



Department of
Transport

2014 Netherlands Cycling Study Tour Observations and Reflections Report



Netherlands Influential Tour

Prepared for Department of Transport

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Executive Summary

This paper presents the findings and reflections from a tour by an Australian Delegation to the Netherlands that had a primary focus on active transport, but also took in other modes. The tour was arranged by the Cycling Promotion Fund and the Netherlands Government (though the Dutch Embassy in Sydney).

The delegation consisted of a range of transport professionals and advocates that have the passion to drive innovation in active transport within Australia by taking an open set of eyes and an open mind to what is possible in the short, medium and long term. The delegation of twelve was as follows:

- Stephen Hodge-Government Relations Manager, Cycling Promotion Fund
- Peter Bourke-General Manager, Bicycle Industries Australia
- Craig Wooldridge-Director Network Planning Moving People, Department of Transport Western Australia
- David Shelton-Executive Director Strategy and Planning, Vicroads
- Michael Roth-Executive Manger Public Policy, Royal Automobile Club of Queensland
- Cathy Oke-Councillor, City of Melbourne
- Myfanwy Lawrence-Australian Local Government Representative, Australian Bicycle Council
- Jon Leighon-President Bicycle new South Wales and Member International Cycling Union Participation Commission
- Marilyn Johnson-Board Member Australasian College of Road Safety
- Clare-Ferres-Miles-General Manager Place Strategy and Development, City of Port Phillip
- Alan Evans-Director National Roads and Motorists Association and Chairman Strategic Policy Committee
- Fiona Campbell-Manager Cycling Strategy, City of Sydney



The tour consisted of a mix of presentations by Dutch experts from regional and local government, the private sector and advocacy groups along with practical cycling and walking experiences. The cities and towns visited were as follows:

- Utrecht
- Rotterdam
- Eindhoven
- Amsterdam
- Houten
- Zwolle
- Arnhem-Nijmegen City Region

Overall the cities visited in The Netherlands are much smaller than those in Australia. For example, the capital Amsterdam has a city-wide population of 800,000 and a regional population of 2,300,000. What is important to note however is that while this is smaller than most Australian cities, the inner city population of 800,000 is far greater than that of Australian Capital Cities with a much smaller footprint. Of note, the City of Amsterdam is a 7km radius and the greater region is forty kms by forty kms.

While the city sizes are smaller, the approach to integrated planning across all modes is of strong interest. Australia has more recently moved to a focus on moving people and goods, and it is clear that The Netherlands have taken this a step further with a focus on human orientated city planning along with a strong economic focus with the movement of goods on regional networks (road, rail and pipelines). Within cities and towns the highest priority in The Netherlands is cycling, followed by walking and public transport and finally car movement.

With a strong focus on cycling, bike ownership is high, with an average of 1.3 bikes per person, a figure higher than any other European country. Moped ownership is also high at about 1m, which could be attributed to the fact that lower powered models are allowed on the cycle paths as long as they keep at a speed no more than 25/km/h (although most riders do not obey this ruling).

Dutch car ownership patterns reveal some interesting statistics: in the 1970s, with a population of 8m, car ownership rates were around 50% (4m). Today the population has increased to 16m but car ownership is still at 9m (56%). While the ownership percentage has increased, the number of cars is not the critical factor, it is more about how and when each mode of transport is used.

The scale of the bike network is a key factor in attracting cyclists, while a safe systems approach also contributes. Most cities plan for residents to be with 400-500m of the primary cycling routes (mostly separated paths) and within 250m of the secondary routes (mostly shared and on road).

The approach taken has had a positive impact with an overall mode share for bikes being 27%, and mode share for inner city areas being up to 40-50%. Within the cities on average 3.2 trips per day are taken by each person with the mode breakdown being: 1 by car, 0.5 as car passenger, 0.8 cycling, 0.6 walking and 0.3 by public transport. A significant proportion of trips are short due to the compact nature of the cities and towns, with more trips being made by bike than car when the trip distance is under 4km. Interestingly, when the car is used for the longer trips the car occupancy is reasonable low, although still significantly higher than Australia, but there is more of a culture to share trips due to the opportunities presented by high-density living.

