



## **Why is there a need to describe traffic networks' cycle friendliness?**

**A report within CyCity.**

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### 1. What are the benefits of a quality description?

Have you ever thought about the fact that different cities are different to ride a bicycle in? Comfort and travel time varies from city to city and from neighborhood to neighborhood. In good cycling cities one can feel safe and enjoy cycling while in other areas and in other cities much is left to be desired.

It can be hard to pinpoint what makes a city more cycle friendly than others and therefore a quality description is helpful. A quality description is used to identify and explain what works well today, and what works less well. In doing so, one can identify important steps to make a city or region more cycle friendly, and know more about how cycle investments will be enjoyed and appreciated by the city's road users. A good quality description, in other words, is the basis for cost-effective cycle planning.

BikeRoute is a service package that helps to analyze the quality of cycle infrastructure and to identify strengths and weaknesses. A quality description using BikeRoute helps to:

- Systematize the work related to cycle planning,
- Visualize and communicate the strengths and weaknesses in the infrastructure,
- Identify cost-effective measures, and
- Analyze and describe the effects of planned measures.

### 2. A complex task

Measuring a city's or route's cycle friendliness is not so straightforward. Many factors influence bicycle road users. Do you have to stop at traffic lights to push a button or do the signals automatically detect cyclists and turn green? Does the person who chooses to cycle on his/her travels receive priority at crossings and junctions or are they forced to frequently stop or take detours that make the cycle trip a slower option than the car? Does the cyclist experience a cycle network that makes sense?

### 3. How have others measured cycling quality?

The Netherlands is one of the world's most successful cycling countries with many knowledgeable cycle planners. That is why when we in CyCity work to describe the quality of transport infrastructure and cities, the Dutch experience is used as a reference point.

The Dutch design manual for cycle traffic (CROW 2007) presents five quality requirements:

- Safety,
- Continuity,
- Directness,
- Comfort, and
- Attractiveness.

These overall quality requirements have also been copied by several other countries to their own guidelines for cycle planning. One such example is Ireland (National Transport Authority 2011). But the Dutch quality requirements, as stated, are quite comprehensive. Not even the Dutch can always explain in more detail how for example continuity is measured or described. Everyone understands that many short sections of cycle paths which are not connected make it more irritating and difficult to ride, and maybe even less safe. But the Dutch design manual does not explain how to measure and concretely describe the qualities that are important for cycle traffic. This is one of the starting points for the work that has taken place in the Swedish development project CyCity and this led to the planning tool BikeRoute.

**4. What happens if quality is measured without basis?**

A second starting point for the work of BikeRoute is that it is important to measure the right things, and to understand what it is to be measured.

In the absence of good planning tools that measure cycling quality in a more accurate manner and in accordance with the five factors there is a need to explain what measures can increase cycle traffic and make cities more cycle friendly. One example is to use the total amount of cycle paths in meters per inhabitant as a measure of cycle friendliness in a city, in the belief that the more cycle paths you have in the city, the better (see Figure 1).

