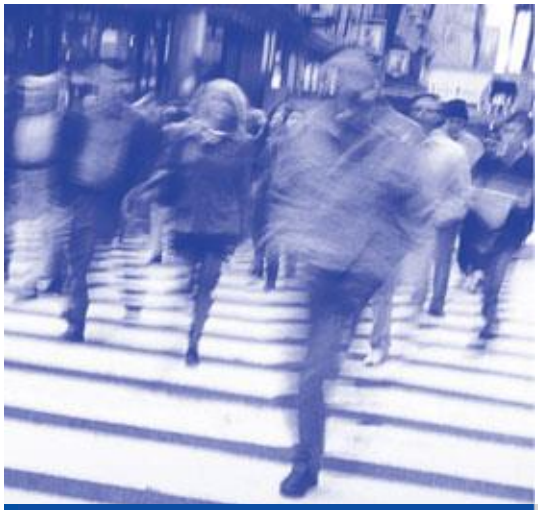

2020 CiViTAS
Cleaner and better transport in cities

HANDSHAKE

# Deliverable 4.2

## Mid-term monitoring report

| | |
|---|---|
| Deliverable No.: | D 4.2 |
| Project Acronym: | CIVITAS Handshake |
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| CIVITAS Handshake | |
| Grant Agreement No.: | 769177 |
| Work package/Measure No.: | 4 |
| Work package/ Measure Title: | |
| Monitor, assess and compare | |
| Responsible Author(s): | |
| Giorgia Galvini, ISINNOVA; Paolo Ruffino, DECISIO; Lilian Tilburgs, DECISIO | |
| Responsible Co-Author(s): | |
| Mario Gualdi, ISINNOVA; Kees van Ommeren, DECISIO | |
| Date: | 01-02-2021 |
| Status: | Concept |
| Dissemination level: | PO |

2020 CiViTAS
Cleaner and better transport in cities
HANDSHAKE

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## Abstract

This deliverable monitors the progress of Handshake cycling solutions at the project and city level. The introductory chapter briefly recaps the evaluation methodology and provides an overview of all cycling solutions, highlighting the main changes from the ex-ante assessment. The report describes the development of all 64 cycling solutions at the city level, considering the last values for assessing targets' progressive achievement. General conclusions and lessons learned have been deducted to provide a synthetic overview of cities' progress at the project level and pave the way for the ex-post evaluation.

## Project Partners

| Organisation | Country | Abbreviation |
|---|---|---|
| Istituto di Studi per l'Integrazione dei Sistemi | Italy | ISINNOVA |
| Copenhagen | Denmark | CPH |
| Amsterdam | Netherlands | AMS |
| City of Munich, Department of Public Order | Germany | KVR |
| BORDEAUX METROPOLE | France | BM |
| City of Bruges | Belgium | BRUGGE |
| Dublin City Council | Ireland | DUBLIN |
| Municipality of Kraków | Poland | GMK |
| City of Helsinki | Finland | HEL |
| Transport for Greater Manchester | United Kingdom | TfGM |
| Riga City Council - Traffic Department | Latvia | RCC TD |
| Roma Servizi per la Mobilità | Italy | RSM |
| City of Turin | Italy | MS TO |
| Amsterdam University - Urban Cycling Institute | Netherlands | UVA-UCI |
| Mobiel 21 | Belgium | M21 |
| Velo Mondial | Netherlands | Velo Mondial |
| DECISIO | Netherlands | DECISIO |
| ICLEI European Secretariat | Germany | ICLEI |
| Cadiz | Spain | Cadiz |

## Document History

| Date | Person | Action | Status | Diss. Level |
|---|---|---|---|---|
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| 11/12/2020 | Giorgia Galvini | First draft of mid-term results. | Draft | PC |
| 28/12/2020 | Lilian Tilburgs, Paolo Ruffino | Second draft of mid-term results, introduction, conclusion | Draft | PC |
| 15/01/2021 | Giorgia Galvini, Lilian Tilburgs, Paolo Ruffino | Third draft of mid-term results, introduction, conclusion | Draft | PC |
| 22/01/2021 | Giorgia Galvini, Lilian Tilburgs, Paolo Ruffino, Mario Gualdi | Final deliverable | Final | PO |

Status: Draft, Final, Approved, and Submitted (to European Commission).

Dissemination Level: WPL = Work Package Leader, PM = Project Manager, PC = Project Coordinator, PO = Project Officer

## Legal Disclaimer

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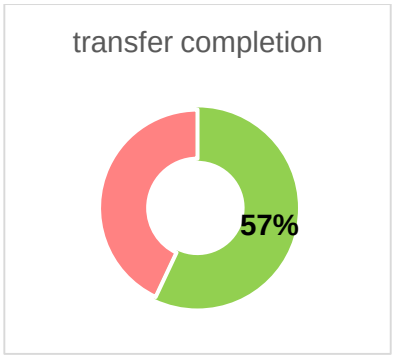
# Executive Summary

Civitas Handshake brings together 13 cities to accelerate the transfer of 64 technical and organisational cycling solutions. This monitoring report aims to:

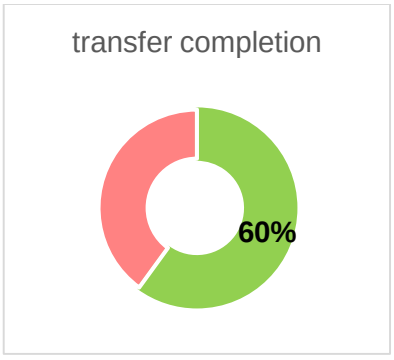
1. Assess the **overall progress** of each transferred solution.
2. Update the target **impact indicators** with the **latest available measurements**.
3. Understand **barriers and opportunities** faced by the cities during the transfer process, particularly in light of the enduring **COVID-19 pandemic**.

The following charts provide a synthetic overview of each city's progress in rolling out the respective Handshake cycling solutions, taking into account the latest data collected.

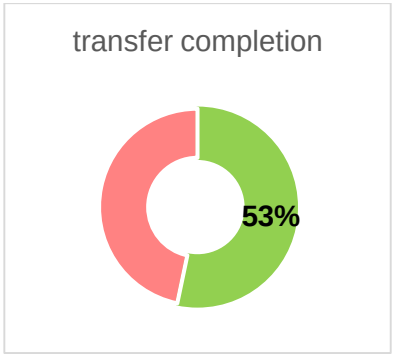
City of Amsterdam



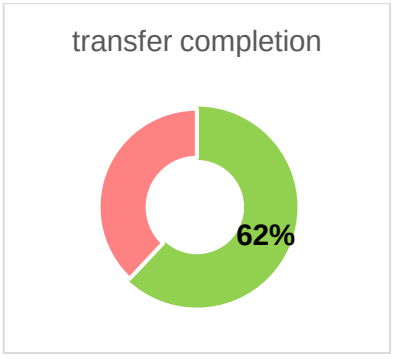

City of Bruges



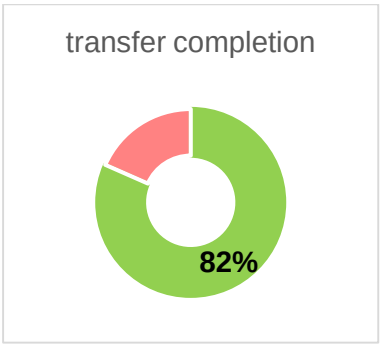

Bordeaux Métropole



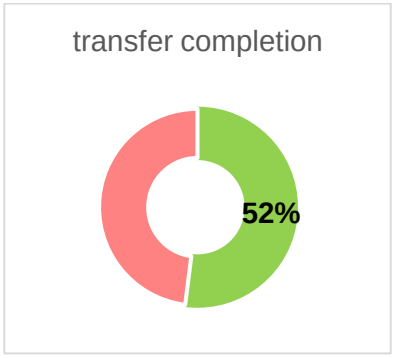

City of Cadiz



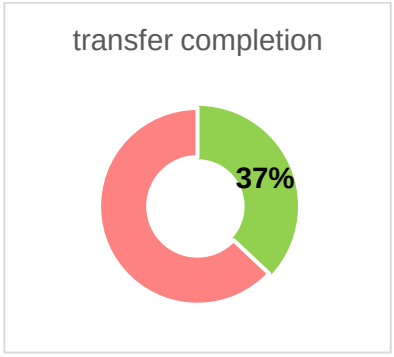
### City of Copenhagen



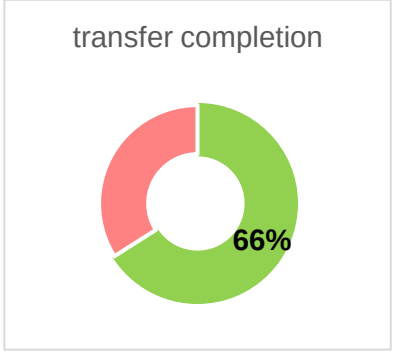

### City of Dublin



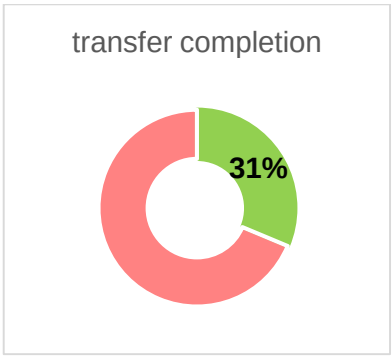

### Greater Manchester



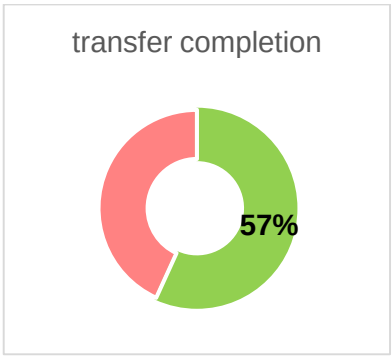

### City of Helsinki



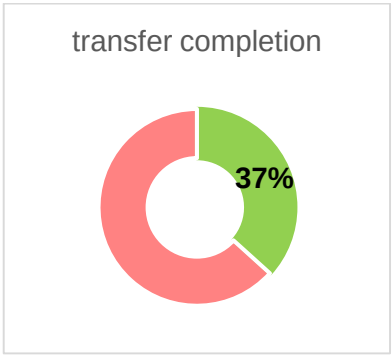

### City of Krakow



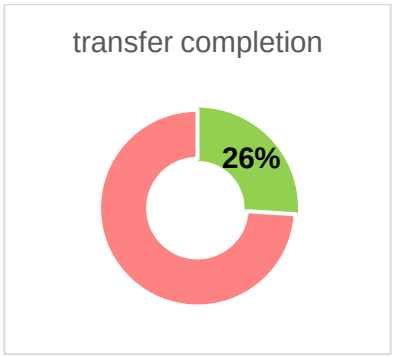

### City of Munich



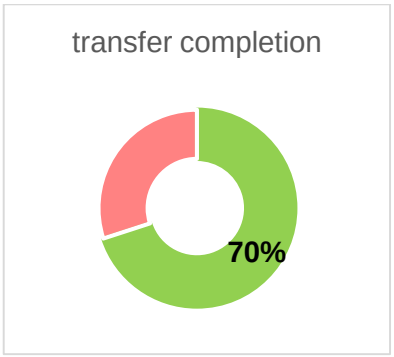

### City of Riga



City of Rome




City of Turin




The resulting picture is one showing a general alignment with project planning, with the notable exception of Dublin, Krakow, Manchester, Munich, Riga and Rome, whose cycling solutions have been particularly slowed down by the social distancing and sanitary measures undertaken to cope with the pandemic. These effectively affected the population as a whole and businesses, as well as the staff of the public organisations that work in Handshake.

A more detailed commentary with insights on what has been learned by our cities while coping with the pandemic is included in the conclusions.

# Glossary

| | |
|---|---|
| ▶ | In progress, no mayor delays |
| ▶ | In progress but delayed |
| ⏸ | On hold |
| ■ | On hold. Possibly discontinued |
| ✓ | Completed |
| ND | Not Defined |
| NA | Not Available |

# 1 Introduction

This chapter briefly outlines the main project goals and introduces the specific objectives of monitoring and evaluation.

## 1.1 Project background

Civitas Handshake supports the effective take up of the integrated cycling solutions successfully developed by Amsterdam, Copenhagen and Munich, our 3 Cycling Capitals (CCs) and world-renowned cycling front runners, to 10 other cities in Europe by "opening up the **black-box**", and namely by means of:

1. A complete and coherent **transfer program** benefitting 10 highly committed "Future Cycling Capitals" (FCCs) coming from different socio-cultural and political conditions.
2. An intensive **dissemination effort** aiming at leaving behind a legacy for post-project exploitation.

## 1.2 HANDSHAKE overall objectives

The **overarching goals** set by Handshake can be summarised as follows:

- Support the take up of innovative cycling solutions by transferring them from the 3 CCs to the 10 FCCs, thereby enabling a faster and more cost-effective deployment towards sustainable urban mobility. Possible technological and non-technological barriers and ways to overcome them will be identified and addressed.
- Study and compare the impacts and the conditions for effective transfer, with both medium-term (2022) and long-term (2030) Handshake scenario assessments.
- Add to and make publicly available a comprehensive body of knowledge, including producing evidence-based practical guidance, for wide take up in other contexts (in Europe and beyond) as a post-project legacy.
- Foster inter-city professional and personal collaborations and turn our cities into full-fledged cycling innovation ambassadors.

## 1.3 Solutions overview and transfer process

Between 2018 and 2020, the transfer process promoted by Handshake has encompassed a total of **64 solutions** ranging from:

A. Planning, regulation, and standards.

B. Infrastructure and services.

C. Modelling and assessment tools.

D. Awareness and communication actions.

The table below shows for each category the solutions (in code) made available by Cycling (CCs) capitals to Future Cycling Capitals (FCCs). A complete overview of solutions can be found on Deliverable 1.2.

**Table 1** Overview of solutions

| Category | Description | Solution Code |
|---|---|---|
|  **Planning, Regulation and Standards** | The delivery of high-quality infrastructure, together with achieving a motivated cycling population, require effective planning and preparation. Activities include the preparation of cycling infrastructure network plans, raising the standards in design guidance documents, and linking with other modes of transport to improve how the transport system is managed. Together these helps give cycling projects a fair chance to succeed. | AMS1; AMS2; AMS3; AMS5; AMS8; AMS9; AMS15; |
|  **Infrastructure and services** | The design and layout of physical infrastructure projects is the most topical aspect within Handshake. Cities recognise the importance of getting investment right by learning from those cities that have refined and developed their techniques over a number of years. Solutions range from expanding the quality and proportion of space created for cycling, to improving the street environment, catering for bicycle storage and changing traffic lights to give cyclists easy and continuous journeys without stopping | CPH1; CPH2; CPH3; CPH4; CPH7; CPH12; AMS4; AMS10; AMS14; AMS18; |
|  **Modelling and assessment** | Techniques can be used before and after cycling schemes are implemented to make sure they contribute effectively towards a wide range of different objectives. Handshake looks at the effectiveness of cycling solutions from many angles, such as through the experiential analyses of cyclists' safety, to the modelling and measuring how the transport system operates, to the effectiveness of publicity to encourage cycling. | AMS11; CPH5; CPH8; CPH10; CPH11; MUN6; |
|  **Awareness and Education** | Communications campaigns and approaches help blend practical knowledge with inspirational messaging. When done well, they can heighten the success and status of new infrastructure projects. Handshake will support the delivery of information to key audiences, including school children and their parents, those new to cycling and those already existing bicycle riders looking for better and safer routes. | CPH14; MUN1; MUN2; MUN3; MUN4; |

FCCs have in turn selected a number of solutions that will be transferred, adapted to the specific context, implemented and evaluated within the project timeline. For simplicity, Figure 2 below has been made (source Deliverable 1.2) to graphically illustrate the complexity of transfer links between cities and solutions.