While the bike share mode is impressive the gender split and reasons for cycling are also of interest. In The Netherlands more females cycle than males, which is largely assisted by the slower pace of cycling (more social than a race) and shorter distances travelled. The reasons for

cycling are broader than that in Australia with the key reasons being health, low cost, easy parking, fast, fun and environmental. There are also air quality factors that are regulated (for planning approvals of new developments) that assist in driving more sustainable modes of transport. With these factors in mind it is therefore not surprising to learn that the highest cycling benefits are social (the human side), followed by environmental and finally economic (which is fairly small).

The cycling culture starts at a young age with cycling education commencing at the age of four, and many kids being on a bike well before this age. With no school buses and car parking being limited, the main option for getting to school is bike and this assists in embedding cycling as a major transport mode early in the lives of the Dutch. Overall kids (under the age of 18) travel the longest distances compared to other age brackets. There is no divide between the various socio economic levels with all in society valuing cycling as a valid and fast mode of transport, even the royal family.

For longer trips, public transport plays a key role, with cities being linked by heavy rail and internal connections being by bus, light rail and bike. The public transport agency has moved to a door to door approach, with hire bikes to encourage multi modal trips.

The Netherlands approach to urban and transport planning is vastly different to that in Australia and we cannot expect to super impose the Dutch approach into the Australian context. However, there are some key learnings that can be considered in Australia:

1. Significant and sustained growth in cycling numbers will not occur without a safe and connected cycling network;
2. Parking bays for cars in the inner cores of CBD areas must be minimised to reduce congestion and create a safe and attractive environment for cycling and walking;
3. Cycling facilities on arterial roads should be separated where possible;
4. There is scope to review cross section options for local access roads to provide a variety of safer options for cyclists and lower operating speeds for motorised traffic;
5. Bike education should be considered in primary schools, but bike trainers would be required to ensure a greater burden is not placed on teachers;
6. Planning is required for safe off road facilities for cycling and walking to schools, including parking facilities with schools;
7. Planning is required for free or low cost end of trip facilities in CBD and Strategic Activity Centres, including the long term needs before options are built out;
8. Shared paths should be provided within industrial areas and the key feed in routes; and
9. Planning and construction of primary missing links is essential;
10. Continual and reflective investments must be made to create environment conducive to cycling.

Key Highlights in Focus

The tour revealed a number of interesting findings and observations that have been summarised below.

The Netherlands Embrace of Cycling Did Not Happen Overnight

The transformation of the Netherlands from a cycling city to a car city and then back to a more balanced transport city was not an overnight success. Like many cities around the world The Netherlands embraced the car after World War Two, thereby moving from a high of 85% cycling mode share to a low of 25% by the mid 1970s. By this stage, historic buildings were being demolished to make way for freeways through city centres and the annual death toll from road crashes (all modes) had hit more than 3,000, including 400 children. Cyclists made up 17% of the fatalities and 32% of those injured in crashes.



The culmination of these factors, along with significant spikes in fuel prices and fuel shortages, created a ground swell of protest that resulted in the development of the Peoples Transport Plan 1976 to 1980. The Plan included funding for cycling, two demonstration projects (the Hague and Tilburg) and extensive before and after studies. Following the learnings from the two demonstrations projects, a further trial was undertaken in Delft, based on a network approach.

As with the previous projects, a before study was included as was a short term after study, but a long term after study was also included. Key features in these projects were bi-direction separated bike paths on one side of the road, traffic calming, priority for cyclists at most intersections and coloured surface treatments for cycling facilities.

The ongoing learnings fed into the 1980 and 1989 National Transport Strategies. The 1989 Strategy contained the goal to reduce car use growth and a Bicycle Master Plan. Subsequent Plans have built upon the early plans and have continued to evolve, with the latest being released in 2012.

Urban, Economic and Environmental Planning

The Dutch place a very high priority on integrated planning across many areas. This has resulted in strict planning measures being in place, such as growth boundaries and air pollution requirements. For many cities the business as usual approach has prevented future growth as the pollution levels would have been exceeded if the development proceeded. This has resulted in developments being reworked to reduce car dependency to achieve a more sustainable outcome.

Within the inner core of larger cities, road capacity has been reduced to make it harder for people to drive in congested areas. This has been achieved by removing lanes, converting two lane streets to one lane/one way and reducing the continuous lengths of streets. This approach has achieved good results and the residents appear to have adapted to the changes. High density has greatly assisted in this cause as it ensures that most trips are fairly short and achievable by other modes such as cycling, walking and public transport.

