2010). The car led to urban sprawl and create barriers in cities by the necessary roads (Carmona, et al., 2010). The urban sprawl results in suburbs in rural areas, where most inhabitants focus on the city (Carmona, et al., 2010; Schiller, et al., 2010). As consequence of this focus rural areas lost many functions, facilities and activities since all these facilities and activities moved to the city (Cittaslow International, 2011).

The two transitions described above – namely, the urbanization and ‘hypermobility’ – contribute to globalisation and urban homogenization. A consequence is that the urban areas dominated the rural areas (Radstrom, 2011). To improve the situation of the rural areas a new approach is required. This new approach for the rural areas should focus on their local distinctiveness (Mayer and Knox, 2006; Radstrom, 2011). One approach among others is the Cittaslow movement, which was started by three Italian majors, who wants to preserve their rural identity (Radstrom, 2011). The Cittaslow movement should improve the quality of life on the countryside. Another approach is the sustainable transportation paradigm started by scientists stated that the hypermobility caused many societal challenges, think of social, spatial and economical issues (Schiller, et al., 2010). The gathered knowledge of the sustainable transportation paradigm should contribute to a better world, where slow transportation modes become dominate (Schiller, et al., 2010). One movement and one paradigm, two different approaches, but both contribute positively to the slow transportation modes.

1.2 The Municipality Alphen-Chaam: essential characteristics

Alphen-Chaam is small rural municipality in the southern part of the Netherlands (Alphen: 51.48N, 4.96E and Chaam: 51.51N, 4.86E). The location of the two towns is showed on Figure 1. The municipality of Alphen-Chaam has 9640 inhabitants and the municipality has a total surface of 93,63 km² (Alphen - Chaam, 2012). Alphen and Chaam are the two towns with the highest number of inhabitants, together 83% of the inhabitants live in these two towns (Alphen: 4030 and Chaam: 3987), which is remarkably close to the averaged urbanization in Europe (UNEP, 2001; Alphen - Chaam, 2012). There is not a highway located in the municipality Alphen – Chaam, but there are several important regional roads. Most of the surface is countryside where many country roads are located. Breda, Tilburg and Turnhout are the big cities in the region and accommodate most of the facilities. The regional roads connect these three cities with each other. Figure 1 shows Breda and Tilburg; Turnhout is located more south.

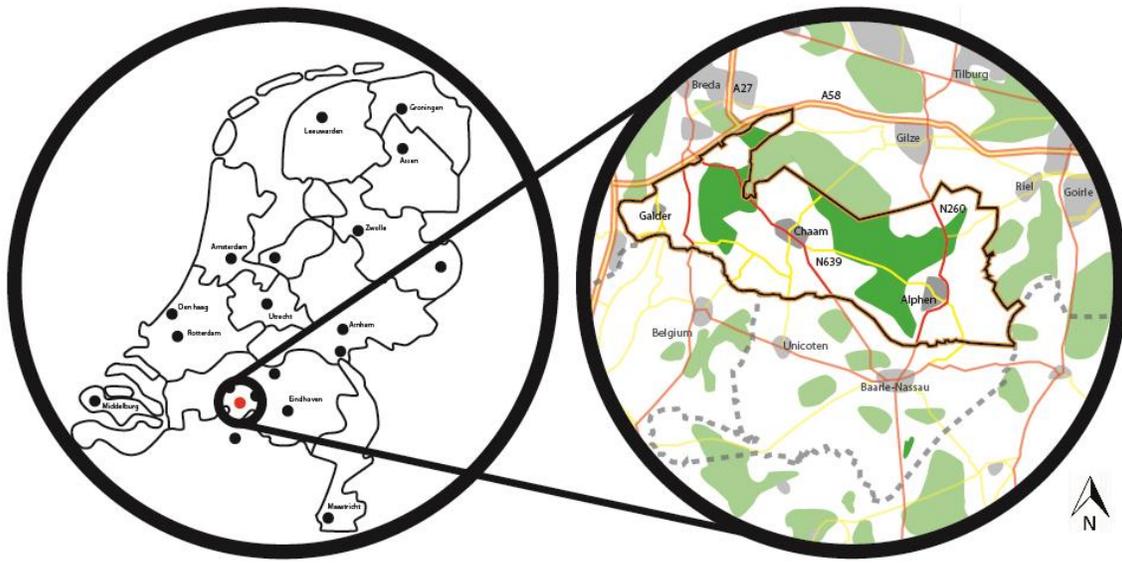


Figure 1: left: The location of the municipality of Alphen - Chaam within the Netherlands; right: The location of the municipality of Alphen – Chaam within the region.

1.2.1 Nature, tourism and agriculture

To get a better feeling of the environment of Alphen – Chaam a short overview of most relevant spatial formations is given. The natural landscape of the municipality of Alphen – Chaam has formed the current spatial arrangement, which resulted in many different land – uses. The natural landscape constrained certain developments for example the peat areas are not suited for urban developments. Those areas are the lower areas of the municipality and cattle were farmed. The other way is also true, human activities changed the landscape drastically: if the groundwater was low and contained enough nutrients, trees were planted. This is still visible in the current spatial formations of Alphen – Chaam, the Chaamse bossen are located at the nutrient rich grounds and agriculture areas at the peaty soils.

Nowadays nature conservation organizations and the municipality try to restore and preserve these landscape values since they is an important ‘selling point’ of the municipality (Alphen - Chaam, 2012). The landscape attract at this moment many tourists and some business services (KvK and SES, 2009; Alphen - Chaam, 2012). The municipality puts effort to attract new business, which suits the green environment of the municipality of Alphen – Chaam. The touristy sector is very important for the municipality of Alphen - Chaam and it generates many jobs (KvK and SES, 2009). Many camping sites, bungalow pars and mobile home parks are scattered through the municipality with sizes varying from small, (a dozen places) to very large (1000 places). The number of hotels beds is very low in Alphen – Chaam, which is very remarkable for a touristy municipality (KvK and SES, 2009). Due to shrinking economical activities in the municipality of Alphen – Chaam, especially of the agricultural sector, the municipality wants to attract more tourists to generate an impulse of the local economy.

1.3 Scope of the study: Alphen – Chaam towards sustainable transportation

Studying the synergy between the Cittaslow movement and sustainable transportation paradigm requires a clear starting point. It is possible to start this study from many different perspectives and with different problems, constraints and limitations. The next part gives a clear view of all choices which were made for this study.

1.3.1 Alphen – Chaam and the relevant challenges: the starting point

Some transportation issues are not yet fully incorporated in the transportation visions of the Dutch Cittaslow municipalities (Midden - Delfland, 2011; Regio West - Brabant, 2012). The municipality of Alphen – Chaam is aware of the main challenges faced by the municipality (Alphen - Chaam, 2010; Van Strien, 2012). These challenges are an important starting point for this thesis and its analysis. The major transportation challenges in Alphen-Chaam are:

- The large cities of Breda and Tilburg are situated close by and create a constant traffic flow between the municipality and the two cities because of facilities and services.
- There are carrying capacity problems on the A58 and A27, which has a negative impact on the roads joining these highways.
- The national government wants to shift some traffic from the highways to the secondary road network, which will cause more traffic in the municipality Alphen-Chaam.
- The transit truck traffic from the A58 in the north to Belgium (Turnhout and Baarle-Nassau).
- The ring road of Alphen attract more traffic
- Traffic from the A16 to Hazeldonk uses the road through Galder as shortcut.
- The core of the town Chaam is very busy.
- There are several vast natural areas in the municipality, which attract additional recreational traffic.

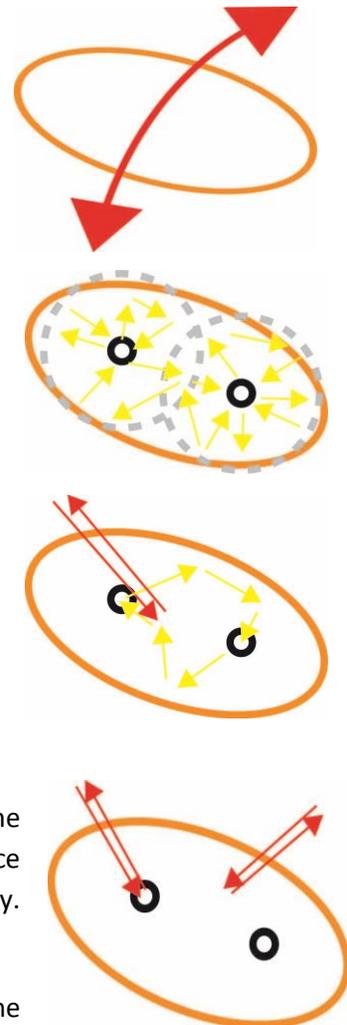
Whilst these are the current transportation challenges in the municipality, new challenges are expected to arise. These new challenges are enhanced by the municipality's own policy goals. By becoming a new green business area and a cultural hotspot of the Province Noord-Brabant the municipality would attract much additional traffic (Alphen - Chaam, 2012). This should result in an economical impulse for the local economy. The downside of these economic ambitions is the additional traffic which is and would be created, which causes additional nuisances for the local inhabitants and has negative effect on the environmental quality of the municipality. These additional traffic flows are contradicting the Cittaslow philosophy. Therefore those ambitions are taken into account in the solutions. This should lead to a new balance between the current ambitions and future sustainability of the municipality of Alphen Chaam.

1.3.2 Analyzing mobility: four different types of trips

The study area, existing challenges and the principles of Cittaslow and the sustainable transportation paradigm were introduced. Now a proper structure is needed, which resulted in a proper focus on the most important challenges. To do that four types of trips are defined based on the existing trips in the municipality of Alphen - Chaam. The four types of trips include most trips and travellers in the municipality of Alphen - Chaam. Those four groups are often separated to discussed individual; also the trips were used during the description of different transportation flows in the municipality of Alphen - Chaam.

The four different types of trips are:

- **Transit traffic¹**; is about the traffic which flow through the municipality of Alphen Chaam with its origin and destination outside the municipality. The transit traffic is dominated by regional traffic and drives via the regional network through the municipality of Alphen - Chaam. They want to travel as fast as possible to their destination.
- **Local trips**; is about short and local trips. All trips take place within the municipality and are mostly performed by local inhabitants. The maximum distance is about 7 kilometres, because 7 kilometres is about 30 minutes cycling.
- **Touristy trips**; is about tourists, who are touring through the municipality. This is different than local trips since tourists have in most cases the same starting and ending point, which is different than local trips. Another touristy trip is the arrival of tourists in the municipality, which is also included in the touristy trips.
- **Visiting trips**; is about trip between a location outside the municipality and a location inside the municipality or vice versa. The duration of stay has maximum of one day. Commuting is included in the visiting trips.



All important challenges fit predominately within one of the four types of trips, which allow a systematic approach for the challenges. For example the second challenge (capacity problems of the highways) deals with the transit traffic. The four types have also different spatial and/or temporal scales. This study focuses on the regional and local scale. To understand the affect of the regional flows the surrounding areas are very

¹ Transit traffic is in this case not public transport, but traffic which only drives through the municipality (in Dutch: doorgaand verkeer).

important. Sometimes patterns outside the municipality are important to determine what the origin of the traffic is. There are large temporal differences, the transit traffic generate a flow with a peak during rush hour while the local trips are fairly constant. Also both flows use different roads, which generate spatial differences.

1.3.3 Research objective

The conducted quick study resulted in four trips types and the main transportation challenges of the municipality of Alphen – Chaam. Those results resulted in the following three goals of this study: (1) Unravelling the synergy of the concepts of Cittaslow and sustainable transportation for the possible answers and effects on slow transportation in Alphen – Chaam. (2) Improving the current transportation pattern of the municipality of Alphen – Chaam, and (3) visualizing and creating an overview of the possibilities to improve the slow transportation network in the Cittaslow municipality of Alphen – Chaam. The **main research question** of this study is:

Which concrete landscape and policies developments in the next 25 years are required to develop a sustainable transportation network in the rural Cittaslow municipality Alphen-Chaam?

Chapter 2 - Theoretical framework

Sipes and Sipes (2013, p. 1) stated: "A road... is just a road", followed by the statement: "But a road can be something more". These two statements represent the fundamental principles of the Cittaslow movement and sustainable transportation paradigm (Schiller, et al., 2010; Cittaslow International, 2011). The Cittaslow movement and the sustainable transportation paradigm stress the importance of added value for the quality of human life (Schiller, et al., 2010; Radstrom, 2011). The transportation network and mobility patterns contribute to the quality of life, positive or negative depending on the quality of the transportation network. Slow transportation modes have generally a positive contribution to the quality of life due to the effects on social life, local economy, local environment and human health (Ortuzar et al., 2000; Van Wee and Dijst, 2002; Carmona, et al., 2010; Schiller, et al., 2010; Cittaslow International, 2011). The sustainable transportation paradigm and the Cittaslow movement also focus on the advantages of slow transportation modes and therefore stimulating the transition from hypermobility to a new situation where the majority of movements is executed by slow transportation modes (Schiller, et al., 2010; Radstrom, 2011). To enhance the transition from hypermobility towards slow transportation modes; people have to change from the car to a bicycle (Schiller, et al., 2010). Therefore it is important to understand why people choose for specific transportation mode. The reasons of the transportation mode choice are crucial for the development of a transportation vision. Therefore the rest of this chapter is devoted to the transportation mode choice with special attention on the aspects, which positive contribute to the use of slow transportation modes. This supports a vision which enhances the shift from hypermobility to a cycling oriented transportation system. The first part of the theoretical framework is about the question if the transportation mode choice is rational or not. The second part is about the different aspects which influence the transportation mode choice including their relevance for the transportation mode choice.

2.1 Are transportation mode choices rational choices?

In the scientific debate about the transportation mode choice exists many different perspectives, which differs depending on the scientific paradigm; e.g. physiological, built environment, transportation and mode choice modelling (Cervero, 2002; Van Wee and Dijst, 2002; Bamberg and Schmidt, 2003; Collins and Chambers, 2005). A different transportation mode choice of an individual contributes to new transportation patterns since all individual choices together form the transportation pattern. The focal point of this discussing is if that transportation mode choice is rational or not? (Cervero, 2002; Bamberg, Rölle, et al., 2003; Van Wee et al., 2006). Since all individuals travel a lot and there is much variation between the individuals it is very challenging to simulate, predict or reconstruct the individual transportation mode choices. Therefore many scientists, engineers and policy makers are more interested in the overall transportation patterns, which are based on the individual transportation mode

choices since those can be simulated, predicted, and reconstructed (Van Wee and Dijst, 2002). The challenge is to extract individual information from the overall patterns and vice versa (Cervero, 2002; Van Wee, et al., 2006). Many quantitative scientists assume that the transportation mode choice based on a rational decision (Cervero, 2002; Schwanen and Mokhtarian, 2005; Van Wee, et al., 2006; Heinen, et al., 2010). The rational mode choice approach is drawn on the assumption that every individual evaluates all transportation possibilities before each trip and chooses the best transportation possibility (Cervero, 2002). The best possibility is the transportation mode that leads to the highest personal benefits; e.g. shortest duration, best for your health and good for the natural environment (Cervero, 2002; Van Wee, et al., 2006). The second assumption of the rational mode choice is that every trip has a purpose, which means that a trip should only be considered when something is not available at the current location and is available at a different location (Van Wee and Dijst, 2002). There is one exception on this second assumption: tourists (Van Wee and Dijst, 2002). Tourists can have trips, which start and end at the same location, so it was not necessary to travel to another location (Van Wee and Dijst, 2002; Shiftan, 2008). Some important aspects for the rational evaluation are time, distance, health, danger, landscape, fun and bad weather (Heinen, et al., 2010). All variables should be evaluated before every trip and choose the best opportunity.

The rational approach is not the only scientific approach. More and more scientists stress the importance of social and irrational aspects for the transportation mode choice, like habits and routines (Bamberg and Schmidt, 2003; Gärling and Axhausen, 2003; Collins and Chambers, 2005). These scientists stress that these 'irrational' aspects have to be included to capture all aspects of individuals' mode choice behaviour (Bamberg and Schmidt, 2003). A consequence of the irrationality of people is that they choose a transportation mode without a proper evaluation (Gärling and Axhausen, 2003). The social behaviour and social networks are very important, this determines of a large part the attitude towards slow transportation modes (Heinen, 2009). This can be seen as irrational since the social behaviour is based on habits and experiences of other people and since not all possibilities are evaluated, it is not rational. Nowadays there are several studies, which integrate both approaches (Bamberg, Rölle, et al., 2003; Gärling and Axhausen, 2003; Heinen, et al., 2010). The increased possibilities to predict habits and social behaviour contribute positively to this development.

Although the irrational approach is more and more popular, the rational approach is still very important for many spatial planners since it allows planners to relate the spatial organization to the transportation mode choices (Cervero, 2002). Although a combined approach is desired (Bamberg, Rölle, et al., 2003). This study is mainly based on the rational approach with some aspects of the irrational approach. Summarizing the rational transportation mode choice approach is the central approach of this research which is based on the principles that every individual makes a rational choice and travels from A to B when A and B are not at the same location (Cervero, 2002). Together with some habits and social behaviour this gives a comprehensive overview.

2.2 Which aspects are important for the rational mode choice?

Although the willingness to travel of individuals is high, the transportation mode choice is depending on many aspects (Heinen, 2009). Every rational transportation mode choice is drawn on multiple aspects, which all influences the transportation mode choice (Van Wee and Dijkstra, 2002). The most relevant aspects of the decision making process are shown on Figure 2 and are discussed in the following sections. The aspects are discussed one by one or grouped when possible. Before all aspects are discussed a simple model is discussed. After the model the discussion starts with the most important aspects for the rational mode choices and continues with the irrational aspects. Further the quantitative aspects are discussed before the qualitative aspects. The section ends with an aspect, which cannot be influenced: the weather.

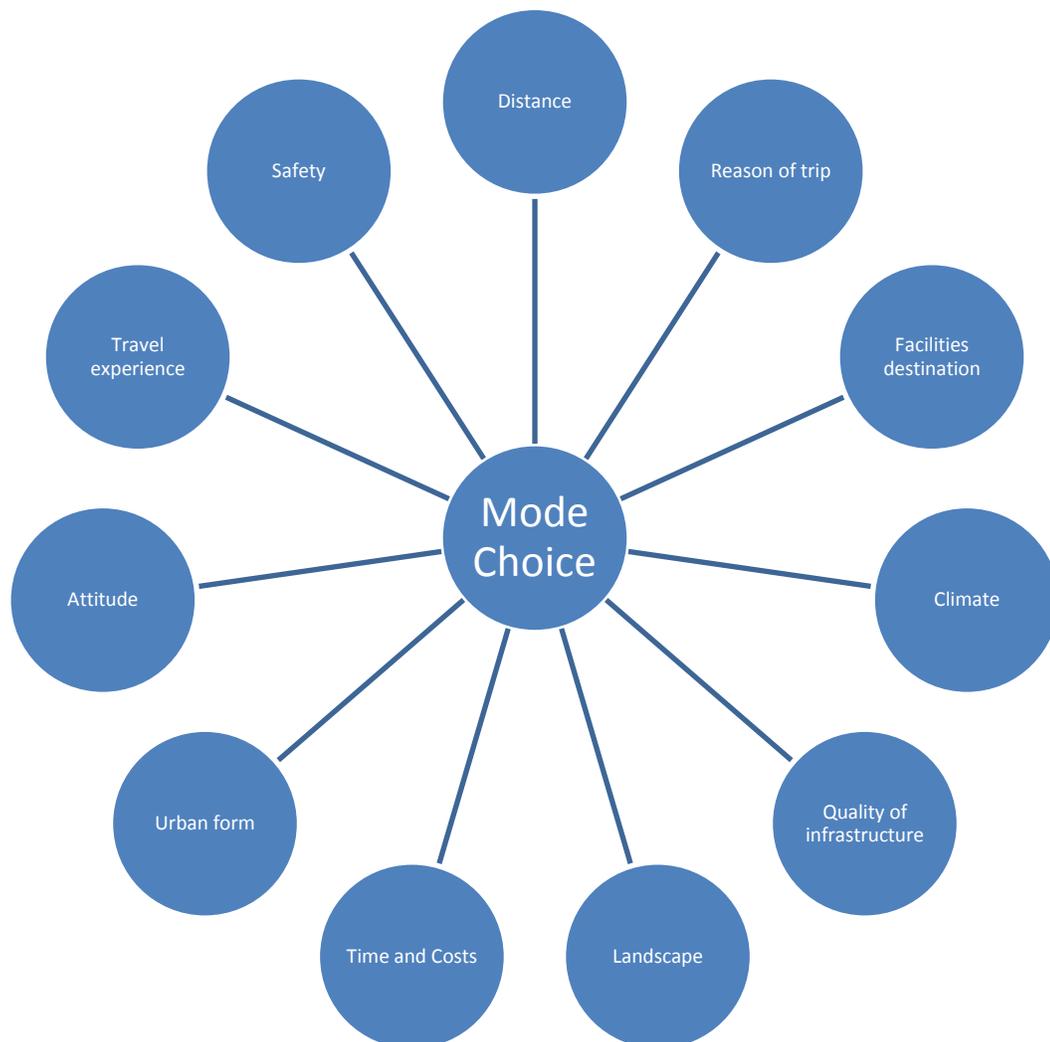


Figure 2: Many aspects that influence the transportation mode choice of people (Made by Wouter Engel based on a literature review).

2.2.1 A simple mode choice model

The NOA model is a very useful and simple model to explain the reason of a transportation mode choice (Van Wee and Dijst, 2002). The letters of NOA means needs, opportunities and abilities. The N is very useful to understand the reasons of the trip. The rest of the NOA model is well suited to explain the choices of an individual. Therefore the simple model is introduced in this section. It allows understanding decisions of people.

Every human being has its own basic needs which are mainly food, money (work) and leisure. These basic needs are in most cases the main reason of a trip (Van Wee and Dijst, 2002). People have to travel because they do not have food, job opportunities or leisure activities at their home, so to for fill their needs they have to travel to other place. For every need there are multiple destinations, for example some people have a vegetable garden and others have to travel to a grocery store. If a trip is inevitable there are multiple transportation mode opportunities to travel to the location of the basic needs. The selected opportunity is depending on the abilities of a person (Van Wee and Dijst, 2002). The abilities of a person are very important for the slow transportation modes because the number of items or weight you can carry is limited (Van Wee and Dijst, 2002). It is possible to carry 3 kilograms of groceries by bicycle, but 30 kilograms is too much. Combining the three aspects of the NOA model results a transportation mode choice, which for fill all opportunities and fits within the abilities of a person (Van Wee and Dijst, 2002). Therefore the NOA model is a very useful and simple tool to explain transportation patterns and specific transportation choices (Van Wee and Dijst, 2002). In this sense the NOA model is applied in this research.

2.2.2 Distance, time and costs

The most important quantitative aspects of the rational transportation mode choice are distance, time, and costs (Dickinson et al., 2003; Heinen, 2009). All three aspects have a large influence on the transportation mode choice of an individual (Dickinson, et al., 2003). Based on the assumption that every trip has a starting point and an ending point, which is not the same location, each trip has a distance (Cervero, 2002; Moudon and Lee, 2003). All possible distances have to be known prior for a proper transportation mode choice evaluation (Cervero, 2002; Moudon and Lee, 2003). Each transportation modes has its own optimum distance, which are closely related with time. Time is more important for motorized transportation modes and distance for slow transportation modes (Limtanakool et al., 2006). A derivative of distance and time is speed. A higher speed allows people to travel further in a shorter time. Therefore the car is in most cases preferred above the slow transportation modes for long distances (Bamberg, Rölle, et al., 2003; Limtanakool, et al., 2006).

For short distances cycling and walking are very interesting opportunities because the distance is crucial for the willingness to cycle (Moudon and Lee, 2003). A study showed that the maximum cycling distance from home to work is about 6,6 km for women and 11,6 km of men (Heinen, et al., 2010). Since 83% of the trips are shorter than 3 kilometer there are many

opportunities for the slow transportation modes (Heinen, et al., 2010). So in at least 83% of the cases, the distance is not the limiting factor for cycling or walking. Many studies suggest to change the urban form to minimize the distances of the slow transportation network because a denser network have positive effects on the cycling share (Cervero, 2002; Heinen, et al., 2010). This approach is applied by multiple movements and is becoming more important in the United states of America (Heinen, et al., 2010). A denser network lead not only to short distances and a large cycling share, it generates also the feeling of directness which is positively for pedestrians and cyclists (Rodríguez and Joo, 2004; Heinen, et al., 2010; Winters et al., 2011; Wahlgren and Schantz, 2012).

Not only the distance is important for cyclist, also the cycling time is very important since travelling time by bicycle is experienced different than travelling time by other transportation modes (Hunt and Abraham, 2007). One minute of cycling is experienced as three minutes by the other transportation modes (Hunt and Abraham, 2007; Heinen, et al., 2010). This applies especially for trips through a monotonic countryside (Heinen, 2009). A denser and more varied land use contribute positively to cycling because it reduces the experienced travelling time (Heinen, et al., 2010).

Costs are not crucial for the slow transportation modes because walking is free and cycling requires only a small investment (Heinen, 2009). This is totally different than for a car. A car needs fuel, maintenance, insurance and before you can drive you have to buy a car. To reduce the car use, pricing of car use is often suggested (Rodier, 2009). Since higher costs should lead to less car use, a higher fuel price resulted in less car use (Heinen, 2009; Rodier, 2009; Heinen, et al., 2010; Buehler, 2011). An important remark is that pricing only is successful when a proper transportation alternative is available (Rodier, 2009).

2.2.3 Facilities during the whole journey

Every transportation mode requires its own facilities, to park your car or to navigate on your bicycle. There are two types of facilities, namely along the route or that the destination or starting point. The most important facilities at the destination or starting point is a parking place to park your car or bicycle (Heinen, 2009; Heinen, et al., 2010; Winters, et al., 2011). Too little parking places for cars or bicycle racks for bicycles have a negative effect for their shares (Heinen, 2009). People will not choose for a transportation mode when the facilities are very poor (Winters, et al., 2011). For cyclists a safe place is as important as a place to park their bicycle (Hunt and Abraham, 2007; Heinen, 2009; Winters, et al., 2011). A cyclist appreciates many facilities, but there is not a direct correlation between more facilities and a higher cycling share (Heinen, 2009). For Car users a proper place to park their car is inevitable.

Tourists and local inhabitants have different desires, local inhabitant appreciates a good cycling shed in the centre and tourist wants next to the cycling shed in the centre also facilities on the countryside along the cycling routes (Heinen, 2009). Possible facilities on the countryside are picnic spots, showers and cabins and car parking (Heinen, 2009). For tourists signalling is a

very important facility since it directs the tourists along the beautiful spot or towards interesting locations. Signalling is less important for local inhabitants because they know the area (Heinen, 2009).

