2. Local transport

2A. The current situation

Nijmegen has an important structural disadvantage: The city is compartmented by rivers, canals and railways which signifies strongly conditioned traffic flows (figure 1). Bridges lead to bundling main traffic flows. Within the compartments, Nijmegen has seven districts with a scattered traffic structure that is ideal for cycling and walking.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Data</th>
<th>Units</th>
<th>Year of the data provided</th>
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<td>Share of the population living within 300 metres from a public transport line (hourly service or more frequent)</td>
<td>88.7%</td>
<td>%</td>
<td>2014-2015</td>
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<td>For all trips less than 5 km*, part of these trips are done by: i) car, ii) public transport, iii) bike iv) on foot and v) other</td>
<td>Car 30%</td>
<td>%</td>
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</tr>
<tr>
<td></td>
<td>Public transport 3-4%</td>
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<td></td>
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<tr>
<td></td>
<td>Bike 37%</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>On foot 28%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other 1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of buses in city with low emission (at least Euro V)</td>
<td>100%</td>
<td>%</td>
<td>2015</td>
</tr>
</tbody>
</table>

* values entered on the basis of short trips under 7.5 km

Characteristic of traffic flows:
- Situated in the city centre, traditionally decentral to the river, with radial road structure.
- Due to construction of district Nijmegen North (Waalsprong) the city centre is even more central.
- Main work location (Radboud University, Academic Hospital, HAN University of Applied Sciences) deep in urban web, without direct connection to motorway network, accessible via roads with limited capacity.
- For two years there have been two traffic bridges over the Waal, formation of urban ring road S100
- For two years there have been three cyclist bridges over the Waal
- Urban ring road not closed due to protected nature/green lung east side, on lateral moraine.
- Most inner city railway crossings are fly-over junctions.
- Barrier effect railway-Prins Mauritssingel in district Nijmegen North.
- The channel separates two southwestern districts in the remaining part of Nijmegen.
Figure 1: Urban structure

Local and regional transport and mobility streams
The centre of Nijmegen attracts a lot of traffic. Traffic flow is derived from its 170,000 inhabitants, as a regional work location with employment for 90,000 people, high schools, shops/catering establishments/nightlife, university/college (40,000 students), two large hospitals, (major) events and tourism.

Daily traffic into the city comprises commuters, students, business traffic and hospital and downtown visitors. The daily outgoing flow also concerns commuters for work and education, mainly to the surrounding cities and the Randstadregion.

Public transport is essential. The main railway station processes 45,000 people a day. The train system is high-grade, with both intercity connections and regional fast trains. There is proper pre- and post-train transport at the stations. Almost 50% of travellers cycle to the train.

In the city, with short distances up to 7.5 km, bike traffic dominates. In 2005 37% of all journeys in the city were by bike (figure 3). Two of our indicators show that there has been a major increase in bike traffic over the years:
- Commuter traffic by bike: 64% of all commuter traffic (2013); 54% (2005) (+19%)
- Traveling to the centre by bike: 65% of total traffic (2015); 2005 50% (+30%)

Proportionate to the urban cycling traffic, car traffic for short distances decreased considerably (internal rides 2013: 22%; 2005: 34%) (-55%).
Four types of infrastructure characterise the current transport system:
1. railways and location stations
2. urban main roads
3. network of cycle superhighways
4. limited traffic zones
Public transport
Train: intercity system, high frequency rail transport and regional slow trains (urban rail system). Five local stations connected to urban junctions (figure 4), urban rail system, Meuse line towards Venlo-Roermond.
Bus: almost 89% of inhabitants within 300 m of public transport. Bus rapid transit - bus from station, to P&R and Arnhem (two lines). 100% low emission buses, Euro V.