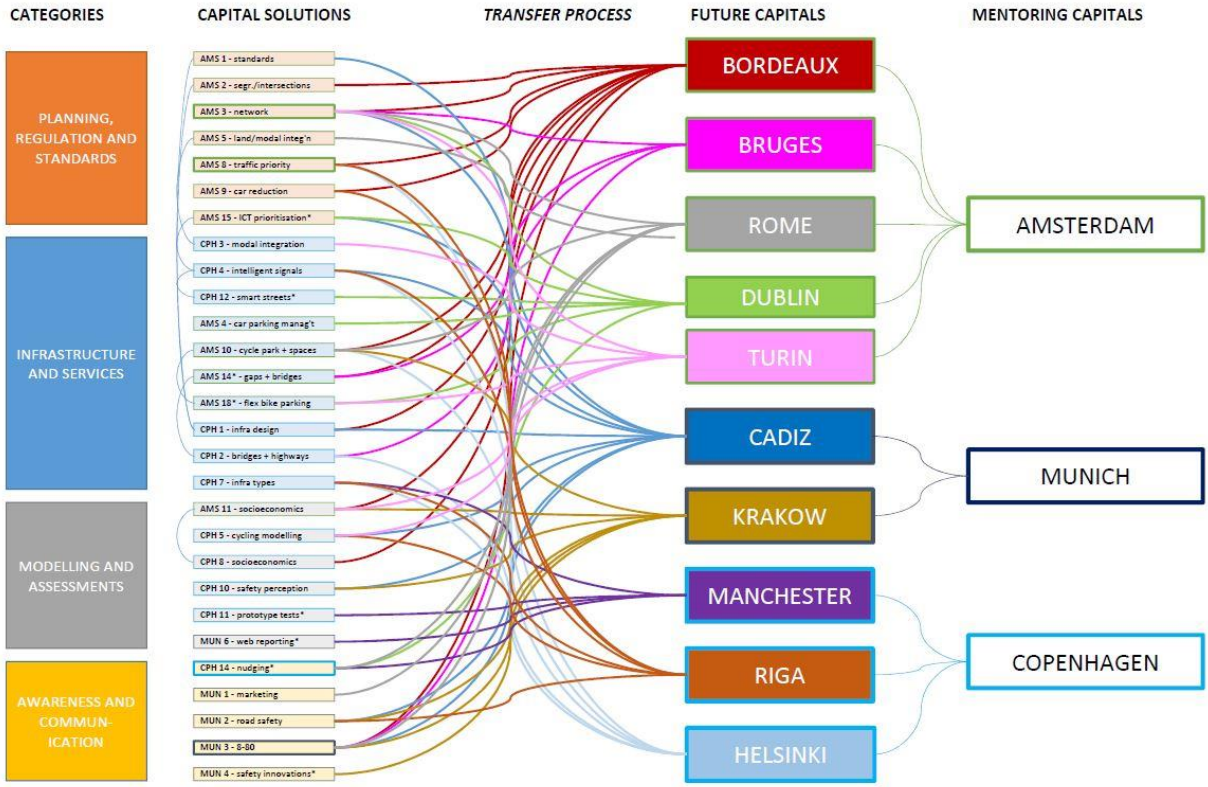



**Figure 1** Transfer links

## 1.4 Main changes from the ex-ante assessment

The next table provides an overview of the changes in the solutions that have been recorded since we performed the ex-ante assessment in D4.1. The table provides:

- Official code of the solution.
- Brief description of the solution.
- Information on the change, whether an adaptation, a cancellation or a substitution.

| Code | Cycling solution | Adapted, added or dropped |
|---|---|---|
| BRD6 | New (see description in Bordeaux's section) | BRD 6 (AMS 1 → 2021) Creating a new active mode plan<br><br>Bordeaux Métropole is creating a new Active mode Plan 2021-2024, it is currently being written. Reviewing and commenting the state of the plan would be interesting for people in the transition arena. This upcoming cycle plan should be a reassertion of the current plan. It is the next step in the cycling policy Bordeaux Métropole has implemented during the past decades with success. A larger budget for cycling will become available with the introduction of this plan. |
| BRG1 | BRG 1 (AMS 3 → 2020-2021)<br><br>Throughout the city centre and surrounding suburbs they are confronted with a busy ring-road, that, at first hand, seems unsolvable mobility puzzles for cyclists. From a progressive point of view, Bruges is sure that with the help of the leading city, they can design better conditions on these roads and solve some mobility dilemma's in favour of the cyclists without touching on the mobility flow. | (AMS3 → 2020-20121) Solutions for strengthening / creating a cycling tangential around the historic city centre |
| BRG2 | BRG 2 (AMS 14 → 2019-2021)<br><br>Bruges is completely surrounded by a lush green cycling tangential on the inner ring road alongside the canal, profiting from the medieval fortified structure of the town. On the real ring-road however – on the other side of the canal – heavy traffic and busy intersections completely cut the city centre from the attached suburbs. 3 cyclists were killed on these intersections during the last 2 years. To minimize conflict, Bruges wants bicycle bridges that de-connect cyclists from crossing the ring-road. The first bicycle bridge will set the standard for others to follow. | BRG2 (AMS14 → 2019-2021) Evaluation of the new cycling connection centre – Sint-Michiels |
| BRG3 | BRG 3 (CPH 2 → 2019-2021)<br><br>This solution is connected with the previous one and the city needs also technical support, engineering advice, and suggestion on how to cope with UNESCO for building the bridge. | BRG3 (CPH2 → 2019-2021) Strengthen the cycling infrastructure near the train station, hereby coping with Unesco-concerns |
| HEL5 | New (see description in Bordeaux's section) | HEL5 (CPH1 → 2018 – 2022) Redesign of major thoroughfare Hämeentie<br><br>This is a solution with more concrete data available for a proper analysis with bikenomics than the other solutions already defined. |
| KRA1 | KRA 1 (AMS 10 → 2018-2020) High-quality on-street bicycle parking | KRA 1 (AMS 10 → 2018-2020) – only knowledge transfer during Handshake |

| | | |
|---|---|---|
| | The demand of parking spaces is becoming more and more high in the city and the number of parking facilities is already growing. Krakow wants to learn from Amsterdam how to create high-quality public spaces improving systematically the cycling parking system. | Krakow moves to clarify that the solution although classified under the “Infrastructure and Services” solution category, does not involve any actual infrastructural implementation within HANDSHAKE‘s timescale. It entails an intense and targeted knowledge exchange with Amsterdam, which will lead to the deployment of a quality cycling parking system after the end of the project. |
| KRA3 | KRA 3 (MUN 2, MUN 4, → 2020-2022) Awareness campaigns to enhance traffic safety.<br>This is something very important for Krakow and could accompany other campaign actions that the city is dealing with at the moment. The number of cyclists in the city is growing and traffic safety is becoming more and more problematic issue. | KRA3: small bicycle repair service located in different points in the city for residents.<br>To offer more solutions on awareness, campaigns and marketing. |
| KRA4 | KRA 4 (CPH 10 → 2018-2020) Systematic assessment of perceived feeling of safety as well as actual traffic safety measures<br>Systematic assessment of perceived feeling of safety as well as actual traffic safety (e.g., in intersection design). Presently the city does not focus at all, especially systematically, on this theme, though it corresponds to the overall issues of safety mentioned in other solutions. | Dropped solution.<br>The City of Kraków drops KRA 4 "Systematic assessment of perceived feeling of safety as well as actual traffic safety (e.g., in intersection design)" as it is no longer in place. Present unit responsible for the cycling policy in the city does not perceive the measure as an important problem that should be dealt with within the project timeline. |
| KRA5 | KRA 5 (MUN 1, MUN 3 → 2020-2021) Mobility education for families, children and young people<br>As promoting and campaigning themes are in the field of Krakow daily actions, they are willing to find out more and more about it and they are open to test new solutions and ideas. Mobility education Page 21 of 48 for families, children and young people is crucial in the city vision. They have already quite some experience in this field, but they want to deepen it (as well as share their experience with other partners) KRA 5 (MUN 1, MUN 3 → 2020-2021) “STARS ride to school” – new concept of the project | KRA 5: Night-time biking (modelled on Munich’s actions)<br>To offer more solutions on awareness, campaigns and marketing |
| MUN4 | MUN 4: Awareness campaigns to improve traffic safety (temporarily closing and visually highlighting a crossroad to visualize hazardous areas). | MUN4: Improving safety and attractiveness of cycling lanes by red colouring.<br>The solution was adjusted due to a currently running evaluation of a measure (red marking), where concrete data is available and scientific analysis is done. |
| MUN7 | New (see description in Munich’s section) | MUN7: Bicycle streets: Redesign Clemensstraße into a Bicycle Street |

| | | |
|---|---|---|
| | | This is a solution with more concrete data available for a proper analysis with Bikenomics than the other solutions already defined. |
| MUN8 | New (see description in Munich's section) | MUN8: Events and campaigns to raise awareness for bicycle streets.<br>To offer more solutions on awareness, campaigns and marketing |
| MUN9 | New (see description in Munich's section) | MUN9: Awareness campaigns for car drivers with and without cycling affinity.<br>To offer more solutions on awareness, campaigns and marketing |
| RIG1 | RIG 1 (AMS 8, AMS 9, CPH 7 → 2018-2022) Improvement of city planning regarding integration of car network and bicycle network.<br>Concerning the reduction of car mobility, Riga wants to create a detailed action plan on how to ensure that progressive priority is given to cycling transport. Firstly, it is necessary to make a logical car and bicycle route network, not to burden additionally the already overloaded transport network. Secondly, new, wise and innovative solutions would be necessary to apply within Riga city, taking into account the current street planning. RIG1 (AMS8, AMS9, CPH7 à 2018 – 2022) Improvement of city planning regarding integration of car network and bicycle network. | RIG1 (AMS8, AMS9, CPH7 → 2018 – 2022) Redesign of thoroughfare Bruņinieku street<br>The scope of the solution was too broad for the timeline of Handshake. Therefore, the solution was scaled down to the redesign and evaluation of a specific road artery. |
| ROM1 | ROM 1 (AMS 3 → 2019-2023)<br>Rome is already working on over 50kms of brand-new bike lanes as well as three 30km/ h zones to be implemented (ideally) in a 3-year time. Such projects are aimed at both traffic calming and cycling safety measures and the work done by Amsterdam is a fundamental point of reference. ROM1 (AMS 3 → 2019-2023). Development of 80 Km bicycle network. | ROM 1 (AMS 3 → 2019-2023). Redesign of Via Prenestina<br>The scope of the solution was too broad for the timeline of Handshake. Therefore, the solution was scaled down to the redesign and evaluation of a specific road artery. |
| TUR2 | TUR 2 (AMS 11 → 2019-2021) The socioeconomic assessment of investment in cycling<br>This is something very urgent and never used in the past. Learning from Amsterdam will help the city to use it as tool for decision making at political level and in the in the planning process. With this know how the city will be able to evaluate the economic benefit for the city consequent of investing on cycling infrastructures and services. Page 22 of 48 | TUR 2 (AMS 11 → 2019-2021). Redevelopment of major thoroughfare Via Nizza. |

## 1.5 Objective of this report

The aim of this monitoring report is to:

- Assess the overall progress of each transferred solution.
- Update target / impact indicators with the latest available values.
- Understand barriers and opportunities faced by cities during the transfer process.

In light of the unexpected COVID-19 pandemic, this monitoring reports also investigates the impacts of Coutbreak on the overall implementation progress and evaluation process.

## 1.6 Methodology

The drafting of this report has involved 5 main steps:

- **Step 1: Preparation.** A “mid-term” monitoring sheet per city / organisation was developed containing the evaluation information of each solution as well as the values collected during the ex-ante assessment to facilitate data collection.
- **Step 2: Data Collection.** Using monitoring sheets, each partner organisation collected the required information.
- **Step 3: Measurement.** The progress measurement was performed based on the information received.
- **Step 4: Validation**. A validation of the results has been performed by sending back the report to each partner organisation so that they could double check and integrate the information where necessary.
- **Step 5: Quality check and final drafting.** The report has been finally drafted and reviewed by ISINNOVA.

## 1.7 Structure of the report

After this brief introduction, the report describes the state of affairs of each transferred solution of all 13 cities. At the end of the report, some general conclusions and lessons learned in the process are provided that will be carefully taken into account during the later stages of the project and the ex-post evaluation.

# 2 Mid-Term Results

This chapter provides a summary of the evaluation performed in Handshake for each city and solution.

## 2.1 City of Amsterdam


### 2.1.1 Overview of solutions

| List of Handshake solutions | Short Description | Type of Solution |
|---|---|---|
| AMS 13: Wider and higher capacity bike lanes, smaller car lanes. | With road reconstruction and retrofitting, Amsterdam will give more space to cyclists and less to cars. |  |
| AMS 14: Improvement in cycling methods: modelling and assessment | Amsterdam wants to acquire the necessary knowledge to develop new methods to model cycling behaviour, collect bicycle data and perform ex-ante assessments. |  |
| AMS 15: ICT system for cycle traffic flows improvement and cycling prioritisation at intersection. | Amsterdam pilots an innovative ICT system with heat sensors that predicts cycling demand at busy intersections |  |
| AMS 16: Assessment of the effect of behavioural interventions on cycling behaviour: the new way of cycling. | The City wants to influence cycling behaviour to ease stress levels and make cycling more comfortable |  |
| AMS 17: Efficient use of parking facilities and parking spaces by | The City of Amsterdam wants to improve the findability of available parking spaces |  |

| | | |
|---|---|---|
| better signing and (dynamic) wayfinding. | to reduce the parking search time of cyclists and improve visibility. | |
| AMS 18: Sharing test results of space-effective and/or multifunctional bicycle parking solutions | The City of Amsterdam wants to share and gain knowledge about spatial optimization techniques for cycling solutions. |  |
| AMS 19: Assessment of experienced satisfaction of cyclists about improved cycling routes. | Amsterdam will be monitoring how changes within AMS13 will result in terms of perceived cycling satisfaction, comfort and safety. |  |

**Table 2** Overview of solutions for Amsterdam

### 2.1.2 Detailed description of solutions

#### AMS 13 - Wider and higher capacity bike lanes, smaller car lanes.

**Background information**

It is getting more and more crowded on the bicycle network of Amsterdam. Within Handshake, the City of Amsterdam wants to widen bike lanes and separated bicycle paths of the bicycle network to accommodate and welcome the growing numbers of cyclists. Widening the bike lanes will increase the capacity, diminish stress levels and create a safer environment. With road reconstruction and retrofitting, Amsterdam will give more space to cyclists and less to cars.