2.2.4 The quality of the infrastructure

The most important quantitative aspects are yet discussed; the qualitative aspects will be discussed. The quality of the infrastructure is important for all road users, because it determines largely the safety and the experience of the road users (Carmona, et al., 2010). It is not only the surface, which is determining the quality of the road also the division, clearness and signalling of the road are important for the quality of the road. Good quality is in this report good for cyclists since this is written from a cycling prospective.

There are three types of cycling infrastructure; mixed traffic, bicycle lane and bicycle path (Hunt and Abraham, 2007). The mixed traffic means that cyclists cycle between the other traffic (cars and trucks) and share the road. A bicycle lane means that cyclists cycle on the road but have their own space on the road. The final type is the bicycle path, which is a separate path for cyclists. Most cyclists appreciate the last one: a bicycle path, because a bicycle path is much safer caused by less interaction with other transportation modes (Rodríguez and Joo, 2004; Heinen, 2009; Wahlgren and Schantz, 2012). Cyclist do not have burden of overtaking cars with a large speed difference on a bicycle path (Heinen, et al., 2010). Sidewalks and bicycle path contribute positive on the slow transportation modes shares (Rodríguez and Joo, 2004). Tourists appreciate bicycle paths even more when the bicycle path is not in the neighborhood of a busy road since this contribute positively to the experience of the landscape and tranquillity (Heinen, 2009). This is different for local inhabitants, they appreciate a bicycle path along a road since this improves their feelings of safety especially during the nights (Heinen, 2009). Although these feelings are often subjective since those are very personal (Heinen, et al., 2010). People tend to remember the dangers parts better than normal and safe parts (Heinen, et al., 2010).

The quality of bicycle paths and lanes are heavily determined by the quality of the surface, design and continuity of the route (Stinson and Bhat, 2003; Heinen, et al., 2010). The quality of the surface is even more important for elderly people (Heinen, et al., 2010). Next to a smooth surface a steady width of bicycle path is very appreciated by cyclists (Heinen, et al., 2010). Debris and glass on the bicycle lane or path is experienced as very negative (Winters, et al., 2011). The continuity is reflected in delays, detours and interruptions (Stinson and Bhat, 2003). A cycling path should be continue and not have too many interruptions by road crossings and should not end without new cycling possibility (Stinson and Bhat, 2003; Heinen, et al., 2010). A good continuous route does not have any sharp corners, which slow down cyclists (Wahlgren and Schantz, 2012). An important delay is waiting for a traffic light. These waiting times result in longer travelling time and the inconvenience of stopping (Wahlgren and Schantz, 2012). Both disadvantages contribute negatively to the cycling experience (Stinson and Bhat, 2003; Heinen, et al., 2010; Wahlgren and Schantz, 2012). Minimizing the waiting times and the number of

stops stimulate cycling (Heinen, et al., 2010). Traffic lights are not always negative; when cyclists have to cross a large road and the traffic light helps them to cross the road it is positive for the cyclists (Pucher and Dijkstra, 2000; Heinen, et al., 2010; Wahlgren and Schantz, 2012).

Properly managed traffic lights are also important for cars because it results in fewer nuisances, air pollution and traffic jams. As discussed in the section about facilities car parking is very important for car drivers, but parking lots can be design in a wrong way. Parking lots next to a bicycle path, especially when cars have to cross the bicycle path are not appreciated by cyclists since it can cause dangerous situations (Heinen, 2009). Car parking on the streets can lead to dangerous situations because there is less eye contact between the different road users (Heinen, et al., 2010). There is also a large difference in experience between urban areas and rural areas, in urban areas it is less problematic to park the cars along the road than in rural areas (Heinen, et al., 2010).

Car drivers need also a smooth road surface since a silent road is appreciated by car drivers and local residents and reduces the nuisances of the road. A clear network improves the safety of all road users and reduces the nuisances for all road users and local inhabitants. Therefore a good network is simple and has some clear nodes.

2.2.5 The landscape and environment

Research about the influence of the landscape on the transportation mode choice is lacking because it is expected that the landscape does not influence the transportation mode choice (Heinen, 2009). This seems to be true for car drivers and public transport users, but it is expected to influence the cycling behaviour, especially of tourists (Heinen, 2009; Wahlgren and Schantz, 2012). A varied route is preferred above a monotone route because varied routes are much more attractive and it reduces the experienced effort of the slow transportation modes (Heinen, 2009; Winters, et al., 2011; Wahlgren and Schantz, 2012). So an attractive landscape should stimulate the bicycle share (Heinen, 2009). Not only tourists like a nice landscape also the local inhabitants prefer a nice landscape because the experienced effort decreases (Winters, et al., 2011). For many people it is important to cycle in an environment with fresh air and without the smell of cars (Winters, et al., 2011)

The topography influences the transportation mode choice very much since people do not like to cycle or walk on steep hills (Ortuzar, et al., 2000; Rodríguez and Joo, 2004; Heinen, 2009). In the Netherlands there is almost no topography, which can influence the transportation mode choice. Therefore it gets no further attention.

2.2.6 Urban Form

There are different types of rurality, which are based on different transportation patterns, like the density of a city. The typology indicates the role of transportation in social exclusion and transportation mode use (Gray, 2004). A rural area further away for a city and facilities is more

depending on car use and causes more social exclusion than a rural area located close to a large city (Gray, 2004). This also indicates the possibilities for slow transportation and the dependence of towns on the larger cities.

Although there is little built environment in rural areas, it still influences the transportation behaviour of people (Crane, 2000). In the study area Alphen and Chaam can be seen as built environment. A feature of the hypermobility is that urban areas are dominated by cars and are designed for cars, which is visible by the many parking lots and broad roads (Crane, 2000; Schiller, et al., 2010). In combination with the move of shops to the edge of the cities, a monotonic land use arise which is very bad for the slow transportation modes (Crane, 2000; Cervero, 2002; Heinen, 2009; Carmona, et al., 2010; Schiller, et al., 2010). An advice of Crane (2000) for spatial planners is to incorporate transportation patterns during the planning of a new residential area with the focus on the slow transportation modes as much as possible. Nowadays much of the residential areas are designed for car use instead of slow transportation modes (Crane, 2000). Focusing on the slow transportation modes improves the safety of the road users (Pucher and Dijkstra, 2000). This contributes to a possible different transportation mode choice.

2.2.7 Road safety

The safety of road users is important for the transportation mode choice, especially for cyclists. Most of the dangerous situation for cyclists are caused by the motorized traffic (Wahlgren and Schantz, 2012). A car driver is better protected than a cyclists, which results in more fatalities under cyclists than car drivers (Pucher and Dijkstra, 2000; Wahlgren and Schantz, 2012). Dangerous situations often occur when dense traffic flows join or when great speed difference exists (Wahlgren and Schantz, 2012). Since it is very important to cycle in a safe environment, much attention is necessary to improve the safety of cyclists (Wahlgren and Schantz, 2012). A safe cycling environment contribute positive to the cycling share, but the effects of a negative environment are much larger (Pucher and Dijkstra, 2000).

2.2.8 Attitude and Habits

Almost all people have an attitude towards specific transportation behaviour (Bamberg, Ajzen, et al., 2003; Heinen, 2009; Heinen, et al., 2010). The attitude towards a transportation mode is very important for the willingness to take a specific transportation mode (Heinen, 2009). The willingness is often based on previous actions. People who do not often cycle has in many cases a negative attitude towards cycling (Heinen, 2009). A negative attitude towards cycling does not mean that people are not willing to cycle at all. Using always the same transportation mode results in a positive attitude towards that specific transportation mode and a negative attitude towards other transportation modes (Bamberg, Ajzen, et al., 2003). The attitude of people is heavily influenced by their social environment (Heinen, 2009). Several studies showed that using a bicycle for commuting a few times leads to a change from the car to the bicycle since people get used to a specific transportation mode very quickly (Heinen, 2009).

A habit is a routine, something what people do frequently with the same order (Gärling and Axhausen, 2003; Heinen, et al., 2010). The habit is a short-cut for the human brain because the brain recognizes a specific situation and chooses for the same transportation mode as in the past (Gärling and Axhausen, 2003). As result of this behaviour, people can miss new opportunities because people do not collect all new information every time. Multiple studies show that a habit does not mean that it is more difficult to change of a transportation mode (Bamberg, Rölle, et al., 2003). Offering people a proper alternative; free public transport or short cycling route, can result in a change of their travel behaviour because they were not aware of these opportunities (Bamberg, Rölle, et al., 2003; Gärling and Axhausen, 2003). Also discussing important issues like ecology, economical benefits and environmental issues can lead to a transportation mode change (Bamberg, Rölle, et al., 2003). It is very challenging to predict the human behaviour, although there many opportunities to positively stimulate a behavioural change (Gärling and Axhausen, 2003).

2.2.9 Weather conditions

The weather cannot be influence by humans on the short-term; although human actions can influence the climate on the long-term (climate change). The sustainable transportation paradigm promote the environmental advantages of slow transportation modes (Schiller, et al., 2010). The most important aspects of the weather for the slow transportation modes are rain and wind (Heinen, 2009). Bad weather for cycling and walking is heavy rainfall, wind, snow and ice, this can create dangerous situations and people are reconsidering their transportation mode choice (Akar and Clifton, 2009; Heinen, 2009; Winters, et al., 2011). Another important outdoor condition is light and dark, people do not like to cycle through the dark and prefer a car (Heinen, 2009; (Winters, et al., 2011). Also for tourists the weather is very important, tourist will undertake only cycling tours when the weather is good. So the mode choice depends a lot on the weather but cannot be modified.

2.3 Conclusion: the positive travel experience

In this chapter most relevant aspects of the transportation mode choice were discussed. The role of the aspects: weather, attitude, and habits are seen as input rather than an aspect which can be influenced due to the focus of this research. Still those aspects are important for the transportation mode choice and could be used as an explanation of the observed transportation patterns. Several experiences are discussed; like road safety, road quality (experience), and the landscape, which are important for the transportation mode choice. Although the most important aspects are distance, time, costs, facilities, road quality (physical) and urban form. Distance, time and urban form are the basis of the network analysis because the network determines to a large extent the distance and time it takes to travel. This all is used during the conducted network analysis.

The following lessons are learnt from the theoretical overview given in this chapter. Most lessons learnt focuses on the slow transportation modes although there are also several lessons about the car.

- Short distances lead to an increase of the cycling share
- Good parking facilities are essential for cyclists and car users.
- A smooth and clean road surface is important for cyclists
- Continuity of the network is crucial, especially for cyclists
- Avoid many stops and interruptions, for example traffic lights
- A nice landscape generate a positive experience and stimulates cycling
- The urban form influences the transportation network and cycling share
- Bad weather is dramatic for slow transportation modes, but it is impossible to influence the weather

Overall there are many aspects, which influence the transportation mode choice. Finally it is about the experience of people and especially of the last couple times they use a transportation mode. So to stimulate a sustainable transportation in the municipality of Alphen – Chaam a positive experience should be generated for the slow transportation modes.

Chapter 3 - Analyzing the transportation pattern

To understand the current transportation mode patterns in the municipality of Alphen - Chaam, a thorough analysis was conducted. The analysis is divided into five main sections: a network analysis (1), mapping all facilities and stay areas (2), network usage of different types of trips (3), experiences of road users (4) and an overview of the current transportation policies (5). The network analysis consists of an inventory of all significant infrastructure; mapping and characterizing with special attention for the slow transportation infrastructure. Time and distance are the important aspects, which are discussed during the network analysis. Next to the transportation network the transportation facilities are very important for the transportation mode choice. Mapping the facilities makes it possible to explain the transportation patterns. At stay location many facilities are present and people live in a stay area. A stay area is in many cases the starting point of a journey. Connecting stay areas show different transportation flows caused by the different types of trips. These connections show the important roads of the municipality of Alphen – Chaam. The experience of the road user is not only determined by the road quality but also by its surrounding landscape and urban form. Therefore all these qualities are studied to understand transportation mode choices. The analysis is finished with a thoroughly study of the current transportation policies of the municipality of Alphen – Chaam and other governmental bodies.

3.1 Network analysis

Since a single road is not a network and for a proper network the roads must be blending, when one road ends, start another road. So the network analysis has to unravel the whole network structure. The small municipality of Alphen – Chaam has many different type of transportation infrastructure (e.g.: roads, bicycle paths and footpaths). To unravel this heterogeneous system, the system is split up into four different networks which are analyzed separately. The four different networks are: the regional road network (1), the local road network (2), the road structure in the built environment of Alphen (3) and the slow transportation networks (4).

The information is gathered by on line maps, the topographical maps of the ‘Kadaster²’, bicycle atlas, policy documents of the roads and local observations. Most information is mapped because this shows the location of the different networks.

3.1.1 The regional road network of Alphen - Chaam

The first network analysis is about the regional transportation network. The overview map of the region is shown on the next page. This map does not only show the regional roads but the whole system, which improves the understanding of the region.

² A civil service of the Netherlands, which map and measure the whole Netherlands

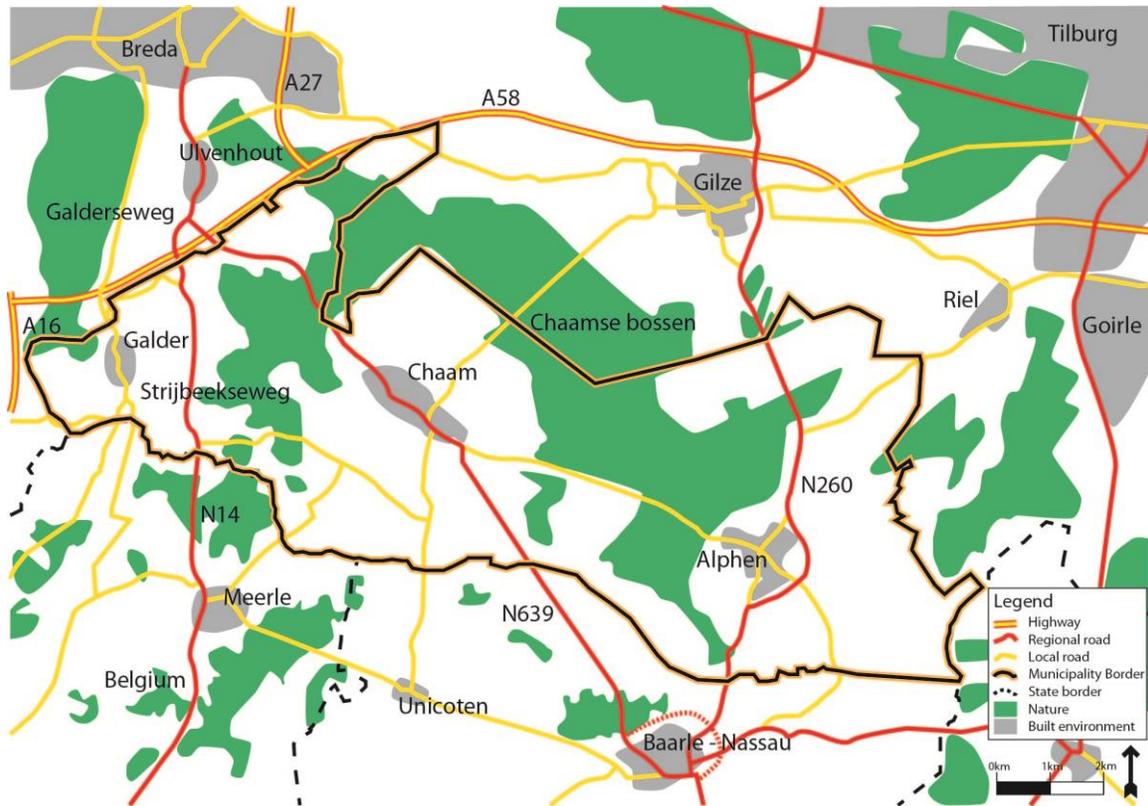


Figure 3: An overview map of the region around the municipality of Alphen – Chaam including the most important roads, cities, towns and nature areas

The regional transportation network consists of four roads. These four roads handle most transit traffic and connect areas outside the municipality with the municipality of Alphen – Chaam. All four regional roads are oriented north – south. The N260 and the N639 are the two most roads of the municipality of Alphen - Chaam; the N260 is important for Alphen and N639 for Chaam. The national highways (A16, A27, and A58) are located just outside the municipality. The highways are nevertheless very important because the highways are the main supplier of the transit traffic, tourists and day visitors. The N260 and N639 connect the A58 with Baarle-Nassau, where both roads join. After passing the town of Baarle – Nassau the road continues into Belgium towards Turnhout. Much transit traffic towards Turnhout drives via the N260 and N639.

The transit traffic is not equally divided over the N260 and N639. Most transit traffic into the direction of Turnhout is driving via the N639 through the centre of Chaam. The flow of transit traffic is sustained because of the signalling on the highway and navigation systems. Both systems advise road users to drive via Chaam because this route is a little bit faster and shorter. The N260 and N639 have both a speed limit of 80 km/h outside the built environment and inside the built environment of 50 km/h. The N260 and the N639 are owned by the province of Noord – Brabant. Therefore the province is responsible for further developments and maintenance of the two regional roads. At this moment the province constructs a new ring road around the

town of Baarle – Nassau. The new ring road improves the traffic flow; reduces the congestion and reduces the traffic nuisances in the centre of Baarle - Nassau. The route of the new ring road is shown on Figure 3 (overview map). It is very unlikely that the division of transit traffic will change because of the new ring road since the ring road affects both roads the same.



Figure 4: left: photo of the N260 ring road around Alphen (crossing Terover); right: photo of the N639 close to Breda

The N260 connects the municipality with Tilburg, especially Alphen. The transit traffic from Tilburg drives via the N260 towards Turnhout. To avoid that all transit traffic drives through the centre of Alphen the province constructed a ring road around Alphen. The new ring road resulted not only in a tranquil centre but it ensures a steady traffic flow with a higher averaged speed on the N260. The N639 is the main connection between Breda and the municipality, especially with Chaam. The N639 is the entrée of the municipality for most of the traffic coming from the A16. Since Chaam does not have a ring road all traffic drives through the centre of Chaam. A small traffic count in Chaam results in 800 vehicles per hour, including 120 trucks. On both roads tractors are allowed to drive, which has consequence for speed and design.

The regional road structure shows not only the transportation patterns, but also the mental connections. The town of Alphen is really focused on Tilburg and Chaam on Breda; both are large cities with many facilities. Not only the N639 connects Breda also the two other regional roads are connected with Breda. The two other regional roads of the municipality Alphen – Chaam are located in the western part of the municipality; the Galderseweg and the Strijbeekseweg. Both roads are very popular by commuters, truck drivers and other motorists as short cut for the national highway because of the congestion on the A16 and A58. Both roads are owned by the municipality of Alphen - Chaam. The municipality of Alphen-Chaam is

reconstructing the Galderseweg at this moment to minimize the cut-through traffic through Galder. The Galderseweg will have a speed limit of 60 km/h in the future. The Galderseweg is constructed as a local road. The current developments limit the transit traffic. The Strijbeekseweg, the connection between Breda and Belgium, has a speed limit of 80 km/h. The Strijbeekseweg has the same road lay-out as the N639 but has worse maintenance compared with the N639. The Galderseweg and Strijbeekseweg are busy during peak hours.

It was remarkable that during a visit of the municipality, there were not any landmarks to show that a road user enters the municipality of Alphen – Chaam, which is a Cittaslow municipality. Driver sees only a Cittaslow sign when they enter the towns Alphen and Chaam. A Driver on the Strijbeekseweg does not have any sign of a Cittaslow municipality.



Figure 5: left: photo of the Galderseweg, just south of Galder; right: photo of the Strijbeekseweg close to Breda

3.1.2 The simplified regional network

The exact location of the regional network is not the most important aspect of a regional network because the main aim of the network is sustaining a decent transportation flow. Distance and time are the best aspects to express the properties of a regional network, which are shown in a simplified network map on Figure 6. The simplified network is based on a node-to-node network principle. The yellow sections are located in the build environment.

Figure 6 shows the routes of the transit traffic. Most transit traffic travels to from Rotterdam (A16) or Utrecht (A27) to Turnhout. The transit traffic from the A16 and A27 drives via the A58 towards exit 14. Exit 14 is located south of Breda and joins the N639 to Chaam. The transit traffic chooses for this route because it is a little bit shorter. Although the difference in travel time and distance is not very big between the N260 and N639. Point 10 is the node where the N260 and N639 merge. The route via the N260 has a length of 15,2 kilometer from exit 12 (A58) to point 10 and the N639 has a length of 16,2 kilometer from exit 14 (A58) to point 10. So the N260 seems to be shorter, but the difference arises when the starting point is changed. The distance between the A16 and A27 to exit 14 is shorter, which results in the following distances: 20,1 kilometer from the A16 (counting from point 16) to point 10 via the N639 and 30,4 kilometer via the N260. The travelling time via the N639 is almost 20 minutes and via the N260 about 25 minutes. From the A27 (counting from point 2) to point 10, driving via the N639, the distance is 19,2 kilometer and driving via the N260 to point 10 the distance is 23,8 kilometer. The route via the N639 takes about 19 minutes and via the N260 it takes 21 minutes. So it is indeed faster to drive via the N639.

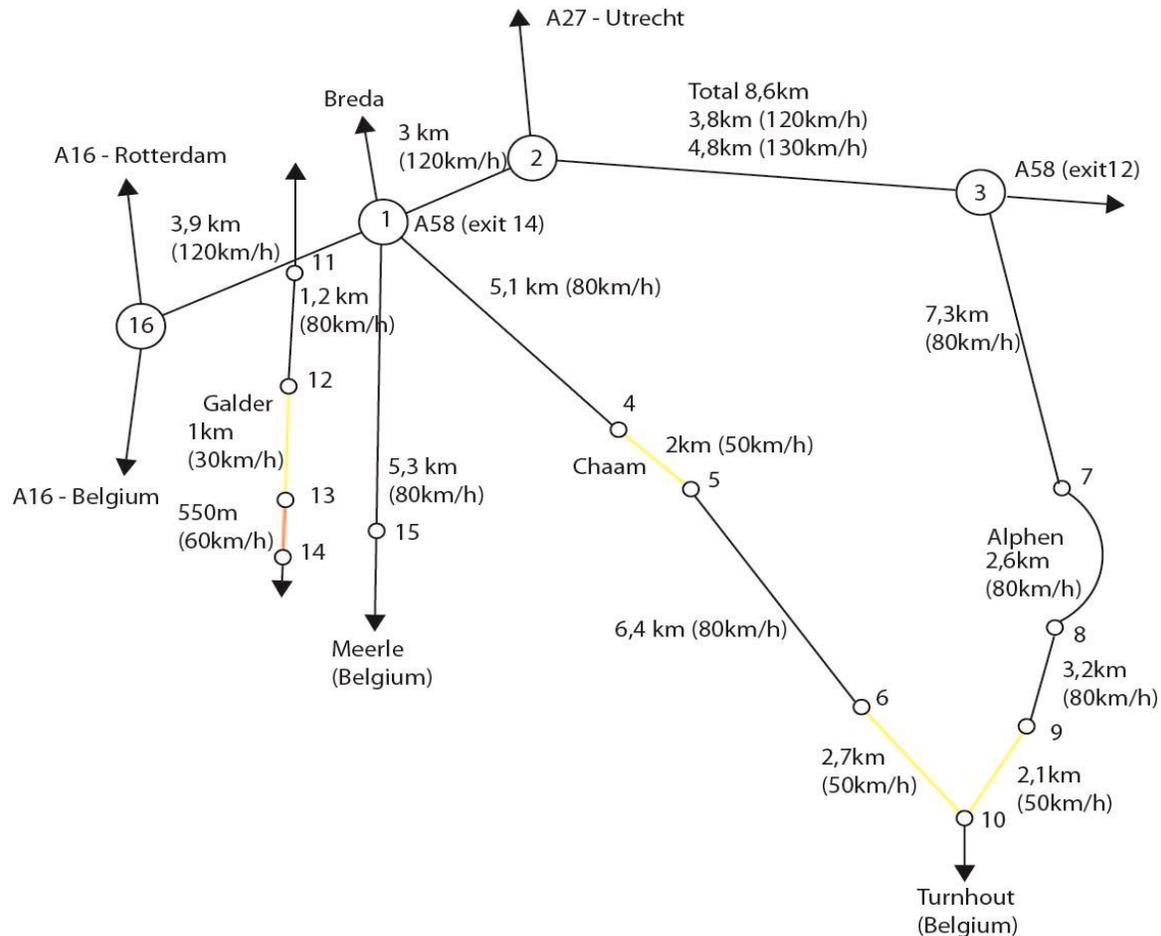


Figure 6: Simplified regional road map of the study area, the yellow sections are roads in the built environment, the brown section is a 60 km/h zone

3.1.3 The local road network of Alphen - Chaam

The local roads are equally important for the local inhabitants as the regional roads for the transit traffic. Most of the roads are local roads in the municipality of Alphen - Chaam. The large number of local roads requires an adequate categorization of local roads, so that it is possible to focus on the most important local roads. There are two division made, first division is between the countryside and the built environment and the second division is only made for the countryside. The second division separates three types of roads on the countryside, namely: local connection roads (1), agricultural roads (2) and touristy roads (3). The local connection roads connect several towns, villages and hamlets with each other and have a local flow function. The agricultural roads are located in the areas where the main activity is agriculture. The touristy roads are located around nature areas and attraction zones. Almost all the local roads have a speed limit of 60 km/h and all are owned by the municipality of Alphen – Chaam. Although there are large differences in road experience, usage and quality between the local roads. This difference is even larger for the slow transportation modes.

3.1.3.1 The local connection roads

The local connection roads connect several towns with each other. The towns can be located within the municipality of Alphen – Chaam or outside the municipality. All local connection roads are not very interesting for transit traffic and therefore less intensively used. Since they are not attractive for transit traffic, they are not categorized as regional road. There are six local connection roads in the municipality of Alphen – Chaam and most have a different road design compared to the regional roads. The six connection roads have many similar properties, although large differences arise due to the renovation date of every road. Since they are not the same and therefore they are discussed individual.

The six connection roads are: the road between Alphen and Chaam (1), the road between Chaam and Gilze (2), the road between the N260 and Riel (3), the road between Chaam and Unicoten (4), the road between Alphen and Baarle – Nassau via Terover (5) and the connection road between the Strijbeekseweg and the Galderseweg (6). All six local connection roads are numbered and shown on Figure 8. Only two of the local connection roads have a bicycle path along the road. The most important and most interesting local connection road is the road between Alphen and Chaam, because it is connecting the two largest towns of the municipality and it is the largest internal road. The local connection road is located through a very important tourist stay area (the area is discussed later) and other facilities, which attracts many people. The road is surrounded by beautiful nature and agriculture land, one side is forest and the other side agriculture. This results in some beautiful views while driving on the local connection road.