Figure 4: Public transport network (train and bus)

Road traffic
The transport system is largely determined by the location of Nijmegen by the Waal. Since 2013 there are two river-crossing connections for road traffic, the Waal bridge and De Oversteek, together amounting to road capacity of 100,000 vehicles per 24-hour period. The new traffic bridge is part of new urban ring road S100. Priority for throughput and traffic flow; dynamic traffic management. 22% of all trips < 5 km by car (private cars).

Network of cycle superhighways
All main municipal roads (total 70 kilometres) have safe, separate cycle paths. There are three bike bridges over the Waal; for the oldest, a renovation and upgrade is being prepared. Bicycle traffic is stimulated by an independent network of cycle superhighways in the city (figure 5). Total length: 79 km, 43 km of which is ready. The sustainability traffic system has been increased since 2010 by the realisation of seven new bike tunnels, bridges and fly-over junctions with (busy) car traffic. Nijmegen has approx. 0.7 metres of cycle path for each head of the population.
Figure 5: Network cycle superhighways

Limited traffic zones
All roads in the city are appointed as either access road or limited traffic-road, with corresponding road design. Nijmegen has 630 kilometres residential streets (residential area) and 70 kilometres access road (figure 6). In Nijmegen’s city centre there is limited traffic.
2B. Previous performance targets

In the past ten years Nijmegen has successfully implemented Transport and Spatial Policy Plans. We want a sustainable urban transport system, with a focus on opportunities for urban environment, safe and clean urban transport. Actions have focused on managing demand (cars), traffic calming, improving quality of public transport and creating a high quality system of urban/regional cycling routes to encourage active travel and reduce private car use. Nijmegen has reduced the public transport system's dependency on fossil fuels with 100%. All buses use natural gas as fuel, which has improved the air quality. Also a total of 43 km of cycle superhighways has been realized.

Traffic safety
Traffic safety is a basic requirement for a sustainable traffic system with a lot of transport by bike and substantially fewer traffic jams. To minimise the chance of accidents, a strict road categorisation has been introduced. All roads are designed as access roads (flow function, 50 kilometres/hour) or residential streets (max. 30 kilometre/hour) (figure 6). Major connected residential areas (length: 630 kilometres of limited traffic residential streets) do not have dangerous traffic. Car traffic is clustered on access roads (length: 70 kilometres) with separate cycle paths. Cyclists have right of way on safely designed junctions and roundabouts. The result: a safer social climate, a comprehensible traffic system with advantages such as clean air and less noise nuisance.

Figure 6: Access roads (red/blue) and residential streets (residential area grey)
The bicycle is the most efficient urban mode of transport: zero emission, major positive effect on the urban social climate and avoids congestion. To stimulate bike use, there has been major investment in a network of separate, high-quality cycle superhighways. Of a total of 79 kilometres, 43 kilometres is ready and another 5 kilometres will be added soon (figure 7).

A characteristic of cycle superhighways is quality; a pleasant cycle without much delay. Cycle paths go in two directions through limited traffic areas, with priority over car traffic. The realisation of proper cycle superhighways has a discernible effect on reducing traffic jams and a shift from car to bike. The share of bikes in the modal split is increasing, certainly for short distances. Comfortable cycle superhighways are a must for e-bikes. Cycle superhighways do not end at the cities borders, but connect to surrounding towns and villages. For instance, the RijnWaalpad, which opened in 2015, connects Arnhem and Nijmegen with 18 km of cycle superhighway. A special light fixture gets car drivers thinking: isn’t cycling a better option?

Expensive, yet valuable for cyclists are bicycle tunnels and bridges (safe, no delay). Nijmegen has realised six bicycle tunnels and a bicycle bridge these past five years. One can cycle over the city on bicycle bridge Snelbinder, an icon over the Waal, 2,300 metres long, (figure 14).
Successful policy mix
The possibilities of stimulating sustainable mobility behaviour (use of train, bus and bike) strongly depends on a proper policy alignment. The integration of spatial policy versus traffic and transport policy has been introduced widely. Important, is our structural vision, the ‘Nijmegen Sustainable Accessibility’ memorandum and the ‘Parking’ memorandum. Thanks to integration in the spatial policy, bus corridors (bus rapid transit) and new, direct bike connections are incorporated, free from car traffic. The parking policy financially and progressively stimulates the choice of sustainable mobility. Together with the improvement of bus lines and bicycle infrastructure, we are working on a sustainable behavioural change (figure 10).