**Goals to be achieved**

- Reduce the crowdedness levels of bike lanes.
- Improve the perceived comfort of cyclists.

**Groups targeted by the solution**

Amsterdam cyclists and drivers.

**Changes in activities to be performed**

The implementation phase to reconstruct maximum 20 roads and widen the lanes and paths with a minimum of 2.5 meters may be extended to after 2022.

## Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Lack of physical space to accommodate other modalities. | **H** | **H** |
| **Resistance from local residents/shop owners** | More space for bicycle infrastructure can reduce car parking spaces and/or space for trees and green. | **H** | **H** |
| **Political barriers** | Other priorities of city council/politicians. | **M** | **H** |
| **Bureaucracy/legislative** | National traffic laws are very strict because of traffic safety.<br>Long procedures for underground infrastructure.<br>Different departments do have different wishes or interests. | **M** | **M** |
| **Financial barriers** | Projects are more expensive than expected since COVID conditions have increased the costs causing budget shortages | **H** | **H** |
| **Other types of barriers?** | Delay of reconstruction projects because the city needs to remain accessible. No available time windows. Too many road works hinder the accessibility of the city. | **H** | **H** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | An integrated approach will be taken, and modalities will be mixed as much as possible. |
| **Resistance from local residents/shop owners** | Organize participation of residents/shop owners in the projects to explain the benefits of the intervention. |
| **Political barriers** | Inform politicians/city council about the importance/necessity of the project. |
| **Bureaucracy/legislative** | The municipality will research what is (not) possible according to the national traffic law by involving and cooperating with other relevant departments and possibly revise some solutions. |
| **Financial barriers** | Improve the estimations of the costs. |
| **Other types of barriers?** | Start proper planning, communicate in early stage of plans. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Bicycle lanes / paths with minimum with of 2.5 meters wide | *Percentage of the entire bicycle network (%)* | 42% | **43%** | **not yet available** | 50% |
| Cyclists' perceived comfort | *Scale 1 – 10* | 6 | **6.7** | **7.0** | 7 |
| Cyclists' perceived comfort | *Scale 1 – 10* | 6 | **6.7** | **7.5** | 7 |

## AMS 14 - Improvement in cycling methods: modelling and assessment

### Background information

Amsterdam owns and maintains its own transport model (VMA). Cycling is an important element of this VMA model. Amsterdam is always looking for ways to improve current modelling practices, better understand cycling behaviour and work on data that are needed to feed the model. Amsterdam plans for new cycling infrastructure to facilitate increasing demand. It needs information about how to improve cycling

modelling, cycling data collection (to fit the model) and update cost benefit assessment methods.

### Goals to be achieved

- Learn new insights from other cities.
- Possibly enhance current appraisal techniques based on the knowledge acquired, leading to better planning, reducing costs and improving traffic flow and safety.

### Groups targeted by the solution

Transport planners, transport modellers, mobility policy makers, mobility researchers.

### Changes in activities to be performed

The improvement in cycling methods is closely connected to the development of WP2 that is affected by slight delays. The report about new modelling and assessment practices is the final result of this measure and it is foreseen by the end of 2021 as planned.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Workshop | | | | |
| Research | | | | |
| Deliverable | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Conducting and receiving all the inputs from the cities will likely take a while but the city plans on overcoming this by mapping and involving from the beginning the right experts. | **L** | **H** |

### Evaluation

The measure will be assessed using the report that will be realized once the three planned workshops will be concluded. The expected value (2022) of the organised workshops has to be considered in total during the HANDSHAKE project.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Value (2021) | Expected (2022) |
|---|---|---|---|---|---|---|
| Consulted cities | *Number* | 0 | 3 | **3** | **3** | **3** |
| Workshop organised | *Number* | 0 | 0 | **1** | **2** | **3** |
| Report produced | *Yes/No* | No | No | **No** | **Yes** | **Yes** |

### COVID-19 impact on measure development and evaluation

A face-to-face workshop was planned, but it was held due to Covid-19 constraints. Instead, a few digital workshops will be organised with Munich and Copenhagen on relevant themes for those cities. One of the themes is modelling, data collection and assessment. The workshop and literature research have faced some (minor) delays. Therefore, the results will not be available before the end of 2021. The first workshop on modelling and data collection has been conducted in November 2020. A lot of material has already been collected and reported by the cities which is useful input to AMS 14 and the final report.

## AMS 15 - ICT system for cycle traffic flows improvement and cycling prioritisation at intersections.

### Background information

Amsterdam wants to explore ways to reduce the perceived waiting time at intersections where waiting time cannot be reduced by optimizing the operation of traffic lights. With an ICT system for cycle traffic flow improvement and cycling prioritisation at intersections, Amsterdam seeks to achieve constant speeds for cyclists to keep traffic flowing. Within Handshake, Amsterdam pilots an innovative ICT system with heat sensors that predicts cycling demand at busy intersections. Information is used to adjust traffic lights and improve cycling speeds.

### Goals to be achieved

- Optimize the operation of traffic lights.
- Realising constant traffic speeds and reduce (perceived) waiting times at traffic lights.

### Groups targeted by the solution

Cyclists and drivers in Amsterdam.

### Changes in activities to be performed

The heat camera at intersection Bilderdijkstraat/De Clercqstraat due to March 2020 has not yet been installed. The position of the camera was a problem. The heat camera will now be installed at the intersection Houtmankade – Spaarndammertunnel/Tasmanstraat.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | Feb - Mar 2019 | | | |
| Design | July – Nov 2019 | | | |
| Implementation | Dec 2019 | - | March 2021 | |
| Evaluation | | | March 2021 | March 2022 |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Cameras break down | **L** | **H** |
| **Resistance from residents/shop owners** | Other modes of transport (than cyclists) possibly longer waiting times. | **M** | **M** |
| **Bureaucracy/legislative** | For traffic lights waiting car traffic causes local air quality problems. | **M** | **H** |
| | It is possible that innovations do not fit within the rules and regulations. | **L** | **H** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Get all technical details in place before commit to private partners. |
| **Resistance from local residents/shop owners** | Manage expectations. |
| **Bureaucracy/legislative** | Discuss rules and regulations in early stage with other municipal departments (e.g., about air quality) |

### Evaluation (Bikenomics)

The bikenomics analysis will be updated in the ex-post report. The updated values of inputs on the project so far are stated in the table below. These values where provided by the city or based on expert judgement.

| | After-bridge programme | | Heat camera | |
|---|---|---|---|---|
| Parameter | Junction 1 | Junction 2 | Junction 3 | Junction 4 |
| Investment costs | € 3.200 | € 3.200 | € 19.000 | € 19.000 |
| Maintenance costs per year | 1% | 1% | 1% | 1% |
| Number of cycling trips per year | 46.392 | 67.870 | 7.493.118 | 3.550.976 |
| Number of car trips per year | 19.432 | 51.017 | 1.460.953 | 2.072.720 |
| Waiting time in seconds for cars | 12 | 17,5 | 21 | 21 |
| Waiting time in seconds for cyclists | 12 | 17,5 | 20 | 20 |
| Material damage accidents | 2 | 1,4 | | 1,6 |
| Minor injury accidents | 1 | 0,6 | | 0,6 |
| Severe injury accidents | 0 | 0,4 | | 0,4 |
| Deathly accidents | 0 | 0 | | 0 |

### COVID-19 impact on measure development and evaluation

Covid-19 has influenced the car and bicycle traffic. During the first Covid-19 wave, there was less traffic in Amsterdam, because a lot of commuters, residents and students work/study (partly) at home. A lot of them cycle. Moreover, there are much fewer tourists and visitors in the city. As a result, less car and bicycle traffic. Since summer 2020 the car traffic is almost back to the normal level., but t There are still

fewer cyclists than before Covid-19, because a lot of cyclists still work or study at home due to Covid-19.

## AMS 16 - Assessment of the effect of behavioural interventions on cycling behaviour: the new way of cycling.

### Background information

The city wants to influence cycling behaviour to ease stress levels and make cycling more comfortable. A growing number of cyclists in Amsterdam indicate that they experience stress while cycling in rush hour, due to increasing level of congestion on bicycle paths and misbehaviour of other cyclists. Amsterdam wants to introduce new behavioural interventions "The new way of cycling" that diminish stress levels and create a safer feeling. Assessment of behavioural interventions is needed to understand effectivity and possibly modify behavioural interventions.

### Goals to be achieved:

- Reducing behaviour that jeopardizes other road users
- Improving the behaviour of cyclists
- Improve perceived speeds and comfort
- Improve the perceived attractiveness
- Improved perceived ease

### Groups targeted by the solution:

The solution mainly targets cyclists that have much control on their bike and ‘rule the streets’ as opposed to the more vulnerable road users (like the elderly, children, the disabled).

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | Sep 2019 – Nov 2019 | | | |
| Design | | Dec 2019 – Apr 2020 | | |
| Implementation | | | May 2020 - Dec 2022 | |

| | | | | |
|---|---|---|---|---|
| Evaluation | | | | June 2020 - Dec 2022 |

## Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Resistance from residents/shop owners** | Nuisance to residents/shop owners | **L** | **H** |
| **Political barriers** | Risk of not using the right tone of voice, so that the cyclists' attitude towards cycling will be affected negatively. | **M** | **H** |
| **Bureaucracy/legislative** | Different opinions between the municipal campaigning office and the staff members of the bicycle program. | **L** | **L** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Resistance from local residents/shop owners** | Cooperate with city districts and reach out to residents during the process. |
| **Political barriers** | |
| **Bureaucracy/legislative** | |

## Evaluation

The main source for measuring the following indicators is Amsterdam Cycling Experience Research 2020 (Fietsbelevingsonderzoek Amsterdam 2020).

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Perceived safety | *Scale 1-10* | 6.7 | **NA** | **7.5** | 7.0 |
| Perceived speed | *Scale 1-10* | 6.3 | **NA** | **7.0** | 6.6 |

| | | | | | |
|---|---|---|---|---|---|
| Perceived ease | *Scale 1-10* | 7.0 | **NA** | **7.1** | 7.3 |
| Perceived comfort | *Scale 1-10* | 6.5 | **NA** | **7.0** | 6.8 |
| Perceived attractiveness | *Scale 1-10* | 6.3 | **NA** | **6.7** | 6.6 |

## AMS 17 - Efficient use of parking facilities and bicycle parking spaces by better signing and (dynamic) wayfinding.

### Background information

Parking facilities at stations are very crowded. With a good signage and a dynamic wayfinding referral system for available bicycle parking places, the City of Amsterdam wants to improve the findability of available parking spaces. This will reduce search time of cyclists for parking facilities and for available bicycle parking places. The number of available parking spaces for bikes will be shown at the entrance of the parking. In areas with several parking facilities (like major train stations) cyclists will also be informed about the availability of parking spaces on their way to these parking facilities.

### Goals to be achieved

- More and easier to find bicycle parking spots for cyclists.
- Reduce search times.

### Groups targeted by the solution

(Commuter) cyclists to train and metro stations.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | The Municipality expects only some technical barriers in connecting available/non-available systems inside the bicycle parking to the facilities with the dynamic signing system in public space. | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | To address the risk, the city will investigate how the available/non-available systems in the parking to connect to the dynamic referral system. In the requirement specification they will include how to prevent possible risks arising from this. |

### Evaluation

The main source for measuring the following indicator is Amsterdam's Cycling Experience Research 2020 (Fietsbelevingsonderzoek Amsterdam 2020)

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2020) |
|---|---|---|---|---|---|
| Satisfaction of cyclists | *Scale 1-10* | 6 | **NA** | **6,7** | 7 |

## AMS 18 - Sharing test results of space-effective and/or multifunctional bicycle parking solutions.

### Background information

In the entire city, there are over 255,000 bicycle spaces in public areas. Most of them are situated in residential areas. All train and metro stations have bicycle parking facilities. Also, all important attractors, such as shops schools, work, nightlife areas, and other kinds of public services (e.g., sport, medical, cultural) have dedicated parking spaces. The public space in Amsterdam is becoming increasingly busy and more and more limited. At some locations there is no or insufficient space to meet the growing demand. Amsterdam has therefore tested flexible or multifunctional use of parking

places. At certain times of the day parking places can be used by freight traffic (e.g., unloading zones), but during the rest of the day it can only be used as bike parking. Or, on busy evenings, for example the Albert Cuyp market and entertainment area in 'De Pijp' is used as a parking area for cyclists. Amsterdam did monitor the effects of these flex parking trials and of the level of recognisability from a user's perspective. The city wants to share the results of this project in order to gain further insight and spread its knowledge about “adaptive space”.

### Goals to be achieved

- Share and transfer knowledge on the results of the project ‘Space effective and/or multifunctional bicycle parking solutions.”
- Increase the knowledge on possible other solutions about meeting growing demand for bicycle parking at busy locations.

### Groups targeted by the solution

City officers and city politicians

### Timeline of roll-out

Throughout Handshake project duration.

### Risks management

Risk-free.

### Evaluation

Amsterdam has already organised 4 (virtual) study visits/workshops in 2019 and 2020. Due to Covid-19 Amsterdam organised in 2020 virtual workshops instead of study visits on the spot. Amsterdam also developed a Handbook Bicycle Parking with a description of all the bicycle parking solutions in Amsterdam. The English version is available for all Handshake cities. The expected value (2022) of the study visits to locations has to be considered in total during the HANDSHAKE project.

| Indicator | **Unit of measurement** | **Value (2018)** | **Value (2019)** | **Value (2020)** | **Expected (2022)** |
|---|---|---|---|---|---|
| Study visits to locations | Number | 0 | **1** | **3** | 5 |

### COVID-19 impact on measure development and evaluation

In 2020 COVID-19 made it impossible to receive study visits to show our parking solutions on the spot. Two of the three study tours of the Cycling Capitals Amsterdam, Copenhagen and Munich will be virtual. One of the study topics is will be Bicycle Parking in Amsterdam. The first virtual CC-study tour is will be held in November 2020. (23-24-25 November). Amsterdam did will present which different types of bicycle parking solutions the city has realised. In June 2020 Amsterdam organised a virtual webinar about Bicycle Parking in Amsterdam for all Handshake cities. In October 2020 Amsterdam organised a virtual webinar for students (40 participants).