The local connection between Alphen and Chaam has a speed limit of 60 km/h and has a very basic road design. Combined with the fact that the road is very straight and there are not any speed reducing measures. Many drivers are speeding, which is a large nuisance for local residents, the camp sites owners and cyclists. Therefore the



Figure 7: The local connection road between Alphen and Chaam. A long straight road without a special zone for cyclists

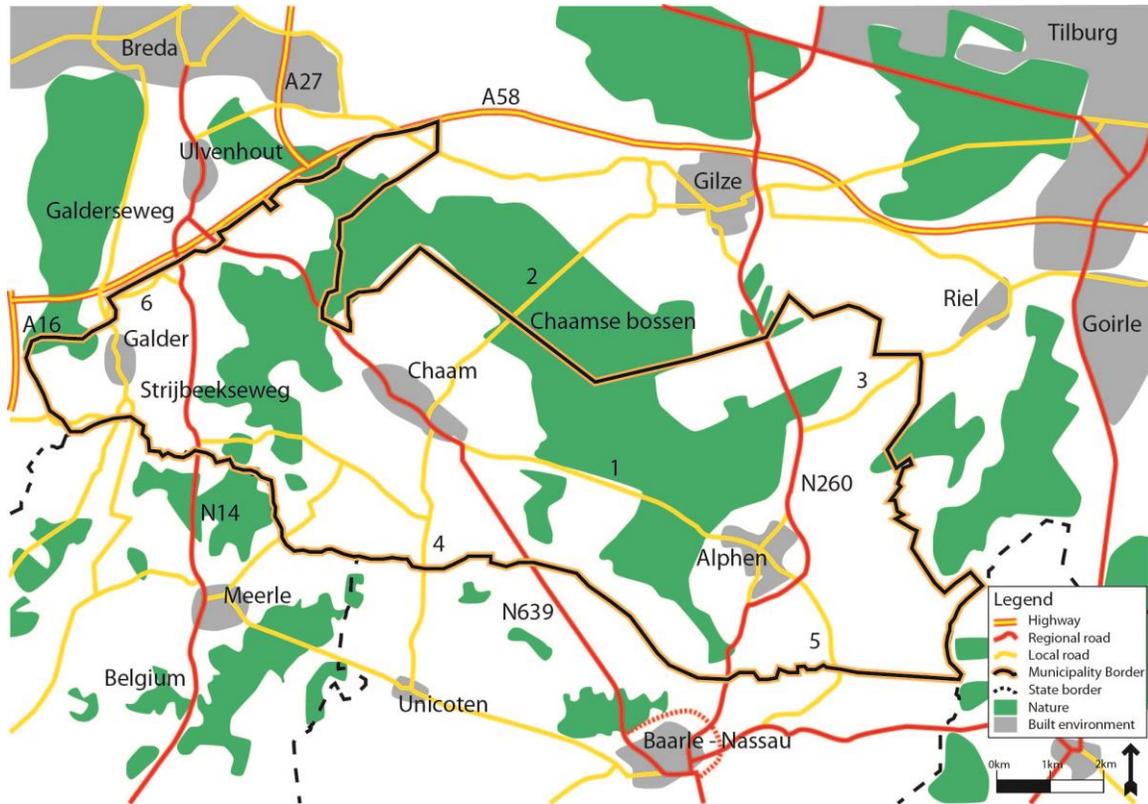


Figure 8: The local connection roads of the municipality of Alphen – Chaam, every local connection road is numbered from 1 to 6. 1: Alphen and Chaam, 2: Chaam – Gilze, 3: N260 – Riel, 4: Chaam – Unicoten, 5: Alphen – Baarle – Nassau via Terover, 6: Strijbeekseweg – Galderseweg

police is controlling on the maximum speed very often. The local connection road does not have a bicycle path, only a bicycle lane which is poorly marked as bicycle lane as shown on Figure 7. There are also several exits to touristy locations, which are often poorly visible. This can result in very dangerous situations especially for the slow transportation modes. An example of such dangerous situation is when cyclists enter the road out of the forest. Cyclists can easily be missed by a car driver due to the trees. The municipality of Alphen – Chaam and a camp site owner are keen on a bicycle path along this local connection road.

Two local connection roads connect the municipality of Alphen – Chaam with surrounding towns and with the city of Tilburg. These two local connection roads are the road between Chaam and Gilze (number two) and the road between N260 and Riel (number three). Both roads are quite busy and have the same flow function. The largest differences are the road design and the landscape around the road. The road between Chaam and Gilze is an alternative route to the A58 and is mainly used by car drivers who want to go to Chaam. The road has a speed limit of 60 km/h, which is supported by its location. The local connection road is located in a very dense forest where many animals can cross the road. The dense forest narrows the roads and decreases the speed of car drivers automatically. This local connection road shows the beauty of

the municipality of Alphen – Chaam. There are bicycle path located on both sides of the road including several crossings for cyclist. The road quality is very high because of the new tarmac.



Figure 9: The local connection road between Chaam and Gilze, which is experienced narrower due to the trees on both sides of the road

The road between the N260 and Riel is an alternative route for the northern part of the N260, especially for those who want to travel to the centre of Tilburg. The road towards Riel has a speed limit of 80 km/h and has a bicycle path, which improves the safety of the cyclists. The road surface is much older compared with the road between Chaam and Gilze. The road is located in an agricultural zone, which gives the feeling of space. This creates the opportunity for speeding, nevertheless the higher speed limit causes less people to speed. Still the opportunity of speeding requires additional attention.

The fourth local connection road is the road between the Strijbeekseweg and the Galderseweg (number 6). This local connection road is small, but is a very busy road during the peak hours. The local connection road has a speed limit of 80 km/h and this road is mainly used by people, who are living in and around the village of Galder. The local connection road is the fastest way to the highway A58 for the people of Galder. Therefore the road is very busy during the peak hours. The road is located next to the highway A58, but still the landscape is nice because of the trees around the road and the river the Mark. The road is badly design for cyclists

because cyclists have to cycle between the cars and the road is very winding, which can create dangerous situations.

The last two local connection roads are discussed in one section. The two local connection roads are the roads between Alphen and Baarle – Nassau via the hamlet of Terover and the road between Chaam and Unicoten. The first road is mainly used by local inhabitants of the municipality of Alphen – Chaam and the second road is very popular by tourists. The road to Unicoten leads to the historical village of Meerle and very beautiful nature. Both roads have a standard road design with a speed limit of 60 km/h. Interesting is the change of maximum speed, when car drivers enter the municipality of Alphen – Chaam. The maximum speed changes from 80 km/h to 60 km/h without hardly any changes of the road design. The only change is the different lines on the road, which can easily be unnoticed by car drivers. Both roads are also popular by farmers to reach their properties. This can lead to busy (tourists) and dangerous situation (large agricultural vehicles) during summer days for cyclist.



Figure 10: The municipality border on the local connection Alphen - Baarle - Nassau via Terover. The speed limit and the signalling changes, but the road width does not change.

For all local connection roads is true that it is unclear when you enter the municipality of Alphen – Chaam. The lack of knowing when entering the municipality of Alphen – Chaam results in less awareness of being in a Cittaslow municipality. Therefore many car drivers do not adapt

their driving style and continue driving 80 km/h. This is dangerous for cyclists and future plans there should increase the safety of the slow transportation modes.

3.1.3.2 The agricultural roads on the countryside

The local connection roads are the most important local roads of the municipality, but the local connection roads are only a small portion of all local roads in the municipality Alphen – Chaam. Most of the local roads are agricultural roads. Large areas of the municipality are dominated by agriculture. Looking on the overview map the agricultural areas do not have a colour. These areas are full with agricultural roads. The agricultural areas are characterized by a low population density and many open fields. There are several hamlets and freestanding farms in the agricultural zone. The most important agricultural zones are located east of Alphen, around Chaam and around Galder.

The main functions of the agricultural roads are supporting the local traffic, so that local inhabitants can reach their houses and farmers their agricultural grounds. Therefore the agricultural roads are very quite. The quality of the agricultural roads is moderate, some of the roads are paved with concrete slabs others are still unpaved. The roads towards the hamlets or farms are all paved, only the roads to the agricultural grounds are unpaved. So the unpaved roads are mainly used for agricultural purposes. Next to agricultural traffic cyclists use these roads because the roads are part of the large cycling network (the cycling network is discussed later). The agricultural roads are tranquil and have a low car density and therefore there are not any transportation problems based on the capacity. Therefore the agricultural roads do not need further attention in this study because the improvements have a little effect on the transportation patterns in the municipality of Alphen - Chaam.



Figure 11: A simple agricultural road on the countryside

3.1.3.3 The touristy roads on the countryside

The touristy roads are much more interesting than the agricultural roads because the touristy roads attract much more traffic, which is interesting from a transportation point of view. Touristy roads have two purposes: supporting leisure activities and reaching touristy sites. Leisure is about relaxing and enjoying the day in a beautiful landscape, which is possible since

many touristy roads are closed for motorized traffic. This allow cyclists to cycle in a tranquil environment, although these roads have less maintenance it is good enough for cycling. Only local farmers are allowed to use these closed roads. So there are large areas in the municipality where cyclists can cycle without any nuisance of motorized traffic.

The touristy roads, which are open for motorized traffic, are mainly used to reach parking lots, beautiful views and daily recreational activities. Many people start their hike or bike tour from a parking lot because they do not like to start their tour in the built environment of Alphen or Chaam. Therefore many touristy roads are located around the nature areas since most tourists are visiting the municipality of Alphen – Chaam for the beautiful nature. Therefore many touristy roads are located around the Chaamse bossen and around the Strijbeekse heide. There are also many recreational activities located around these nature areas, for example the swimming lake 't Zand ('t Zand is not only a bungalow park, but also a neighborhood and a swimming lake). The road to the swimming lake is constructed to reach the swimming lake; there is not any other destination. So the touristy roads do not have a flow function for motorized traffic.



Figure 12: A touristy road, which is closed for motorized traffic

3.1.4 The built environment of the municipality of Alphen – Chaam

Although most of the roads are located on the countryside of the municipality, most trips origin and ends in a town. There are several towns and hamlets that can be considered as built environment. The hamlets are not interesting enough to study them closely because the hamlets consist of two or three roads, which are in most cases agricultural roads. So the focus is on the larger towns with more than 1000 inhabitants. Only Alphen and Chaam have more than 1000 inhabitants and has therefore the focus of this section is on Alphen and Chaam. Both towns are completely different, like the different orientation on the larger cities, the regional roads and nuisances. Both towns have about 4000 inhabitants.

3.1.4.1 The road structure of Alphen

Alphen is a small rural town in the municipality of Alphen – Chaam. The transportation patterns of Alphen are largely influence by the ring road around Alphen, which is part of the regional network. The ring road has a very large positive effect on the town of Alphen because it improves the quality of life of the local inhabitants very much. The quality of life is higher due to a tranquil centre in Alphen. The former route of the N260 is now the main road through the centre of Alphen, but has nowadays a speed limit of 30 km/h including a nice road design, which contribute to the low maximum speed in Alphen. The ring road is connected with two junctions to Alphen, which are two roundabouts: one north and one south of Alphen. So a people with a destination close to or in Alphen has to drive through Alphen, all others take the ring road. There is a large junction in the centre of Alphen, where multiple roads cross. The main road through Alphen joins two local connection roads, one from Chaam and one from Terover. The road to Chaam is recently improved with a nice road design and a better overview is created. Still this is one of the worst places in the built environment of Alphen with little pedestrian crossings and only a few places to park a bicycle. To reach the hamlet and bungalow park 't Zand people have to drive via Alphen. The swimming lake has a different entree.

Further the built environment exits out of residential neighbourhoods, which are only used by local traffic. The residential areas have several exits. The residential areas are design well for a Cittaslow town. The cars are parked on their property and the streets have a very nice design. An example of this proper road design is the road in front of the primary school. Cars have to drive over the cobblestones and cyclists can use a smooth surface. So cars will slow down in front of the school and cyclists can cycle safely along the school. Next to the nice street design, there is a lot green space available in the built environment of Alphen. There are Cittaslow sign located on the border of the built environment and around the town hall. Figure 14 shows the town of Alphen, the ring road and the local connection roads are red and all other roads are yellow. The bicycle paths are purple.



Figure 13 (left): A proper road design for slow transportation modes in Alphen.

Figure 14 (right): An overview map of Alphen.

3.1.4.2 The road structure of Chaam

The regional road N639 dominates the centre of Chaam. It dominates the centre because of its nuisances of the many cars and trucks. The regional road is the most important road of Chaam because almost all facilities are located along this road and all residential roads joins the N639. There are two large junctions within the built environment of Chaam with local connection roads; one towards Unicoten and one towards Gilze. Just south east of Chaam a roundabout is located with exits to the local connection road towards Alphen and the tourist stay area. This regional road is designed to handle much traffic instead of being a road through the centre of a small town. Therefore the centre of Chaam suffers from the regional road. The road design of the N639 is not focused on the slow transportation modes.

Next to the regional road and local connection roads, all other roads are residential roads. Several of these residential roads are one way because these roads are narrow. In the residential areas many cars are parked along the streets instead of on the property of the local inhabitants. The roads in the residential area are mostly designed for cars. There are only a few measures to slow down the motorized traffic. The overall experience of the residential areas is pretty sober. There are less trees and green spaces than in Alphen. The overall road structure of Chaam is very basic.

The best public space is a nice space is the square in front of the local supermarket and church. This square is a recent development. The square is a parking lot for visitors of the local supermarket and is therefore very busy, especially during the summer period. The square is located along the N639. There are only a few signs of the Cittaslow movement in the built environment of Chaam. There are several Cittaslow signs along the N639 and several Cittaslow flags in front of the old town hall and local tourist office.



Figure 15: An overview map of Chaam

3.1.4.3 Hamlets on the countryside of the municipality of Alphen – Chaam

There are several villages and hamlet next to Alphen and Chaam in the municipality. Galder is the third town and other built environments are hamlet or small communities like Terover. Most of these built environments consist of one main road along which most of the houses are built. Galder has also several side streets. These areas do not influence the transportation patterns much and are not very common destinations of the different types of trips. The local inhabitants, who live in these hamlets, prefer a slower road. This is safer for themselves and their children. Other measures are not desired in these built environments.

3.1.5 The slow transportation network

The slow transportation network is the last network, which will be discussed in this section. This is done with the same approach as the motorized traffic, first the countryside and later the built environment. In the previous sections several issues about the slow

transportation network were already discussed, like several bicycle paths. The following slow transportation modes are discussed in this section: cycling, walking and the public transportation. Although the public transportation is not slow, it is part of the sustainable transportation paradigm and therefore discussed in this section.

3.1.5.1 The slow transportation network on the countryside

Cycling is the most important slow transportation mode on the countryside. The large distances are not feasible for walking and there are not many bus stops on the countryside. So the cycling network is the most important network on the countryside for the slow transportation modes. The cycling network on the countryside is based on two types of cycling infrastructure, namely the cycling node network and the bicycle paths along the main roads through the municipality. Some bicycle paths are part of both types.

The cycling node network

In the recent years the cycling node network was developed in the Netherlands. The cycling node network is handy tool for cyclists and is based on the principle that you cycle from node to node. In this way you are free to choose your own route and navigate by following the numbers. The cycling node network is shown on Figure 16. Every node has its own number, but on Figure 16 the node numbers are not displayed. Figure 16 shows a dense cycling node network. The cycling node network avoid as much as possible the cycling path along the main car routes. To enter the municipality there are three routes namely via the Chaamse Bossen, along the Mark and via the Strijbeekse Heide. The cycling node network avoids also many cities, town or villages. For example Chaam has not a cycling node in its centre. This is solved with an extra sign to direct people to the centre of Chaam and this is also done in other areas. The routes are mainly located in beautiful nature areas with beautiful views.

The cycling node network uses mainly the agricultural roads, touristy roads or bicycle paths in the nature. When cyclists and car traffic share the road, this does not lead to dangerous situations because these roads are used only by a few cars. On the agricultural roads the agricultural vehicles can create dangerous situations because of their width and mud they can leave behind them. In most cases the mud is not too severe to pass otherwise the road should be cleaned. The bicycle paths are not always paved, but are always hardened, so it is safe to cycle. A perfect example of a cycling path is “het Bels Lijntje” from Tilburg to Turnhout. This path is a former railroad track between Tilburg and Turnhout, which was not used for a long time. “Het Bels Lijntje” surrounded by crops and grasslands and is covered by tree lanes, mainly oak trees. It is unclear when cyclists enter the municipality of Alphen – Chaam via bicycle paths. So cyclists are not aware they enter a Cittaslow municipality, which stimulates cycling.

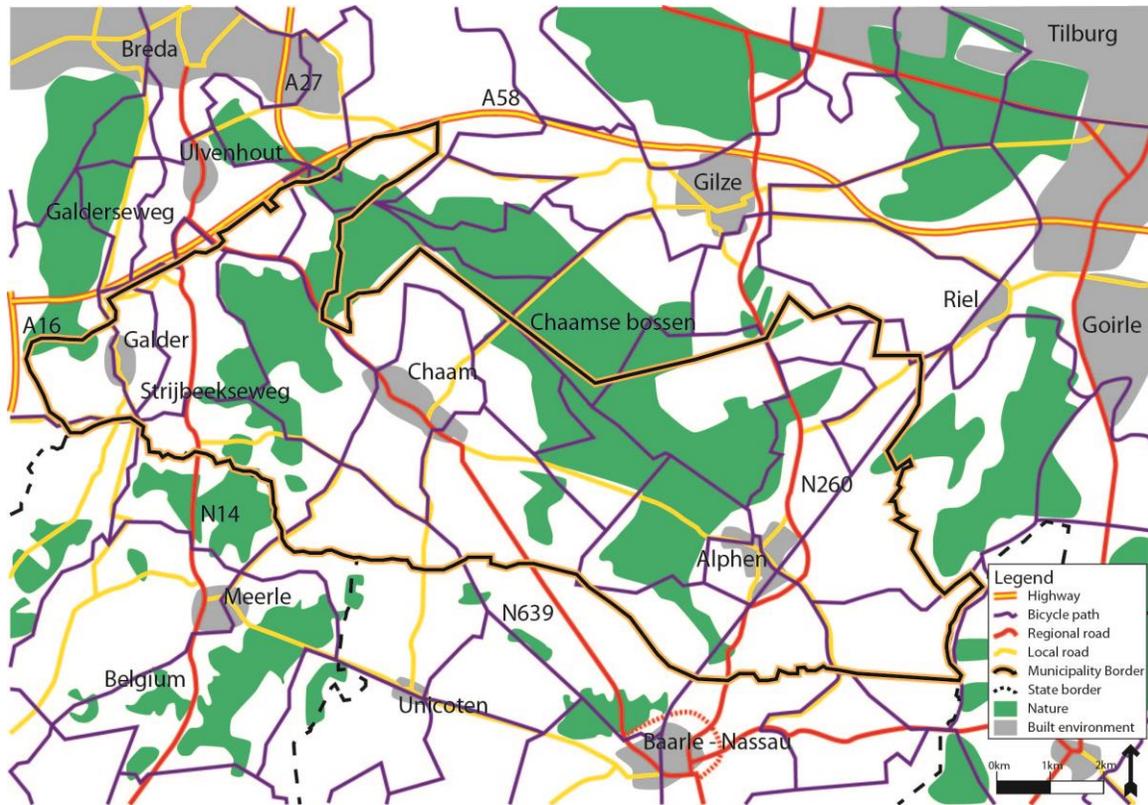


Figure 16: The cycling node network in the region around the municipality of Alphen – Chaam, the nodes are not displayed.

Cycling paths along the main roads

The regional roads are very important for the motorized traffic, but for many cyclists this is also the shortest route to their destination. To ensure the safety of the cyclists, it is not possible to share the road. Therefore bicycle paths are built and these bicycle paths are in most cases not part of the cycling node network. There are two sections of the regional roads, where there is not a bicycle path along the regional road. These two parts are the ring road around Alphen and a section of the Galderseweg between Galder and the Belgium border. The ring road around Alphen has no added value for cyclists and on the Galderseweg car drivers drive not fast than 60 km/h. The N639 is popular by commuters towards Breda and has therefore a proper bicycle path. Commuters towards Tilburg can use “het Bels-lijntje”. Local inhabitants prefer to cycle along a busy road because this support their feelings of safety.

Some local connection roads are too busy for sharing, that a bicycle path would improve the safety a lot. There are two local connection roads with a bicycle path; the road between Chaam and Gilze and the road between Riel and the N260. The two roads are busy roads and the road towards Riel has a high maximum speed of 80 km/h. The other four local connection roads should be safe enough to share the road with cyclists. This is not true for the local connection road between Alphen and Chaam. This road is very busy and many cars are speeding and therefore the people experience this road as dangerous. Local inhabitants, tourist and the

municipality prefer a bicycle path along the road between Alphen and Chaam. The route is also popular by local youth, which cycle towards Alphen, Chaam or to the swimming pool in the middle. Figure 17 shows all roads with a bicycle path. The bicycle paths are visible with the blue lines along the roads.

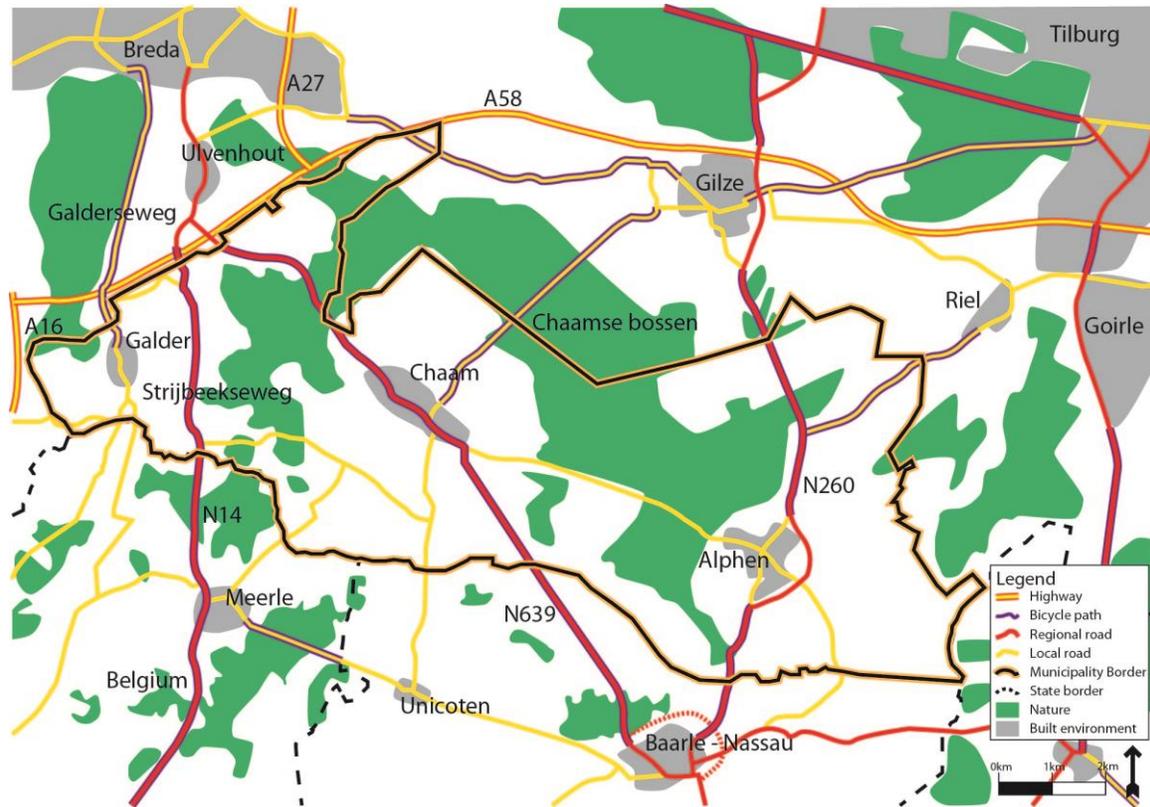


Figure 17: The bicycle paths along the roads

Walking

Walking is not a common transportation mode on the countryside, but is mainly a leisure activity. Most hiking routes are in or around the nature area: the Chaamse bossen and the Strijbeekse heide. On these place tourists and local inhabitants start their hike to relax and enjoy the landscape and nature. Most hikes are round trips with same start as end point. So many people hike in the municipality of Alphen – Chaam, but walking is not an important transportation mode.

Public transportation

The public transportation is the third way of slow transportation on the countryside. Although it has not the focus of this research, it is good to have a proper overview of the public transportation network. Bus line 132 is the only bus line in the municipality Alphen – Chaam. The route of bus line 132 is from Breda to Tilburg via Chaam, Baarle – Nassau and Alphen and vice versa. Breda and Tilburg have both an intercity train station. So to leave the area by public

transportation you have to go to Breda or Tilburg. So there are very limited opportunities for public transportation in the municipality of Alphen – Chaam.

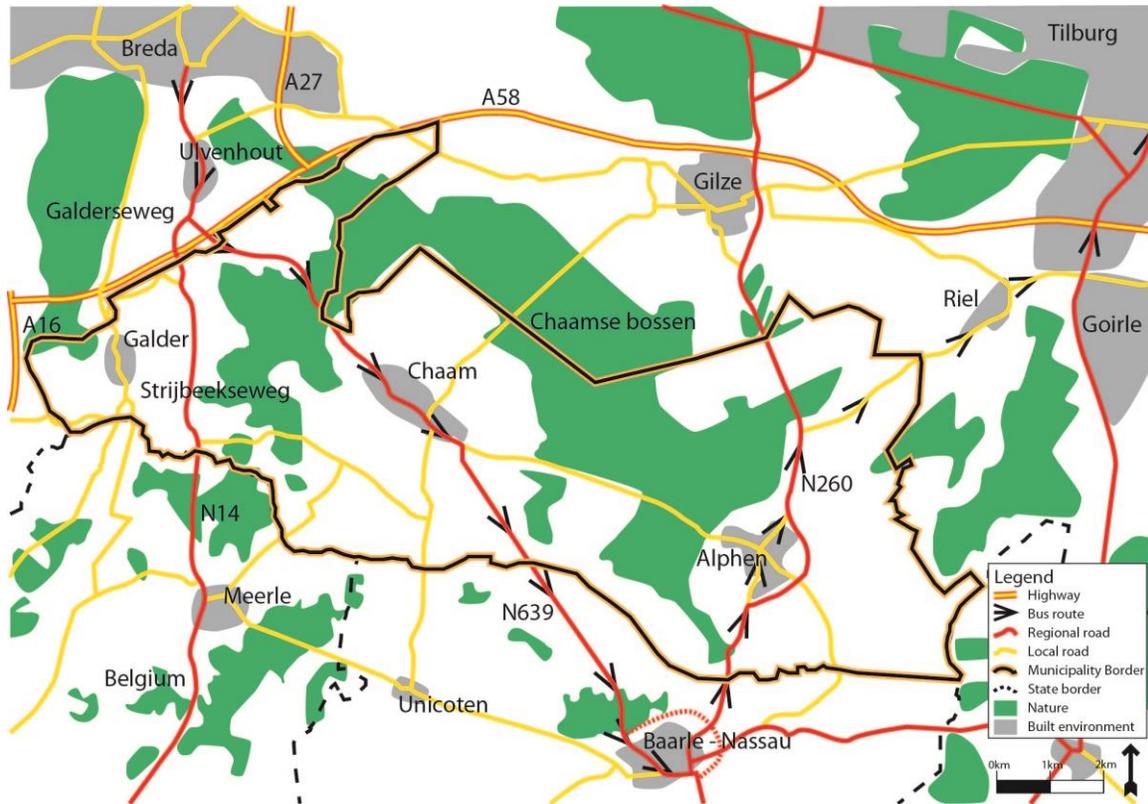


Figure 18: The route of the public transport in the municipality of Alphen – Chaam.