Separated Bike Paths and Sealed Shoulders

The planning for cycling in the Netherlands is based around a road hierarchy of expressways (freeways), arterial roads and local roads. On freeways and arterial roads the cycling facilities are always separated from the motorized traffic to maximise safety and encourage cycling.

On lower speed arterial roads there is a mix of approaches. Up until recent years the approach for low speed arterial roads (those within CBD and central city centres) was to separate cyclists with the provision of a separated bike path.

More recent road reconstructions and modifications in a number of cities have resulted in the separated facility being removed and replaced with a sealed shoulder, mostly in the order of 1.5 to 1.8m wide. While this appears to be a step backwards in safety there are other factors at play: the move to lower speed limits does reduce the risk of fatal and serious injuries with non-segregated facilities; pedestrian walkways needed to accommodate greater numbers; and rubbish trucks had difficulty accessing bins with the gap caused by the segregated paths.



Separated path example



Sealed shoulder example



Local road example

On local roads (30 and 50km/h roads) the main focus is on the car being a guest and cyclists having priority. There are a variety of approaches including sealed shoulders, shared space and narrow roads. The approach taken appears to depend on the funding available, the width of the existing road and volumes on the road.

For the sealed shoulder approach there is a growing movement towards a 1.8m shoulder to provide a greater level of separation and safety between cyclists and motorised traffic. Where the space is shared the main focus is to keep the width of the road down with lane widths for motorised traffic generally being 2.5m where two lanes are provided and down to 2.5m to 3m on roads that are mostly operating as laneways servicing driveways.

Speed Limits on Local Roads

Speed limits on the local roads vary between 30km/h and 50km/h. Within the inner core of the cities, travelling beyond 30km/h is largely not possible due to the very narrow streets of the medieval towns and the congestion in the more modern cities - this has largely been achieved through travel demand measures with limited lanes and parking available. Beyond the inner core the speed limit debate is alive and well particularly in relation to reducing significant areas down to 30km/h and whether a 30km/h limit is appropriate compared to a 50km/h limit. From riding through a number of the post war cities, the road widths on some roads were clearly more suited to a 50km/h limit. That being said if treatments were installed, options would be there for reductions to 30km/h.

Bike Parking

With significant bike use, comes the problem of where to park all of the bikes at the end destination. Historically, this has been accommodated by using public space such as verges, canal railings and public squares. With population growth, this situation has become untenable and more provision has been made for off street parking.

A significant focus has been placed on providing underground bike parking at rail stations based on the principles of: right spot, right size and customer focus. The City of Utrecht is a leader in this area and has 4,200 underground bays at the central train station, which was developed in detail before construction using micro simulation to ensure that peak periods were functional.

Shop converted to bike parking



These types of facilities cost between 3,000 and 8,000 Euro (AUD\$4000-11,5000) per bike bay to construct, which is still many times cheaper than an equivalent bay for cars in a underground or multi storey facility. Parking for the first 24 hours is free and the following 24 hours is 1.25 Euros (AUD \$1.80). They are currently expanding the underground parking to 12,500 (by 2016) and have plans for 32,000 bays by 2035.

Even with the increase in underground parking there are very significant numbers of bikes being parked in public spaces. This appears to be largely a cultural attachment to past practices and the convenience of parking as close as possible to the end destination. In Utrecht, they have recently taken a different approach by renting a shop that had been empty for a few years and created an in-shop bike parking facility that is free to use and is open from 6am to 4am.

Bike theft is an issue that is assisting in driving 'more cyclists to park at the underground stations, which are guarded. Bike theft peaked at 1m bikes per year, but has now dropped to 0.5m per year. While guarded facilities have assisted in dropping the theft rate other initiatives such as programs to address homelessness and assistance for people with drug addictions have also helped.

Car Parking

Car parking supply is carefully managed in each of the cities that were visited. All of the cities restrict the amount of parking supply within the central city areas to reduce the demand for car use and many residents/workers do not bring a car to work as it is simply too difficult and expensive to find a car parking space. This in turn has allowed for most of the arterial roads within the ring road systems to be kept at one lane in each direction with widenings at intersections for turning lanes. Some roads have parallel parking bays, but not all.

Bikes and Train Stations

With cycling being a strong mode choice, it is logical to link cycling with public transport, particularly when there is a very well connected regional passenger rail system being in place.

This is demonstrated by the fact that 42% of train passengers arrive by bike and 14% continue their journey by bike.