## AMS 19 - Assessment of experienced comfort of improved cycling routes.

### Background information

It is getting increasingly crowded due to the startling growth of bicycle traffic. Cyclists' satisfaction with regard to the experienced comfort of their routes, will be measured. Lessons should also be relevant to be transferred to other cities within HANDSHAKE. The large numbers of cyclists demand more space. The lack of space is the reason that cyclists are not satisfied about a part of the network.

### Goals to be achieved

- The City of Amsterdam wants to increase cycling satisfaction by creating more space.

### Groups targeted by the solution

Cyclists in Amsterdam.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Resistance from local residents/shop owners** | Nuisance to residents/shop owners | **L** | **H** |
| **Political barriers** | Risk of not using the right tone of voice, so that the cyclists' attitude towards cycling will be affected negatively. | **M** | **H** |
| **Bureaucracy/legislative** | Different opinions between the municipal campaigning office and the staff members of the bicycle program. | **L** | **L** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Resistance from local residents/shop owners** | Cooperate with city districts and reach out to residents during the process. |
| **Political barriers** | |
| **Bureaucracy/legislative** | |

## Evaluation

The perceived comfort has been monitored by the Amsterdam Cycling Monitor 2019 (Monitor Fiets Amsterdam 2019) and Amsterdam Cycling Experience Research 2020 (Fietsbelevingsonderzoek Amsterdam 2020), while the perceived safety has been assessed by the Amsterdam Cycling Experience Research 2019 and 2020 (Fietsbelevingsonderzoek Amsterdam 2019 and 2020).

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Perceived comfort | *Scale 1-10* | 6.0 | **6.7** | **7.0** | 7.0 |
| Perceived safety | *Scale 1-10* | 6.0 | **6.7** | **7.5** | 7.0 |

## 2.2 Bordeaux Métropole


### 2.2.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| BRD 1 (AMS 10 → 2018-2022) Develop higher capacity parking solutions |  |
| BRD 2 (AMS 11, CPH 8 → 2019-2022). Develop economic appraisal techniques to assess cycling policies (Pont de Pierre case) |  |
| BRD 3 (CPH 1 → 2021). Update current bicycle design guidelines. |  |
| BRD 4 (MUN 3 → 2020-2022). Cycling educational program for all generations. |  |
| BRD 5 (AMS 3 → 2020-2024). Patch-up missing links in the network. |  |
| BRD 6 (AMS 3, AMS 10, AMS 11, CPH 1, CPH 8, MUN 3→ 2020-2021). Elaborating a 3rd Cycling Plan. |  |

Table 3: Overview of solutions for Bordeaux Métropole

### 2.2.2 Detailed description of solutions

## BRD 1 – Develop higher capacity parking solutions

### Background information

In the Bordeaux Métropole there is a scarcity of bicycle parking spaces, particularly large ones. Every year since 2015, Bordeaux Métropole has installed more than 1,500 cycle racks in the public space. To support this action, as of 2019, the Metropolitan Authority will implement new medium-capacity parking modules (from 5 to 40 spaces) that are accessible via subscription. In terms of high-capacity parking, Bordeaux Métropole has just 2 parks around the Bordeaux Saint-Jean train station, of 350 and 370 places (which is very little). Bordeaux Métropole wishes to develop other parking facilities of this capacity to promote cycle use.

### Goals to be achieved

- Develop a higher capacity bicycle parking space.
- Develop guidelines for bicycle parking at stations.

### Groups targeted by the solution

Commuter and recreational cyclists living and visiting the Bordeaux Métropole.

### Changes in activities to be performed

Bike boxes will be installed by the end of December 2020 instead of August 20202 due to Covid-19 conditions, while their evaluation will be performed in 2021.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | For secured bike parking:<br>- the structures will replace car parking spaces, which means possible sites must be found and car parking spaces withdrawn.<br>- these structures must blend harmoniously into the urban aesthetic (particularly in the UNESCO-listed hyper centre).<br>For the Brazza bike parking: The development of the district is governed by a technical requirement brief (materials, height, etc.) | **H** | **H** |
| **Resistance from local residents/shop owners** | For secured bike parking: the structures will replace a car parking space. Non-cyclist residents and shop-owners who are convinced that there is no business without car parking may object. | **M** | **L** |
| **Political barriers** | For the Brazza bike parking: all projects in this sector are subject to the approval of elected representatives and the Chief Architect, for whom the aesthetic aspect may outweigh practical or economic concerns. | **H** | **M** |
| **Bureaucracy/legislative** | For the Brazza bike parking: It is not known at this stage who will manage the operation (operation and maintenance) of this site. | **L** | **M** |
| **Financial barriers** | For secured bike parking: this new parking facility may be highly successful and the Métropole may not have a sufficient budget to meet all requests.<br>For the Brazza bike parking: the study phase is funded. However, pending development options and feasibility studies, at this stage no budget has been established for the building of the facility. | **M** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | For secured bike parking: a single structure has been defined for the whole metropolitan area in a colour matching the tram (colour already in use and approved by UNESCO.<br>For the Brazza bike parking: The technical requirements brief must always be referred to at all stages of the project. |
| **Resistance from local residents/shop owners** | For secured bike parking: "1 car parking space = 5 bike spaces" is a highly persuasive argument |
| **Political barriers** | For the Brazza bike parking: All decision-makers must be informed of every stage of the project. |
| **Bureaucracy/legislative** | For the Brazza bike parking: It has already been decided that the future operator of the Brazza bike park (opening 2024) will be the transport delegate to be appointed by 2022. |
| **Financial barriers** | For secured bike parking: Via its Alvéole programme, the French State will support the Métropole in its investment.<br>For the Brazza bike parking: the required amounts have been included in the budget and no longer represent a risk. |

## Evaluation

The occupancy rate of parking spots and the perceived safety indicators are difficult to calculate. While the parking places build has been assessment not only qualitatively but also collecting information about the quality of bicycle parking.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Parking places built | *Number (Car parking)* | 40087 | **42780** | **42780** | 43000 |
| | *Number (Bicycle Parking)* | 2524 | **2638** | **2944** | 4300 |

| | | | | | |
|---|---|---|---|---|---|
| Occupancy rate of parking spots | *Average daily car parked / total car parking supply* | NA | NA | NA | 100% |
| Perceived safety | *Average daily bicycle parked / total bicycle parking supply* | NA | NA | NA | 100% |

### COVID-19 impact on measure development and evaluation

The main consequence of the health crisis (besides a slowdown in activity during the March-May lockdown) was the postponement of the municipal elections from March to June. In addition to a political changeover, the newly elected metropolitan representatives only took up their positions as of September in reality. Nevertheless, relative to the development of bicycle parking, certain actions had already been initiated:

- the installation of bike racks was suspended during the 3-month lockdown, but resumed after the lockdown period,

- the installation of the first 30 bike boxes, roadside structures with secured parking for 5 bicycles in dense residential areas will now take place in December and not August as was initially planned,

- studies for the large-scale bike park in the Brazza district have progressed but are currently on hold, due to delays in the urban project unrelated to the health crisis.

## BRD 2 – Develop economic appraisal techniques to assess cycling policies

### Background information

Besides the practical implementation of cycling policy and infrastructure, officers need to convince elected representative, partners and occasionally own colleagues of the social relevance and benefits of cycling. To achieve this, Bordeaux Métropole has to rely on figures of socio-economic benefits and return on investment found on Dutch and Danish reports but these figures are not available for the French context, or at least, there is not the expertise inside the organisation to perform such studies.

### Goals to be achieved

The objective is to make available usable figures to measure the economic effects of cycling and thus prove the usefulness and necessity to further invest on cycling policies.

### Groups targeted by the solution

Elected representatives, partners and colleagues in other departments.

### Changes in activities to be performed

The idea of this type of study will be included in the development of the 3rd bicycle plan. The necessary principles and partnerships will be implemented in 2021; while the indicators to evaluate the measure will be set in 2022.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | As we lack experience in this field, we do not know where to begin. All the data must be gathered as it does not appear to exist on a local level at present. | **H** | **M** |
| **Bureaucracy/legislative** | If work is to be carried out with multiple stakeholders (design offices, universities, etc.), numerous contracts and/or agreements must be drawn up. | **H** | **M** |
| **Other types of barriers?** | We must motivate and convince the stakeholders who may consider this project to be too fastidious for too low a return. | **H** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | From the outset, we will require the support of experts in this field of cycle use in order to produce a roadmap. |

| | |
|---|---|
| **Bureaucracy/legislative** | The above-mentioned roadmap must provide for all measures required, in order to launch them without delay with the administrative departments. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| List of indicators set up | *Yes/no* | No | **No** | **No** | Yes |
| List of tested/used in practice | *Yes/no* | None | **None** | **None** | All tested |

### Evaluation (Bikenomics)

The bikenomics analysis will not be updated because the closure of bridge Pont de Pierre is already completed. The above-mentioned indicators are the continued evaluation during the Handshake project.

### COVID-19 impact on measure development and evaluation

The main consequence of the health crisis (besides a slowdown in activity during the March-May lockdown) was the postponement of the municipal elections from March to June.

In addition to a political changeover, the newly elected metropolitan representatives only took up their positions as of September in reality.

This action, which had not started prior to the elections (except for the impact study of the restriction of the Pont de Pierre to bicycles and pedestrians) has not yet been initiated and will likely not begin before the 2nd half of 2021, further to the approval of the 3rd Metropolitan bicycle plan (see BRD6).

## BRD 3 – Update current bicycle design guidelines

### Background information

The cycling planning and design guidelines which Bordeaux Métropole road designers refer to, dates to 2011. Since then, bicycle use has risen dramatically, as have local ambitions in this field. Thus, the guidelines are becoming outdated and road designers no longer use them. This results in heterogeneous and inconsistent designs across

the Métropole. An update of this guide is thus required. Bordeaux Métropole would like to update the cycling planning part on the basis of new standards that they could be learned through Handshake. Using these new guidelines, the aim is to justify wider and higher-capacity cycle lanes and smaller car lanes.

### Goals to be achieved

- Update current bicycle design guidelines.

### Groups targeted by the solution

The road designers of Bordeaux Métropole.

### Changes in activities to be performed

A new guidance manual which will set metropolitan standards for cycling facilities and intersection design will be elaborated in 2021, while the evaluation will be done in 2022.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | The facilities in Bordeaux Métropole have reached a turning point: the facilities which were geared towards several hundred cyclists per day are now used by several thousand and must be transformed accordingly. New solutions must therefore be found in areas where space is limited and without too much disruption for other travel modes and users. Rules must thus be laid down | **H** | **H** |

| | | | |
|---|---|---|---|
| | which will be unquestionable and accepted by everyone | | |
| **Human resource barriers** | The main risk is the lack of time which the 'experts' of Bordeaux Métropole will have to devote to this task. However, without their involvement, the guide will never be adopted by the road system designers. A high level of implication on the part of the active transport modes department may offset this lack of availability, but this department already has a considerable workload. | **H** | **H** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | If necessary, external support will be requested. |
| **Human resource barriers** | A staff member from the active transport modes department could be delegated full time to deal with this matter. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Guidance manual produced | *Yes/no* | No | **No** | **No** | Yes |

### COVID-19 impact on measure development and evaluation

Approval of the 3rd bicycle plan, initially planned for September 2020, is thus postponed to July 2021. The definition of cycle facility standards could have been initiated in late 2020 and will not begin before mid-2021. An initial task on "cycle highway" standards, based on the notably Dutch CROW recommendations, began in October.

## BRD 4 – Cycling educational program for all generations

### Background information

At present, most residents know how to cycle but are uneasy with the current urban setting. Users sometimes cycle as if they were on foot or driving a car. The aim is to

train them to build confidence, from the earliest age. Bordeaux seeks to create an educational cycling playground, possibly through a public private partnership. It needs to estimate the costs, the necessary space, and the role of each public and private partners.

### Goals to be achieved

- Set-up courses to teach all generations how to cycle in the city and thus boost use among children and adults.

### Groups targeted by the solution

Everyone, starting with children.

### Changes in activities to be performed

Revalidation of the site and definition of needs for late 2020 instead of early 2020. The design phases, including studies, building permits will be carried out during 2022, while the commissioning and beginning of evaluation in late 2022.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Political barriers** | As the chosen site originally served another purpose (road safety training track geared towards cars), all elected representatives must agree with the decision to transform the site. Regarding the transformation of the site, some may wish to create a natural area, given that the track is located in a park. | **H** | **M** |

| | | | |
|---|---|---|---|
| **Bureaucracy/legislative** | The site currently belongs to the City of Bordeaux, ownership must be transferred to Bordeaux Métropole. | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Political barriers** | Enact the project in the upcoming Metropolitan Cycle Plan to be approved in 2020. |
| **Bureaucracy/legislative** | Operation, management and maintenance of the cycle school will be entrusted to the transport delegate in the framework of the next Public Mobility Department Delegation. |
| **Financial barriers** | A study budget is planned (for the Métropole and in the framework of Handshake) and €1M has been allotted in 2022 for works. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Cycling school project launched | *Yes/no* | No | **No** | **Yes** | Yes |
| Cycling school created | *Yes/no* | No | **No** | **No** | Yes |
| Number of visitors | *Per year* | NA | **NA** | **NA** | 20000 |

## BRD 5 – Patch-up missing links in the network

### Background information

Certain missing links in the Bordeaux Métropole cycle network appear particularly difficult to resolve. The solutions put forward by the cycling cities may be worth examining. The city identified the missing links in the cycling network.

During the health crisis and to encourage bicycle use, temporary facilities were installed to patch up a large number of these missing links.

Depending on the results, these installations may become permanent.

### Goals to be achieved

- Patch-up the bicycle network of Bordeaux Métropole at the identified locations.

### Groups targeted by the solution

Cyclists and other road users.

### Changes in activities to be performed

Studies are underway to patch up missing links. During the lockdown, temporary facilities were designed and implemented, pending to become a permanent solution.

Evaluations of these temporary facilities were carried out, and others are to be developed as soon as the definitive facilities are defined.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Missing links on the cycle network are obviously places where there are the highest number of constraints on the roadway (insufficient width, longitudinal parking, etc.)<br>Filling these gaps thus implies making ambitious choices, such as the withdrawal of parking spaces or traffic directions. | **H** | **H** |
| **Resistance from local residents/shop owners** | Shop-owners who believe that there is no business without parking may object to facilities which remove parking spaces from in front of their establishment. | **M** | **M** |

| | | | |
|---|---|---|---|
| **Political barriers** | Restricting vehicle traffic in favour of cycling may lead to an initial rise in traffic congestion. Such measures require conviction and patience before evaluating actions, to give users time to adapt. | **M** | **H** |
| **Human resource barriers** | To lead such developments, roadway project leaders specialised in cycle infrastructures are required. | **H** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | With the gradual decline in city-centre vehicle traffic, spaces open up and traffic flows may be replaced by bus/cycle lanes, for example. |
| **Resistance from local residents/shop owners** | French studies show that cyclists, on average, consume more in local shops. |
| **Political barriers** | The ambitious project to close Bordeaux's central bridge, the Pont de Pierre, to cars and reserve it to soft modes has been highly successful and may serve as an encouraging example. |
| **Human resource barriers** | A growing number of project leaders are mindful of the development of bicycle use and the recruitment or re-assignment of staff could also be envisaged. |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Km of bicycle lanes tested | *Km* | NA | NA | **52** | 66 |
| Black spots resolved temporary | *Number* | NA | NA | **109** | 148 |
| Km of bicycle lanes built definitely | *Km* | NA | NA | **NA** | 50 |

| | | | | | |
|---|---|---|---|---|---|
| Black spots resolved definitely | *Number* | NA | NA | **NA** | 100 |

### COVID-19 impact on measure development and evaluation

For this action however, the health crisis had a trigger effect with the implementation of a number of temporary facilities to patch up certain cycling black spots and thus encourage bicycle use, a transport solution which complies with social distancing. It must be seen if these operations will be made permanent and followed by heavier, more definitive structures.