3.1.5.2 Slow transportation in Alphen and Chaam

Within the built environment the slow transportation modes are more important than on the countryside and also the reasons for a trip are different. More local inhabitants' cycle or walk within the built environment because the distances are much shorter. Therefore the cycling and walking infrastructure is important. The slow transportation modes requires proper infrastructure to stimulate the slow transportation modes. A high quality network of slow transportation mode infrastructure is only possible in the larger towns and therefore only Alphen and Chaam are discussed.

Alphen

In Alphen is hardly any infrastructure especially for the slow transportation modes. Cyclists and motorized traffic share the road. Sometimes there are markings on the road to give the cyclists some space (see Figure 19). Sharing the road is possible since Alphen has a tranquil traffic regime. Because of this tranquil and slow environment it is safe for cyclists to cycle on the road. Along most roads there are footpaths which are at several places very wide because cyclists and cars share the road more space is left for pedestrians. There are not many roads

crossings for pedestrians or at least marked crossings. There are only a few ramps to cross the street properly. The road to the campsite 't Zand is not properly designed for slow transportation mode since a continuous footpath or cycling lane are lacking.



Figure 19: A residential area in Alphen, there is little space for cyclist on this road.

In the residential areas of Alphen are several short cuts for slow transportation modes. The short cuts in Alphen are in favour of the slow transportation modes. 't Zand has many short cuts resulting that the cars have to take a large detour and cyclists can cycle the direct route. This creates a large advantage for the cyclists instead of the motorized traffic. The cycling connection between Alphen and Tilburg is really good. Alphen is connected with "het Belslijntje". The cycling path route is rerouted in Alphen because several houses were built on the former route. "Het Belslijntje" gives slow transportation from Alphen an advantage for long distances.

Chaam

The situation in Chaam is different than the situation in Alphen. In Chaam the cyclists and cars do not share the main road (N639) because too much traffic uses the road. There is a bicycle path and footpath located along the N639. The footpath and the bicycle path along the main road are sometimes very narrow, which is caused by the way of designing the road. The

road (car section) must have a constant width due to its flow function, which leaves little room for the bicycle path. Besides the constant width there are also parking lots along the N639, which reduces the room even more. Since cycling is very unsafe on a too narrow bicycle path, the footpath is even narrower than the bicycle path. Sometimes the footpath is about 40 cm. There are only street crossings available for the slow transportation in the centre.

The continuity of the footpaths is very poor in Chaam. The pavement of the footpath stops by every road crossing, where the paving of the road and bicycle path continues. This difference causes that cars are waiting for the cycling path but blocking the footpath. Sometimes more cars are waiting and the pedestrians have to walk between the cars to cross the road, which can be dangerous. In the centre of Chaam there is a footpath that ends close to the road without clear continuation. Such details can make a difference for the mode choice.

Further there are hardly any short cuts for cyclist or pedestrians and cyclists, pedestrians and cars share the road in the residential areas. There are many parked cars along the streets in the residential areas. The road design is plain, which do not generate a nice experience. So to stimulate the slow transportation the road design has to change. There are not any special measures for the slow transportation modes in Chaam. Both motorized traffic and slow transportation traffic have to drive the same route.



Figure 20: left: Photo of a narrow bicycle path and footpath in Chaam, right: Photo of stopped cars on the footpath.

3.2 From shop to picnic spot: all interesting areas and facilities

Everybody uses the transportation network with a reason. All roads are part of the transportation network and have a destination. So where do all these roads lead to? The roads lead in many cases to facilities and services, think of shops, companies, residential areas, leisure facilities and many more. All important destinations within the municipality of Alphen – Chaam are discussed and mapped in this section. This results in several important areas, which can be a stay areas or tourist hot spots. The mapping of facilities and services is very important for further analysis of the municipality of Alphen – Chaam since geographical mapping results in possible flows between areas. The transportation flows are discussed later. First all facilities, stay areas and services of high interest are discussed.

3.2.1 The staying area of the municipality of Alphen – Chaam

There are multiple staying areas in the municipality of Alphen – Chaam since local inhabitants and tourist have to overnight. Since local inhabitants and tourists are very interesting groups, the staying areas are discussed in detail. Important facilities for staying are discussed in this section, other facilities are discussed later. The most important areas are residential areas and camp sites.

3.2.1.1 Staying: residential areas

Most local inhabitants live in the towns of Alphen and Chaam (about 83%) and Galder has about 10% of the local inhabitants. So only a few people live on the countryside, which results in a very low density on the countryside. Therefore most trips of the local inhabitants have its origin in the towns of Alphen, Chaam and Galder. These towns together form the residential areas of the municipality of Alphen – Chaam.

The towns are small and have a limited internal distance of two kilometres and most houses are located within one kilometer from the centre. Most houses are semi-detached houses with the possibility to park their cars on their own property (there are differences between Alphen and Chaam, but these are already discussed in previous sections). There are a few apartments in the centres of Alphen and Chaam, which are recently built. These apartments are mainly occupied by elderly inhabitants, which want to live close to the centre. At this moment several small neighbourhoods are built in Alphen and Chaam.

3.2.1.2 Staying: from holiday home to tent

Many tourists stay on one of the camp sites of the municipality of Alphen – Chaam. There are many camp sites in the municipality of Alphen – Chaam and there also many different types of camp sites. The different types of accommodations are: camp sites, bungalow parks, holiday homes, clamping and mini camp sites. In analysis of 2004 250000 overnights stays were estimated by the municipality of Alphen – Chaam (ZKA Consultants & Planners, 2004). There are approximately 2400 places on all the different camp sites and bungalow parks together for

tourists and the two largest accommodations are the Flaasbloem and 't Zand (ZKA Consultants & Planners, 2004). About 70% of all places are seasonal or yearly places, which is higher than the average of the Netherlands (ZKA Consultants & Planners, 2004). So many tourists visit the municipality often, which results in much knowledge about the local transportation network by the tourists.

The tourists are mainly enjoying the nature, the open space and tranquillity of the municipality. Tourists like to cycle or hike through the beautiful nature and agricultural areas. This is reflected in the location of the tourist stay facilities. Many of these camp sites are located close to the nature areas, which allow tourists to enter these areas easily. Other important facilities and services for tourists are shops, beautiful towns and large attractions in the region, think of grocery stores, the town of Meerle and the Efteling (theme park).

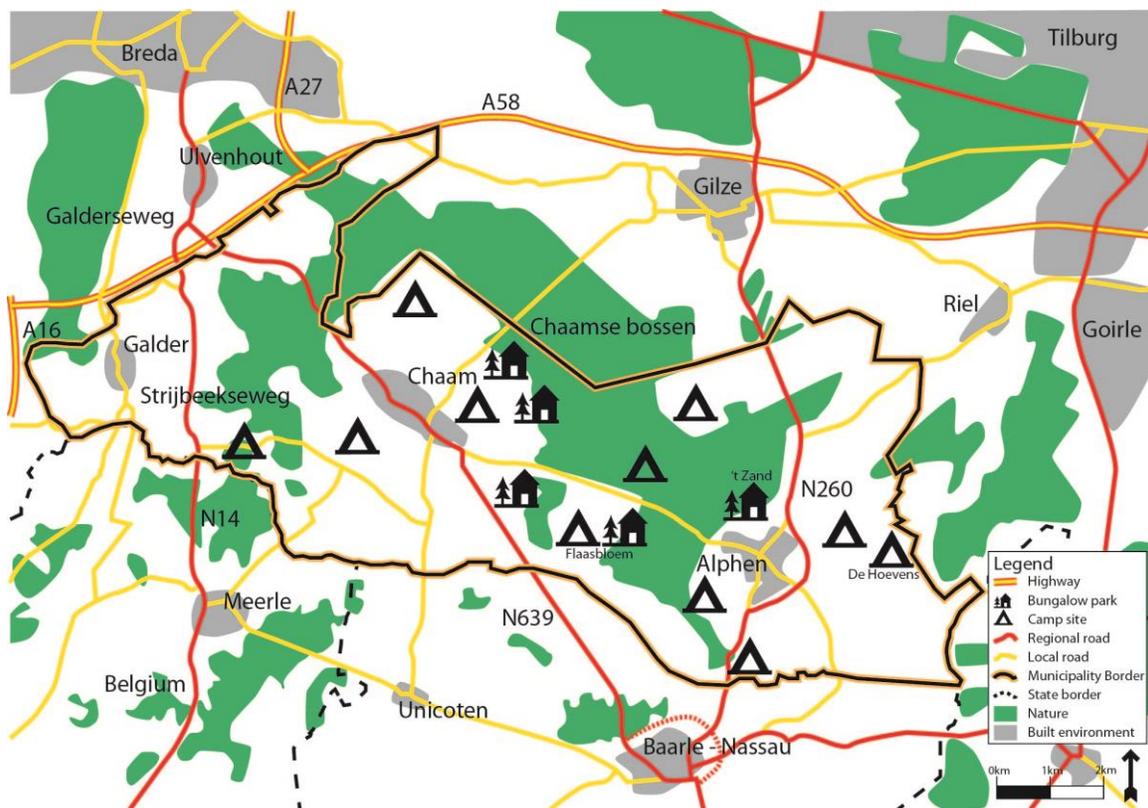


Figure 21: All campsite in the municipality of Alphen - Chaam.

Figure 21 shows all camp sites and bungalow parks within the municipality of Alphen – Chaam. There are also camp sites just outside the municipality, but these do not influence the transportation patterns in the municipality Alphen – Chaam. The figure shows a clear concentration of accommodations between Alphen and Chaam, which is close to the Chaamse Bossen. The larger camp sites and bungalow parks are located close to the local connection roads. Some small camp sites are located on the edge or within the nature areas. Most camp sites west of Chaam and East from Alphen are rather small and are mainly mini – campings and

camping by a farmer, which is a good interpretation of the Cittaslow principles. The bungalow park 't Zand is not located along a local connection road and is only accessible via Alphen.

The number of beds is very low in the municipality of Alphen – Chaam, only 59 beds (KvK and SES, 2009). The beds are distributed over several small accommodations, think of bed & breakfasts and sleeping by the farmer. The municipality stimulates new accommodations to increase the number of beds and attract other tourists. This development should create a new economical impulse to the municipality. A special accommodation is *“The Hoevens”*, which is not very interesting from a transportation point of view, but *“The Hoevens”* is a perfect example of a Cittaslow camp site. The local agriculture grounds generate money to maintain the estate. Since the agriculture does not generate enough money to maintain the estate properly, other services and facilities are offered. One of the services is the camp site.

3.2.2 The facilities of Alphen - Chaam

There are many facilities in the municipality of Alphen – Chaam. These facilities serve the local inhabitants, tourists and day visitors. By facilities think of: shops, camp sites, parking lots, pubs, swimming pools, education opportunities, business areas, sport, picnic spots, but also facilities to navigate properly through the municipality.

3.2.2.1 Shopping in Alphen and Chaam

One of the most important reasons for a trip is to shop for daily groceries. This activity takes place on a regular basis for some people daily and other twice. Most shops are located in the built environment of Alphen and Chaam, Galder has also several small shops. Alphen and Chaam have both a large supermarket in the centre, which is the most important shop. Alphen and Chaam have besides the supermarket also several small shops, like a bakery, butcher and pharmacy. Chaam has also a large non food discount shop, which is located along the N639. Alphen, Chaam and Galder have a bicycle shop including a workshop to repair bicycles, which important for a Cittaslow municipality to support the slow transportation modes.

Other shops are more spread over the municipality or are not present in the municipality. Several hardware stores for private purposes or agricultural purposes are spread over the municipality. Especially the hardware shops for agricultural purposes are close the agricultural areas. For non daily items, like cars, televisions and furniture people have to leave the municipality of Alphen – Chaam and travel to larger cities.

The chosen transportation mode is not only depending on the distance, when people travelling to a shop. Although the distances are rather small many people choose for a different transportation mode. An important factor for their choice is the number and weight of the items. Local inhabitants and tourists are not willing to cycle with 20 kilograms of groceries. Also tourists want to enjoy their holiday and travel by car since it is much faster. So many people choose to use the car instead of the slow transportation modes.

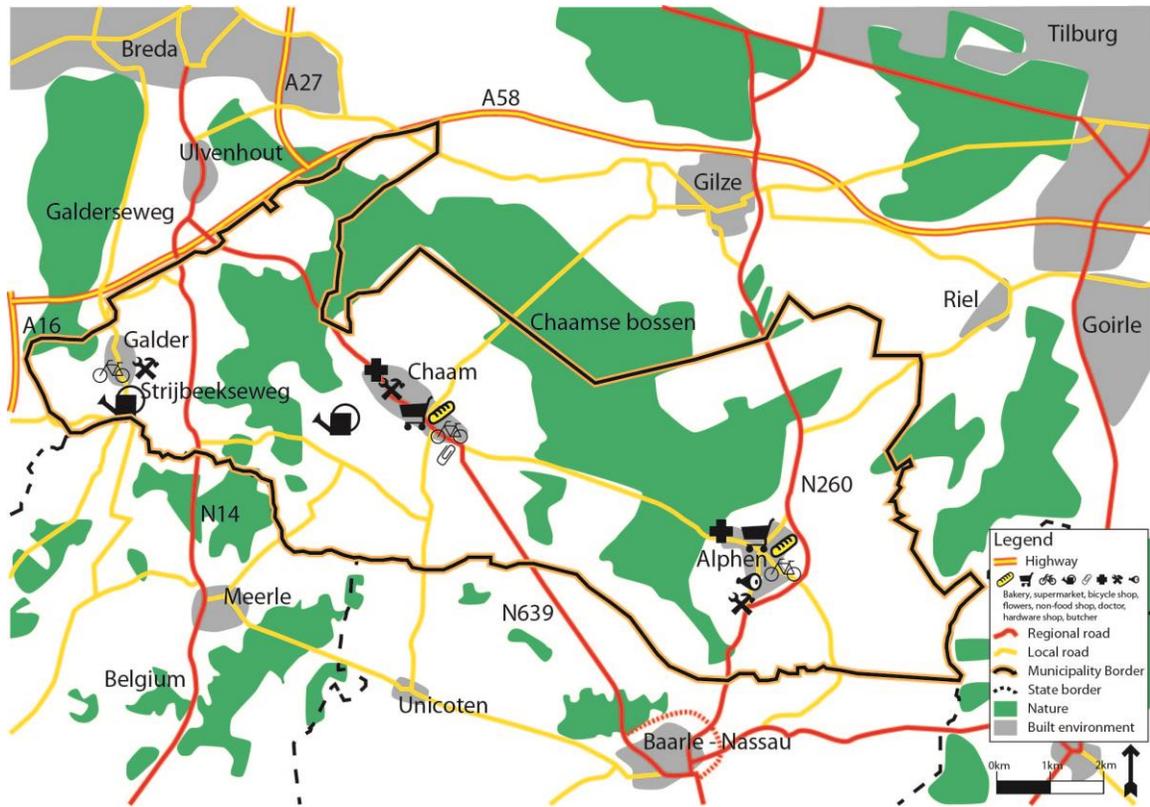


Figure 22: All shops in the municipality of Alphen - Chaam, the symbols are not on the exact location of the shop.

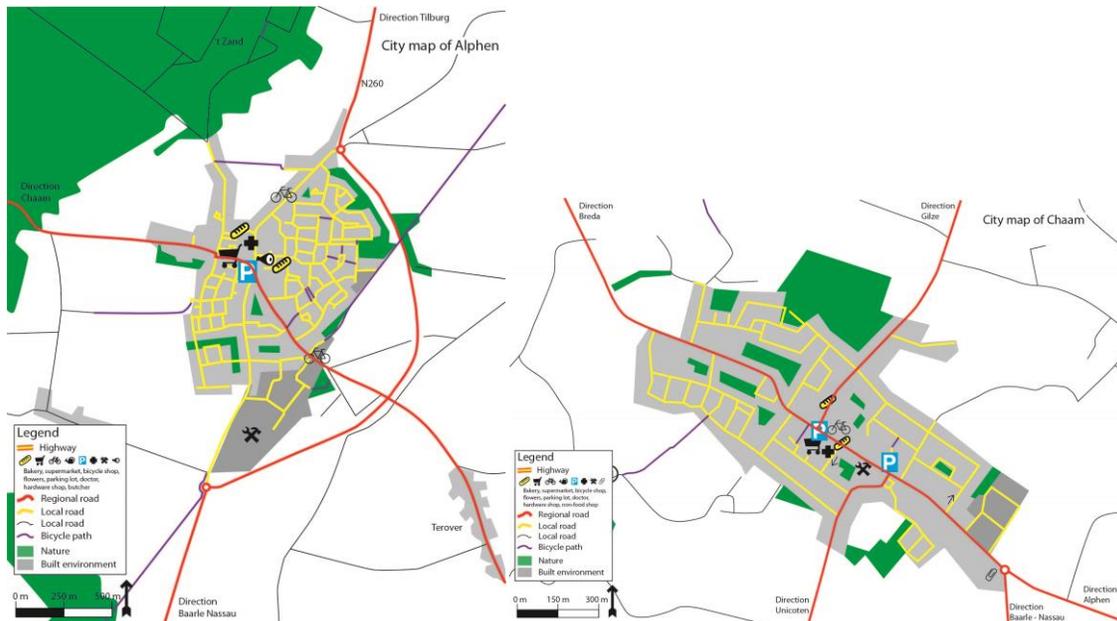


Figure 23: left: The location of the shops in Alphen; right: The location of the shops in Chaam.

3.2.2.2 Educational facilities for local inhabitants

There are four primary schools in the municipality of Alphen – Chaam; one in Alphen, two in Chaam and one in Galder. As mentioned before the road in front of the primary school in Alphen is designed very well and create a nice environment for a primary school. In Chaam one of two schools is located along the N639. In Galder the school is also located along the main road through the village. Around these educational facilities more facilities for children are located, like childcare.

There is not a secondary school in the municipality of Alphen – Chaam. The closest secondary school is in Baarle – Nassau, other secondary schools are in Breda and Tilburg. The secondary school of Baarle – Nassau has only limited educational possibilities. The higher educational levels (HAVO and VWO) are offered only for the first three years, after these years students have to switch to a school in Breda or Tilburg. Youth have to cycle about 6 to 8 kilometer towards Baarle – Nassau or have to take the bus. For higher levels the youth have to travel further.

3.2.2.3 Business or working opportunities

Travelling to their job site is one of the most important trips of most local inhabitants. An important source of work is the agricultural sector, which spread through the entire municipality. Many farmers live on their own farmyard and do not have to travel. Many farmers do have assistants, who travel mostly by car to the farm via and the agricultural roads. Currently the number of jobs is declining in the agricultural sector (KvK and SES, 2009).

Instead of the agricultural sector the tourist sector is growing (KvK and SES, 2009). The tourist sector generates about 10% of the jobs. The tourist sector is seasonal, so in the summer there are more jobs than in the winter and many of them are part time jobs. Many of the employees live in Alphen or Chaam and travel to the touristy locations. Youngsters travel by bike and some full time employees travel by car depending on the travelling distance and working times. Another growing sector is the industrial sector. There are several industrial zones in the municipality Alphen – Chaam. Alphen has a large industrial zone. Other important sectors are the small business and services, think of architects, consultants and notaries.

About 3200 local inhabitants travel from Alphen – Chaam to another municipality for work and about 1400 people travel the reversed journey. Most of the local inhabitants of Alphen – Chaam, who are working outside the municipality travel to Breda or Tilburg. The reversed journey is performed by inhabitants from Breda and Baarle – Nassau. Most of these people travel by car. As many local inhabitants use the car to drive to their job or cycle to their job. An important aspect is the distance, so when they work within the municipality of Alphen – Chaam, more inhabitants cycle.

3.2.2.4 The sport facilities of Alphen - Chaam

Sport facilities are important for the local inhabitants and several of the facilities also for tourists. There are two swimming opportunities in the municipality of Alphen – Chaam. One swimming pool is between Alphen and Chaam, the other is the swimming lake 't Zand. The swimming pool is opened during the summer when the weather is good and is located in the forest, which is beautiful location for a swimming pool. The swimming pool will close in 2015 because the lease expires with Staatsbosbeheer, the owner of the ground. The swimming pool is intensive used by local inhabitants and tourists. The swimming lake is a large lake, where you can swim but also surf at a special spot of the lake. You can enter the area for free and is very popular by local inhabitants and tourists. Around the lake there are large meadows and these meadows are used to organize some special events. Sufficient parking lots are present for cars and bicycles and are well connected with the transportation network.

Next to swimming facilities there are many other places with sport facilities. Alphen has a football club and a sports hall, which accommodates many sports like badminton, volleyball, squash, futsal and karate. Chaam has less sports opportunities than Alphen; Chaam has a football club and tennis club. Galder has also a football club. Further there are many more sports associations like cycle racing, horse riding and card games, but these sports do not have large facilities or one place where they come together.

Sports are not only for the local inhabitants, since there are also many day activities. These activities are maybe not as active as most sports, but attracts many people. You can play farmers golf in Strijbeek, archery and midget golf in Chaam and climb in the adventure playing ground. Almost all day visitors arrive by car.

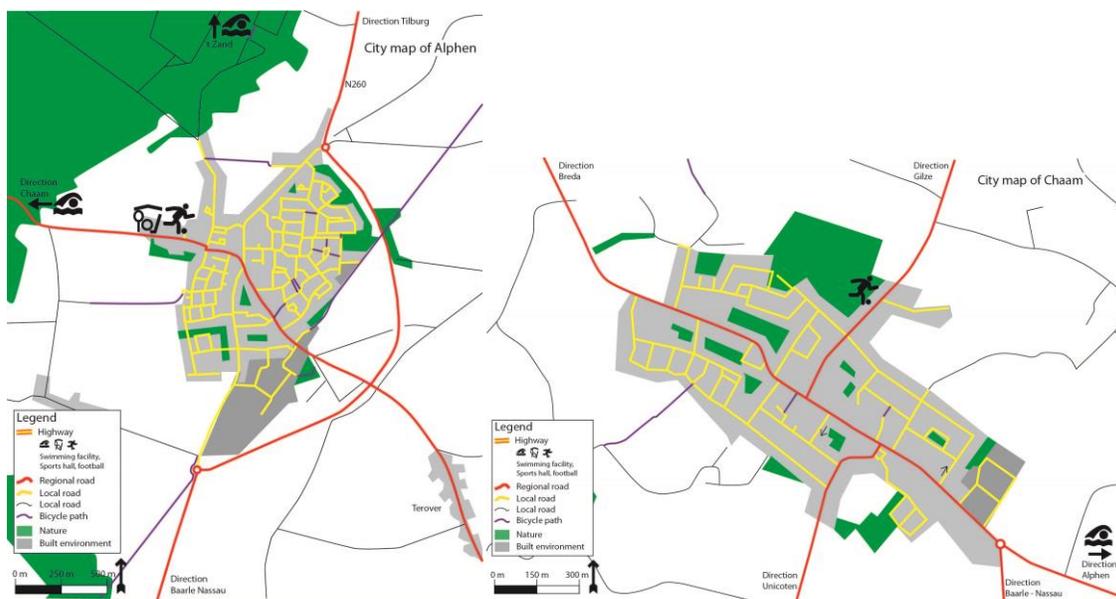


Figure 24: left: The location of the sport facilities in Alphen; right: The location of the sport facilities in Chaam.

3.2.2.5 The parking facilities of Alphen - Chaam

Essential for every transportation mode are the parking facilities. Cars need large parking places and a parking lot with sufficient places. Cyclists require bicycle racks to park their bicycle. The quality of the parking facility is important for the transportation mode choice. Bad parking facilities cause that people choose another transportation mode or different destination, although parking facilities for car users are more important than cyclists. Since it is not possible to park your car on every sport, car users need a parking place in the residential areas, shopping areas, nature areas and services areas.

In the centre of Chaam a proper parking facilities for cars and bicycles are present. These are located at the central square of Chaam, which is recently redeveloped. The parking lot has sufficient capacity for the local inhabitants. During the summer there is often a lack of parking places since many tourists buy their groceries in the centre of Chaam, which mainly arrive by car. As result of that the local inhabitants avoid the central square by car during the summer and visit a neighbouring town to buy their groceries, which is very undesirable. So the effect of facilities is visible in the transportation patterns of local inhabitants. There are enough bicycle racks on the square. Further there are several other parking opportunities in Chaam: there is a parking lot in front of the old town hall, many local inhabitants park their car in front of their home and there are several small parking lot owned by several businesses.

Currently the local situation in Alphen is different compared with Chaam. There are less parking places in the centre of Alphen, only a small parking lot in front of the town hall and the supermarket. This parking lot is chaotic and poorly designed in combination with a busy junction. Most bicycle racks are hard to notice, especially those in front of the town hall. At this moment the local connection road towards Chaam is redeveloped, which improves the current situation. The rest of the centre is part of a new master plan, which is discussed later. The problems in the summer are smaller than in Chaam since there are fewer tourists in Alphen. Also the quality of the parking facilities discourages car use within the built environment of Alphen. The other parking places are in front of the church, by all sport facilities and several businesses.

Many parking lots, which are located outside the built environment, are close to the nature area. These parking lots serve cyclists and hikers, which want to enjoy the beautiful nature. Cyclists and hikers start their hikes at a parking lot since they do not like a route through the built environment. Also the two swimming facilities and other sport facilities have their own parking facilities. To stress the distribution of all parking lots, these are mapped on Figure 25.

3.2.2.6 Navigating through the municipality of Alphen - Chaam

Car drivers, truckers, cyclists and hikers have to navigate through the municipality; therefore navigating facilities are important for the transportation patterns. Motorized traffic navigates mainly by navigation systems or road signs. Most motorized traffic has a navigation

system, although local traffic does not need navigation systems. Tourists want to enjoy the landscape and take not always the fastest route. Most tourists are familiar in the region since many tourists visit the area on a regular basis. Still proper signs for the tourists are important.