This is partly well facilitated by Dutch Railways providing 100 guarded bike parking areas with capacities that vary from 500 to 5,000. In addition, small stations have bike lockers and bike racks. A number of users have one bike parked at the origin station and another at the destination for a fully connected journey. Bikes are not permitted on trains due to high passenger numbers during peak periods, but are allowed during the off peak for 6 Euros (AUD\$8) and fold up bikes are allowed and are free at all times.



Secure parking at the rail stations is free for the first 24 hours and a fee of 1.25 Euro (AUD\$1.80) is charged for each day after that. They are looking at reducing the fee for the subsequent days to 0.5 to 0.75 Euros a day to accommodate part time workers and students.

Abandoned bikes at stations are an issue and are known as orphan bikes. These bikes are estimated to take up 10-20% of bike parking bays and automatic sensors have now been fitted to reduce the problem.

In 2007, Dutch Railways took over a pilot bike rental scheme that operates within the bike parking areas at train stations. The scheme had 34,000 members in 2007 and this has increased to 160,000 current members. Membership is 10 Euro (AUD\$15) a year and the daily cost to use a bike is 3.15 Euro a day (AUD\$4.50), with billings being monthly via direct debit. At present there are 120 guarded and 180 non-guarded rental locations with a total of more than 8,000 bikes. Excluding the upfront capital costs, the scheme is revenue neutral with vandalism and theft not being a big issue. The customer satisfaction rate is a high 7-8.

Surveys of public transport customers (30,000 annually) have revealed that the perceived wait time at the initial boarding is 2.5 times that of real time and when transferring it is 4 times real time. The scheme goes a long way towards reducing waiting times for connecting modes such as buses and light rail, as the connection is made by bike instead. This has the added bonus of reducing the high demands on the bus and light rail services during peak periods in the busier areas.

Schools

Schools have been provided with very good cycling facilities in terms of bike paths, bike parking and 30km/h school zones in the immediate vicinity of the schools. There are no school buses, some roads are blocked by pop up bollards during drop off and pick up periods and close to half of the students arrive by bike.

Bike education is a compulsory part of life in the school system. The education starts at the age of four with many kids being competent cyclists before this age. A number of practical circuits have been built that facilitate learnings away from live traffic to assist in developing awareness and skills in a safe environment. The education continues through primary school and culminates in a written and practical test in the year before they move to high school. This early approach to embrace cycling with guided education is a key component of setting the kids up for a life long attachment to cycling, which is aided by travel demand measures that limit car use. The education process has other benefits that include a greater appreciation of safety issues for the other modes of transport.



Industrial Areas

Industrial areas are well served with off road cycling paths. As with Australia, industrial areas are difficult to service with public transport due to the early start times and the large blocks. The off road facilities allow for cyclists to get to and from the work place in a safe manner without significant interaction with heavy vehicles.



Ebikes

Electric bikes have started to increase in numbers with 1.3m being sold in The Netherlands so far. Current sales equate to half the value of all bikes sold per year. This has enabled more seniors to ride and, for others, longer distances are now possible. E-charging points are being provided to allow cyclists to recharge their bikes for the return trip. On the negative side, the increased speed availability that comes with high powered e-bikes and scooters is creating safety issues in congested inner city areas as many cyclists do not slow down. This is being further exacerbated by the arrival of new, more powerful bikes, including a recent introduction to the market that has 500W of power and a top speed of 45km/h.

Sharing Cycling Knowledge

The Dutch have established an organisation known as the Dutch Cycling Embassy that is a public private partnership. The Embassy has a focus on sharing knowledge and expertise, economic diplomacy/export promotion, business promotion and alliances with civil organisations. Initially set up with private funding for three years, this has now been complemented with federal government funding for another three years.

The Embassy has three staff and is facilitating work in 38 countries. Some of the key areas in which they work are; education, culture, how to organise change and formulation of ambitions beyond simply the number of cycling path kilometres. Future cycling study tours can be arranged through the Embassy on a cost recovery model.

Data Collection and Analysis

Data collection is a valuable part of the transport planning process to track trends and assist in planning for the future. Across The Netherlands, 50,000 travel surveys are undertaken each year.

In addition, Dutch Railways undertake another 30,000 travel surveys for stations each year. These surveys provide a great array of information across all modes that feeds into strategic and operational planning. However, the fine grain travel data for cycling is still a work in progress. Further work is being undertaken in this area in 2015, with one city seeking a grant to fuse Strava data (commercial personal phone application GPS tracking) with GPS data.