## BRD 6 - Creating a 3rd Cycling Plan.

### Background information

Bordeaux Métropole is creating a 3rd Cycling plan 2021-2024, it is currently being written. Reviewing and commenting the state of the plan would be interesting for people in the transition arena. This upcoming cycle plan should be a reassertion of the current plan. It is the next step in the cycling policy Bordeaux Métropole has implemented during the past decades with success. A larger budget for cycling will become available with the introduction of this plan.

### Goals to be achieved

- Voting the 3rd metropolitan cycling plan by July 2021.
- Implementing new solutions to reach modal share of cycling of 18% in 2030.
- Associating a large part of partners, citizens (by the transition arena) but also Bordeaux Metropoles elective representatives and departments to share and to make appropriate as best as possible this 3rd cycling plan.

### Groups targeted by the solution

- Bordeaux Métropole’s departments.
- Bordeaux Métropole’s partners (others administrations, NGO…).
- Every Bordeaux Métropole’s inhabitants.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | The lead time for the drafting of the Bicycle Plan (9 months) requested by elected representatives is relatively short. The plan must be rolled out rapidly | **H** | **M** |
| **Political barriers** | Many elected representatives were replaced and the governance of the Métropole changed in 2020. The approval of the Bicycle Plan may require new agreements between Metropolitan representatives and on the degree of ambition to be given to the development of bicycle use. | **H** | **L** |
| **Human resource barriers** | The development of the Bicycle Plan in such a short lead time requires a high level of implication from the active mode department. | **H** | **M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | There is an awareness of many issues already and the actions will mainly be a continuation, with a budget to be increased in order to take things further. |
| **Political barriers** | This 3rd Bicycle Plan follows on from 2 highly ambitious plans for the development of bicycle use and should form a natural continuity. |
| **Human resource barriers** | |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Cycling Plan launched | *Yes/no* | No | **No** | **Yes** | Yes |
| Cycling Plan approved | *Yes/no* | No | **No** | **No** | Yes |

## COVID-19 impact on measure development and evaluation

The development of the 3rd Bicycle Plan is thus starting with a 6-month delay and the plan will be approved in July 2021 instead of September or December 2020 as initially planned.

## 2.3 City of Bruges


### 2.3.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| BRG 1 (AMS 3 → 2020-2021). Solutions for strengthening / creating a cycling tangential around the historic city center. |  |
| BRG 2 (AMS11, CPH8 and CPH16→ 2019-2022) Evaluation of the new cycling connection center – Sint-Michiels |  |
| BRG 3 (CPH 2, AMS 14 → 2019-2021). Strengthen the cycling infrastructure near the train station, hereby coping with Unesco-concerns |  |
| BRG 4 (MUN 3 → 2019-2021). Increase monitoring capacity and ability to communicate data for planning |  |

Table 4: Overview of solutions for Bruges

## BRG 1 – Solutions for strengthening / creating a cyling tangential around the historic city centre

### Background information

All cycling routes from the suburbs run towards the city centre. Due to the increase in cycling, existing cycling infrastructure alongside the city centre is (locally) falling short in accommodating the high numbers. This is especially the case on the green cycling tangential on the inner ring road ("Vesten"). If Bruges wants to accommodate the raising numbers comfortably and safely, a new concept is needed. This can also help to realise an even more ambitious modal shift since potential cyclists are today "scared" by the weak links (feeling unsafe / not comfortable / …) or are demanding other (especially long distance) cycling infrastructure.

### Goals to be achieved

- Identifying the new cycling tangential
- Identifying weak links and opportunities to strengthen the cycling network near / around the historic city centre.
- Creating a public support for the new concept.
- Creating an official support for the new concept (which would enable Bruges to attain subsidies for the realisation).

### Groups targeted by the solution

There are, besides the city's own administration and council, two main identified target groups: the Flemish government (incl different Agencies) and the Province. But also, the local citizens of Bruges, the Cyclist Union and regional stakeholders.

### Changes in activities to be performed

The roadmap, vision and strategy have a slight delay (more than 6 months) but several actions, like quick wins, have no delay.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |

| | | | | |
|---|---|---|---|---|
| Evaluation | | | | |

## Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | / - only expected at the project-level | **L** | / |
| **Resistance from local residents/shop owners** | / - only expected at the project-level | **L** | / |
| **Political barriers** | The concept has to be approved by the city council | **M/L** | **H** |
| **Bureaucracy/legislative** | The FR30 has to be recognized by the Flemish government, the impact would be high at the project level | **M/L** | **H** |
| **Financial barriers** | / - only expected at the project level | **L** | / |
| **Human resource barriers** | / - a third party (consortium of West 8 – Copenhagenize – Vectris) has been appointed | **L** | / |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | First projects were realised in 2020, quick wins - to show the potential |
| **Resistance from local residents/shop owners** | This is more an opportunity than a barrier / threat. At the project level more detail will be given to raising local support for concrete investments. |
| **Political barriers** | Several meetings with the Mayor and the Mayor's office were organised to discuss the then draft documents at the mid of 2020. This approach was successful: city council approved the concept on November 9, 2020. |
| **Bureaucracy/legislative** | Several meetings with local and supralocal partners were organised to create a broad support for the then draft documents at the mid of 2020.<br>This approach was successful: the 'projectstuurgroep' (a by decree mandatory administrative board) approved the concept on November 30. |

### Evaluation

A new investigation will only be released after 2020 due to COVID conditions.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Modal shift | *% cyclists* | 42% | **NA** | **NA** | 44% |
| Modal shift | *% car drivers and passengers* | 55% | **NA** | **NA** | 53% |
| Red / Black spots situated on the R30 | *AVOC-score*<br>*(red = cycling accidents – black = all accidents)* | Several red/ black spots | **NA** | **NA** | Drop op red / black spots |
| Air quality | PM – reflection to EU and WHO standards | Main cycling routes are situated alongside main roads | **NA** | **NA** | Decoupling of cycling routes and hence improving air quality |

### COVID-19 impact on measure development and evaluation

BRG1 had a slight sit back in Spring 2020 due to Covid-19. Still, in Summer the city of Bruges held a series of online meeting with partners (within the city's administration, with the partners at the supralocal level, with the Mayor – Mayor's office). In November, the study has been approved by the city council and the projectstuurgroep). Nevertheless, the city of Bruges had already approved the first actions on the FR30 cycling route and the first implementations (e.g., a new cycling street). Also, different ambitious studies have been initiated so that the dream of the FR30 will become a reality during Handshake already (not the whole route but important parts/today missing links).

## BRG 2 – Evaluation of the new cycling connection centre – Sint-Michiels

### Background information

A pivotal point in the (cycling) infrastructure network is the train station where the highest numbers of cyclists are recorded. On the side of the suburb Sint-Michiels a new cycling connection was successfully implemented, on the side of the city centre a safe cycling connection is lacking (see next topic). The new cycling connection

Sint-Michiels will be socio-economic studied, herebye setting the standard for the other one.

### Goals to be achieved

- Creating a safe and comfortable cycling connection between the city centre and Sint-Michiels (housing and higher education).

### Groups targeted by the solution

All modes: Motorist – Bus - Cyclists – Pedestrians.

### Timeline of roll-out

Measure already implemented.

### Risks management

Measure already implemented.

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Cycling intensity | Number of cyclists | 3.620 cyclists on average per day<br>623 cyclists on average per peak hour (Tuesday Morning) | **1,736 cyclists on average per day**<br>**389 cyclists on average per peak hour (Tuesday Morning)*** | **3.578 cyclists on average per day – 486 cyclists on average per peak hour** | Slight increase<br>+5% to + 10% |

***** a default in the counting device was discovered so that the number of 2019 is much lower than in 2018 or 2020.

### Evaluation (Bikenomics)

The bikenomics analysis will not be updated because the new cycling connection centre – Sint-Michiels is already completed. The above-mentioned indicators are the continued evaluation during the Handshake project.

### COVID-19 impact on measure development and evaluation

The morning/evening peak is less accentuated, and probably there have been two COVID-19 effects: less homework/school traffic (hence the less high peaks) and more recreational cycling traffic.

## BRG 3 – Strengthen the cycling infrastructure near the train station, hereby coping with Unesco-concerns

### Background information

In the forthcoming years the transformation of the surroundings of the train station (side city centre) will be set in motion by private and public partners. The city of Bruges wants to use this window of opportunity to strengthen this crucial link in the cycling network. A crucial but also unsafe link since the ring road and its bicycle crossings is ranked as one of “the black spots”. The city of Bruges wants therefore to lobby for a new cycling bridge so motorized and cycling traffic don’t cross physically. The city wants to support the Flemish government (which is taken the lead in the study of the ring road) by using the expertise of cycling capital-partners on e.g. how to match such infrastructure in the cycling network and how to cope with Unesco for building the bridge (which would be situated in “buffer”-area).

### Goals to be achieved

- Network analysis, road safety analysis and other traffic research.
- Samenwerkingsovereenkomst – agreement of cooperation between the Flemish government and the city council.
- Initiating a feasibility study.

Overall goal is to create official support for the idea of tackling the (cycling) problems near the train station.

### Groups targeted by the solution

The main target group is the Flemish government (AWV – MOW) and also other public government partners.

### Changes in activities to be performed

Regarding BRG3, the partnership agreement and tendering was a little bit slower than expected (because of administrative hurdles). Still, the partnership agreement has been signed (letter of the Flemish Road Agency of October 12, including a grant of 357.251 EUR for the study) but also that the tender has recently been given to the engineering company Tractebel who joined forces with architect Ney + Partners (who is an internationally renowned designer of bridges).

## Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 | 2022+ |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

## Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | At the moment (August 2019) a first scooping is finished. Two technical barriers are identified (the necessary height of a bridge because of exceptional transport loads and the maximum depth of a tunnel because of the hydrology of the terrain). | **M** | **M** |
| **Resistance from residents/shop owners** | One café and a dozen residents are situated in the proximity | **L** | **M/L** |
| **Political barriers** | The concept of a cycling bridge is mentioned in the Policy Program of Bruges, so at the local level there is a formal support. The main challenge will be to convince the new Flemish Government – Minister of Mobility of the project (phase 2). | **M** | **H** |
| **Bureaucracy/legislative** | The project is situated in the Unesco-(buffer)zone, special attention is therefore needed to this aspect. Although we think the probability is medium / low since the area is not intact (cfr criteria authenticity and integrity of ICOMOS) and a smart positioning can mitigate the impact. The city of Bruges has its own reflection platform ECU (ExpertenCommissie Unesco) in which the project can be discussed | **M/L** | **M/H** |
| **Financial barriers** | Funding from the Flemish government is paramount. We consider the risk “low” since the | **L** | **H** |

| | | | |
|---|---|---|---|
| | R30 is known to “hoste” several “black spots” so action is mandatory from the goals on road safety (which aren’t questioned). Phase 1 (e.g. the network analysis) delivered also impressive arguments which proof that the project can be granted (high) subsidies | | |
| **Human resource barriers** | Being included in the Policy Program, the city has supported the project by a well-equipped team (the Lead Coordinator, Department of Mobility, Department of Public Domain). | **L** | **L/M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Two introductory meetings with enterprises working on exceptional loads were organised in 2020 - the group who won the tender has worldwide expertise on similar projects (lead partner Tractebel - bridge engineering by partner Ney) |
| **Resistance from local residents/shop owners** | In the tender a specific action on public participation was included |
| **Political barriers** | On June 15 2020 a meeting with the Flemish Minister of Transport and Mobility took place, on October 12 2020 the formal partnership agreement was signed, on May 26 2020 the city council already approved the tender and the partnership agreement |
| **Bureaucracy/legislative** | In the tender a specific action a multi-scenario/multicriteria approach was included, the group who won the tender has worldwide expertise on similar projects and will address the survey by a multidisciplinary team conducting a broad range of studies (from traffic engineering till tree and heritage assessments). |

## Evaluation

During 2019 and 2020, the indicators will not be evaluated since the budget for monitoring them in 2018 was one-slot.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of cyclists | *Trips per day* | 15.000 | **NA** | **NA** | Increase + 5% in 5 yr |

| | | | | | |
|---|---|---|---|---|---|
| Number of cars | *Trips per day (vehicles towards Katelijnepoort)* | 6.531 | **NA** | **NA** | Decrease – 2,5% in 5 yr |
| | *Trips per day (vehicles to Unesco-round-about)* | 16.683 | **NA** | **NA** | |

### COVID-19 impact on measure development and evaluation

Probably there have been two COVID-19 effects: less home-work/school traffic (hence the less high peaks) and more recreational cycling traffic with the co-notation that the number of cars has dropped presumably more since the severe impact on local tourism/shopping of the COVID-19 measures.

## BRG 4 – Increase monitoring capacity and ability to communicate data for planning.

### Background information

Bruges has a tradition as cycling city but in contrast to cycling capitals as Copenhagen or Amsterdam, the city has no tradition in periodic – long term data monitoring. When tackling a problem, an ex-ante evaluation is done so no symptoms, but actual problems are dealt with. The city especially lacks ex-post evaluation and if this exists, it's mostly fragmented – compartmentalised. One of the main data lacks is not having a good insight in the traffic flows entering or leaving the historic centre. Bruges is currently collecting data from 4 general counts of modal split per year. The city wants within Handshake to gain further expertise in collecting data for cyclists, and in using this data for communication planning. The goal is to reach and identify the 'turning point' where cyclists (and pedestrians) regain control of the public space and motorized traffic is outnumbered. Bruges, as the cycling capital in Belgium, has this opportunity to reach this stage.

### Goals to be achieved

- Development of an API (application programming interface) .

### Groups targeted by the solution

City administration (IT-department – department of Mobility).