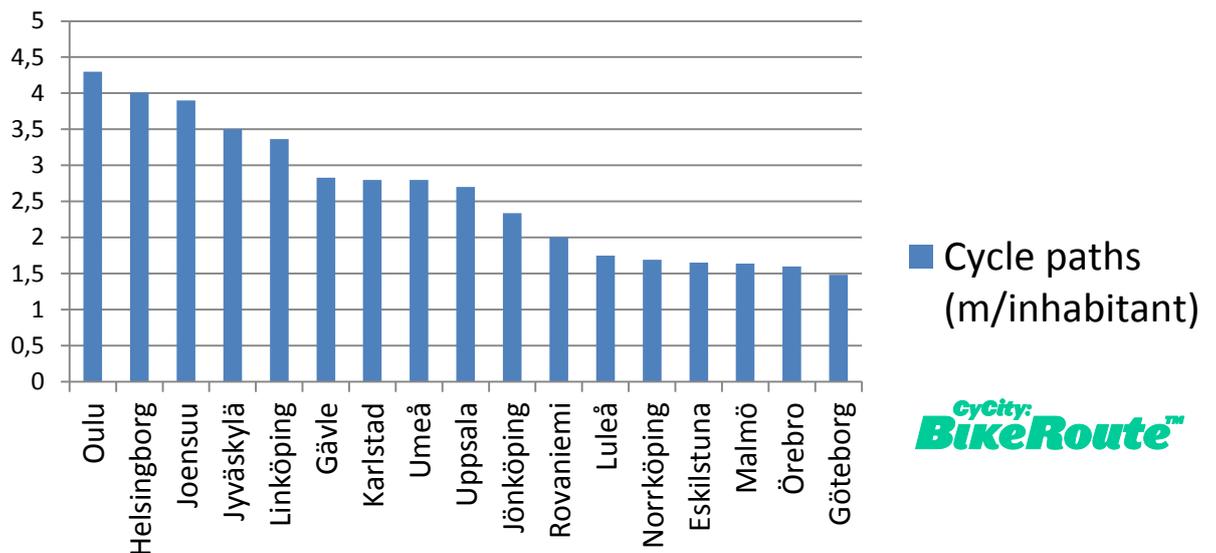


Figure 1. Cycle paths measured in meters per capita in 17 Nordic cities.

Maybe you've heard someone say that building more cycle paths will increase cycle traffic. If so, then the Finnish town of Oulu should have the highest share of bicyclists of the surveyed Nordic cities. Malmö, Örebro and Gothenburg should all be cycle unfriendly cities with few cycle trips. But when one examines the relationship closer, you will see something different. As shown in Figure 2, Oulu has a relatively high proportion of cyclists, 22% of all trips. Only five cities have a higher share according to available statistics (Joensuu, Linköping, Uppsala, Malmö, and Örebro). Among the cities shown in Figure 1 that have a relatively small number of cycle paths, several of these cities have a high cycle share.

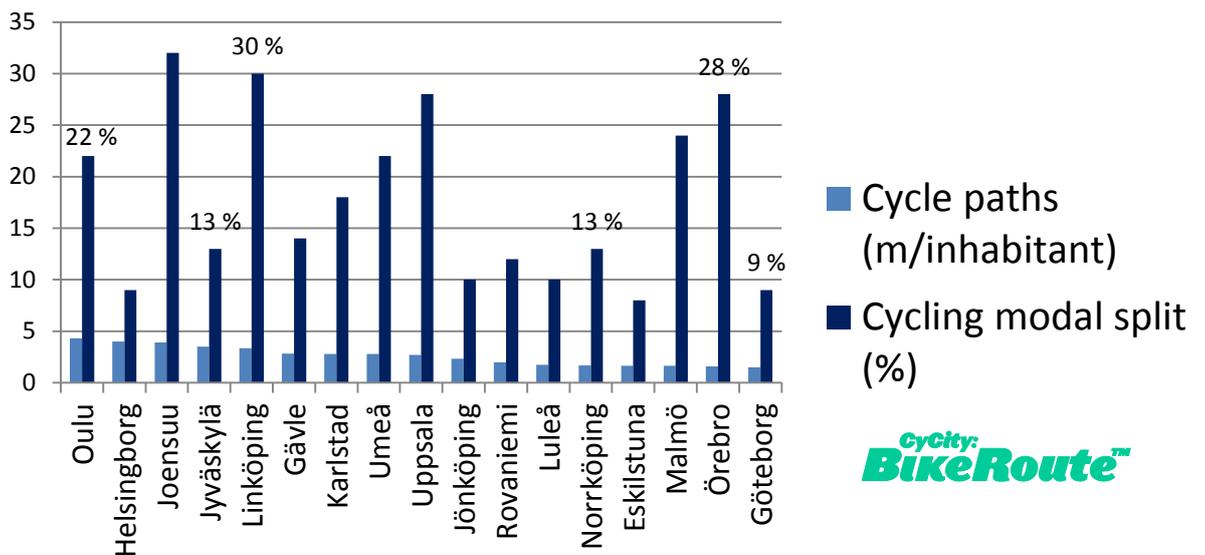


Figure 2. Number of meters cycle path per capita in relation to the proportion of trips with cycles in 17 Nordic cities.