Facts and Figures From Each City

Each city that was visited provided a great range of facts, figures and innovation that can provide a range of learnings and applications in the Australian context. The key items from each city have been summarised below.

Rotterdam

- Second largest city in the Netherlands
- A city population of 620,000 and 1,181,000 across the region
- Only two buildings left standing after World War Two
- Largely rebuilt following the United States approach – primarily around movement by car
- City centre densification underway
- Old Port now mainly residential/commercial
- Growth boundary in place
- All levels of government and the private sector work together to achieve outcomes
- Largest port in Europe and 4th largest in the world (60km long)
- Freight destinations within 50km of the port are mainly moved by truck
- Modes shares - car driver 23%, car passenger 12%, Train 1%, bus/tram 13%, bikes 22%, walking 28% and other 1%
- 80,000 to 90,000 CBD workers
- Not many residents in the CBD, but working on encouraging CBD living
- 80,000 cyclists a day into the CBD
- 5,000 underground parking bays at the central train station
- Four Light Rail Lines
- Inner core streets downgraded for non car modes
- Active streets strategy in place with two way flow, parking on one side and low speeds
- Underground bike parking planned 15 years ago did not accommodate strong increase in demand
- Cycle paths 3-4m wide to allow for side by side cycling
- Bike lanes 1.5-1.8m wide
- Moved a tree 1.5m at a cost of 100,000 Euro (AUD\$150,000) to accommodate a bike path (overall project 2.8m Euro)
- Bike paths in industrial areas black with red at intersection crossings to save on costs
- Bike theft still an issue at guarded bike parking
- On average 1km of bike lanes costs 1m Euros (AUD\$1.5m) (costs vary from site to site)
- 5m Euro (AUD\$7.5m) allocated for bikes lanes per year over the past ten years
- Landscaping an important part of the design process

Utrecht

- Fourth largest city in The Netherlands
- A city population of 322,000 and 650,000 across the region
- Has the largest university in The Netherlands
- Has the busiest railway station in The Netherlands
- Train passenger congestion during peak periods
- Adding new stations and extra rail tracks
- One Light Rail in place and another being built to link the University
- Congestion on the ring road expressway during peak periods
- Focus on improving regional road and rail links
- The city centre is being densified with office buildings
- A major highway that ran through the city has been removed and a canal is being put back in.
- 100,000 bikes cross through the historical centre each day
- City centre bike congestion issues
- Average distance between bike routes 400-500m
- Converting low volumes roads into bike streets (shared space, similar to laneways). These can be a sealed shoulder on each side with the motorised traffic portion being about 2.5m to 3m wide (for two way traffic). Mainly just for roads accessing driveways, not through roads.
- Looking into lowering speed limits for the entire city
- Around 22,000 bike parking stands in the vicinity of the rail station and historical centre
- 13 guarded bike parking facilities
- Constructing 12,000 bike parking bays at/around the central train station, which is due for completion in 2016. The operations were run through a micro simulation model to ensure maximum efficiency is achieved during peak periods.
- Bike parking provided at train stations and bus stops
- Focus for 2010 to 2015 - Upgrading of the 5 busiest bike routes, building missing links (including structures), more and better bike parking, expansion of the public bike scheme (at rail stations) and bike promotion
- Building cycle paths on both sides of major roads
- Trying to plan new bike routes to spread the peak demand
- Trying to reduce bike parking in public spaces to improve walking spaces
- Improving traffic signals to reduce cyclist delays
- Path widths usually 3.5m to 4m and busier sections such as at the university are 5m wide
- New areas have combined bike/pedestrian paths with 3.5m for cyclists, 1.2m for pedestrians. Separation is via a painted white line plus red asphalt for the cycle portion and black for pedestrians
- For new areas, local roads are planned with a 1.5m sealed shoulder, 2.5m wide motorised traffic lanes and 30km/h speed limits
- Having issues in deciding what to provide for cyclists on 50km/h roads
- Not too much of a focus on enforcement, except when school terms start, where caution notices are used

Utrecht 2011-12 Mode Split Percentages				
	<7.5km	7.5-15km	>15km	Average
Motor Vehicle	21.3	64.6	66.8	41.3
Public Transport	3.9	15.1	29.7	13.7
Bicycle	43.1	16.4	1.7	26.3
Walking	30.5	0	0	17.2
Others	1.2	4.0	1.8	1.5