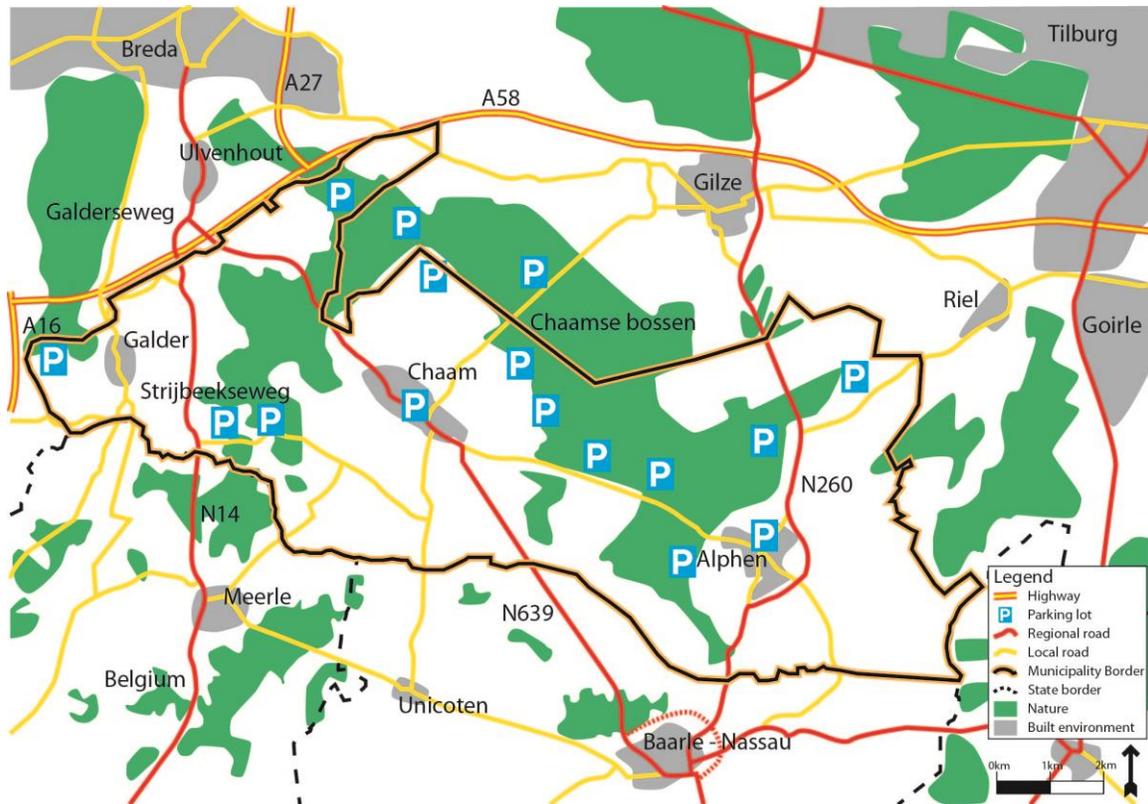


Figure 25: The parking lots in the municipality of Alphen – Chaam.

Navigation facilities are more important for cyclists and hikers than for car drivers. The cycling node network is an easy tool to navigate since cyclists can follow the signs and reach the following node. Most nodes have a regional map, so it is possible to plan your route and adjust it when you want. Next to the cycling node network there are many additions cycling signs (in Dutch called: paddenstoelen) to direct cyclists to towns. These signs give information about the direction and distance to a town. Hikers use a different system; most hikers follow a planned route by following the coloured poles. The coloured poles direct the people along the beautiful spots and end where the route was started. The quality of the navigation facilities is good, but not noticeable better than other Dutch municipalities.

3.2.2.7 The rest opportunities of Alphen - Chaam

Tourists like to have rest opportunities during their cycling and hiking routes. So they can rest and eat something. The cycling node network allows the municipality to locate the rest facilities on proper locations. Along the route many benches are already located and some picnic spots to take a break, although it is hardly impossible to have too many benches. Often picnic spots are located at parking facilities since the maintenance is easy at those locations.

Food facilities are scarce on the countryside and in the nature areas. Most of the food facilities are located in one of the towns or close to the camp sites. In the towns are multiple restaurants and pubs to take a drink or lunch. So more rest opportunities is an improvement for the municipality of Alphen – Chaam.

3.3 The experience while being on the road

The third analysis is subjective and differs between people; nevertheless it is important for the transportation mode choice of people. It influences the transportation mode choice because people remember the experiences from the past and used them for their next transportation mode choice. Now all physical components are discussed, a mental aspect is discussed. This analysis is conducted by field observations and explains with striking pictures.

3.3.1 Experiences the towns: Alphen and Chaam

The experiences in Chaam are dominated by the regional road N639 since the N639 causes much nuisance. This causes a negative experience, which results in a bad experience of Chaam. The large vehicles cause the largest negative effect and is supported by the bad road design since the bicycle path and footpath are very narrow. The current road design does not stimulate the slow transportation modes because footpaths are often interrupted by side streets. Also the network of footpaths is not a continuous and therefore it is not an attractive network. Green spaces and trees contribute positively to the experience; nevertheless there is a lack of green space and trees in Chaam. Although there are a few exceptions, which are green spots in the residential areas. The parked cars cause a chaotic streetscape. Also the lack of parking places during the summer causes a negative experience for the local inhabitants. The first picture shows a narrow cycling path, narrow footpath and a wide street. The second picture shows the lack of continuity of the footpaths. The third picture shows a car that is blocking the footpath. The fourth picture shows the lack of trees in a residential street (Figure 26 and 27).

The experience of Alphen is completely different because of the ring road. The town is very tranquil and has a nice road design with plenty of green and nice street furniture. The cyclists and cars can easily share the road, which is possible since the roads are wide. This results in more space for the pedestrians. This all contribute to a positive experience, especially for the slow transportation modes. The main junction of Alphen is at this moment problematic because of the parking lot, which is chaotic. Also the quality of the footpaths is low around the supermarket. Further there are not clear crossings for pedestrians, so they will cross anywhere the road. These aspects cause the unwanted negative experiences.

Most cars are parked on the private ramps of the local inhabitants, which results in empty roads in the residential areas. This is positive for the slow transportation modes. There is also much green space present in the residential areas. Overall Alphen is much more design for the slow transportation modes and generates a more positive experience than Chaam. The largest problem in Alphen is the junction in the centre of town. The picture (Figure 28) shows the nice

road design of the main road and the second picture shows a larger road in Alphen with trees along the road.



Figure 26: left: A narrow bicycle path and footpath in Chaam; right: The footpath crossing is not marked like the bicycle path.



Figure 27: left: Photo of stopped cars on the footpath; right: Little green in the built environment of Chaam.



Figure 28: A photo of the road design in the built environment of Alphen with enough room for slow transportation modes.

3.3.2 Experiencing the countryside

The experiences in the built environment are very important for the local inhabitants and tourists, but other areas are equally important for the municipality. The countryside is very important for tourists, transit traffic and visitors. The regional roads are designed for cars, although the car drivers do not have always a positive experience on the regional roads. The N260 and Strijbeekseweg are designed well for cars and have a positive experience with respect to the flow function. The N639 and Galderseweg have a worse flow function, which result is a worse experience. The built environment of Chaam annoys the car drivers and the Galderseweg is design as a local road without flow function. Cyclists have a different experience on these roads. Tourists prefer not to cycle along a busy road, but local inhabitants prefer to cycle along a busy road since this increase the safety when it is dark. So there is a complete different experience between local inhabitants and tourists. Next to the road design the landscape contribute to the experience since some parts a located in beautiful nature, although for the regional roads the landscape is less important as the flow function.

The local roads are designed well for car drivers, although they are often too straight. Almost all roads have a speed limit of 60 km/h, although the straight roads allow car drivers to drive faster. For the best experience the speed limit should be close to the design speed. This is on many local connection roads not the case. Car drivers as well as cyclists get a negative experience on the local connection roads, therefore additional measures are inevitable. An exception is the road between Chaam and Gilze, which generates a positive experience caused by its location and road design. A bicycle path improves normally the experience of cyclists, which is also in this cause also true. Most other local roads (not local connection roads) are very quiet and create a proper rural experience.

Next to all roads, there are many bicycle paths through the nature areas. These bicycles paths are ideal for tourists, to enjoy the tranquillity and the beautifulness of the nature. For

these bicycle paths the maintenance is very important because little help is present in case of an accident or a bicycle breakdown. The current quality of the bicycle paths differs a lot for each section. Tarmac bicycle paths are less sensitive for maintenance because in most cases no big gaps arise. Tiled pathways are more vulnerable since these can have sharp edges, when tiles shift or tilts. Proper maintenance is very important for a positive and safe cycling experience. The picture on the top left shows a bicycle path through nature. The bicycle path is very narrow and oncoming traffic is problematic. However this bicycle path generates a positive experience by tourists. The picture on the top right is a nice agricultural road, which generates a positive experience by its users. The picture bottom left is along the N639. The quality of the bicycle path is poor and many cars drive over the road. For cars drivers it is this still a good road. So cyclists have a negative experience and car drivers a positive. The picture bottom right is the local connection road between Alphen and Chaam, which is very straight and cyclist do not have a nice experience on this road.



Figure 29: left: Unpaved bicycle path through the nature; right: An agricultural road on the countryside.



Figure 30: left: Bicycle path towards Chaam along the N639, which is poorly paved; right: Road between Alphen and Chaam, there is little space for slow transportation modes.

3.3.3 Experiencing the landscape

The last important experience of the municipality of Alphen – Chaam is the landscape. The landscape can create a positive impulse for the experience. In the introduction the landscape of Alphen – Chaam was introduced. The municipality of Alphen – Chaam is known for this beautiful landscape and attracts many tourists and visitors with its beautiful landscape. The landscape around the roads and bicycle paths determines for a large part the experience of tourists. The effect of the landscape is for local inhabitants mixed since they enjoy sometimes the landscape and another time they are in a hurry.

The road between Chaam and Gilze create a positive experience based on its landscape. This experience is caused by the location of the road within the forest. More touristy and agricultural roads have this experience of the landscape. These roads are quiet, which allows people to enjoy the landscape. On touristy and agricultural roads the speed is lower, so it is possible for car drivers to enjoy the landscape. So overall the municipality has a beautiful and generate a positive impulse. A trip through a nice landscape will be experienced much more positive than driving through a monotonic landscape.



Figure 31: left: A bicycle path on the countryside; right: A touristy road through the Chaamse bossen.

3.4 The transportation flows of Alphen - Chaam

Local inhabitants, tourists, day visitors have all a destination within the municipality of Alphen – Chaam of which most are discussed in the previous sections. To reach these destination people have to travel, which results in transportation flows. All different flows result in one comprehensive transportation pattern. The transit trips have a large contribution to the transportation pattern. The results of this section are an overview of the important routes and a basis for the future plans of the municipality of Alphen – Chaam.

3.4.1 Transportation flows creating by transit traffic

The transit traffic travels only through the municipality and is completely performed by motorized traffic. The cars and trucks drive mainly via the regional roads of the municipality, where the N260 and N639 are the most important regional roads and handle most of the transit traffic. Much traffic originates from the A16 and A27 and drives to Turnhout or further and most of the transit traffic chooses for the N639 via Chaam. Another important source of the transit traffic originates from Tilburg and drives also towards Turnhout; the only difference is that this traffic uses the N260 via Alphen. As discussed in the network analysis there is a small difference in travelling time between the N260 and the N639. Since the N639 is a little bit faster most transit traffic from the A16 and A27 chooses for the N639, although the N260 has a proper ring road with better predictable travelling times. The built environment of Chaam can cause delays for the transit traffic.

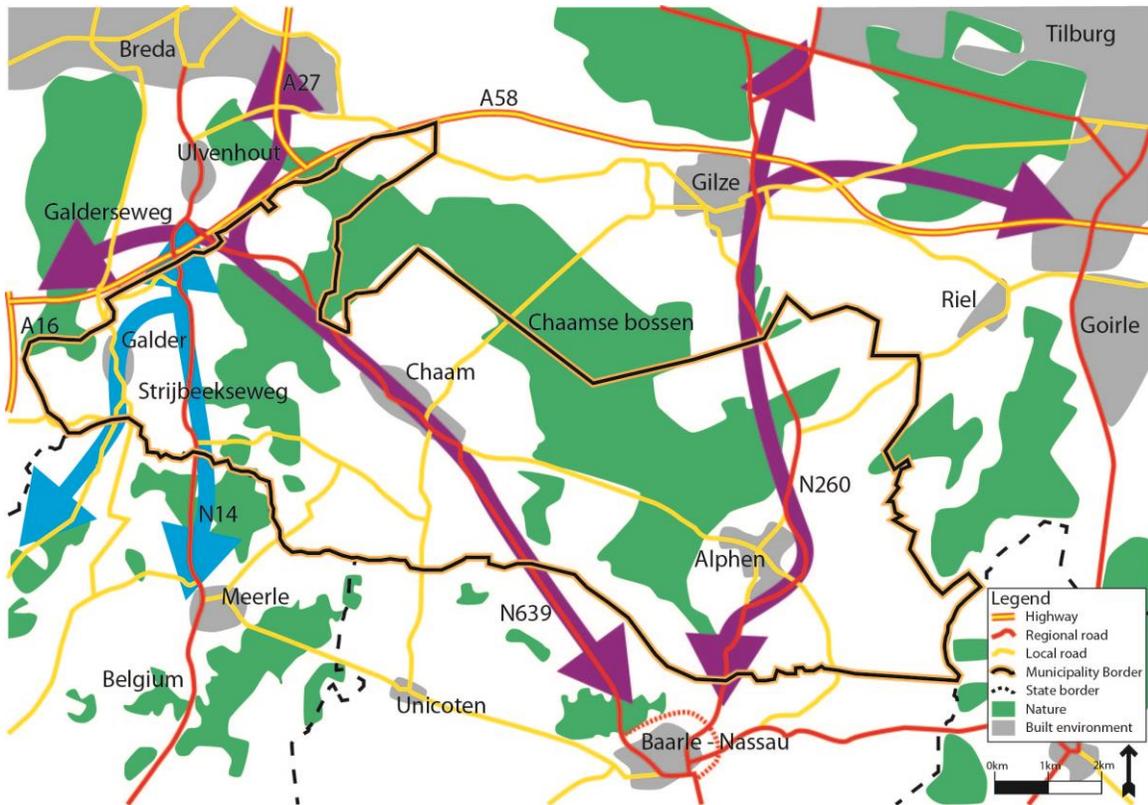


Figure 32: The transit traffic flow through the municipality of Alphen – Chaam.

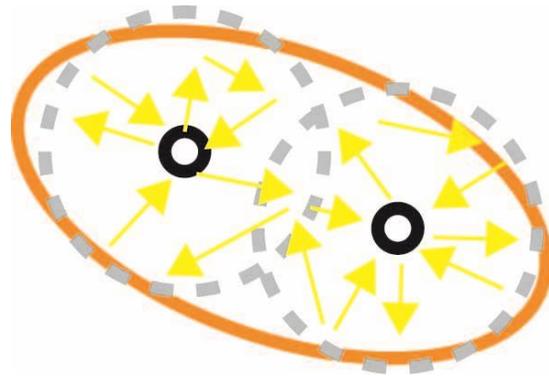
The other two regional roads are mainly used by cut – through traffic, to avoid traffic jams of the highways. This flow has a clear pattern. During the peak hours many car drivers choose for this alternative route, but for the rest of the day a limit number of cars drive via this route.

The cut – through traffic wants to return as fast as possible to the highways, which is different than the other transit traffic. The existing master plan improves the current situation of the Galderseweg. The road will be designed as slow road and is unattractive for cut-through traffic. This could affect the Strijbeekseweg since possibly more cut – through traffic drives via the Strijbeekseweg.

The transit traffic is not dominant on the other roads in the municipality. Modifying the regional roads should not lead to busier local roads. The transit traffic, that uses the local connection road, uses these roads since they live close to that local connection road and do not have another option. All transit flows are mapped on Figure 32. In purple the transit traffic between the highways and Turnhout and in blue en cut-through traffic between the A16 and A58.

3.4.2 Transportation flows creating by local trips

The local trips start and end within the municipality of Alphen – Chaam. Most of these trips start within the built environment because 92% of the local inhabitants live within the built environment, which cause most of the local trips. Most local trips are for daily shopping, work and sports activities and about 85% is shorter than 3 kilometer. This distance allows the local inhabitants to cycle. Local trips are also performed by tourists, which is mainly shopping and enjoying the nature. Many tourists stay in the touristy zone and drive towards Chaam for their groceries or drive to a parking lot to start their hike.



Many tourists stay in the touristy zone and drive towards Chaam for their groceries or drive to a parking lot to start their hike.

Currently a large part of the trips is performed by car instead of bicycle. Although the distance of the trip allows in most cases the local inhabitants to cycle. The three reasons why people choose for the car are: people have to carry to many items, which are too heavy, it is a habit or it should save time. When local inhabitants buy their groceries several times by car, a habit develops. Many people drives by car to a sports accommodation since it should be faster and it is more relax. There are many leisure activities, which are close to the home. So it is possible to cycle to most leisure activities.

Since many inhabitants work outside the municipality, the working trips are a limited part of the local trips. The agricultural jobs cause some of the local trips, but since these jobs are spread over the whole countryside, it is difficult to map these flows. Also the flows caused by the farmers, who live on the countryside, are not mapped since these are also scattered over the entire municipality. The commuters are discussed during the visiting trips.

Summarizing every local inhabitant has its own routes and own choices. Since there are common destinations, like the shopping centres or sport facilities several roads are used by many local inhabitants. So the most internal traffic of Alphen drives via the junction in the centre and in Chaam drives via the N639. The transportation flows of the tourists are not shown on Figure 34.



Figure 33: The local trips through Chaam.

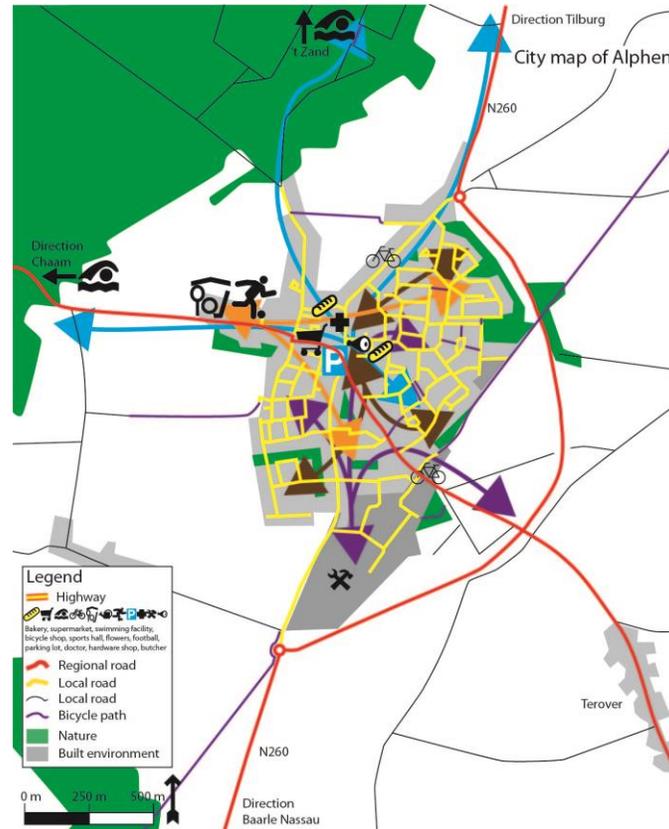
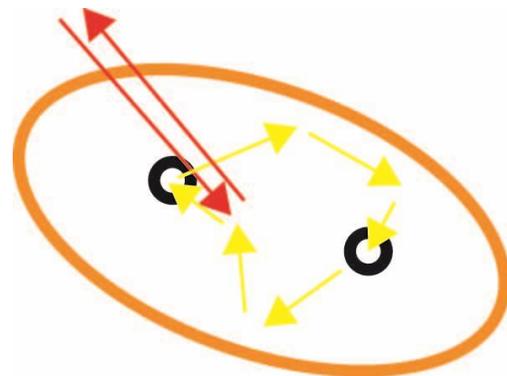


Figure 34: The local trips through Alphen.

3.4.3 Transportation flows creating by touristy trips

The third type of trip is the touristy trip. The touristy trips are not always based on the rational assumptions since tourists do have round trips, which mean that the start and end point are the same location. The four most important activities of tourists are: touring through the beautiful nature, buying groceries, arriving at the camp site, and visiting interesting location. The last activity is seen as a visiting trip.



Tourists move themselves with multiple transportation modes. Touring through the nature is mainly performed by bicycle or by foot, buying groceries by car and arriving also by car. Sometimes tourists drive by car to a parking lot in the nature to start their tour. Tourists use in many cases the car since they want to limit the transportation time and maximize their quality time, which is in line with the rational approach. The touring trips of tourists are not rational, since they have the same starting and ending point. It is hard to reach the tourist stay area of

the municipality of Alphen – Chaam by public transportation, so almost all tourists arrive by car. On Saturdays it is very busy since it is the most important changing day.

Most tourists overnight on camp sites in the municipality of Alphen – Chaam. The most important area is between Alphen and Chaam, as discussed earlier. This area and the large camp sites generate most transportation flows, by car and bicycle. Since the main activity of the tourists is enjoying nature, space and tranquillity of the municipality, many tourists visit regular the nature areas, like the Chaamse Bossen. Many tourists start their bicycle tour from the camp site, but for a hiking tour they travel first by car because they want to visit the beautiful spots.

The two other important activities of the tourists are dominated by the car. Shopping because people like to BBQ or have an extensive diner and buy many items. As result of that tourists choose for the car. The final (or first) activity of a tourist is leaving or arriving on the camp site. This activity is dominated by the car since most tourists are living the southern parts of the Randstad (Rotterdam, Dordrecht and The Hague). These tourists have to travel via the A16 and A58 to the N639 and drive via Chaam towards the camp sites. Only tourists with a camp site around Alphen use the N260. Most tourists know the area well because they have a seasonal or yearly place. Many flows are via the regional roads as shown on Figure 35, but the local connection roads are also very important. Since most of the camp site are located along a local connection road.

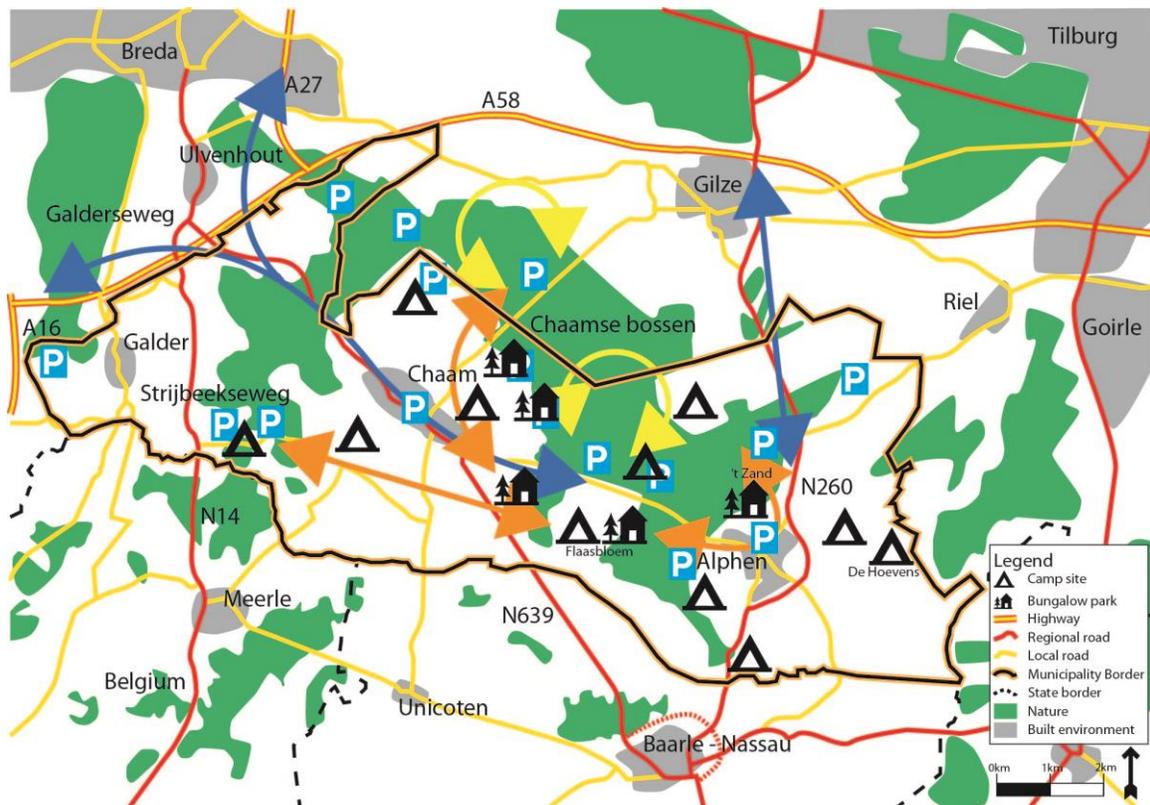


Figure 35: The touristy trips in the municipality of Alphen – Chaam.

3.4.4 Transportation flows creating by visiting trips

The last type of trip is the visiting trips. Visiting trips are day visitors of municipality of Alphen – Chaam. They enjoy the nature visit family or travel to their work. Characteristic of these trips is that the visitors enter and leave the municipality on the same day. The number of day visitors will increase because of two reasons; one: the municipality wants to increase the number of facilities in the nature and two: tourists make more day trips instead of long holidays, which result in a higher number of visitors.

Commuters from the municipality of Alphen – Chaam travel mainly towards Breda and Tilburg. The commuters travel mainly by car and drive via the regional roads, the N260 to Tilburg or the N639 to Breda. This is a periodic flow, which exists mainly during rush hours. There is a limited group, which cycle from Alphen to Tilburg via the 'Bels lijntje'. Commuters to the municipality of Alphen – Chaam originate mainly from Breda and Baarle – Nassau. They drive also via the regional roads. The commuters cannot change their routes since they have a fixed destinations and origin. Since the municipality wants to stimulate '*green*' businesses, this will attract more visiting traffic towards the nature and green areas. The location of the future businesses are yet unknown so it is impossible to locate them and to characterize the flows.

The transportation mode choice of day visitors of nature areas is depending on the area they originate since this causes the travel distance and time. Instead of tourists most day visitors live closer to the municipality of Alphen – Chaam, think of Tilburg, Breda, Eindhoven and 's Hertogenbosch. For most day visitors the public transportation is not adequate since they want to visit the nature areas. For day visitors of the towns the public transportation can be adequate, although this result in most cases in a longer travel time. Most day visitors enter the municipality via the N260 and N639 and their destination is in most cases a parking lot around the nature areas. When day visitors live close to the municipality it is possible to cycle to the nature areas or to their family, but most trips are performed by car.

Tourists visit interesting places outside the municipality during their stay. These trips are the visiting trips. Interesting places for tourists the in region are the town of Meerle, zoo 'Beekse Bergen', theme park 'De Efteling' and large cities in the region. Tourists travel mostly by car to the interesting location since the distance do not allow for other transportation modes. For example 'De Efteling' is about 27 kilometres away, which is too far for normal cycling. Also the public transportation system is not sufficient since it takes too long. Tourists leave the area mostly via the regional roads, only for Meerle tourists drive via the local connection roads.