The data in Figure 2 shows the complexity of describing how cycle friendly a city is. Simple measures that at first glance seem logical may lead to wrong conclusions and ultimately bad decisions. The extent of cycle infrastructure has significance (see Figure 3) but there are also other factors that are often not included in the simplified analysis. For example, how secure and fast it is to ride on local streets in mixed traffic influences cycle road users (see Figure 4).

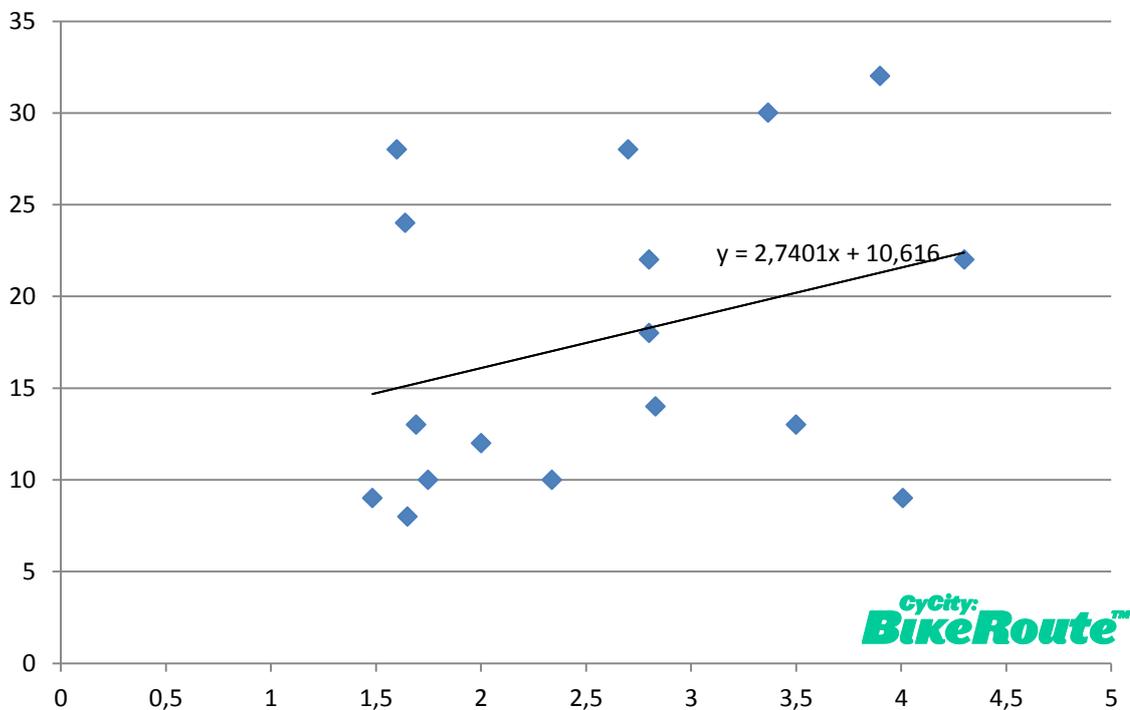


Figure 3. Positive, albeit weak, statistical association between amount of meters of cycle path per capita and cycle share in different cities. The more meters of cycle paths, the higher the cycling percentage.

Figure 3 illustrates that there is a statistical association between the percentage of trips by cycle and cycle path in meters per capita, although it is relatively weak.