### Changes in activities to be performed:

The implementation and evaluation will have a 6-month delay because of other priorities.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Development of the API<br>- Combining the data of 36 counting points<br>- Translating them in an API | **L** | **H** |
| **Human resource barriers** | Interdepartmental cooperation is paramount sine this requires expertise beyond the Mobility Department | **L** | **M** |

### How Risks will be addressed:

| Barrier | Enabler |
|---|---|
| **Technical barriers** | A partnership in between our (“tandem”) IT-department – Mobility Department and the private partner SignCo. |
| **Human resource barriers** | In the 1st half of 2019 an intense dialogue was initiated so all city partners defined their roles and their expectations. |

### Evaluation

The city of Bruges will be able to collect data on these indicators once the API is developed.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Domain of collecting data specified | *Yes/no* | Individual data (both digital (on going counting) and paper) | **NA** | **NA** | API – Dashboard |
| Use of data for communication planning known | *Yes/no* | Only ad hoc (project based) communication on evaluation of traffic issues exist | **NA** | **NA** | City-wide communication strategy focussing on data collecting and dissemination |

## 2.4 City of Cadiz


### 2.4.1 Overview of solutions

| List of Handshake solutions (Code and Name) | Type of Solution |
|---|---|
| CDZ 1 (AMS 1 → 2019-2022). Development of a Bicycles Municipal Ordinance |  |
| CDZ 2 (AMS 3, AMS 15, CPH4, CPH5 → 2018-2022). Development of "Director Bicycle Plan" |  |
| CDZ 3 (CPH 1 → 2019-2022). Development of the bicycle network |  |
| CDZ 4 (CPH 10 → 2018-2022). Development of a mobility website and other interactive tools for participation purposes |  |
| CDZ 5 (MUN 2, MUN 3 → 2018-2022) Development of training courses for children and adults |  |

Table 5: Overview of Solutions for Cadiz

## CDZ 1 – Development of a Bicycles Municipal Ordinance.

### Background information

In the PMUS action plan, the city includes the development of a joint Ordinance of mobility to regulate not only motor vehicles management, but it also includes the management of the pedestrian, cycling, public transport, etc. mobility; thus, it gets more adapted to European mobility regulations and ordinances. Therefore, the development of a Bicycles Municipal Ordinance, which is pending elaboration, will be updated within Handshake. This ordinance will establish a favourable regulatory framework that allows the use of the bicycle as a means of transport integrated with other modes of urban mobility. It will also enable the reduction to 30km/h the maximum circulation speed in many of the streets of the city centre, having a great impact on traffic calming, creating the conditions for the bicycle to become a real mobility alternative, safe and functional, while improving road safety (in terms of number and severity).

### Goals to be achieved

- Development of the Bicycle Ordinance according to the latest local and European standards.

### Groups targeted by the solution

All citizens of Cadiz are targeted by this solution.

### Changes in activities to be performed

The time for drafting and approving the final text was reduced due to the need for providing guidelines to use new bicycle lanes and personal mobility vehicles.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Draft | | | | |
| Dissemination | | | | |
| Final version | | | | |
| Approval | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Lack of personnel. | **H** | **H** |
| **Resistance from local residents/shop owners** | None. | **L** | **L** |
| **Political barriers** | High political support. | **L** | **L** |
| **Bureaucracy/legislative** | Slow bureaucracy. | **H** | **M** |
| **Financial barriers** | Own personnel. | **L** | **L** |
| **Human resource barriers** | High, lack of dedicated personnel | **H** | **H** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Specific personnel dedicated and increase the number of people working on this task. |
| **Human resource barriers** | |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Bicycles Municipal Ordinance developed | *Yes/no* | No | **Yes** | **Yes** | Yes |

## CDZ 2 – Development of Director of Bicycle Plan

### Background information

In PMUS action Plan, GM14 action includes the elaboration of the "Director of Bicycles Plan". This document is the reference for the bicycle promotion policy as a means of transport improving the sustainable mobility of the city. It meets the basis measures that the City Council must apply in the next few years for the bicycle to be used effectively by the citizens. This master plan, which is pending elaboration, collects "Safety measures for cyclists" among its strategic lines of action. It is necessary to

define traffic-calming areas in combination with motorized and non-motorized transport modes and to include intelligent signalling and traffic lights for cyclists in the network.

**Goals to be achieved:**

- Development of the Bicycle Master Plan that defines long-range objectives and actions for developing cycling as a sustainable mean of mobility in the city of Cádiz. This includes the whole process from planning, construction, implementation, awareness campaigns, education, cycling facilities and structures, identifying and tracking results, integration with public transport, etc.

**Groups targeted by the solution**

City designers and planners, and citizens as result.

**Timeline of roll-out**

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Draft | | | | |
| Dissemination | | | | |
| Final version | | | | |
| Approval | | | | |
| Review | | | | |

**Risks management**

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Lack of experience. | **H** | **H** |
| **Resistance from residents/shop owners** | Medium | **M** | **M** |
| **Political barriers** | High political support. | **L** | **L** |
| **Bureaucracy/legislative** | Slow bureaucracy. | **H** | **M** |
| **Financial barriers** | Own personnel. | **L** | **L** |
| **Human resource barriers** | High, lack of dedicated personnel | **H** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Specific personnel dedicated and increase the number of people working on this task. |
| **Resistance from local residents/shop owners** | Publicity. |
| **Human resource barriers** | Specific personnel dedicated and increase the number of people working on this task. |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Traffic-calming areas defined | *Yes/no* | No | **Yes** | **Yes** | Yes |
| Traffic light system and signalling for cyclists implemented | *Yes/no* | No | **Yes** | **Yes** | Yes |
| Number of cyclists in defined areas | *Trips per day* | 500 self-estimated | **2500** | **4640** | 5000 |
| Accidents involving cyclists | *Per year* | Not available (NA) | **18** | **17** | 20 |
| Number of bicycles parking | *Total number for a single bike* | 342 | **1196** | **1206** | 1600 |
| New car parking slots created | *Capacity of the parking* | 140 | **303** | **80** | 40 |
| Restructuration of the | *Number of residential car parking* | NA | **0** | **696** | 750 |

| | | | | | |
|---|---|---|---|---|---|
| remaining car parks. | *Number of rotary car parking* | NA | **845** | **1105** | 1150 |
| | *Number of mixed car parking* | NA | **726** | **1202** | 1250 |
| Bike share system | *Yes/no* | No | **No** | **No** | Yes |
| Awareness campaigns | *Total number per year* | 1 | **1** | **1** | 1 |

### COVID-19 impact on measure development and evaluation

| |
|---|
| Lack of personnel assigned to the development of this solution that has been affected by several delays due to COVID 19. |

## CDZ 3 – Development of the bicycle network

### Background information

Cadiz is constructing a network of bike lanes to create a connected and safe cycling network. Adding another 10,6 kilometre to the already existing 16,6 kilometres. This work is being carried out as part of a local and regional administration agreement, which aims to create a connected and safe cycling network throughout Cadiz and reducing the emission of CO2. Construction started in 2018 and is expected to be completed in 2022.

### Goals to be achieved

- Complete the existing cycling network and improve the existing one.
- Increase the number of users.
- Increase sustainable mobility within the city, safety, reduce noise, air pollution, traffic congestion, etc.

### Groups targeted by the solution

Cyclists of Cadiz and all other citizens in general.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Lack of experience mainly regarding safety issues. | **M** | **M** |
| **Resistance from local residents/shop owners** | Disagree with the car parking removal. | **H** | **M** |
| **Bureaucracy/legislative** | Slow bureaucracy. | **H** | **M** |
| **Financial barriers** | Limited mainly to external funding. | **H** | **H** |
| **Human resource barriers** | Lack of personnel specifically dedicated. | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Specific personnel dedicated and increase the number of people working on this task. |
| **Resistance from local residents/shop owners** | Awareness meetings. |
| **Bureaucracy/legislative** | |
| **Financial barriers** | |
| **Human resource barriers** | Specific personnel dedicated and increase the number of people working on this task. |

### Evaluation

The bikenomics analysis will be updated in the ex-post report. The updated values of inputs on the project so far are stated in the table below. These values where provided by the city or based on expert judgement.

| Parameter | Value | 2020 |
|---|---|---|
| *Maintenance costs per year* | 1% | 1% |
| *Number of bike trips per year* | 443.685 | NA |
| *Number of car trips per year* | 8.184.411 | NA |
| *Modal share - bike* | 0,07% | 3,3% |
| *Modal share - car* | 31,1% | 57,6% |
| *Modal share - public transport* | 17,7% | 2% |
| *Modal share - pedestrian* | 51,2% | 29,5% |
| *Speed of cyclists (km/h)* | 12 | 12 |
| *Speed of car (km/h)* | 40 | 40 |
| *Average trip distance - bike* | 3 | 3,5 |
| *Average trip distance - car* | 4,5 | 4,5 |
| *Existing bike lanes (km)* | 16,6 | 17,4 |
| *Project bike lanes (km)* | 10,7 | 3,5 |

### COVID-19 impact on measure development and evaluation

| |
|---|
| COVID-19 has delayed one bike line tender by 6 months. |

## CDZ 4 – Development of a mobility website and other interactive tools for participation purposes

### Background information

There is no bicycle culture in Cadiz. Very few people use the bike lanes even where facilities are given. One of the city's objectives is to promote participation and mechanisms of communication among the involved agents.

### Goals to be achieved

- Enable a bicycle platform for information, promotion and interaction with citizens.
- Integrate the bicycle related information within a website.

### Groups targeted by the solution

All citizens of Cadiz.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Lack of experience. | **L** | **L** |
| **Financial barriers** | Limited budget. | **H** | **H** |
| **Human resource barriers** | Lack of personnel specifically dedicated. | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | |
| **Financial barriers** | Find other sources of funding. |
| **Human resource barriers** | Specific personnel dedicated and increase the number of people working on this task. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Mobility website created | *Yes/no* | Yes, but poor information and spread out. | **Yes**, but poor information and spread out. | **Yes**, but poor information and spread out. | Yes |
| Monthly documents published on website | *Number of documents per year* | 0 | **16** | **7** | 2 |
| Website popularity | *Number of visitors* | 6193 | **8455** | **5869** | 100000 |
| Mobile interaction applications developed | Number of apps. | 0 | **0** | **0** | 2 |

### COVID-19 impact on measure development and evaluation

| |
|---|
| Lack of personnel due to COVID-19. |

## CDZ 5 – Development of training courses for children and adults

### Background information

Cadiz wants to establish two programmes: i) for publicity and training in schools to educate children in developing a new culture of sustainable mobility and safety/security; ii) for senior citizens to carry out awareness campaigns specific for this age range since accident data shows the vulnerability of people older than 60.

### Goals to be achieved

- Early incorporation of children to the use of bicycle as a means of transport.
- Promote cycling among senior citizens.

### Groups targeted by the solution

Students and senior citizens.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Lack of experience | **L** | **L** |
| **Financial barriers** | Limited budget | **H** | **H** |
| **Human resource barriers** | Lack of dedicated personnel | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Specific personnel dedicated and increase the number of people working on this task. |
| **Financial barriers** | Find other sources of funding |
| **Human resource barriers** | Specific personnel dedicated and increase the number of people working on this task. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Mobility Classroom created for kids | *Yes/no* | No | **No** | **No** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| Mobility Classroom created for elderly | *Yes/no* | No | **No** | **No** | Yes |
| Number of cycling students | *Number of students attending to the mobility classroom* | NA | **3444** | **1959** | 4000 |
| Share of cycling children | *Percentage of total children that cycles* | NA | **NA** | **NA** | 0,05 |
| Number of elderly cycling | *Number of elderly attending to the mobility classroom* | **0** | **0** | **0** | 10 |
| Share of cycling elderly | *Percentage of total elderly that cycles* | 0 | **0** | **0** | 0,02 |
| Number of bike to schools campaign | *Number per year* | 0 | **0** | **0** | 1 |
| Number of supported schools. | *Number* | NA | **28** | **28** | 28 |
| Number of guided functional cycling routes for seniors | *Number* | 0 | **0** | **0** | 2 |
| Number of conferences | *Number per year* | 0 | **0** | **0** | 28 |
| Number of conferences assistants | *Number* | 0 | **0** | **0** | 840 |

## 2.5 City of Copenhagen


### 2.5.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| CPH 11: User-driven prototype tests as an innovative method to develop new concepts for campaigns, way finding solutions and bicycle parking. |  |
| CPH 12: Intelligent solutions for dynamic street lighting, right turn warning lights, data collection and flexible way finding. |  |
| CPH 13: Customised traffic modelling tools developed to calculate bicycle traffic capacity and flow. |  |
| CPH 14: Behavioural change via nudging and smart data. |  |
| CPH 15: Bicycle parking solutions that are space-effective and/or multifunctional. |  |
| CPH 16: Socioeconomic assessments of investments in cycling: Farum route. Comparison of Dutch and Danish approach |  |

Table 6: Overview of solutions for Copenhagen

## CPH11 – User-driven prototype tests as an innovative method to develop new concepts for campaigns, way finding solutions and bicycle parking

### Background information

Copenhagen is seeking how to further develop the process of involving users in the design of prototypes of future cycling solutions. Service solutions for cyclists in the form of campaigns, wayfinding through signs and online route planners, and specialized bike parking racks all help to make cycling more intuitive and attractive. Copenhagen has experience with involving users directly in the design of prototypes for service solutions. By engaging with end users already in the first development of new concepts and ideas, and test these prototypes in the user's context, it is possible to accelerate innovation, avoid misinterpretation and failed investments, and ensure added value in the end.

### Goals to be achieved

- The main goal of this solution is to have the development of new prototypes of cycling solutions in the municipal better aligned with the wishes and needs of the users and the overall goals in Bicycle Strategy 2011 – 2015.

### Groups targeted by the solution

Cyclists and future cyclists (especially car users).

### Timeline of roll-out

Measure has been rolled-out, it is currently being monitored. The final evaluation is expected by the end of the project.

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | The choice of communication (platform) is outdated and do not reach the target group. | **L** | **M** |
| **Resistance from local residents/shop owners** | Why use our money on communication/research and not on real infrastructure | **M** | **L** |
| **Political barriers** | Why use public funding on communication/research and not on real infrastructure | **M** | **H** |

| | | | |
|---|---|---|---|
| **Bureaucracy/ legislative** | User driven methods tends to challenge the traditional decision-making process and organizational hierarchy in public administration | **M** | **L** |
| **Financial barriers** | Lack of finance (political will) | **M** | **H** |
| **Human resource barriers** | The knowledge and experience of developing, planning, organizing and implementing user driven processes in relation the functional measures on bicycle solutions are limited to only a few people in the organization | **L** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | A combination of qualitative interviews, focus groups and online survey will counter the barriers related to reaching the target group |
| **Resistance from local residents/shop owners** | The local residents (copenhageners) will be involved in the process and this will by and large counter local opposition – if any. |
| **Political barriers** | The possibility of avoiding misinterpretation and failed investments through the involvement of end users is a good way of securing political support |
| **Bureaucracy/legislative** | Involving users/citizens makes it easier to focus on solutions that are recognized among the users |
| **Financial barriers** | |
| **Human resource barriers** | |

## Evaluation

The main source for monitoring the following indicators is a survey. Nevertheless, the data on cyclist satisfaction will be available in August 2021 since a biannual survey collects them.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Cycling culture's impact on urban life and atmosphere (Cyclist satisfaction) | % | 72% | NA | NA | 76% (Goal2025 - 80%) |

| | | | | | |
|---|---|---|---|---|---|
| Easy to get around on bicycle (Cyclist satisfaction) | % | 71% | **80%** | **NA** | 80% (Goal in 2025 - 90%) |

## CPH12 – Intelligent solutions for dynamic street lighting, right turn warning lights, data collection and flexible way finding

### Background information

The technology needs personnel to be able to use the technology. There is thus the need for better education of the personnel and cross-sectoral integration of ITS programs in the organisation. The City of Copenhagen has an ITS program developing intelligent street lighting, real time monitoring of bicycle traffic flow and variable message signs for flexible way finding. Furthermore, Copenhagen has hosted the ITS World Congress in 2018. The conference and ongoing project will be integrated and further developed in Handshake so other cities can learn and benefit from the ITS projects in Copenhagen.