Eindhoven

- Fifth largest city in The Netherlands
- A city population of 220,000
- 300,000 bikes
- 400km of bike paths
- 6,900 free bike parking bays
- A university city
- Previously the Phillips head quarters for manufacturing, which is now outsourced overseas
- Ring road not fully complete which results in a significant amount of through traffic
- Planning for bikes only started in 2006
- Bike plan from 2009 to 2013
- There are 175 traffic signals that result in delays for all modes
- Politicians are demanding change (support for bikes)
- There are a lot of missing cycling links
- Decision made to finish each link in full rather than a bits and pieces approach on all links
- A conversion program is in place to change traffic signals to roundabouts in appropriate locations
- Cyclists get 2 green phases in each traffic signal sequence
- U rail bike parking is being expanded
- Car parking bays are being removed for bike parking (1 car bay equals 12 bike bays)
- All residents have a smart card for bike parking (lock and leave)
- The Hovenring overhead bike roundabout replaced a three lane roundabout for all modes that had a high crash pattern and delays for all modes. This has now become a tourist attraction.
- On minor roads, asphalt is provided for the bike lanes and bricks for the car lane/s
- On bike streets, bricks are used for the cycle shoulders and the narrow car lane is asphalt to encourage cars to stay in the middle of the road
- 101 cycling projects have been completed in the past 4 years at a value of 30m Euros (AUD\$43m)
- 85 other projects have been completed to a value of 22m Euros (AUD\$31m)
- Cycling promotion has a budget of 320,000 Euro (AUD\$450,000) per year, with key targets being students, commuters, large employers and visitors. This has resulted in a 10% increase in cycling
- A 65km cycling circle has been created for families and seniors
- Aiming for an overall increase of 35% in cycling trips
- Free pram loan service in the CBD with demand outstripping supply
- Current focus is on the 7 high quality radial cycling routes that feed into the CBD
- There is a focus on promoting what has been achieved
- A cycling handbook is being developed
- Community events are utilised as an opportunity to ask targeted questions
- A glow in the dark Van Gogh cycle path painting is being installed in 2015
- 30% of kids arrive at school by car
- School zones are posted at 30km/h with an additional advisory 15km/h limit
- Motion sensing lighting is on more recently constructed paths and some have heating to melt the snow during winter
- 3D signage is being developed for the paths

Amsterdam

- Largest city in The Netherlands
- Amsterdam city has a 7km radius and the region is 40km by 40km
- A city population of 800,000 and 2,300,000 across the region
- There are 800,000 bikes
- 15-20 cyclist fatalities occur each year in Amsterdam and there are 50 per year for all of The Netherlands
- Serious injury crashes involving cyclists are increasing
- 25% of Police time is taken up with moped enforcement
- A national calendar for safety campaign topics is in place for all agencies
- 100kms of canals
- Congestion is an issue for all modes
- The average resident cycles 2.3km per day
- Commuting bikes cost between 200 and 300 Euros (AUD\$300-450)
- Cycling volumes have increased by 40% in the past 15 years, while public transport mode share has dropped
- There is a need to invest in extra bike lanes, improved crossings and bike parking
- Cyclists see bike parking as the number one issue by a long way
- There are 250,000 unguarded and 13,00 guarded bike parking bays
- 10,000 parking bays are in the vicinity of the central train station including a floating parking barge
- Guarded parking bays will be expanded to 38,000 by 2020 and 80,000 in the long term
- Bike parking is free for 1 day, 0.5 Euro for 2-3 days and 4 2 Euro for 4 days
- Count down timers displays are at traffic signals to advise cyclists how long the wait is until the next green signal to discourage red light running
- Some traffic signals have small bike mirrors under the green lantern to enable cyclists to check if a truck is behind them
- Currently building a 3.3b Euro subway (AUD\$4.73b)
- Constructing underground bike parking cost between 3,000 and 8,000 Euro per bay (AUD\$4000-12000)
- Working on public education to encourage cyclists to park in designated areas and not where they like to free up public space
- 74,000 orphan bikes removed per year (44,000 for illegal parking and 30,000 abandoned)
- 30km/h speed limits for motorised traffic makes cycling trips faster by comparison
- Distributor roads have 50km/h speed limits
- Drastic choices are need in the coming years to manage congestion
- Most of the car based parking is managed by the City of Amsterdam with an annual income of 170m Euros (AUD\$250m)
- 80,000 people live in the inner city, 800,00 in the city limits and 2,300,000 in the region
- 60,000 to 80,000 tourists walk from the central train station to the city centre each day
- 30m tourists per year
- Car mode share is still dropping, now down to 24%
- Public transport mode share was dropping but has been flat at 21% for the past 4 years
- Cycling mode share still growing with mode share being 53% for 3km trips and 2% for 6km trips
- Inner city cycling mode share is 62%
- Other areas in the city have a cycling mode share of 20%
- Cycling mode share in the regions vary significantly
- Half of the train users arrive by bike and many have a bike at both ends of the journey