High frequency railway
A proper train system is the basis of a sustainable urban transport system. Apart from improvements on intercity trains, there has been a lot of investment these past few years in six new stations in and around Nijmegen (figure 4). The train system is increasingly becoming an urban rail system, which transports high frequency passengers through the urbanised region.

Bicycle – public transport chain
In the bicycle-train chain preliminary transport by bike has increased to 43% and subsequent transport to 22%. Bicycle parking at stations has been improved quality-wise and quantity-wise. With 8,700 new bicycle parking spaces the situation near Central Station Nijmegen can now be considered satisfactory. The new bike transferium (4,000 spaces) is open round the clock and has an automated bike referral system. The use of public rented bike has increased strongly. Bicycle parking in the city centre of Nijmegen has strongly expanded (from 500 to 2,700 spaces in the street), and free guarded parking facilities (from 360 to 2,500 spaces in 2014).

Bus rapid transit systems
In addition to the train system, high-grade public transport (bus rapid transit system) was developed. With high-grade lines, travellers have been transported quickly from the region to the city since 2008. An important stop is the Park & Ride area at the approach road from Arnhem. The rapid transit buses also have a separate bus lane. The bus shuttle to Radboud University / HAN University of Applied Sciences / Academic Hospital is a frequently used bus rapid transit connection (figure 8). Because of this, the share of public transport from and to campus has strongly increased, for students as well as staff. To prevent the emission of diesel fumes in city and elsewhere, the whole regional bus fleet drives on low-emission biogas. A large amount of this green gas is generated in fermentation plants in our own region.

Figure 8: High-grade public transport with Waalsprinter (red)
Dynamic Traffic Control (DTC)

For urban accessibility, there is a focus on optimal use of the available traffic infrastructure via dynamic traffic control (figure 9). It is led by our fulltime manned traffic control centre, which works with cameras.

![Diagram of Dynamic Traffic Control](image)

**Figure 9: Dynamic traffic control measures**

Typical for mobility on an urban level is that networks cross each other so the decision has to be made which mode of transport gets priority. Nijmegen developed this in its Multimodal Traffic Management. Within the ring road, bicycles and public transport get priority. This has already been implemented at various junctions.

Traffic lights have been adjusted to dose traffic over the S100 ring road and to let traffic stagnate as little as possible. Where possible, a ‘green wave’ is introduced. This also improves air quality and reduces noise nuisance, as less cars need to brake and accelerate. The settings of traffic lights are adapted to the current situation en route and road users are informed via dynamic information signs. When the traffic from the city route does not flow properly, the influx of new traffic is limited and the outflow of traffic is increased.
In and around the city centre Nijmegen has a parking referral system with dynamic referral to prevent driving around unnecessarily. On approach motorways and on the municipal ring road a DRIPS (Dynamic Route Information Panel System) provides high-grade and real-time driving advice. By Smart Travelling / SUDS drivers are advised to avoid the peak in advance (figure 10).

Freight transport
In the Green Hub we try to arrange the provision of the city centre more sustainably. The supply of goods and the removal of return freight and waste are important for the economic vitality of our city (centre) and for air quality, liveability and safety. To limit the inconvenience of freight transport we aim to stock the city centre smarter, cleaner and safer and stimulate the transition to clean fuel. The goods are delivered at one exchange point outside of the city and are then clustered and delivered with ‘clean’ lorries per shopping street or client.