### Goals to be achieved

- The intended objective is to have better education of personnel and integration of ITS in the organization to get the full effect of the ITS programs.

### Groups targeted by the solution

Decision makers and personnel in Technical – e.g., Environmental Department of the City of Copenhagen.

### Timeline of roll-out

Completed, internal reporting phase.

### Risks management

| **Risks management** | | | |
|---|---|---|---|
| **Risk type** | **Description** | **Probability (H/M/L)** | **Impact (H/M/L)** |
| **Technical barriers** | The development and implementation of ITS solutions is a mine field of technical barriers as well as opportunities | **H** | **M** |

| | | | |
|---|---|---|---|
| **Political barriers** | Not seeing the potentials in using new ITS solution and seeing them as overly expensive and unnecessary. | **M** | **H** |
| **Bureaucracy/legislative** | Lack of organizational integration. There could also be issues related to surveillance and data storage. | **M** | **H** |
| **Human resource barriers** | The knowledge and experience of developing, planning, organizing and implementing ITS solutions in relation the functional measures on bicycling are limited to only a few people in the organization | **M** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Re-education of personnel and making sure the organization is capable of choosing the ITS systems that is integrable with existing traffic infrastructure. |
| **Political barriers** | Better documentation of the actual effects and cost benefit analyses |
| **Bureaucracy/legislative** | Securing horizontal implementation and integration of ITS-programs |
| **Human resource barriers** | Better levels and opportunities for re-education of personnel in the use of ITS |

## Evaluation

The main source for monitoring this indicator is a biannual survey, then the related data are expected in June 2021. Travel time is calculated with 2012 as the base year. It is based on two factors: travel speed and distance. The travel speed is calculated using the same method as Copenhagen have measured the average speed on a bicycle since 2004. The distance is calculated using the City of Copenhagen's route planner for cyclists, where 30 workplaces and 30 homes are representatively selected across districts. Then the route planner gives a total average distance for cyclists. These two numbers together give a number for the average travel time.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Reduction in travel time | % | 9 | NA | NA | 12 (goal in 2025 - 15) |

## CPH 13 – Customised traffic modelling tools developed to calculate bicycle traffic capacity and flow

### Background information

Copenhagen has developed and are using different kinds of customised traffic modelling tools to e.g., calculate bicycle traffic capacity and flow. One modelling tool is COMPASS. COMPASS is developed to calculate the consequences on the traffic of changes in the city. Changes can be anything from a larger population, a closed road or a large infrastructure project. COMPASS is scheduled to be implemented in 2020. Furthermore, Copenhagen have developed a traffic model for signalized intersections (CyKap) that is currently being tested and implemented. Copenhagen wants to test both the mentioned models and share knowledge with other cities that are working with transport models. The learning points from the tests can be transferred to other cities. The question is thus how to test and share knowledge on traffic modelling tools with other Handshake cities.

### Goals to be achieved

- The main aim is to gain a better understanding of the potentials and barriers of Copenhagen's modelling tools and the ability to use these modelling tools across different cities in different countries.

### Groups targeted by the solution

Traffic planners and experts, users of transport models, climate projects, noise reduction, air pollution reduction, planning at strategic level.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | TBD | TBD |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Difficult balance between developing a model that can do holistic and accurate calculations and at the same time is not too complex for people to use. | **M** | **M** |
| **Bureaucracy/legislative** | Difficult to decide where the model should be placed and organised in the organisation of the Technical and Environmental Administration, and what areas will give input and take decisions based on model. | **M** | **M** |
| **Financial barriers** | Funds have only been allocated for the development of the model and not for the following implementation and operation. This has been fixed now (see enabler) but has several times led to uncertainties about the future of the model | **H** | **L** |
| **Human resource barriers** | The technical complexity of transport modelling is very high and only few employees know how to work with the model. | **M** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Be clear about the aim of the model and on which kind of projects the model should be used. |
| **Bureaucracy/legislative** | Currently, two people are working full time on the model. CPH-Handshake-project leader will contact Compass-project lead to get a better overview of the role and placement of the model in the future. This has not been urgent or relevant so far, since model is still being developed and qualified. |
| **Financial barriers** | Funding for operation has been given via the overall administrational city budget. |
| **Human resource barriers** | Secure modelling experts on permanent contracts |

### Evaluation

| Evaluation (COMPASS) | | | | |
|---|---|---|---|---|
| **Indicator** | **Unit** | **Value (2018)** | **Value (2020)** | **Expected (2022)** |
| Implementation process | *Phase* | Design phase | **Internal assessment** | Tested / Implemented |
| Model effectiveness/ reliability | *Modelled vs real-life data accuracy* | Simulations/ Data collection | **Internal assessment** [1] | Evaluated and refined |
| **Evaluation (CyKap)** | | | | |
| **Indicator** | **Unit** | **Value (2018)** | **Value (2020)** | **Expected (2022)** |
| Implementation process | *Phase* | Active implementation | **Tested/ implemented** | Tested / Implemented |
| Model effectiveness/ reliability | *Modelled vs real-life data accuracy* | Simulations/ Data collection | **Completed** [2] | Evaluated |

## CPH 14 – Behavioural change via nudging and smart data

### Background information

Copenhagen has experience with basing behaviour change initiatives on a combination of 'deep data' (anthropological analyses of citizens' feelings and experiences related to cars and bicycles) with 'big data' (statistical data on transport behaviour, mode choice, demographic profiles etc.). This is used to pinpoint specific nudging initiatives that help citizens switch from cars to bikes. However, it has been

[1] The model is being reviewed internally within the municipality. We are running different simulations to try to define the value of the model, and if adjustments are needed.
[2] CyKap (http://www.cykap.dk/login/login?ReturnUrl=%2f) is a "mini" traffic model, usefull for scheming and estimating bicycle traffic in intersections and potentially show challenges with capacity. Copenhagen Municipality has developed the model with engineering consultant firm Rambøll. Compared to other traffic models, CyKap is pretty user friendly and it is planned to use it as a tool for municipal planners, to make Copenhagen Municipality less dependent on external consultants. The challenge is limited implementation of the model.

difficult to get political support for the use of nudging activities as the documentation of effect on specific initiatives can be somewhat spares.

### Goals to be achieved

- Better understanding of direct effects of nudging activities on the shift from cars to bicycles and the ability to secure better political understanding of the potentials in using nudging as a mobility management instrument.

### Groups targeted by the solution

Cyclists and car users.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | 1st round completed | 2nd round completed | |
| Design | | 1st round completed | 2nd round completed | |
| Implementation | | 1st round completed | 2nd round completed | |
| Evaluation | | TBD | TBD | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Resistance from local residents/shop owners** | General resistance to municipal nudging activities as they are seen as admonitory messages | **M** | **L** |
| **Political barriers** | The political viewpoint is "more infrastructure - less campaigning" | **H** | **H** |
| **Human resource barriers** | The knowledge and experience of developing, planning, organizing and implementing nudging in relation the functional measures on bicycling are limited to only a few people in the organization | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Resistance from local residents/shop owners** | Always choice a positive messaging when working with communication and nudging |
| **Political barriers** | Document the actual effect of nudging |
| **Human resource barriers** | Cooperation with external partners |

### Evaluation

The main source for monitoring the following indicators is a survey. Nevertheless, the data on cyclist satisfaction will be available in June 2021 since a biannual survey collects them.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Copenhagen as a cycling city (satisfaction) | *% Satisfaction* | 97 | **NA** | **NA** | 99 |
| Modal share of cyclists (going to/from work and education) | *% Satisfaction* | 49 | **44** | **NA** | 50 (Goal in 2025 - 50%) |

## CPH 15 – Bicycle parking solutions that are space-effective and/or multifunctional

### Background information:

Bicycle parking is an important policy issue in Copenhagen. However, establishing extra bicycle parking facilities is complex in a city with pressure on urban space. Copenhagen has been testing multifunctional parking at stations and at schools where bicycle parking is very much needed during the day but settles down at night leaving room for example parked cars. Prototypes of space-effective solutions such as vertical racks, nudging in order to distribute bikes more evenly, and valet services have also been tested. Copenhagen needs more bicycle parking, but the city lacks space. The politicians have made a principal decision on this but closing car parking is still political sensitive. More insight in experiences from converting car parking to bicycle parking is needed.

### Goals to be achieved

- Better and more accessible facilities for bicycle parking. More bicycle parking, especially near train stations and other transport hubs.

### Groups targeted by the solution

Cyclists and users of public space.

### Changes in activities to be performed

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Resistance from local residents/shop owners** | Some resistance. Especially from those who stand to lose access to car parking. Shop owners might be anxious. | **M** | **L** |
| **Political barriers** | Political sensitive | **H** | **H** |
| **Bureaucracy/legislative** | Some from the police. The police can veto any changes made to the structure and function the roads. | **M** | **H** |
| **Financial barriers** | Less income from car parking | **L** | **L** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Resistance from local residents/shop owners** | Information on the overall purpose the project. Dialogue with shop owners on the possibilities of better access from a larger group of potential customers. |
| **Political barriers** | This is where the evaluation analysis hopefully will help |

| | |
|---|---|
| **Bureaucracy/legislative** | Better dialogue with the police |
| **Financial barriers** | The documentation of socio-economic benefit of more bicycle parking could counter the decreasing income from car parking |

### Evaluation

The main source for monitoring the satisfaction with bicycle parking is a biannual survey, then the related data are expected in June 2021. While the data collection for the occupancy rate of bicycle parking places is done manually and currently no funds are allocated to conduct the analysis.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Satisfaction with bicycle parking | *% Satisfaction* | 37 | **NA** | **NA** | 45 (Goal in 2025 - 70%) |
| Occupancy rate of bicycle parking places | *%* | 111 | **NA** | **NA** | < 100 |

## CPH 16 – Socio-economic assessment of investments in cycling: Farum route. Comparison of Dutch and Danish approach

### Background information

The Danish Ministry of Finance's transport economic key values show that for every extra km travelled by bicycle society gain 4.80 Danish kroner (0.65 euros), and for every extra km travelled by car the cost is 5.28 Danish kroner (0.70 euros). In all, there is a total gain to society of 10.08 Danish kroner (1.35 euros) for every km travelled. This data can be used to assess both planned and realized projects to determine their feasibility, internal rate and other relevant economic results.

In relation to the 10 new bicycle and pedestrian bridges Copenhagen has built since 2014, with Handshake it will use Bikeconomics to measure the value of large infrastructural project such as these for cyclists. As cycling investments in Copenhagen generally have large return in investments the data can be used to push for further investments in infrastructure in Copenhagen.

### Goals to be achieved

More in-depth and broader knowledge of socio-economic impacts and modelling in developing cycling infrastructure.

### Changes in activities to be performed

The Danish Technical University has presented new calculations about the socio-economic impact of cycling in late 2020. The data shows, that cycling is even more beneficious to society as a whole. The consequences are not yet clear but expected to be positive for investments in cycling. The new findings were noted by the Danish Minister of Transportation, and it is expected that the Danish model for calculating the societal return of investment of infrastructure projects – the TeReSa-model – will be adjusted in the coming months.

### Groups targeted by the solution

Politicians, professionals, central and local administration, researchers.

### Activities to be performed and timeline

Completed, not yet decided on the evaluation.

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | The collection of data on the Cycle superhighways is not aligned with Bikenomics. | **M** | **M** |
| **Political barriers** | The building of Cycle superhighways has broad political support in Copenhagen. Better economic impact analysis on the Cycle superhighways would be supported from the political level. | **L** | **L** |
| **Bureaucracy/legislative** | Cycle superhighways are implemented in cooperation between multiple municipalities. This can slow down the decision-making process. | **M** | **L** |
| **Financial barriers** | Funding on the development of a new economic impact model could be difficult to achieve. | **H** | **H** |

### How the municipality intends to deal with risks

| | |
|---|---|
| **Technical barriers** | Many data are available. The secretariat of the Cycle superhighways will be supportive in the process. |
| **Political barriers** | Keeping focus on the overall benefit of route network to Copenhagen and the access to more knowledge on the impacts of the Cycle superhighways |
| **Bureaucracy/legislative** | Communicating the benefits to the region and the specific municipalities |
| **Financial barriers** | State funding can be unpredictable and is subject to political will. Strong municipal advocacy and co-funding is essential |

### Evaluation

The bikenomics analysis will not be updated because the solution CPH 16 is completed.

## 2.6 City of Dublin


### 2.6.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| DBL 1 (AMS 3 → 2018-2022) Develop the main cycle network |  |
| DBL 2 (AMS 15 → 2017-2021). Optimizing bicycle data collection points. |  |
| DBL 3 (AMS 4, AMS 18 → 2018-2021). Making space for additional bicycle parking and dock less bike share schemes. |  |
| DBL 4 (CPH 12 → 2018-2021). Prioritized intersections for cyclists. |  |
| DBL 5 (CPH 14 → 2017-2020). Use bicycle data for nudging |  |

Table 7: Overview of solutions for Dublin

### 2.6.2 Detailed description of solutions

## DBL1 – Develop the main cycle network

### Background information

The primary cycling network in Dublin is to be expanded over next number of years. Difficulties with lack of road space, and some resistance to change and lack of strong support from the public for the necessary changes are the main challenges where the city can be helped.

### Goals to be achieved

Identify best-practices to develop the bicycle network and adapt them to the Irish context. Currently the measure has not yet been determined because the city would like first to learn more about best practices from other cities through symposia and General Assemblies.