Figure 4 illustrates the importance of mixed traffic network's design for a cycle friendly city.



Figure 4. The difference between riding a bicycle on a local street with car traffic at 50 km / h or if the motorists adapt to cycle speed is great. Picture of cycle city Linköping. Photo: P. Envall.

## 5. How does BikeRoute measure quality?

BikeRoute analyzes several important quality aspects of a city's cycling infrastructure and expresses them by means of maps and key figures. This way, the current situation in a city can clearly be described and compared. Even the effects of planned measures can therefore be tested and quantified.

Key figures drawn by BikeRoute present important aspects of the cycle infrastructures quality - how easy and comfortable it is to ride a cycle. With this data, it is also possible to evaluate the overall goals for traffic planning. Urban development can be monitored, such as the target of cycle traffic "to increase travel speed" or "accessibility to cycle lanes will increase" or "new cycle lanes that are built shall have a good accessibility standard". There are many possibilities.

### a. Travel speed

Travel speed is a central aspect for cyclists - how fast is it to get from point A to B? Are there any slow passages and bottlenecks that force cyclists to make frequent stops? Surveys from, for example, Copenhagen (Copenhagen 2012) show that the main motive to start cycling is that the bicycle is faster than alternative modes of transport.

BikeRoute analyzes the travel speed of the cycle network with a high level of detail by GPS studies with real people. In this way, the city gets a concrete baseline picture of cyclists' accessibility, route preferences and where bottlenecks exist. Travel speed measurement can also show if accessibility is different for different types of cycle infrastructure and various cycle groups and the type of infrastructure cyclists use most.

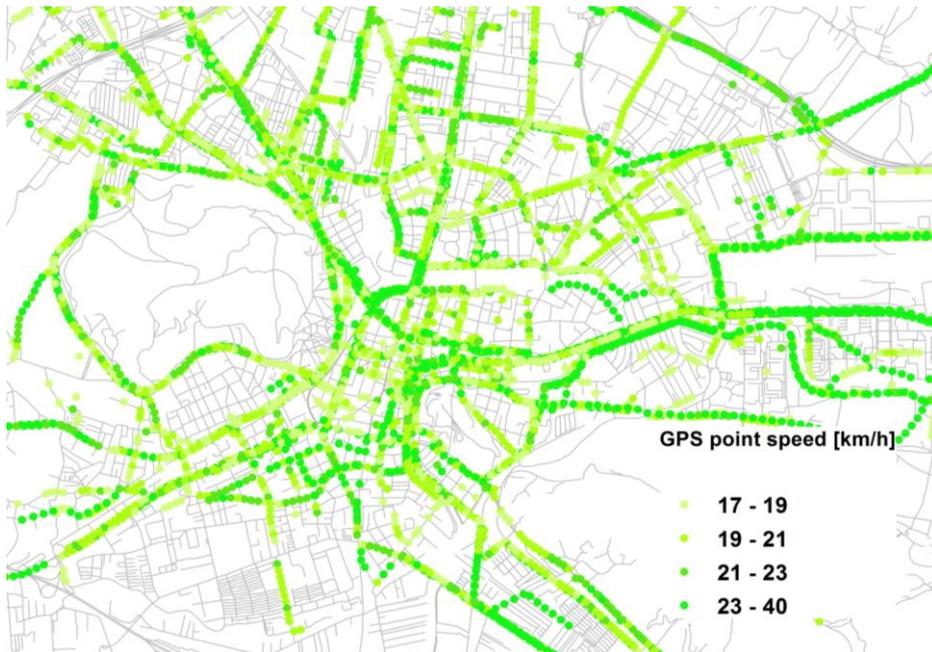


Figure 5. Differences in actual cycle speeds within the cycle network in Ljubljana, Slovenia. Image: CyCity.