National and European networks/programmes
Nijmegen is involved in several networks and programmes focused on broadening the view on urban mobility and propagating experiences in sustainable urban mobility. National support is important for major infrastructure, reducing the barrier of railways, the construction of cycle superhighways and better use of infrastructure/avoiding congestion. The European Training Programme for Urban Transport Professionals, or TRUMP (2004): the integrated working and assessing of urban mobility. Participation and presentation to European/world bicycle conference Velo-City (2007-2008-2010-2012-2013-2015).
2C. Plans for the future

The municipal sustainability agenda (consisting of five pillars, including that of mobility) is the basis of our cooperation with external partners. The implementation programme ‘Duurzaamheid in Uitvoering 2014-2017’ sets priorities in the field of sustainable mobility: more cycle superhighways, even better public transport and logistic. In the sustainable energy pillar we are working on the energy transition in mobility, the Lean and Green status in 2010 (20% CO2 reduction for municipal transport) and a Green Deal Zero Emission for Municipal Transport. In relation to sustainable urban development: bike promoting spatial planning, climate-proof city and an improvement of the quality of the social environment.

Free choice of mode of transport

What is leading in Nijmegen’s mobility policy is the freedom to choose one’s mode of transport. People choose a certain mode of transport on the basis of preferences and availability. The city administration tries to make people aware of their choices and selective car use. Fundamental about this is the improvement of the quality of modes of transport that contribute to a sustainable city, such as bicycles and public transport.

Figure 11: Bicycle traffic in Nijmegen – daily urban system

We are at a turning point with regard to participation in society. While we had to focus on properly realising major infrastructure these past few years, the (responsibility of the) citizen is now the main focal point. Apart from mobility management for employees of companies, we now want to inform and involve residents over the next few years (figure 12). We want to highlight concrete options for the (economic, personal and social) advantages of sustainable mobility. The impending major maintenance of the old Waal bridge requires people to reconsider their choice of transport and offers an ideal moment stimulate people towards sustainable behaviour (see further on in this text).
The use of bikes in and towards the city has potential to increase. But even more efforts are required to improve the routes and infrastructure to important urban destinations. Only then will the switch from car to bike reach a higher level in which commuters leave the car at home and take an e-bike into the city. Bike parking facilities near the most important destinations also require extra attention: these are also key for a more sustainable choice of transport. Changing facilities at destinations or the further implementation of a rate for parking cars also helps. Combatting bike theft remains a point of interest too.

**Short-term cycling measures**

- Nijmegen and Arnhem will be organising international bicycle conference Velo-City in 2017 (ECF) (figure 13); 1,500 delegates will experience how efficient and sustainable the Dutch traffic system is.
- The construction of 14 km cycle superhighway Nijmegen-Mook-Cuijk; financing €14.2 million has been completed.
- Construction of cycle superhighway Beuningen – campus Heyendaal (4 kilometres, in realisation).
- Upgrade crowded cycle paths around city centre.
- Improved alignment traffic lights, prioritising modes of transport in the central ring.
- Widening/upgrading cycle path old Waal bridge.
- Renewal cycle superhighways, 16 kilometres (€5,000,000 municipal credit).
- Information, achievement and reward for cyclists.
- 0-10 years: focus on finishing the network of cycle superhighways.
Public transport measures in the short and medium long term

- Programme high-frequency rail transport (PHS), with fast, high frequency train services; investments in/around Central Station and around the station, approx. €75 million national government; contribution municipality €5.5 million.
- Station Heyendaal operates campus Heyendaal (Radboud University, the UMC, HAN University of Applied Sciences and Regional Training Centre). The regional railway Nijmegen-Venlo is so busy that Station Heyendaal has too little capacity. Together with ProRail and campus partners we will get to work with the expansion of the transfer capacity and upgrade of the station.
- The Meuse line (Nijmegen-Venlo) (now diesel trains) will be electrified, because of which emission will be reduced.
- Expansion of referral system to the 10,000 bicycle parking spaces at Central Station.
- Expansion of bus rapid transit lines, improvement of circulation infrastructure, improvement of reliability.
- The small-scale transport of various target groups (people with a disability, student transportation and public transport for people who do not have a bus line at their disposal) will be procured sustainably. We are investigating the possibilities: minimum requirement seems to be green gas; possibly, part of the vehicles will be electric.