So most visiting trips enter the municipality via the N260 or N639. This does not change in the future since most commuters and tourists have a fixed destination and the alternatives are not sufficient. The flows generate by the visiting trips are shown on Figure 36.

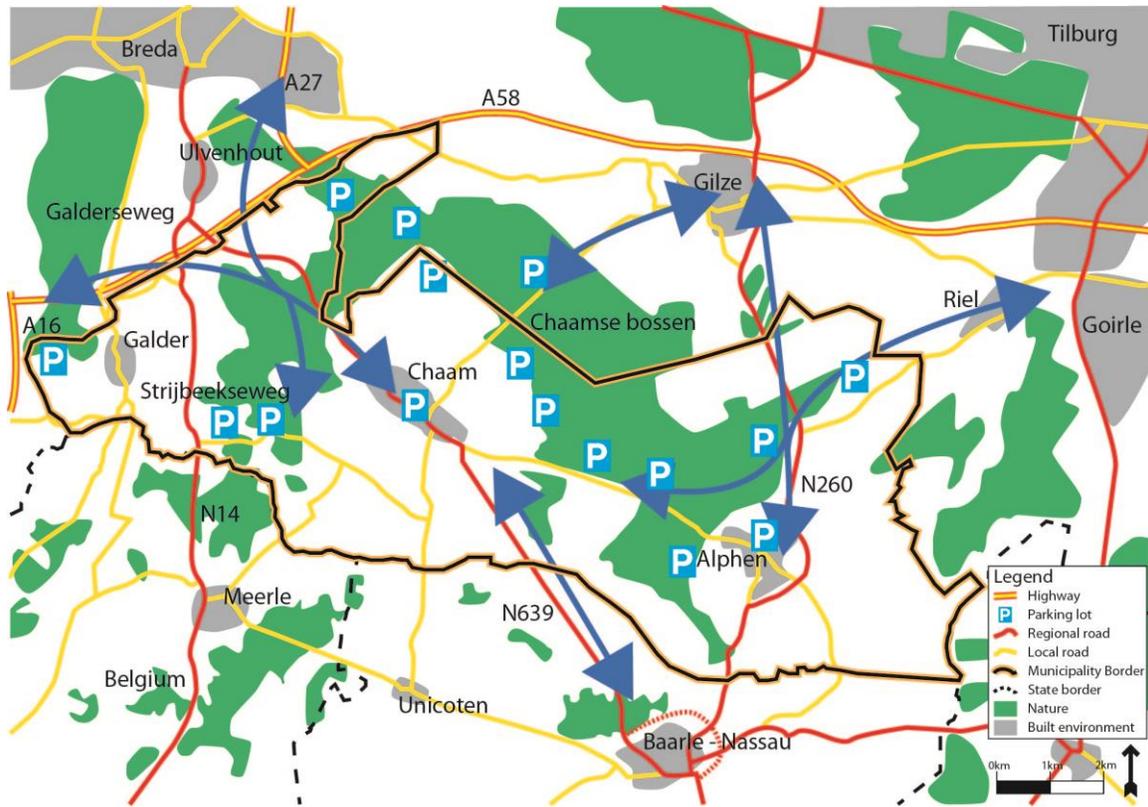


Figure 36: The visiting trips to and from the municipality of Alphen – Chaam.

3.4.5 The transportation flows in the municipality of Alphen – Chaam

So summarizing the regional roads handle most traffic, especially the transit traffic. The N639 handles next to the transit traffic also much local traffic and therefore the N639 is very interesting road. All types of trips uses the N639 and even many cyclists cycle along the N639 to Breda. This results in a very busy road and much nuisances in the built environment of Chaam. So to improve the ‘slowness’ of the municipality, the municipality should pay attention to the N639. Most other roads satisfy most of the ‘slowness’ requirements and are less crucial as the N639 for the transportation in the municipality of Alphen – Chaam.

Alphen and the countryside have also several issues, although these are minor compared to the challenges of the N639. The slow transportation modes deserve more attention, especially on the countryside. So overall the N639 require a lot attention to satisfy the ‘slowness’ aspects and several local connection roads require additional measures for the slow transportation modes.

3.5 The current thoughts about the future

The municipality of Alphen – Chaam is always in development and the spatial developments are led by the municipality, although the national government and the province have a large influence on the spatial developments of the municipality. To get a clear image of

the future transportation plans, the current policies of the different government are discussed. First the national government followed by the province and the municipality.

The national government focuses on the highways, which handle most interregional traffic. The highways A16, A27 and A58 are the important highways for the municipality of Alphen – Chaam. The national policies focus on the reduction of the traffic jams. The junction between the A16 and A58 is improved, to allow more traffic between Tilburg and Antwerp. Currently the national government is busy with the A27 between Breda and Utrecht, to increase the capacity. Especially the first improvement is important for the municipality of Alphen – Chaam since there will be less cut-through traffic and transit traffic because travel time decreases. This should lead to less traffic on the regional road of the municipality.

The province and municipality are busy with improving the local quality of life. The difference is that the province focuses on the regional level and the municipality on the local level. The province connects different local plans to create one comprehensive plan for the entire province. One of these overarching plans is the regional cycling network, which is a structure to connect cities and interesting areas. These connections should be of a high quality or should be improved before they can be included in the network. The province of Noord – Brabant identified the municipality of Alphen – Chaam as a large nature area with important values for the province of Noord – Brabant. This can be seen in the cycling network.

The regional cycling network structure identifies six different zones: urban areas, urban periphery, (intensive) agricultural zones, nature areas, green towns and small towns. Alphen is a green town and Chaam is a small town. The new network connects the urban areas with green towns and small towns with green towns. Based on this approach the following network arises: Alphen is connected with Tilburg, Gilze, Baarle – Nassau and Chaam and Chaam is connected with Breda (Ulvenhout), Alphen and Baarle – Nassau. Most of these links exist already. Although most bicycle path of the municipality of Alphen – Chaam do not meet the quality standards of the province, which was based on the directness of the route, road surface, delays and safety measures. About 90% of the bicycle paths is narrower than 2 meter, which is too narrow. By further implementation of the regional cycling network the quality improves, which has a positive effect on the cycling experience. So this plan contributes to the slow transportation modes.

Next to the cycling network, the province is busy with improving the regional roads, like the ring road around Alphen. Currently a new ring road is built around Baarle – Nassau. This new ring road reduces the traffic in the centre of Baarle – Nassau and reduces the travel time to Turnhout, which is in favour of the transit traffic. Although there are not many differences between the N260 and N639. The cooperation between 19 municipalities is called “Region West – Brabant” and is also developing plans for the region. The vision of this partnership is an extension of the A58 and a plan to redevelop the landscape. The goal of this partnership is to focus on their own challenges and stimulate the province to take action.

The policies of the municipality of Alphen – Chaam do not only exist of plans for the future, but contain also analysis of the current state for the built environment. Those analyses are the basis for new policies. Over the last few years the municipality redeveloped their zoning plans since those plans were outdated. This included an extensive analysis of the different towns. Another important policy is the master plan for the centre of Alphen and Chaam. The master plan of Chaam is already executed and the plan for Alphen is still in the development phase. The municipality communicates the desired experience of the municipality and use that experience to attract new businesses.

The experience concept of the municipality is very important for the future. The experience concept is made in 2008 and will be updated in the coming years. The main purpose of the experience concept is to create a framework and vision for future developments. The framework is used as a check, if new plans suit the future of the municipality of Alphen - Chaam. These plans should be developed by (local) entrepreneurs and when the plans suit the municipality supports them fully. The visions should also attract new businesses and show the direction of the municipality of Alphen – Chaam. The experience concept consist out of six parts: staying in nature, conference meetings in nature, events in nature, green and relax, attractive town centres and interesting sites in the green. So the core of this experience concept is nature, green, space and tranquillity, which is the most important selling point of the municipality. This framework should strengthen the local economy and utilize the landscape.

The municipality redeveloped the zoning plans between 2005 and 2009. The zoning plan of Chaam consists of many technical details and is therefore less useful as the zoning plans of Alphen and Galder. The most important outcome of the analyses is that the towns have to keep their historical and rural appearance. So a large increase of commercial shops is not desirable and the commercial shops should be concentrating around the centre. The municipality wants to emphasize the historical ribbon structure with more trees along the main roads. Galder has to stay a small and rural village with a good connection to the open space around the village. There is limited space available for extensions in the built environment. The study recognized that a bicycle path is missing along the road between Alphen and Chaam.

Most roads within the built environment are part of the 30 km/h zone and most parking facilities are concentrated around the supermarket. The municipality wants to keep the number of parking places as low as possible. Because of the ring road around Alphen, the whole built environment is categorized as residential area. The junction in the centre of Alphen is classified as a very dangerous junction. The new master plan should modify this junction to a safe junction. This is done with a better parking lot, which improves the clearness of the area. Figure 37 shows the master plan of Alphen. The situation in Chaam is different with the N639. Although the master plan is already executed the N639 is still dangerous.

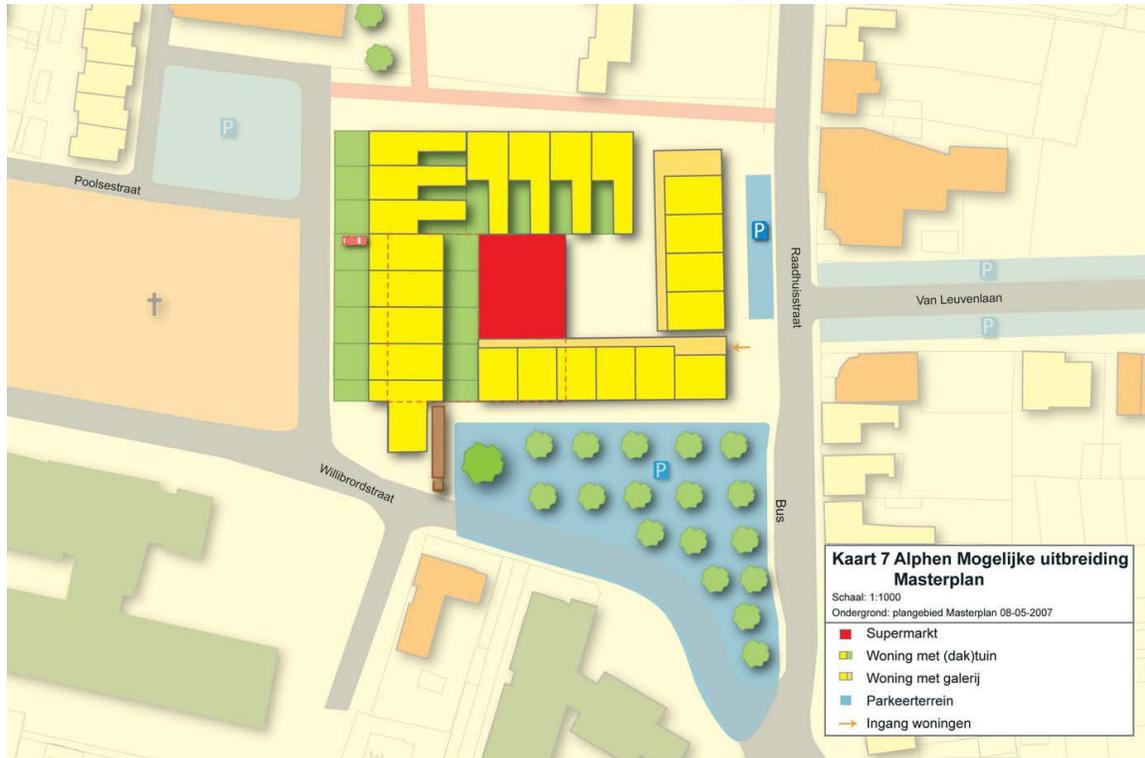


Figure 37: The development plan of the centre of Alphen (source: Droogh Trommelen en Partners).

Overall there are many plans to improve the quality of life of the municipality of Alphen - Chaam. Several are already executed and others have to be developed yet. The most remarkable thing is that the important road the N639 does not have a new development plan.

3.6 Conclusions

The analysis results in several important aspects for the future of the municipality. The municipality of Alphen – Chaam is a beautiful municipality with much nature and agricultural areas. These areas are very quiet and many tourists like to visit these areas. Most tourists stay in the zone between Alphen and Chaam. The municipality want to increase the number of tourists as impulse for the local economy. Most of the local inhabitants live in the larger towns: Alphen, Chaam and Galder, which results in many transportation movements around these towns. The rest of the local inhabitants are spread over the countryside. The countryside has not a dense road network. Most of the local roads are quiet and do not suffer from too much traffic. Only the regional and several local connection roads require special attention. The N639 is the most interesting road of the municipality and has the largest challenges. To improve the quality of life and stimulate the slow transportation modes improvements of the N639 are inevitable. All other roads need in general some small adjustment to improve the situation for the slow transportation modes. Think of an additional bicycle path along the local connection road between Alphen and Chaam and a quality impulse of the bicycle paths. So in the next chapters solutions will be found for the current challenges of the municipality of Alphen – Chaam.

Chapter 4 - Tackling the challenges: possible solution

The previous chapter identified and analyzed all transportation challenges of the municipality of Alphen – Chaam. The central topic of this chapter is to present and discuss all possible solutions for these challenges. Most solutions are based on reference projects and are supported as possible with visual materials. The order of the possible solutions is the same as the analysis, so it starts with the regional network. Several measures are discussed only for the local roads, although these measures are valid for almost all roads. Chapter 5 is devoted to select the best solution, so that there is not an evaluation of the solutions in this chapter.

4.1 A regional challenge: the N639

The largest transportation challenge of the municipality of Alphen – Chaam is the N639 since this road is too busy to be located in the centre of Chaam. This results in much nuisances for the local inhabitants. Other regional roads need less attention because there are less challenges and the Galderseweg has already an improvement plan. The measures to improve the Cittaslow awareness under car drivers are discussed in the section about the local network since there is lack of awareness in the entire municipality. The possible solutions to improve the current situation are based on three aspects: the network, speed limit and road design. Another large challenge next to the physical implications is that the road is owned by the province of Noord – Brabant. So the municipality should convince the province to modify the N639.

4.1.1 The alternatives for the N639

The alternatives for the N639 should result in a comprehensive plan, to tackle all current challenges. The main challenge is the reduction of the nuisances in the built environment of Chaam. This section focuses on the network challenge of the N639. In the ideal situation the transit traffic avoids the N639, which results in a large reduction of nuisances and a reduction in traffic. Since tourists, local inhabitants and visitors use the N639 and are important for the municipality, these flows to have remained on the N639. So the solution should reduce the transit traffic on the N639. There are different opportunities for the N639 and for several opportunities the N260 is important because the transit traffic detours via the N260. There are four solutions suggested to reduce the traffic on the N639 and the built environment of Chaam.

- A ring road around Chaam
- Redirect transit traffic via the N260 by changing the signalling in the region
- Downgrade the whole N639 to a tourist route, which fits into the landscape
- A high speed corridor: downgrade the N639 and upgrade the N260 to freeway (100 km/h)

4.1.1.1 A ring road around Chaam

The first possible solution is built a new ring road around Chaam. This ring road should have the same effects for Chaam as the ring road did for Alphen. The local trips and touristy trips remain in the built environment and all transit traffic or traffic, which has a destination different than Chaam, avoids Chaam. Most tourists drive to the tourist zone, they will drive through Chaam since that is the fastest route, which is important for the local entrepreneurs.

The new ring road will be located south of Chaam since the route south is shorter and north. The ring road deviates from the current N639 at the western entrance of Chaam and joins the N639 about 500 metres south of the roundabout. The suggested route is shown on Figure 38. For the suggested route the nuisances for local inhabitants are taken into account. Nevertheless several local inhabitants have to move because their homes are located on or very close to the route of the ring road. The ring road will be located in an agricultural area. The new ring road has a length of 2,2 kilometer, which is longer than the current route (2,1 kilometer). The ring road will have a speed limit of 80 km/h. The ring road crosses also several local roads and because of safety reasons intersections at the same level are unwanted. The local connection road between Chaam and Unicoten requires a viaduct is. For other road crossings additional research is required.



Figure 38: A possible solution: a new ring road around the built environment of Chaam.

There are two reference projects for this alternative, namely the ring road around Alphen and the new ring road around Baarle – Nassau. Both projects are good reference projects because they have both the same characteristics as the possible new ring road. The road design of the new ring road around Chaam is the same as the ring road around Alphen and also the integration within the landscape, like the viaduct to Terover can be the same as the viaduct to Unicoten. The new ring road would cost about 11 million year based on the ring road around Baarle – Nassau, which has the same characteristics and constructions. The road width is about 30 metres, which is the same for the ring road around Alphen and Baarle – Nassau. The ring road around Alphen showed already that it has the desirable effects of a ring road. It reduces the traffic in the town of Alphen, so a ring road is an appropriate alternative for the current situation of the N639, which reduces the traffic within the built environment of Chaam.

4.1.2 New signalling in the region

Redirecting the transit traffic from the N639 to the N260 by adding new signalling on the A58 and surrounding regional roads is the second alternative. There are two methods of signalling; dynamic signalling or diversion. Dynamic signalling is based on signs, which give the car driver actual travel information and diversion are temporary signs which show a detour. Both methods function only when the information is correct. It is not possible to fool car drivers because of the local knowledge and the navigation systems.

Dynamic signalling becomes more and more popular since more information is available. Dynamic signalling advises car drivers to choose the fastest route. Dynamic signalling is very useful when there are multiple routes, where often a traffic jam arises. The dynamic signalling results in less traffic jams because car drivers avoid busy sections. The signs should give always the fastest route otherwise the system does not function properly. Dynamic signalling is used on several highways in the Netherlands, especially on locations where there are more than one possibility, think of ring road around the larger cities.

It is for dynamic signalling only possible to reroute car drivers via the N260 when the N639 takes more time than the N260. This means that dynamic signalling redirects people only when it is very busy on the N639. This reduces the peak of the N639, but the N639 is still busy. Dynamic signalling is very successful to reduce the peak, but do not reduce the traffic the entire day. So dynamic signalling succeeds only in special occasions.

Diversions are only possible in special cases, when a road section is closed. It is not possible to have a diversion the entire year. It is only possible to change the signalling when the N260 is indeed faster than the N639, like dynamic signalling. So the N260 should be faster than N639, which is only possible after some large interventions. These are discussed as the two other alternatives of this challenge. Signalling is a cheap solution and can be implemented very quickly. Nowadays with the technological advance the traffic signs lose importance and the navigation systems are more important. So signalling has only the desired effect when the N639

is transformed drastically, which means that signalling is an additional measure instead of a measure at itself.

4.1.3 The touristy route: N639

The third alternative for the N639 is downgrading the N639 to a beautiful touristy road. The new road allows tourists to enjoy the landscape of the municipality. The best approach of this new road design is the green parkway approach. This concept, the green parkway, connects a road with its surrounding landscape. The section between Breda and Chaam is very important since it is the entrance of the municipality. In this area multiple historical estates are located, small agriculture take place with hedgerows along the plots and along the lanes oak trees grow. Car drivers have to feel this historical and rural atmosphere when they drive via the N639. To enhance those feelings car drivers should enter the municipality via an estate gate, as a landmark.



Figure 39: An impression of the ambiance of the new N639, the N639 is wider than the photo.

To enhance those feelings a lower speed limit is required, which should be supported by the road design and the landscape. The new speed limit for the N639 is 60 km/h outside and 30 km/h inside the built environment. The downgrade of the N639 increases the travelling time by seven minutes between the A58 and Baarle – Nassau. The original travel time was about 20

minutes, so seven additional minutes is about an increase of 35% of travelling time. This additional travelling time has as consequence that the N260 is faster as the N639. For transit traffic from the A16 the N639 was five minutes faster, but after the downgrade of the N639 the N639 is two minutes slower than the N260. For transit traffic from the A27 the difference between the N639 and N260 is even bigger, in advantage of the N260. Therefore the transit traffic will choose for the N260 in the future, after this intervention is successfully implemented. Less traffic will drive via the centre of Chaam, although tourists still choose for the N639.

As mentioned the road design have to change, more trees along the road are required. All these measures are necessary to stimulate people to drive slower and give them a better experience of the landscape. This all fits within the green parkway approach and is a proper approach for the touristy roads in a Cittaslow municipality. For the touristy road, the green parkways are interesting, the Alpine roads in the Austria and Switzerland and touristy roads in Scandinavian are very interesting as reference project. Most of these roads are designed to enjoy beautiful views and to reach viewpoints. These roads are especially designed for tourists and have little borders between the road and the landscape. So the tourists are able to enjoy the landscape the best. The N639 should also be designed for the tourists and the road should be integrated in the landscape. This results in a perfect touristy experience and lowers the speed of the car drivers.

4.1.4 The high speed corridor

The fourth and final alternative is the high speed corridor, which is partly the same as the touristy N639. In this plan the N639 is also downgraded to a 60 km/h road, but not in a touristy road. To compensate for the lost time the N260 is upgraded to a 100 km/h road. This requires multiple measures to improve the N260. This high speed corridor attracts car drivers to the N260.

Downgrading the N639 to a 60 km/h road is discussed in the previous section and resulted in seven minutes more driving time, which already caused that the N260 is faster than the N639. Implementing the high speed corridor leads to a new travel time of 13 minutes between the A58 and Baarle – Nassau instead of 16 minutes. This saves additional time for the car drivers. The increase speed does not have only advantages. A higher speed limit requires a different road design without dangerous junctions on the same level. To achieve this many new constructions are required. Another issue on the N260 is that there are many small exits, which have to be replaced. The entire local network has to change, so that the N260 is safe enough to operate as a freeway. Maybe a bigger problem is the tractors on the N260, which travel to their ground, are not allowed on a freeway. A solution for the exits and the tractors is a parallel road along the N260, which is then used by local and slow motorized traffic and the slow transportation modes.

The new parallel road allows a higher speed limit on the N260, but requires large interventions in the landscape since there is only limit space available. To create enough space several houses have to be demolished. This causes much resistance from the local inhabitants

and is contradictive with the principles of Cittaslow. The new freeway would be similar to the one on Figure 40. Overall this is expensive alternative which causes much resistance; therefore it is unlikely that this is the best alternative.



Figure 40: Parallel roads to separate the slow and fast motorized traffic (source: Google Street view)

4.2 Measures on the countryside: regional and local roads.

Most road of the municipality of Alphen – Chaam should have adjustments to meet the standards of a Cittaslow municipality. The municipality has already improvement plans for the Galderseweg and the centre of Alphen. For most other road the municipality should change the road design to reduce speeding cars. So overall the other roads require minor adjustments to control the maximum speed, which improve the safety of cyclists and pedestrians. First controlling the speed limit is discussed and second the awareness of car drivers is discussed. Improvements for the slow transportation modes are discussed later as well as the built environment of the municipality of Alphen – Chaam.

4.2.1 Slowing down car on the local roads

Controlling the maximum speed is very important for the safety of cyclists and pedestrians and for the Cittaslow experience. There are two aspects of how to control the maximum speed in this section: the awareness of car drivers and road design. Both focus on other type of measures; soft vs. hard. Hard types of measures force car drivers to change their behaviour and soft measures influence the behaviour on a subtle manner. The measures are mainly for the local connection roads, although it is also useful for other busy roads, where car drivers are speeding. Nevertheless for most regional roads the flow function is more important and these measures disturb the function, which is unwanted. There are many measures to

reduce the speed of cars; the following measures are best suited for the municipality of Alphen - Chaam:

- Speed bumps
- Cobblestones every 600 meters
- Road narrowing, with or without cobblestones
- More turns in a road, less straight roads

During the analysis a lack of awareness of the Cittaslow principles was noticed. Therefore additional measures are required to improve the awareness of the car drivers. To improve the awareness of the car drivers the following measures are best suited:

- A Cittaslow sign, when car drivers enter the municipality of Alphen – Chaam
- Formulate a clear Cittaslow conduct
- A visible municipality border

4.2.1.1 Speed reducing measures

The first alternative to reduce the speed of cars is a very famous one, namely the speed bump. Speed bumps are frequently used on many locations and function well. For a controlling point of view is this measure a very hard measure because it is forcing the car drivers to slow down, to avoid damaging their car. The maximum speed determines the design of the speed bump and the implementation is relatively cheap.



Figure 41: A speed bump (source: <http://www.eiland2.nl/nieuwsarchief%202005.html>).

The second alternative is a different road surface: a cobblestones section every 600 meters. Cobblestones create an annoying sound and vibration in the car, which slow down most car drivers. Although it is possible to drive fast over the cobblestones and therefore this measure is a softer alternative compared with the speed bumps. Next to the driving effects the cobblestones have a nice appearance. The cobblestones require proper maintenance otherwise the road quality decrease drastically.

The third alternative is narrowing the road. The road narrowing can be paved with cobblestones or tarmac and can have a speed bump. In many cases there is separate section for cyclists. The width of the narrowing is determined by the width of the agricultural vehicles since those have to pass the road narrowings. Currently the road is about 5 metres wide and agricultural vehicles are up to 3,5 metres wide. So 3,7 meter should be sufficient for the narrowing. A width of 3,7 meter does not allow cars to pass simultaneously, which slow down the traffic. Adding cobblestones or speed bumps result in speed reduction. At this moment there are several road narrowings within the built environment of Chaam, which are big planters. Figure 42 shows a proper road narrowing with space for cyclists to pass the road narrowing easily.



Figure 42: A narrow section with speed bump (source: http://commons.wikimedia.org/wiki/File:Verkeersdrempel_Rijnstraat_Oudorp.JPG)

The last alternative is the most drastic method to slow down the motorized traffic. The last alternative is adding more corners in the road to slow down the car drivers. This is only

possible for new roads. Otherwise the whole network have to be redesigned which useless and very expensive. Therefore this alternative is only suitable for new roads and not a reasonable alternative for the improvement of the current roads. The four physical measures are not enough to change the mentality of the road users. Therefore the next section focuses on the awareness of car drivers.

4.2.1.2 The approach to more Cittaslow awareness

Car drivers do not notice that they enter the municipality of Alphen – Chaam and that the municipality has a different transportation vision than the surrounding municipalities. Currently only the road signalling alters when car drivers enter the municipality via the local connection roads, which is not sufficient. The municipality should promote the Cittaslow principles better, so that car drivers adapt to the principles of Cittaslow. This can be achieved with multiple measures, like having signs with the logo of Cittaslow or have a Cittaslow conduct with statements like: respect for slow transportation modes and slow transportation modes have priority within the built environment. To enhance the ‘slow’ mobility of local inhabitants, car drivers, tourists, cyclists and pedestrians, a Cittaslow conduct should support the slow mobility and create more awareness by the road users. The Cittaslow conduct should promote the often unknown principles of Cittaslow by road users. The Cittaslow conduct should be presented in a beautiful way in the centres of the built environments and car drivers should be alerted to the Cittaslow conduct by entering the municipality of Alphen – Chaam. This notification can only be executed by additional signs, which remember car drivers of the Cittaslow conduct. The central message is that the municipality of Alphen – Chaam encourage slow transportation and that motorized traffic should respect the slow transportation modes in the municipality of Alphen – Chaam.