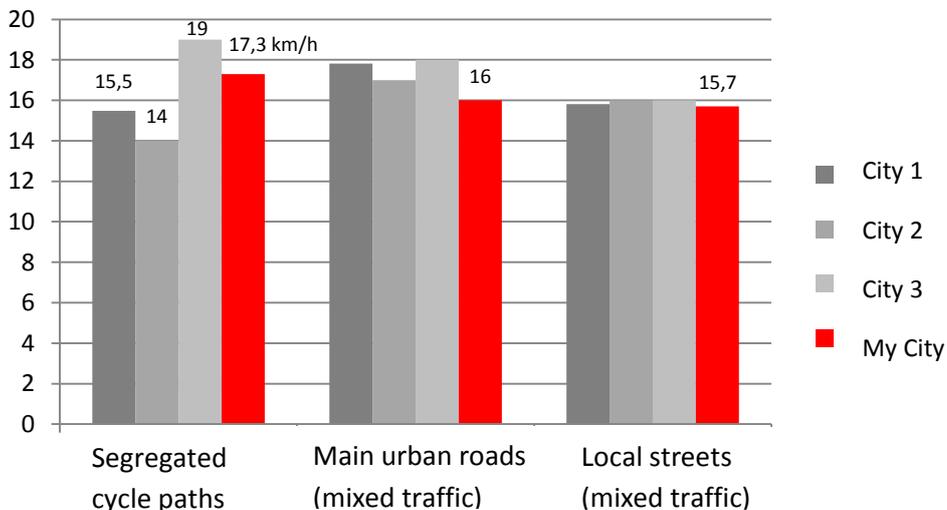


Figure 6. Differences in real cycle speed on various types of cycle infrastructure in different cities. Image: CyCity.

## b. Continuity

The interconnection of cycle infrastructure is important for cyclists. Unfortunately, many cycle paths end abruptly and cyclists are forced to ride in mixed traffic to continue or come to the next section of the cycle path. This is at best annoying for cyclists, but can also be a deterrent to opt out of cycling completely, especially for novice cyclists and children. The reason could simply be a short section of the journey in the shared space with motorists for not choosing the cycle. BikeRoute helps to visualize and measure how

continuous the cycle infrastructure of a city is and how effective an action is to increase the continuity of the network.