- The drivers of increased bike use are; bike policy, car parking policy, educating citizens and the elderly cycling more
- Bike education for children and parents has been outsourced to one company at a cost of 1m Euro per year with written and practical exams during school hours
- Going to the inner city by car is seen as inconvenient
- Heart of the CBD parking is 5 Euro per hour
- The average annual Netherlands income is 32,000 Euro per year (AUD\$45,000)

Houten

- A city population of 50,000
- The original ring road was developed to limit the town population to 30,000
- 8km away from Utrecht
- 20,000 homes
- 70% own a home and 30% rent
- 8 year wait for a rental home
- The Council sets the rental rates
- Town built around cycling in the 1960s when the original rural town had a population of 4,000
- The town was built as a commuting town (2/3 of the employment is out of town)
- Bikes have priority everywhere
- Bike parking is formalised in public spaces
- The town is not anti car, except for short trips
- There are 3,100 bike parking bays at the train station
- Employment within the town is starting to increase along the rail line with an extra station planned
- No low paid industries exist in the town (except retail)
- No cars are allowed within the very inner core (except service vehicles)
- 130km of bike paths
- There is a focus on constructing missing link bike paths
- Cycling mode split 40% for trips up to 7.5km
- The town is based on the separation of functions and modes
- Way finding for cycling is an issue and colour coded metro style signage is being added
- Spatial planning has now been delegated from the national government to the local authorities
- The ring road is now 16km in length
- Suburbs are not interconnected and all inter suburban travel by car requires travel to the ring road to access the next suburb. Bikes have full access across suburbs
- The Houten underground cycle roundabout (below an intersection) preceded the Eindhoven Hovenring

Zwolle

- A city population of 120,000 and 960,000 across the region
- 85,000 jobs
- 40,000 students
- Best economy in The Netherlands
- Greenest city in Europe
- Best Cycling City in Holland 2014
- Bike motorways in place
- Paths grade separated at main roads
- 50% of short trip are by bike
- Compact city centre
- Neighbourhoods planned for cycling
- A recreational bike path network is in place
- Bike racks need to evolve to accommodate ebikes
- Innovative roundabout that provides priority for cyclists over cars. An outer ring provides a continuous sealed shoulder for bikes and cars give way each side of the shoulder. The main route carries 10,000 to 15,000 vehicles and the tee connection carries 5,000 cyclists a day and a relatively small number of cars
- Difficulty in deciding what is a 50km/h road and what is a 30km/h road outside of the inner CBD core
- The path leading to the main hospital carries 6,000-7,000 cyclist per day and 40% of the visitors to the hospital arrive by bike

Arnhem-Nijmegen

- Population of 160,00 in the cities of Arnhem-Nijmegen
- Population of 750,000 across the region
- 20 local government authorities with a variety of cultures
- 2 main cities
- 18 small towns
- A focus on fast paths so that cyclists can travel longer distances in the same time as a shorter distance
- Cycling data is a weak point and are currently applying for an EU grant to fuse GPS and Strava data
- 3 path projects in construction and 3 in planning, total length 80km at a cost of \$55m. Started in 2010 and due for completion in 2017
- New highway for motorised traffic will be tolled due to a shortage of funds. Fees will be 1 Euro for cars and 6-7 Euro for trucks.
- A motorway was closed for one week to accommodate the construction of a pre fabricated cycle tunnel.
- A new phone app will be available soon that allows cyclists to change the lighting colour in a cycle tunnel. Frequent cyclists will have priority of colour choice over low frequent\cy users.
- Median cycle distance is 10km
- Reductions in overall funding has created the situation where car based projects are competing with cycling projects
- Bus travel takes twice as long as bike travel
- Most cycling projects utilise multiple funding sources
- Some are questioning the benefits of cycling as people are living longer

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