Making visible that a car driver enters the municipality can be done with a sign of the municipality along the street or with a line on the street, like a border. These signs should aware car drivers that they enter another municipality. These signs have to refer to the Cittaslow movement; otherwise car drivers do not know that they enter a special municipality. It is possible to draw the Cittaslow logo on the road, which is a clear statement. This measure is easily implementable because signs are quite cheap and easy to install.

4.2.1.3 The remaining challenges of the N260

The N260 is discussed earlier in this chapter, to improve the N260 to a high speed corridor. If upgrade is not implemented because a different alternative is better, the N260 require some major adjustment to improve the safety of the N260. Some measures can have some small impacts on the local inhabitants around the N260. The challenges on the N260 are multiple small exits from neighbourhoods, pastures and houses. These exits can create dangerous situations and should therefore if possible be limited or else be modified. Special attention is needed for the junction of the N260 and the local connection road towards Riel. This is a busy junction and should design in a way it does not interrupt the flow. Currently when car drivers arrive from the north and want to turn off the N260 to the local connection road car drivers have to wait on the road. Car drivers block the flow towards Alphen and create

dangerous situations. A proper reference junction is the junction towards the swimming lake 't Zand. This junction is designed well and ensures a safe completion.

The three possibilities to improve the safety of the N260:

- A detour to avoid the dangerous exits
- Creating new exits, which have better views and more space to enter the road
- Redesigning the junction with the local connection road to Riel

It is possible for several exits to create a detour, think of closing the exit and reroute the car drivers. In most cases this is a very small detour for a limited number of cars. Therefore the nuisance is not very big and it improves the safety of N260 a lot. Therefore this measure is a proper solution for multiple situations. When a detour is not possible a new exit is a good alternative. This is the case for the junction between the N260 and the local connection road towards Riel.

4.3 The slow transportation networks on the countryside

As one of the conclusions during the analysis, the slow transportation network requires improvements. There are a few essential improvements, which increase the quality of the slow transportation network a lot. The challenges are discussed in Chapter 3 and the challenges were observed and mentioned during some small talks. The improvements should fit as much as possible within the existing policy plans of the government. Solutions are required for the next two challenges:

- The missing cycling infrastructure between Alphen and Chaam
- The low quality of the slow transportation network

Both are discussed individual since there are multiple solutions.

4.3.1 The missing link: new cycling infrastructure between Alphen and Chaam

The missing link on the countryside is proper cycling connection between Alphen and Chaam. Local inhabitants, tourists and the municipality indicated that road between Alphen and Chaam is dangerous for cyclists due to the high speed difference between cars and cyclists. Additional cycling infrastructure is therefore needed between Alphen and Chaam. There are three possible solutions for this challenge:

- A bicycle lane on the road
- A bicycle path along the road
- A bicycle path through the beautiful nature

4.3.1.1 A bicycle lane between Alphen and Chaam

Currently there is a dotted line on the street, which marks the space for cyclists. This space is not enough for cyclists to cycle safe on the road. The local connection road should be broadened, so that the extra space can be assigned to the cyclists. This space should be marked orange to be clear that this space is for cyclists. A downside of this broadening is that cars can use that extra space also and a broader street result often for a higher speed. There is also a lack of space for the broadening since there are many trees along the road.

4.3.1.2 A commuter's bicycle path

The most safe solution is to separate the two transportation modes. A large challenge for the new bicycle path is that there are many trees along the road between Alphen and Chaam. So a new bicycle path should be located on the other side of the trees in the pastures or in the forest. This alternative is a very safe one because the two transportation modes do not interfere anymore. Local inhabitants prefer a bicycle path along the local connection road since this increase the safety feelings. This route, which is shown on Figure 43, is the shorted route between Alphen and Chaam.

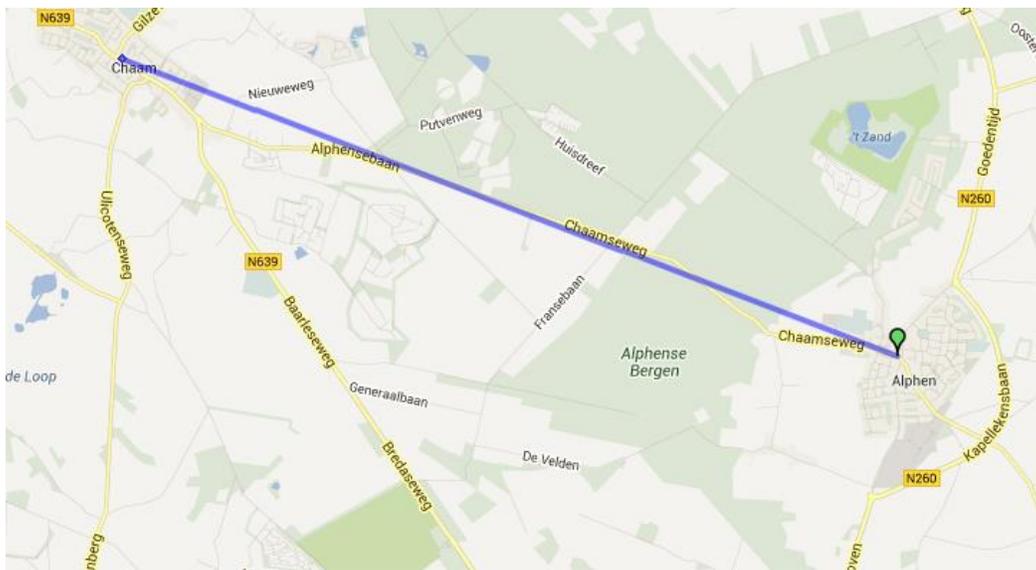


Figure 43: An indication of the possible route of the bicycle path between Alphen and Chaam (Google Maps)

4.3.1.3 A touristic bicycle path

It is not only possible to develop a bicycle path along the local connection road. It is also possible to build a bicycle path through the Chaamse bossen and is a beautiful route. This route is preferred by the tourist because they prefer beautiful routes. Local inhabitants do not like the cycle through the forest during night times. At this moment there are also many bicycle paths through the forest, which can be used for a bicycle path between Alphen and Chaam. This route is longer than the route along the local connection road. This route can be based on existing

bicycle paths and do not require additional bicycle paths, although not all destinations are well connected to the current bicycle paths.

4.3.2 The quality of the slow transportation infrastructure

Most bicycle paths are located in the countryside of the municipality of Alphen – Chaam. All these bicycle path require maintenance to maintain the high quality of the bicycle path. Especially the bicycle path surface is very important for cyclists since they want not to cycle into a hole. The high quality ensures a bicycle path, which is safe to cycle. Therefore maintenance is crucial, especially for tiled bicycle path since they are vulnerable for cracks. Upgrading the bicycle path to a path with a tarmac surface is a huge improvement, especially for those tiled bicycle paths. Although a bicycle path with shells have a much nicer appearance. When the current surface meet the quality standards of the province measures are not required yet.

Several bicycle paths located in the forests and built environment are very narrow. Since this section is only about the countryside, the built environment is discussed later. A narrow bicycle path could be nice to enjoy the nature, but is dangerous for cyclists when they have to pass each other. This is very hard on very narrow bicycle paths. The province analyzed all bicycle paths and lanes already and evaluated their quality. This analysis is executed properly and is a very good basis for the improvement of the quality. This analysis is focused on the bicycle paths and lanes. The same analysis should be conducted for footpaths. The analysis shows that many bicycle paths have a low quality and are too narrow. The municipality should take up the stated challenges and improve the bicycle paths. Since the tourists are very important for the municipality, proper bicycle path should be offered.

4.4 Possible measures for the towns of Alphen - Chaam

Not all challenges are located on the countryside; there are several challenges within the built environment of the municipality of Alphen – Chaam. The main challenge of the built environment is: to stimulate the slow transportation modes, to reduce the car use, to improve the road design to a Cittaslow design and to control the maximum speed. Solutions for the challenges are discussed for the towns: Alphen and Chaam. There are many ideas suggested in this section, which can be implemented. A combination of several solutions is possible since not all solutions have the same intention. A conclusion from the analysis is that town of Alphen is better designed compared to Chaam. Therefore more measures are suggested for Chaam. Of course the suggestions for Chaam are also possible in Alphen.

4.4.1 Possible solutions to reduce car use in Alphen

The town of Alphen is already designed well at this moment, but there are still some improvements possible. The whole town is a 30 km/h zone and the local inhabitants park their cars on their private ramps. The town of Alphen has many trees and a broad street design with enough space for the slow transportation modes. All these aspects contribute to a well designed streetscape in Alphen. Still there are opportunities for improvement, mainly focussing on a

better atmosphere for the slow transportation modes. Therefore the following solutions are suggested to improve the current situation:

- Adjust the street design in favour of the slow transportation modes
- New routing for cars, including more one way roads
- More noticeable street crossings for pedestrians
- More short – cut for slow transportation modes
- More and better facilities for the slow transportation modes

Every solution improves the current situation of Alphen. The first solution: adjusting the street design is based on the street design in front of the primary school in Alphen. The cobblestones are located in the middle of the street and smooth paving on the edge. This street design allows cyclists to cycle smoothly and car drivers have to slow down. The street design should be adjusted at important places, where transportation flows merge and dangerous situation arise. This solution can be combined with solutions 3: more noticeable street crossings for pedestrians. Since car drivers pay more attention when the street is paved with cobblestones, it is easier to cross the road. For other places crossing can be design with additional markings on the street. Both solutions increase the safety of the cyclists and the pedestrians.

Solutions 2 and 4 are network based solutions. Both solutions have the intention to get a network, which is in favour of the slow transportation modes. Car drivers have to change their normal behaviour since roads become one way and are oriented on leaving the town instead of driving via the city centre. The short – cuts should direct cyclists fast to the centre of Alphen. Both measures result in an increased travel time for car drivers compared with the cyclists. Although it is very hard to locate new short – cuts in the built environment of Alphen. The advantage for the slow transportation modes is even large with proper facilities in the centre of Alphen. Currently the bicycle racks are hard to notice in the centre of Alphen and since proper bicycle racks are crucial these should be improved.

4.4.2 Possible solutions to reduce car use in Chaam

The town of Chaam is different than Alphen and requires also different solutions. Next to the solutions, which will be suggested in this section, the first section for this chapter recommended already major improvements. These solutions dealt with the N639. All residential areas are part of a 30 km/h zone and many cars are parked on the roads. The centre of Chaam is redeveloped a few years ago, which result in a nice square with proper bicycle facilities and car parking facilities. Still multiple challenges are left in the built environment of Chaam. To improve the situation for the slow transportation modes the following solutions are suggested:

- Decrease the number of parked cars along the road
- Slow the N639 down to a 30 km/h zone
- Let cyclist cycle on the N639

- More trees or green along the roads
- Noticeable street crossings for pedestrians
- A roundabout for the junction to Gilze
- A just the streets in favour of the slow transportation modes, street partly cobblestones
- Having a new routing for the whole town including more one way roads
- Additional short – cut for the slow transportation modes
- Road narrowing
- Speed bumps

Several of these suggestions were already discussed in the section about Alphen, like the more noticeable street crossings for pedestrians, more short - cuts and a rerouting plan for the cars in the built environment of Chaam. The other suggestions are different than the solutions in Alphen. An important suggestion is to reduce the number of cars, which are parked on and along the road. All these cars create a vague street view and can also create dangerous situations. Less parked cars on the streets is better of the dynamics in Chaam.

Just as on the countryside the N639 required large interventions within the built environment, which reduce the nuisance of the N639 in Chaam. In the new situation the speed limit can be lowered to 30 km/h and large adjustments to the streetscape are required. These interventions should lead to a large change in experience of Chaam. A good reference project is the main road of Alphen, which is a wide road with enough space for the cars and cyclists and where both transportation modes share the street. The main road through Alphen has also a nice road design with trees along the road, almost no cars along the road and proper pavement. So greening the N639, changing the paving of the N639, more space for pedestrians and let cars and cyclists share the road. More green should improve the local experience and the willingness to travel by slow transportation modes. If Chaam can copy the street design of Alphen, the main road of Chaam gets an enormous boost.

The centre of Chaam designed properly since the new square, but still the junction affects the experience of Chaam. A roundabout can improve the junction between the N639 and local connection roads because fewer cars have to wait and it interrupts the traffic, which wants to drive as fast as possible through Chaam. Other solutions are road narrowing and speed bumps. A roundabouts, road narrowing or speed bumps can be combined with street crossings for pedestrians since car drivers have to slow down for these obstacles, which are in favour of the slow transportation modes. This should results in better opportunities for pedestrians and cyclists to cross the road

Chapter 5 - Evaluating and selecting interventions

This chapter is about selecting and elaborating the best solutions. The end result of this chapter is a road map with a time line of the municipality of Alphen – Chaam. The road map gives an overview of a comprehensive plan for the municipality of Alphen – Chaam and allows the conclusion; if the sustainable transportation paradigm can contribute to the future of a Cittaslow municipality. The possible solutions of the previous chapter are evaluated and selected with multiple criteria which are based on the current situation. Every challenge can have its own criteria and sometimes not all alternatives meet the same criteria for the same challenge. In such case the selecting is based on qualitative arguments. The selected solution is elaborated and presented as a proper improvement for the municipality of Alphen – Chaam. All solutions together form the road map for the municipality of Alphen – Chaam.

5.1 Some viable ‘slow mobility’ scenarios

In this section the five challenges from the previous section are evaluated and the best alternatives are selected for further elaboration. This section is only about selection, the next section focuses on the design and elaboration of the different solutions. The order of the challenges is the same as used in the last chapter.

5.1.1 The best solution to reduce traffic on the N639

Since the largest challenges arise on the N639 for the municipality of Alphen – Chaam, the solutions should serve the municipality for a long time. The biggest issue is the nuisances for the local inhabitants caused by the transit traffic. To tackle this challenges four alternatives were listed:

- A ring road around Chaam
- Redirect transit traffic via the N260 by changing the signalling in the region
- Downgrade the whole N639 to a tourist route, which fits into the landscape
- A high speed corridor: downgrade the N639 and upgrade the N260 to freeway (100 km/h)

Selecting the best solution is based on the following criteria: costs, effectiveness (rerouting of transit traffic) and nuisance for the local inhabitants. These criteria fit the best with the desired future of the municipality of Alphen – Chaam. Costs are important since the province and the municipality should pay for the solutions. It is not possible for every solution to calculate the costs, when it is not possible a qualitative statement is made. The solution should be based on the rational approach, so the alternative route should be faster than the N639. During the built and implementation phase the nuisances should be minimized. There are

different types of nuisances, temporal or for a long period, think of road noise or demolishing noise. The transit traffic drives via another route when there are faster alternatives.

Table 1: The value of the criteria's for the N639.

	Costs (relative)	Effectiveness	Nuisance
New ring road	High (11m)	High	High
Signalling	Low	Low	High
Touristy road	Average	High	Low
High speed corridor	High	High	Averaged

The effectiveness of a solution is very important and when a solution has a low effectiveness the solution is not recommended. For the new signalling this is the case, this solution will not result in less transit traffic on the N639. Therefore new signalling is not recommended as only solution for the municipality of Alphen – Chaam. All other solutions have a high effectiveness, so the other criteria are important for the selection. The new ring road around Chaam has little influence on the mobility patterns in the municipality. It redirects the transit traffic around the centre of Chaam, which reduces the traffic in the centre of Chaam very much. The down side of this solution is that it causes nuisance around the new ring road since the new location is very close to existing buildings. Another downside is the high costs of the new ring road, which is about 11 million euro. The new ring road is not recommended due to the nuisances, possible resistance of local inhabitants and the high costs. The last two solutions have many similarities, although the last solutions include also large intervention on the N260. These large interventions are necessary to make the road suitable for 100 km/h instead of 80 km/h. The large intervention is necessary to construct a parallel road for the slow motorized traffic and the slow transportation modes, which requires additional space. This intervention will cause large resistance by the local inhabitants of Alphen. In both cases the car driver chooses for the N260 since that route is faster than the N639. So the best choice is to downgrade the N639 to a touristy road since this result in the least resistance of the local inhabitants and a high effectiveness. The transit traffic drives via the N260 and the tourists drive via the beautiful N639 towards Chaam and their camp sites. Therefore solution three is selected: the touristy road is recommended for the municipality of Alphen – Chaam.

5.1.2 The best solutions to slow down cars on the regional and local roads

The second challenge was to slow down car drivers on the regional and local roads. Most solutions are presented for the local roads since the regional roads have a flow function. Still there are additional measures for the N260. The measures should slow down the car drivers and

increase the safety on the road for all road users, especially the safety of the slow transportation modes. With a higher awareness the safety will rise even more. The following solutions were suggested in the previous chapter to reduce the speed and increase the awareness:

- Speed bumps
- Cobblestones every 600 meters
- Road narrowing, with or without cobblestones
- More turns in a road, less straight roads

To increase the Cittaslow awareness of car drivers:

- A Cittaslow sign, when car drivers enter the municipality of Alphen – Chaam
- Formulate a clear Cittaslow conduct
- A visible municipality border

To improve the safety of the N260:

- A detour to avoid the dangerous exits
- Creating new exits, which have better views and more space to enter the road
- Redesigning the junction with the local connection road to Riel

The solutions are very different and therefore hard to compare since they are based on different principles. The best criteria for the speed reduction measures are: costs, implementation effort and appearance for the slow transportation modes. When a measure is well suited for the slow transportation modes, this is a large advantage for the solution.

Table 2: The value of the criteria's for slowing down the regional and local roads.

	Costs (relative)	Implementation	appearance
Speed bumps	Low	Medium	Low quality
Cobblestones every 600 meters	Low	Medium	Medium quality
Road narrowing, with or without cobblestones	Averaged	Medium	High quality
More corners in a road, less straight	High	Difficult	High quality

The costs of the road narrowings are mostly depending on the additional measures, like cobblestones or speed bumps. The cheapest way to construct a road narrowing is without any additional measures, but the effectiveness and appearance increases when additional measures are constructed. For the municipality of Alphen – Chaam good appearance is important, to improve their 'Cittaslowness'. Therefore both solutions with high appearance are best suited for this challenge. The implementation of more corners is hardly impossible since that would mean

that the entire network has to change. This results in very high costs and many nuisances for the road users. It is possible to implement alternative 4: more corners, by the planning of a new road. So it is important to keep in mind that new routes should include more corners to reduce the speed of the cars. Since that is not possible for the existing roads the best solution to reduce the speed are the road narrowings. The previous chapter showed a good example of a road narrowing. Cobblestones are a nice addition to the road narrowing and increase the effect, but are additional and not necessary.

To increase the awareness of the car drivers three alternatives were suggested in the previous chapter. All three were based on additional signalling when car drivers enter the municipality. Since it is hard to quantify the effects of the three alternatives and therefore quantitative criteria are not selected. Therefore this recommendation is based on qualitative statements. The Cittaslow conduct is the most forcing measure since it is very clear for car drivers what is expected of them. Car drivers should act according to the Cittaslow conduct. The entire conduct is shown in the centre of Alphen and Chaam. The other two alert car drivers on entering a Cittaslow municipality. Since the Cittaslow conduct is the most clear for everybody, this measure is recommended to increase the awareness of car drivers. The other two measures are too voluntary.

The additional measures for the N260 are necessary since the touristy road is recommended for the N639. Therefore the number of small exits should be reduced. The best possibility is to choose a basis alternative and choose that solution unless it is impossible. The basis measure to reduce the number of small exits is to close several small exits and reroute the traffic via detours. An exception of this basis solution is the junction between the N260 and the local connection road towards Riel. The junction requires more space and should be designed in the same way as the junction towards the swimming lake 't Zand.

5.1.3 The best solutions for a better slow transportation network

The slow transportation networks benefits greatly from the reduction of traffic and the lower speed of the motorized traffic, especially on the local roads. Still there are some challenges left for the slow transportation network. The largest challenge is the cycling connection between Alphen and Chaam, which is missing at this moment. Next to this challenge the quality of the cycling infrastructure should be improved. Three alternatives were suggested in the previous chapter to connect Alphen and Chaam, the three alternatives are:

- A bicycle lane on the road
- A bicycle path along the road
- A bicycle path through the beautiful nature

To evaluate these three solutions three criteria's are formulated; physical safety is about the chance that cyclists have an accident, mental safety is about the perceived safety and the target group is about which group appreciate the bicycle infrastructure the most. The final

criteria is important because Cittaslow focuses primarily on the local inhabitants, although the tourists are also important.

Table 3: The value of the criteria's for the slow transportation networks.

	Physical safety	Mental safety	Target group
A bicycle lane	Low	Medium	Local inhabitants
A bicycle path along the road	High	High	Local inhabitants
A beautiful bicycle path through the nature	High	Low	Tourists

The new bicycle infrastructure is made for the local inhabitants because of the principles of the Cittaslow movement and there are enough opportunities of tourists at this moment. Therefore there are only two solutions left. Since the safety of a bicycle path is much higher than a bicycle lane, the bicycle path is recommended. This new bicycle path allows local inhabitants to cycle safely and quick from Alphen to Chaam and vice versa and also during evenings and nights.

The province conducted a study about the quality of bicycle paths. The most important outcome of the study was that many bicycle paths and lanes do not meet the high standards of the province. The inventory of the province is executed properly and gives a clear view of the quality of all bicycle paths in the region. Therefore it is not necessary to analyze these bicycle paths again. So to improve the current state of the bicycle paths, the municipality should use the analysis of the province. If all challenge, which were stated by the province, are solved almost all bicycle challenges are solved. The study of the province did not take several bicycle paths through nature areas into account since the province focuses on bicycle paths along roads. The municipality of Alphen – Chaam is recommended to solve all stated challenges and conduct an additional study about the bicycle path in the nature areas.

5.1.4 The best solution to reduce car use in Alphen

As mentioned in the previous chapters the situation in Alphen, although there still several challenges are left. To improve the current road design, network and atmosphere for the slow transportation modes the following solutions were suggested in the previous chapter to improve the current situation:

- Adjust the street design in favour of the slow transportation modes
- New routing for cars, including more one way roads
- More noticeable street crossings for pedestrians
- More short – cut for slow transportation modes
- More and better facilities for the slow transportation modes

The solutions differ a lot from each other, although they all are in favour of the slow transportation modes. Therefore multiple measures are selected, which together improve the current situation and have the best result. The municipality is recommended to change the road design on dangerous situations. The best road design for these situations is the road design which is located in front of the local primary school. Implementing a road design with cobblestones around the most important junctions, should reduce the speed and increase awareness of the car drivers and alert them for dangerous situation. In the town of Alphen more crossings for pedestrians are necessary. In the centre of Alphen the street crossings are combined with the cobblestones. This results in very noticeable street crossings. The master plan of the centre of Alphen includes already measures to improve the bicycle facilities. Those improve the situation to a high quality.

The final measure is to reroute the cars in the residential areas since short – cuts are impossible in Alphen. This is a drastic measure for the local inhabitants because they have to adjust to the new situations. This results in a longer travel time for cars to the centre of Alphen, which is an advantage for cyclists. The one way streets improve the safety of cyclists. So the recommendation for municipality of Alphen – Chaam about Alphen is the change the street design on junctions and dangerous spots with enough street crossings for pedestrians and the cars should be rerouted in favour of the slow transportation modes.

5.1.5 The best solution to reduce car use in Chaam

In the built environment of Chaam there are more challenges. Therefore there are also more solutions of the built environment of Chaam. To improve the current road design, network and atmosphere for the slow transportation modes the following solutions were suggested to improve the current situation:

- Decrease the number of parked cars along the road
- Slow the N639 down to a 30 km/h zone
- Let cyclist cycle on the N639
- More trees or green along the roads
- Noticeable street crossings for pedestrians
- A roundabout for the junction to Gilze
- A just the streets in favour of the slow transportation modes, street partly cobblestones
- Having a new routing for the whole town including more one way roads
- Additional short – cut for the slow transportation modes
- Road narrowing
- Speed bumps

Many alternatives are valid for the N639 within the built environment of Chaam. The N639 gets a complete transformation within the built environment, like outside the built environment. The basic design principles are: less cars parked along the street, more space for the slow transportation modes, more green, several road narrowings and creating better

crossings for the pedestrians. The next section elaborate on these principles, but the municipality of Alphen – Chaam should make a detailed design for this road. Since redesigning the N639 is very challenging, this therefore requires an extensive design process. This study shows only one possible solution among others. The design affects all trips in Chaam since all trips in Chaam uses the N639. A roundabout on the N639 is not necessary since there is less traffic on the N639; there are enough crossing opportunities available. Other measures are less important than redesigning the N639. The car drivers in the residential areas should be rerouted, like Alphen and other measures are not recommended. So the most important recommendations for Chaam are a total redesign of the N639 to a beautiful road through a town and a rerouting of the car traffic in the residential areas.

5.2 Design possibilities for the municipality of Alphen - Chaam

In the previous section all solutions are selected and in this section the solutions are detailed elaborated. The designs are a possible design to indicate a possible future setting. After an extensive design process of the municipality of Alphen - Chaam the final design can be different than the possible design suggested in the report. These possible designs focus on the highlights of the designs. After this section the road map to the desired future can be constructed.

5.2.1 The slow touristic road: the N639

The slow touristy N639 has a complete different road design than the current N639. The touristy N639 merge into the landscape, which generates a nice experience for the car driver and cyclists. The bicycle path along the N639 is very important for the local inhabitants and more shelter is given from new trees which boost the cycling experience. For the best experience measures have to be implemented for the entire N639 not only for the section within the municipality of Alphen – Chaam. Proper communication with other municipalities and the province of Noord – Brabant is essential. Within the municipality of Alphen – Chaam additional measures are taken to breathe the Cittaslow movement. The road is divided into four zones according to its surrounding land – use. The four zones are: a forest zone, garden zone, built environment, and agricultural zone and a large gate is located at the entrance of the municipality of Alphen – Chaam. The forest zone consists of a dense forest, which similar to the local connection road between Chaam and Gilze. The second zone is a garden zone, where small agricultural, nurseries, and estates are located and via the garden zone car drivers drive to the

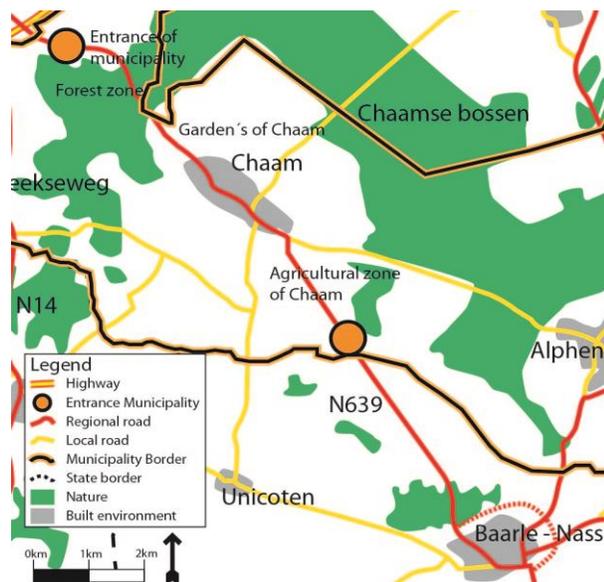


Figure 44: Details of the new design for the N639, the entrances of the municipality are indicated.

built environment of Chaam; which is a 30 km/h zone. The fourth and final zone is the agricultural zone, where large scale agricultural is located. The maximum speed is reduced to 60 km/h and the road has to be optically narrower, like the local connection road between Chaam and Gilze. The car drivers need to experience a narrow road, where 60 km/h is the speed limit. Figure 45 show all pictures with the desired appearance of a possible entrance gate, forest zone, garden zone and agricultural zone. Figure 44 shows the division of the four zones.