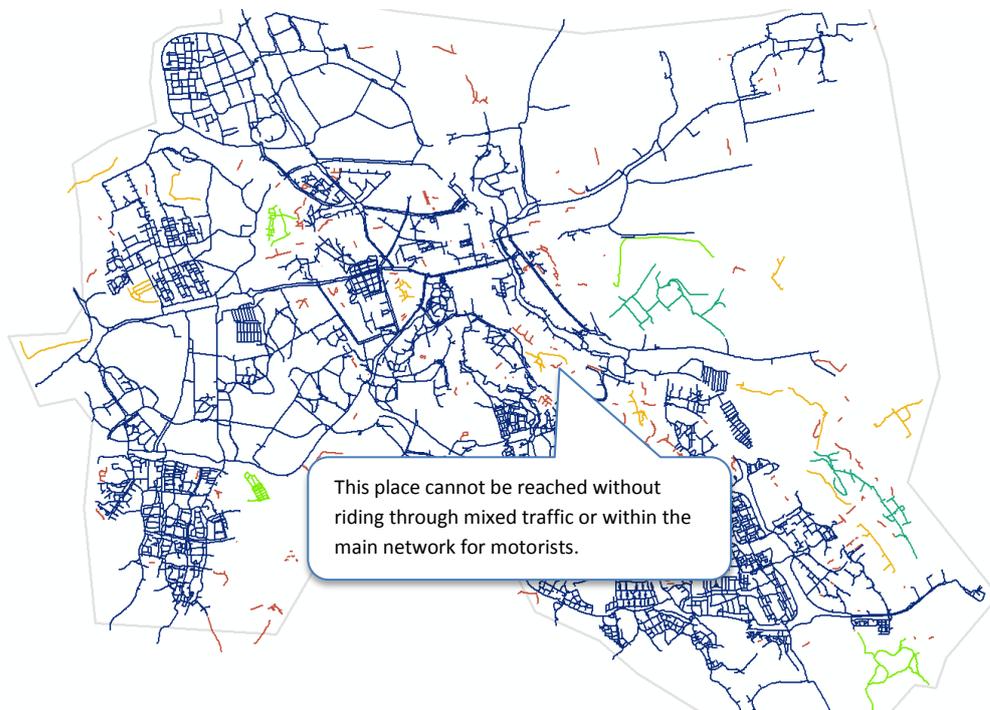


Figure 7. The continuity of the cycle infrastructure expressed by the number of "islands" in different colors. Dark blue shows the connected network where red and orange show small isolated islands.

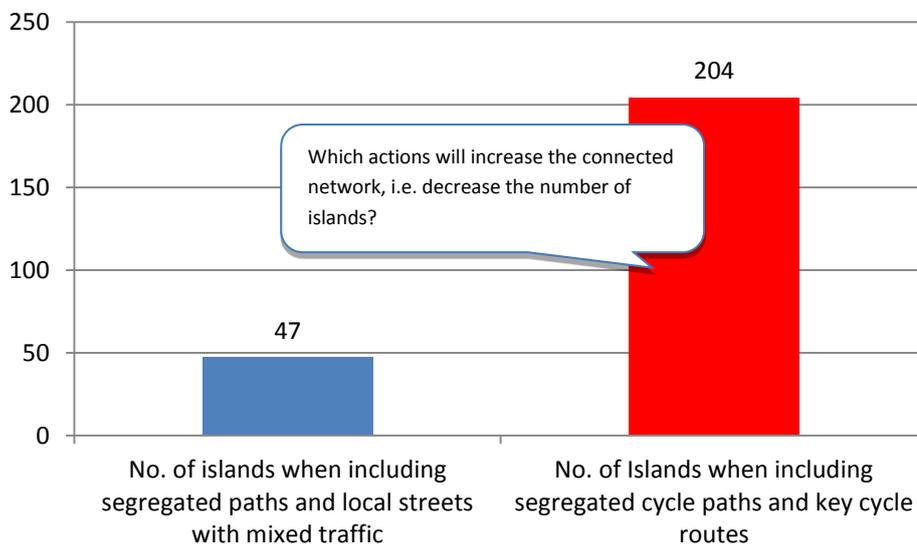


Figure 8. Number of "islands" using two different network measures. Image: CyCity.

**c. Access to cycle paths**

The proportion of the day and night population that has easy access to cycle infrastructure and the lack of easy access is important information to understand the current situation and to prioritize areas for action. BikeRoute matches population data with the available cycle

infrastructure in order to clearly visualize the current situation in the city. The availability of cycle infrastructure is also expressed in a number of key ratios like the percentage of the day and night population that are within the catchment area for cycle infrastructure. Furthermore, access to important destinations such as public transport nodes, schools or large workplaces are clearly visualized.

## 6. Weighing the costs against the benefits?

The total investment in cycle infrastructure in most cities is significant. Although the investment in cycle infrastructure is often socioeconomically profitable, it may differ greatly in effectiveness between different measures. To get the maximum benefit for invested money therefore requires professional planning.

With the help of a current situation analysis with BikeRoute, effective action areas are more easily identified and investments in cycle infrastructure are directed where they will be most effective. BikeRoute makes it possible to also analyze and compare the effect of different measures, such as how many people a new cycle path increases accessibility for cycling or how a particular improvement on a route can increase travel speeds and thereby decrease travel times.

This information can be the basis for identifying the most effective measures and cost-benefit calculations. BikeRoute makes it easier this way for cities to identify the actions that lead to the most new cyclists or highest quality improvement for existing cyclists for money invested.

## 7. References

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