Allocation car traffic

These past few years there has been major investment in main urban roads, amongst which the new city bridge. This offers opportunities for extra measures regarding sustainability, cycling measures and public transport. The road network around the city centre served as the only route north for many years. The new bridge prevents unnecessary through traffic. The next step is traffic calming. Especially taking into account the increasing attraction of the city centre, this offers opportunities for improving the crossing options of cyclists and pedestrians.
Compelling event Waal bridge
Over the next few years the old Waal bridge will be revitalized. This means that the circulation will be considerably reduced for a while. Traffic will be diverted or people will choose a different time or mode of transport. In view of the scope of this assignment we are referring to this as a compelling event, a special occasion for people to change massively their transport behaviour.
With the state programme ‘Better Used Follow-Up (2015-2017)’ a measure package is being developed together with socially involved organisations, with which the traffic participant can take his own behavioural decisions in order to avoid traffic jam problems. The traffic participant thus becomes aware of the impact of car use during rush hour on accessibility and liveability, and the contribution he can provide.

Figure 15. Principles Better Use Follow-Up: positive change in behaviour diminishing delayed car traffic and congestion

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<tr>
<th>Profielen werknemers (voorbeelden)</th>
<th>I</th>
<th>II</th>
<th>III</th>
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2D. References

List of Policy plans and other references:

- Policy memorandums [www.nijmegen.nl](http://www.nijmegen.nl)
- Mobility page [www.naarnijmegen.nl](http://www.naarnijmegen.nl)
  General information about traffic in and around Nijmegen
- Regional cooperation [www.destadsregio.nl](http://www.destadsregio.nl)
  Better regional accessibility, more attractive public transport and better connection to car, train, bus and bike.
- Fewer traffic jams and mobility alternatives [www.beterbenutten.nl/regions/arnhem-nijmegen](http://www.beterbenutten.nl/regions/arnhem-nijmegen)
  Mainly focuses on the behavioural change of travellers. The region expects 2,400 more travellers to avoid the rush hour.
- Leading together in Mobility [www.slimopweg.info](http://www.slimopweg.info)
  The Leading Together in Mobility programme (Samen Leidend In Mobiliteit (SLIM)) is the regional covenant in the field of dynamic traffic management. It indicates how the various road maintenance authorities in the region deal with structural and incidental accessibility problems on the road network.
- Car sharing programmes [www.greenwheels.nl](http://www.greenwheels.nl) and [www.studentcar.nl](http://www.studentcar.nl)
  Good for the environment and the city
  Each shared car prevents 15 other cars on the road. This is not only good for the environment but also provides valuable space in the city.
- Structural vision [http://www2.nijmegen.nl/wonen/ontwikkeling/visies_op_stadsontwikkeling/structuurvisie](http://www2.nijmegen.nl/wonen/ontwikkeling/visies_op_stadsontwikkeling/structuurvisie).
  An arterial route around the centre, new transfers at the edge of the city where car drivers can switch to public transport or the (electric) bike, addition of the Beuningen – Station Goffert – Heyendaal line at the future network of bus rapid transit lines in the city and further expansion of the network of cycle superhighways.
- Twitter account accessibility @tonijmegen
- Logistics approach
  Almost all motor vehicles emit harmful substances. European economic policy aims for replacing 20% of harmful fuels by cleaner ones by 2020. This is why the city of Nijmegen is stimulating driving on natural gas alongside the use of bicycles and public transport. The city of Nijmegen is also looking for smart ways of arranging the provision of the city centre and limiting traffic from and to companies together with the business world.