Figure 45: A photo impression of the views of the new N639, which is about nature, enjoying the landscape and estates

5.2.2 The 'Cittaslowness' of the countryside

Since many cyclists experience speeding cars and overtaking cars as dangerous, more speed reducing measures are required. The road narrowing in combination with the Cittaslow conduct is the best solution to slow down car drivers. The road narrowing does not intervene with the cycling infrastructure since there is a separate passage present for the cyclists. These road narrowings are constructed on the countryside of the municipality of Alphen – Chaam. The road narrowings should be constructed at regular distance so that car drivers cannot speed anymore. Figure 46 shows a good road narrowing because this is safe solution and leaves enough space for cars and cyclists. Recommended is to take these road narrowings as standard solutions. At some locations a different road narrowing is required since the local settings do not

allow the standard solution. One of these challenging locations is the local connection road between Alphen and Chaam, which will be discussed later. Figure 47 shows the location for the road narrowings, shown with yellow – green dots.



Figure 46: a simple road narrowing (source: http://www.nieuwemeer.info/nieuws/pdf/herinrichting_nwmeerdijk_dec_2007/voorbeeld_wegversmalling.jpg).

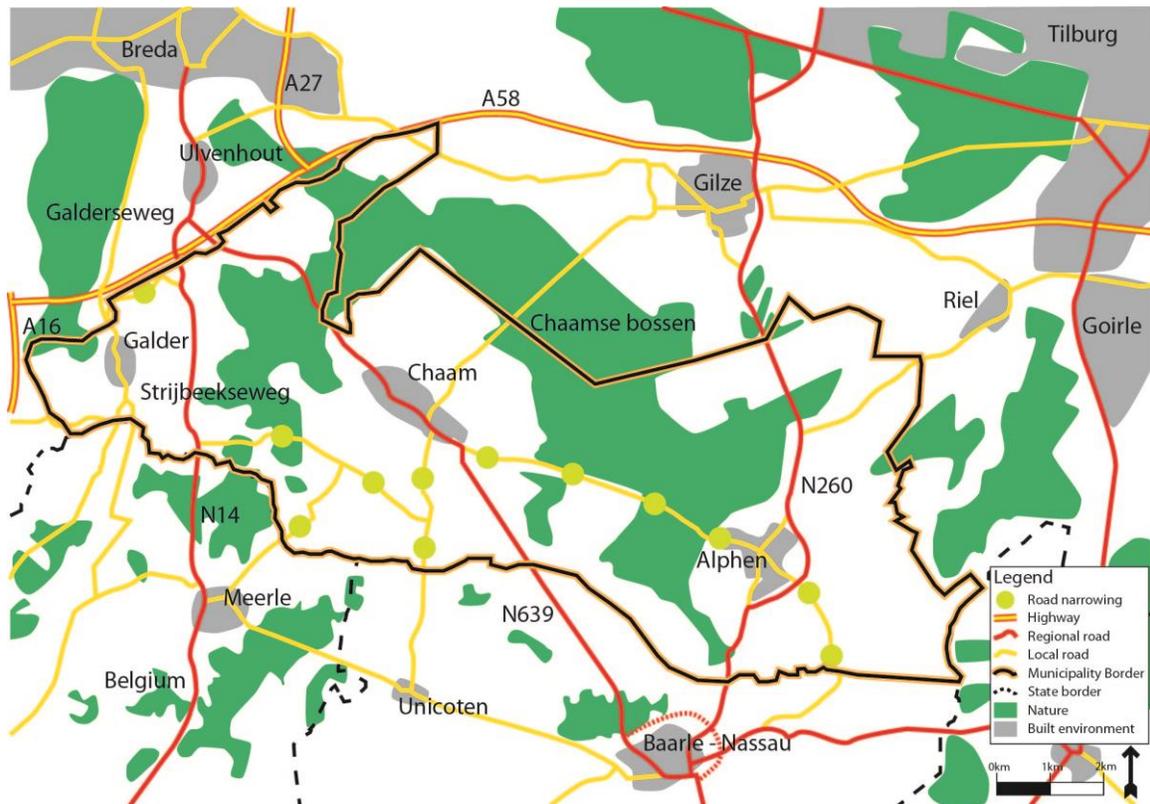


Figure 47: The location for road narrowings in the municipality of Alphen – Chaam.

The Cittaslow conduct is the best solutions to aware car drivers that the municipality of Alphen – Chaam is not a normal municipality. The Cittaslow conduct informs car drivers how to behave in the municipality of Alphen – Chaam. Car drivers are informed by signs along the most important access roads. The locations of the signs are marked figure 48 with red dots. For cyclists smaller signs are significant since they cycle much slower than a car drive. The main message of the sign for the cyclists is: Welcome cyclists to this cycling municipality. The conduct should not consist of too many rules and the conduct has to be very clear. In general the conduct is that car is a guest in the municipality of Alphen – Chaam. An example sign is:

Welcome to the Cittaslow municipality of Alphen – Chaam, keep the following principles in mind:

- Cars are guests in this slow environment
- Have respect for all other road users
- Give cyclists and pedestrians as much priority as possible

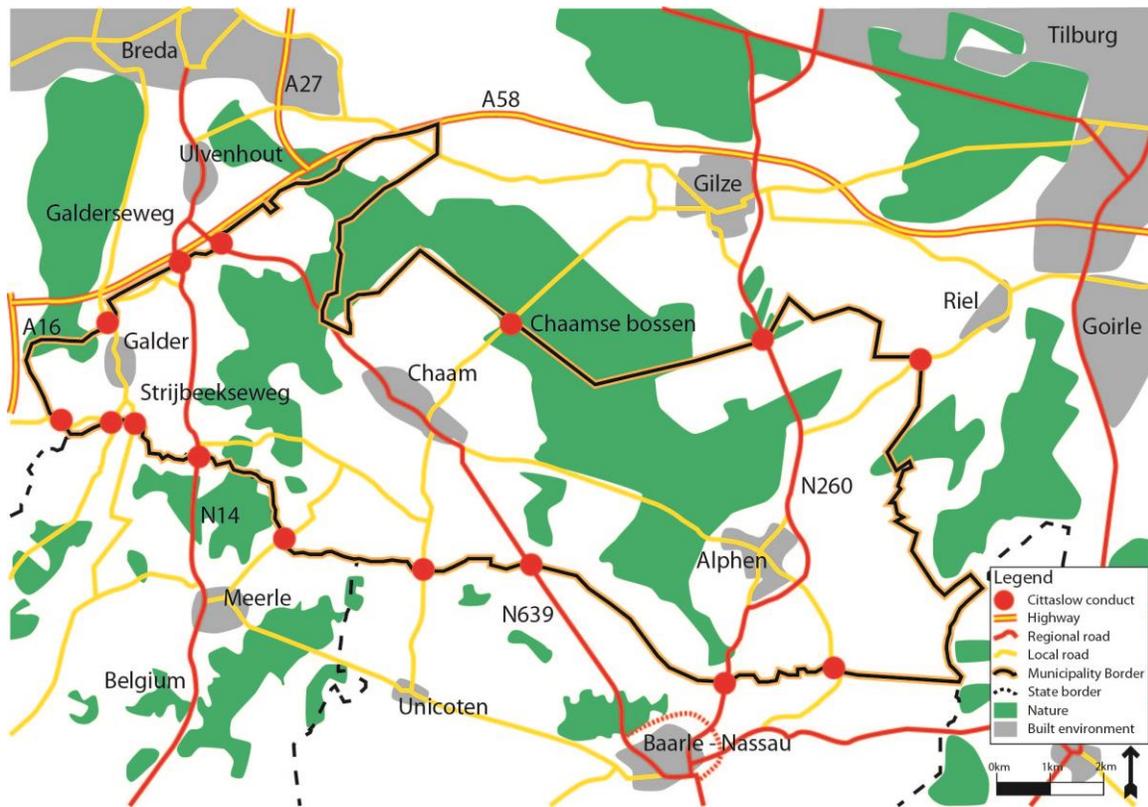


Figure 48: The locations for Cittaslow conduct signs in the municipality of Alphen – Chaam.

The final elaboration of this section is about the road safety of the N260. Additional measures are required since those were not included in transformation of the N639. To improve the current situation two small roads should be closed and a possible detour is indicated on figure 49. For the detour in 't Zand a bicycle path need to be upgraded to a road since this is currently blocked for cars. The road should only be available for local residents of 't Zand. Also

the junction between the N260 and the local connection road towards Riel has to get an upgrade with a proper exit towards Riel. This ensures the safety of the car drivers on the N260. It also improves the flow towards Baarle – Nassau, which can be block by waiting cars.

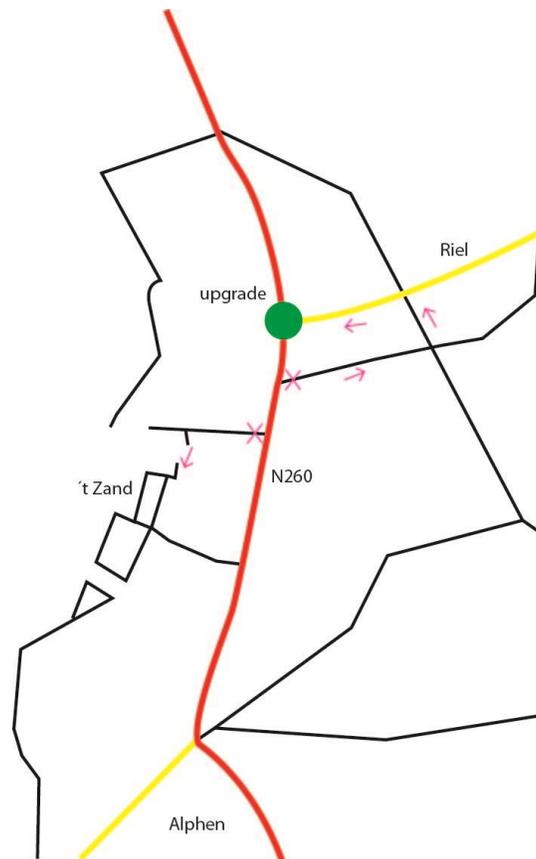


Figure 49: A schematization of the junction on the N260 with the local connection road towards Riel.

5.2.3 The missing link between Alphen and Chaam

The previous chapter gave a simple overview of the route of the new bicycle path. More detailed information is given in this section. The new bicycle path is along the local connection road between Alphen and Chaam. Still there are some very interesting design details, which are discussed in this section (e.g. how to connect the bicycle path with the existing network and on which side the bicycle path is located).

At this moment there is a bicycle path along the N639 and along the first section of the local connection road. The new bicycle path should connect the built environment of Alphen and Chaam. In Chaam there is a bicycle path until the edge of town; Alphen has not any kind of cycling infrastructure on that side of the town. A bicycle path within the built environment is not essential since cars drive much slower. Locating the bicycle path along the road is challenging since multiple buildings are located very close to the road, which does not leave enough space of a bicycle path. A proper solution for these passages is to locate road narrowings at these

spots to create more space for the bicycle path. The best location of the bicycle path is on the north side of the local connection road, although the forest is located north, the number of houses is more important and there are fewer houses built on the north side. This new bicycle path should satisfy the latest design standards and have to be a two-way bicycle path. Figure 50 shows the location of the new bicycle path and the exclamation marks show the spots where there is a lack of space due to some buildings. The road narrowings and sections, where additional ground is required, require special attention during the design process, which is not included in this study. The road narrowings of Figure 47 should still be implemented; the road narrowings suggested in this section are additional to the once shown at Figure 47.

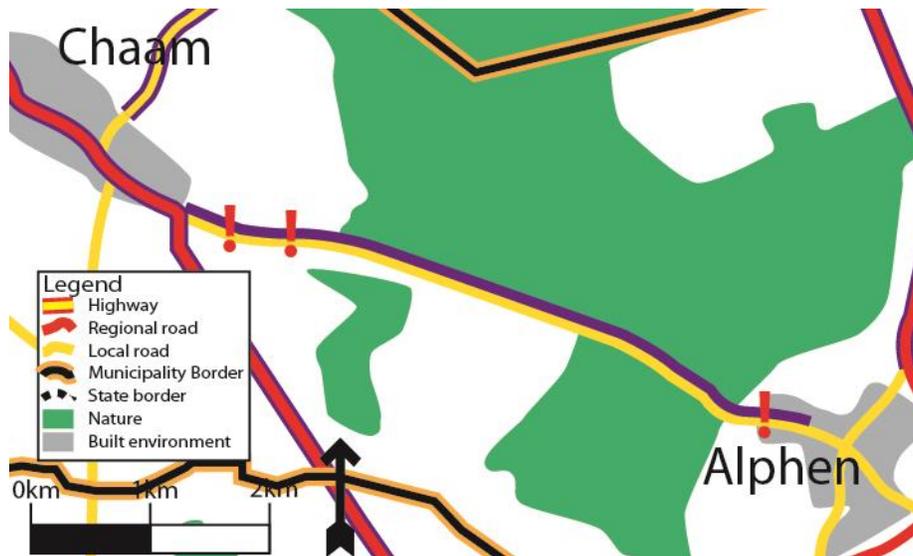


Figure 50: The problematic locations between Alphen and Chaam for a bicycle path because of buildings, which are built very close to the road.

5.2.4 The transition from car to bicycle

Rerouting the car traffic is a significant measure for the built environment of Alphen. The new routing plan of Alphen is shown on figure 51; the arrows indicate the one-way roads. More one-way roads do not strengthen the effect and do not stimulating the slow transportation modes. Six roads are converted to a one-way road, which avoids local inhabitants travelling easily by car to the centre. It also improves the safety of the cyclists in Alphen. Figure 51 shows also additional measures in Alphen. The additional measures are street crossings and a new road design. The sections with the new road design are marked blue and the road crossings are marked with orange dots. The new road design is based on the road design in front of the primary school and shown of figure 52. The combination of cobblestones and street crossings result in a safe environment for the pedestrians.

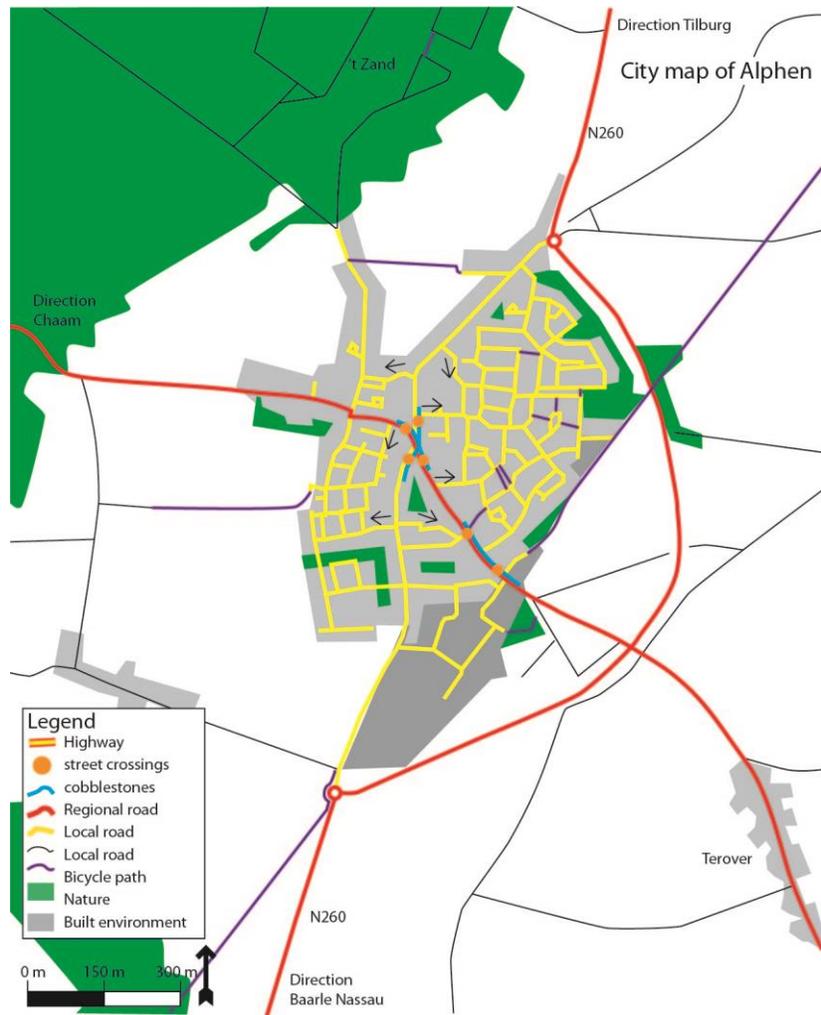


Figure 51: New routing for Alphen with one way streets, road narrowings and new road design.



Figure 52: The new road design of dangerous sections.

5.2.5 The transition of Chaam's main road

The main road of Chaam, the N639, gets a complete new appearance. The new design for the main road of Chaam is present in this section. An important change is the lower speed limit of 30 km/h for the entire road. This lower speed limit allows cyclists and car drivers to share the road. This road design is based on the main street of Alphen (Goedentijd). This road design creates more space for the pedestrians. To improve the atmosphere trees are planted and the recently renovated square is connected properly to the N639. The tarmac will be removed and changed for vowels and road narrowings are connected with several crossings for pedestrians. Additional measures are required for the junction with the local connection road towards Gilze and Unicoten since the new 30 km/h one result in an uncontrolled junction. So speed reducing measures, like cobblestones, have to warn people for a dangerous junction.

Other measures do not have large effect on the appearance of Chaam. Changing the pavement at dangerous and important location and reroute the local inhabitants of Chaam are the additional measures. Figure 53 shows the new design of Chaam. The blue section in centre of Chaam will be paved with cobblestones. The orange dots are new crossings for pedestrians and the arrows show the direction of the one-way roads. There are more one-way streets than Alphen because a larger reduction of traffic is wanted. The green road is the main street, where the maximum speed is lowered to 30 km/h, more trees are planted, a broader street and more space for pedestrians. Figure 54 shows the desired road design of the main road in Chaam.



Figure 53: New routing for Chaam with one way streets, road narrowings and new road design.



Figure 54: The new road design for the N639 in the built environment of Chaam

5.3 The roadmap to sustainable transportation

The best solutions are selected and several design ideas are suggested and all solutions can be combined to a roadmap. It is clear that becoming more sustainable is not the same as more infrastructure for the slow transportation modes. To become more sustainable you have to limit car use by making that choice unattractive. This is also the essence of the roadmap for the municipality of Alphen – Chaam. This section presents a brief roadmap for a sustainable future for the municipality of Alphen – Chaam. This is a brief section since most designs still have to be made. Therefore it is only possible to indicate the most important measures for the municipality of Alphen – Chaam and when to start with the different measures. The roadmap is divided into three sections: short-term, mid-term and long-term.

5.3.1 The roadmap: short-term

The first years have to be devoted to an exploration and elaboration of the solutions and the implementation of the easy measures. Focussing on the easy measures stimulates the sustainable movement of the municipality of Alphen – Chaam. The municipality of Alphen – Chaam has to start early with an extensive exploration about the possibilities for the N639 and the bicycle path along the local connection road between Alphen and Chaam. The exploration has to start early because both measures have large effects on the transportation patterns in the municipality of Alphen – Chaam. Since permission from the province is required to modify

the N639, the communication is very important. So the municipality of Alphen – Chaam should start early with discussion and communication with the province of Noord – Brabant. This process can be very time consuming. After the first couple of years there should be a proper design for the bicycle path along the local connection road and for the N639 the negotiations should be almost finished.

The easy measure on the short term is the introduction of the ‘Cittaslow conduct’. This is a mental change, so this can take a while before effects can be measured. The municipality of Alphen – Chaam should start to make an inventory about the best locations for road narrowings.

5.3.2 The roadmap: mid-term

Many measures are in the implementation phase during this time frame or the final designs are made. The midterm period (5 to 15 years) is devoted to the implementation of the speed reducing measures, the large renovations of the built environments including rerouting of the residential areas and designing the new N639 and constructing the bicycle path along the local connection road between Alphen and Chaam. The municipality of Alphen – Chaam analyzed all roads within the built environment so the rerouting and renovations can be implemented at the proper spots. After this period the built environment satisfy all Cittaslow principles.

5.3.3 The roadmap: long-term

The final phase of the process to a sustainable transportation system in the municipality of Alphen – Chaam the final measures are implemented. During this period the new touristic N639 is the main task of the municipality of Alphen – Chaam, so that the number of cars can be reduced dramatically. The new touristic road should be finished 2035. During this final phase this whole process starts again, which will result in new measures for the new situation. Since there will be large changes in the coming 20 years, which requires additional measures.

Chapter 6 - Discussion and conclusion

6.1 Discussion

This exploring research explores the possible solutions for the current challenges in the Dutch Cittaslow municipality of Alphen – Chaam. The analysis of the transportation network, possible solutions and selection of these solutions resulted finally into a road map for the future of Alphen – Chaam. Since this study is an exploring research only a limited number of solutions is studied. The main focus of this research was the analysis of the municipality of Alphen – Chaam. The results of this analysis are the flow maps about the municipality. These show intense use of the regional and local connection roads. The analysis is a proper basis for a more in dept research about specific issues in the municipality of Alphen – Chaam. Since all solutions had a quick design process, it resulted in impression of a possible future. Therefore it is recommended to have an extensive design process for each challenge. The most important one is the N639, which requires a complete new design.

This study focuses on the physical interventions and the network structures in the municipality of Alphen – Chaam. Transportation patterns and transportation mode choices are not only depending on the network and physical measures. As explained in Chapter 2, there are many important social and irrational aspects in the transportation mode choice. All these aspects are missed in this research. This result in a different approach and a different road map compared with a situation that these aspects are included. Recommended is to conduct a study about the social aspects for the municipality of Alphen – Chaam, which hopefully contribute to the findings of this research.

The Cittaslow movement is much more than transportation, it consists of many different components, which all contribute to a specific atmosphere. The transportation patterns are much more depending on the country than on the Cittaslow movement. Although most of the sustainable transportation paradigm is written in America and Australia is contains much interesting information for Dutch municipality and also for other European Cittaslow municipality. It is important that you keep in mind that the local settings are much more important than a paradigm or a movement. This study contained only one large case study and to show the effects of the Cittaslow movement other case studies are required. Also the implementation of slow transportation modes is much easier in a cycling oriented country as the Netherlands. Therefore it can be much harder to implement measures in favour of the slow transportation modes.

The research can be improved by obtaining much more data about all traffics flows. Since most of this study is based on map observations and *in situ* observations additional data strengthen the findings and allow better conclusions. Still this study is only one step to understand the complex world. To understand this world better more studies are required

about social aspects, more data is needed, models could improve the predictions and multiple case studies could give a comprehensive view.

6.2 Conclusion

Encouraging localism, high quality of life and a unique local identity are the main goals of the Cittaslow movement (Mayer and Knox, 2006; Radstrom, 2011; Cittaslow Nederland, 2012). Many Cittaslow municipalities (in the Netherlands and worldwide) try to solve their own challenges according to the principles of the Cittaslow movement (Fischer and Van de Wiel, 2008; Midden - Delfland, 2011; Regio West - Brabant, 2012). One of the principles is to create, maintain and support a slow transportation network (Radstrom, 2011). In this study many aspects of its possible implementation are identified and discussed so to have proper insight of the perspectives for a slow transportation network in the municipality of Alphen - Chaam. This study had three goals, namely (1) Unravelling the synergy of the concepts of Cittaslow and sustainable transportation, (2) Improving the current transportation pattern of the municipality of Alphen – Chaam and (3) visualizing these improvements. These goals are meeting the main objective of this study.

The Cittaslow movement and the scientific paradigm of the sustainable transportation arose at different moments in history, but both observed the same challenges in society. A large difference between the Cittaslow movement and the sustainable transportation paradigm is that the Cittaslow movement is rooted in society while the sustainable transportation paradigm is rooted in the scientific world. The Cittaslow movement is a very interesting movement to study for scientists of the sustainable transportation paradigm. A thorough analysis of the Dutch Cittaslow municipality of Alphen – Chaam resulted in a very interesting and clear transportation pattern. The transportation flow of both towns is concentrated to a limited number of roads. The experience of those roads, where the flow is concentrated, are the most important roads for the travel experience. The town of Chaam showed that a very busy road has negative impacts on the experienced quality of the infrastructure and the cycling experience. These current transportation patterns are studied by means of *in situ* observations, map analysis and several short talks with local inhabitants. The analysis showed the high Dutch standards in the municipality of Alphen – Chaam. Still many challenges are left. Of the four types of trips the transit traffic has the largest challenge: the N639. It is interesting to see the impact of the transit traffic on the slow transportation modes. The analysis shows some interesting results for policy makers and scientists, which are interesting in Cittaslow.

The solutions presented in this report are not specific sustainable transportation solutions. The only thing in common was that the slow transportation modes have priority during the design phase. So there is synergy possible, although synergy is possible with any movement or paradigm, which is in favour of the slow transportation modes. The sustainable transportation paradigm as well as the green parkways are interesting sources for solution, neither of them is the approach to cooperate with the Cittaslow movement.

Developing a sustainable transportation network in the municipality of Alphen – Chaam is not something you can do based on one approach: the sustainable transportation paradigm. It contributes to sustainable transportation, but there are many more like the green parkway approach. The most important physical intervention is the downgrade of the N639 to a touristy road. This reduces the traffic and the nuisances of the traffic for the local inhabitants. This study showed that the best way of stimulating the slow transportation modes is to reduce the attractiveness of car use. So to implement successfully a sustainable transportation network in a Dutch Cittaslow municipality, all selected interventions should be in favour of the slow transportation modes. In Chapter 4 and 5 several of such interventions were presented and the best for the municipality of Alphen – Chaam were selected.

Chapter 7 - References

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