### Groups targeted by the solution

City officials and cyclists.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Limited design expertise both internally within DCC and from locally based consultants. Narrow streets and the reliance on bus lanes to deliver reliable PT limits space for cycle schemes. | **H** | **H** |

| | | | |
|---|---|---|---|
| **Resistance from local residents/shop owners** | Most scheme meet with resistance from some local residents and traders. This is generally due to competition for kerb/road space. Impact on trees (strong opposition to removal of trees on streets). | **H** | **H** |
| **Political barriers** | Resistance from local residents/shop owners is passed on to local & national politicians. | **H** | **H** |
| **Bureaucracy/legislative** | Very slow rate of change in local & national regulations. Planning legislation can lead to delays and additional costs for all projects | **H** | **H** |
| **Financial barriers** | Financial resourcing issues slows the delivery of planned projects | **H** | **H** |
| **Human resource barriers** | Limited design expertise both internally within DCC and from locally based consultants. Limited number of staff available slows the delivery of projects | **M** | **H** |
| **Other types of barriers?** | Negative public perception of cycling projects | **M** | **M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Adaptive and flexible design approach to take into account local context. |
| **Resistance from local residents/shop owners** | Intensive engagement, multidisciplinary approach in design process |
| **Political barriers** | |
| **Bureaucracy/legislative** | Discussion/lobbying with local and national politicians |
| **Financial barriers** | Programme for Government with commitments to support cycling |
| **Human resource barriers** | Capacity building within departments tasked with the delivery of cycling infrastructure in terms of quantity and quality of personnel |
| **Other types of barriers?** | Demonstrate the advantages of projects to all |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Cycle network planned | *Yes/no* | NA | **Yes** | **Yes** | Yes |
| Number of cyclists | *Trips per day* | 92.589 | **110.245** | **NA** | 146.736 |
| Number of cars | *Trips per day* | 360.120 | **334.031** | **NA** | 268.680 |

### COVID-19 impact on measure development and evaluation

As part of Dublin response to COVID-19 a number of temporary Cycle ways have been added to the network by means of temporary bollards and modification to traffic signals. This include 3.5km Griffith Avenue Route, 1.3km on Liffey Cycle Route, 1.7km on the Phisborough to the Quays Route, 1.7km Rathmines to City Centre, as well as the completion of 800m of the royal canal way (Permanent Scheme) and 900m for the FItzwilliam scheme (temporary implementation of what will later be a permanent scheme).

## DBL2 – Optimizing bicycle data collection points

### Background information

The city has already eight trials in operation for collection of cycle data, all new and upgraded signals now incorporating cycle detection. Dublin needs assistance with determining where bicycle priority should be deployed, as they already use bus and tram priority at traffic signals.

### Goals to be achieved

- Currently the measure has not yet been determined because the city would like first to learn more about best practices from other cities through symposia and General Assemblies.

### Groups targeted by the solution

City officials and cyclists.

### Changes in activities to be performed

Due to COVID uncertainties, there are multiple options to trail cycle detection. While data evaluation has been moved to 2021 due to lack of staff employed to cope with COVID emergency.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Some issues with integrating the equipment into our current system for verification of data | **M** | **L** |
| **Financial barriers** | The cost of the units can make addition of these units expensive at a site | **M** | **H** |
| **Human resource barriers** | The calibration and verification of the units requires time which can affect resources | **M** | **H** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | More time required for project technical consultant to develop new system for recording data |
| **Financial barriers** | Lobby central government for additional funding to increase staffing levels |
| **Human resource barriers** | |

### Evaluation

Four sites have been identified and the equipment has been installed on-site; but to date, we have been unable to verify the results since team members originally assigned to this project were reassigned to other projects related to COVID-19. The

expected figure may seem slightly unambitious, however much of the demand at these locations is believed to be driven by office-based commuters. It is expected that over the next few years there will be a significant reduction in the number of workers commuting to offices 5 days a week. In this context we are expecting just a moderate increase in cycling numbers due to an increase in both cycling mode share and in leisure cycling

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Areas of bicycle priority determined | *Yes/no* | No | **Yes** | **NA** | Yes |
| Number of cyclists measured | *Trips per year* | 481,182 | 611,351 | **NA** | 750,000 |
| Number of cars measured | *Trips per year* | 2,830,833 | 2,633,524 | **NA** | 2,150,000 |

### COVID-19 impact on measure development and evaluation

As part of Dublin's Response to COVID -19 the majority of the team were moved to work on responding to changes required due to social distancing so very little progress can be reported in relation to the development of the data collection system to record cycle movement at the chosen sites.

## DBL3 – Making space for additional bicycle parking and dock less bike share schemes

### Background information

The current Dublin City Development Plan 2016-2022 aims “to increase mode share associated with cycling to reach a minimum target of 25%”. Cycle parking is a problem in the city centre with not enough space on street or on footpaths. Dublin is aiming to increase cycle parking in the city with increased investment over the next number of years. There is insufficient cycle parking to meet the city’s current needs. Also, the quantity and locations of cycle parking throughout the city needs to be increased and broadened to allow for the effective operation of the recently introduced dock less bike scheme.

### Goals to be achieved

- Improve on-street bicycle parking in terms of number and quality.

### Groups targeted by the solution

The target group would be cyclists looking for convenient parking close to their destinations. Close to colleges the target group would be largely students. Close to shops the target group would be largely shoppers and the occasional employee.

### Changes in activities to be performed

Due to Covid related delays Dublin will not meet its 2020 target (80% achieved) for roll out of on street bicycle parking spaces. However additional bicycle parking was installed in schools and at shopping centres along with the first cargo bike parking locations in Dublin.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Location of sufficient suitable spaces | **M** | **M** |
| **Resistance from local residents/shop owners** | Objections are sometimes received from residents/shop owners to the installation of stands on the basis that they lead to anti-social behaviour as teenagers can congregate around them. | **L** | **M** |
| | Objections are also received on the basis that the loss of parking will impact on local business. | **M** | **H** |
| | Objections on the basis that they are unsightly. | **L** | **L** |

| | | | |
|---|---|---|---|
| | Objections on the basis that the stands impact on access or egress to a particular property. | **M** | **H** |
| **Political barriers** | Local Councillors will usually support the views of their constituents | **M** | **M** |
| **Bureaucracy/legislative** | Will require agreement of other section within DCC to reallocate road space (with associated financial losses) | **M** | **H** |
| **Financial barriers** | Loss of Parking Revenue for Reallocated Spaces | **M** | **M** |
| **Human resource barriers** | Will require at least one engineer giving 50% of their time to managing project | **L** | **L** |
| **Other types of barriers?** | Impact on the Public Realm | **M** | **M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Areas where cycle parking demand have been identified will be assessed to ensure parking can be installed in the area without impacting unduly on pedestrian environment/residents/businesses etc. |
| **Resistance from local residents/shop owners** | Investigation of issues and possible redesign of the stands in the area if and when the issues arise.<br>Improve distribution of data on retail spending by cyclists to business owners/ associations.<br>Look at using planters or other greenery to improve the aesthetics of the installations |
| **Political barriers** | Deal with on a case-by-case basis as they arise |
| **Bureaucracy/legislative** | Make a case for cycle parking supported by the current objectives of the current Development Plan and Climate Change Objectives. |
| **Financial barriers** | Attempt to minimise financial barriers. |
| **Human resource barriers** | |
| **Other types of barriers?** | Ensure project is adequately resourced |

## Evaluation

The main source for monitoring the following indicators are surveys conducted each year in Nov-Jan. Each survey only looked at roughly 750 stands recently installed and not the whole stock. It has been used what was installed before 2018 and what was installed in 2018 to get the 2018 figure. While the 2019 figure is a result of 2018 value, plus what was installed in 2019. 2020 is what has been installed so far this year plus what was there previously.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of dedicated cycle parking spots | *Total number* | 1272 | **2242** | **~3000** | 5000 |
| Occupancy rate of parking spots | *Percentage of available spots* | 35% | **19%** | **20%** | 20% |

### COVID-19 impact on measure development and evaluation

COVID-19 lead to a few locations on the footpath in Batch 13 being dropped due to extra widths being required for pedestrians. COVID-19 has meant we can't install cycle parking in a lot of locations due to the footpath being too narrow and no space on the road being available for cycle parking. Pre COVID-19 cycle parking could be installed parallel on a footpath that is 2.85m wide for a non-busy road and 2.95m wide for a busy road/city centre location. Post COVID-19 cycle parking is only installed parallel on a footpath that is 3.3m wide for a non-busy road and 3.4m wide for a busy road/city centre location. This is to ensure the at least 2.2m is maintained for pedestrians. This is causing difficulty in reaching our target of 1000 stands per year. COVID-19 has also caused delays in getting Batches out to Tender due to the lockdowns.

## DBL4 – Prioritized intersections for cyclists

### Background information

The municipality would like to provide additional time to allow cyclist to clear the intersection before opposing traffic is given a green light to move into the junction.

### Goals to be achieved

- Upgrade a number intersections that are part of key cycling routes in order allow additional time for the cyclist to clear the junction

### Groups targeted by the solution

Cyclists and car drivers.

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | 2-3 months per site | | | | |
| Design | 3 months per site | | | | |
| Implementation | 12 months per site | | | | |
| Evaluation | | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Ensuring the proposed system detects and records cyclist accurately in order to ensure that the system can distinguish between pedestrians and cyclist in order to reduce the number of false detections. Ensuring the accuracy of the count of cyclist in particular cycling travelling in groups. | M | H |
| **Political barriers** | There could be knock on affect for vehicle traffic if time is taken for the traffic phases. | **M** | **H** |
| **Bureaucracy/legislative** | No changes to Legislation is required but consideration must be made in relation to additional equipment installed on the street and in particular the public realm. | **M** | **H** |
| **Financial barriers** | Funding has been provided for the initial roll out. Ongoing maintenance cost of the equipment will have to be covered once the equipment installed. | **M** | **H** |
| **Human resource barriers** | Additional staff members may be required. | **H** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | A number of different units will be trialled on site in order to ensure the correct units are ordered. |

| | |
|---|---|
| **Political barriers** | On-going monitoring |
| **Bureaucracy/legislative** | Deal with on a case-by-case basis as they arise |
| **Financial barriers** | |
| **Human resource barriers** | Request for additional staff will be submitted as required |

## Evaluation

The bikenomics analysis will be updated in the ex-post report. The updated values of inputs on the project so far are stated in the table below. These values where provided by the city or based on expert judgement.

| Indicator | Location | Value | 2019 |
|---|---|---|---|
| *Investment costs* | *Junction 1 (AKA Site 6) Leeson St Bridge* | 17.895 | 0 |
| *Year(s) of investment* | | 2018-2019 | 2018-2019 |
| *Maintenance costs per year* | | 2.182 | 2.182 |
| *Number of cycling trips per year* | | 566.779 | 767.473 |
| *Number of car trips per year* | | 4.554.867 | 3.794.648 |
| *Minimum green time (sec) – before* | | 6 | 10 |
| | | | |
| *Investment costs* | *Junction 2 (AKA Site 9)* | 17.800 | 0 |
| *Year(s) of investment* | | 2018-2019 | 2018-2019 |
| *Maintenance costs per year* | | 2.182 | 2.182 |
| *Number of cycling trips per year* | | 887.406 | 1.081.330 |
| *Number of car trips per year* | | 3.408.252 | 3.304.761 |
| *Minimum green time (sec) – before* | | 6 | 10 |

| | | | |
|---|---|---|---|
| *Investment costs* | *Junction 3 (AKA Site 18)* | 13.558 | 0 |
| *Year(s) of investment* | | 2018-2019 | 2018-2019 |
| *Maintenance costs per year* | | 2.182 | 2.182 |
| *Number of cycling trips per year* | | 248.570 | 340.938 |
| *Number of car trips per year* | | 1.843.483 | 1.813.500 |
| *Minimum green time (sec) – before* | | 6 | 6 |
| | | | |
| *Investment costs* | *Junction 4 (AKA Site 32)* | 21.945 | 0 |
| *Year(s) of investment* | | 2018-2019 | 2018-2019 |
| *Maintenance costs per year* | | 2.182 | 2.182 |
| *Number of cycling trips per year* | | 221.972 | 255.663 |
| *Number of car trips per year* | | 1.516.731 | 1.621.188 |
| *Minimum green time (sec) – before* | | 6 | 10 |

### COVID-19 impact on measure development and evaluation

| |
|---|
| As part of Dublin's Response to COVID -19 the majority of the team were moved to work on responding to changes required due to social distancing so very little progress can be reported in relation to the development of the data collection system to record cycle movement at the chosen sites. |

## DBL5 – Use bicycle data for nudging

### Background information

Use of data for Origins and Destinations for cyclists as well as providing better feedback to the City Council is underway but so far utilizing this data for “nudging” is not factored in and experience in how to use this data and how to influence user behaviour in Handshake will be extremely useful.

### Goals to be achieved

- Increase the use of cycle buses and other sustainable methods through improved engagement with schools.
- Publicity campaigns relating to new cycle routes.
- Use recent examples of new cycling infrastructure as a basis of positive evidence for councillors to speed up the decision making of elected officials in relation to cycling projects.

### Groups targeted by the solution

City officials and cyclists.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | GDPR breach arising from collecting data from individuals. | **L** | **M** |
| **Resistance from local residents/shop owners** | Users don’t know how to use the Smart Mobility Hub app or ebikes. | **L** | **H** |
| **Political barriers** | Potential resistance from residents living on a designated School Street about access to/from their property during operational hours. | **M** | **H** |

| | | | |
|---|---|---|---|
| **Bureaucracy/legislative** | No resistance to-date. Potential to lose political support for School Streets if local residents oppose the project. | **M** | **H** |
| **Financial barriers** | Possible legal barriers to closing streets for School Streets | **L** | **H** |
| | Cost of opening and closing School Street and running the Smart Mobility Hub. | **L** | **H** |
| **Human resource barriers** | Users that claim mileage allowance when using their personal cars for work visits. | **M** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Ensure data is anonymised. |
| **Resistance from local residents/shop owners** | Training provided to show how to use the app and the ebikes. |
| **Political barriers** | Consultation with relevant stakeholder from the beginning of project to ensure their buy in. |
| **Bureaucracy/legislative** | Consultation with relevant stakeholder from the beginning of project to ensure their buy in. |
| **Financial barriers** | Consult with other Local Authorities who have implemented a trial school street.<br>Encourage them to see bigger picture of advantages of Smart Mobility Hub. |
| **Human resource barriers** | Request additional staff to support with the project. |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Nudging policies | *Number per year* | 0 | **2** | **1** | 3 |

## COVID-19 impact on measure development and evaluation

COVID-19 has increased the need and urgency to increase the number of children walking and cycling to school. To respond to this need we have adapted the Safe Routes to School programme to create School Zones, rather than School Streets. School Zones include

measures to reduce illegal parking and congestion at the school gate and thereby create a safer environment for children to walk and cycle to school. For the Smart Mobility Hub new protocols were put in place to ensure the safety of all users and to enable the hub to remain open during the pandemic.

- Policy 1: Appoint Walking & Cycling promotions officer.
- Policy 2: Launch Smart Mobility Hub (which includes a bike share system with push bikes and e-bikes to facilitate DCC employees to use sustainable transport modes for work purposes.)
- Policy 3: Design and implement Safe Routes to School Programme to enable a shift in transport modes and increase the number of children using active travel (walking & cycling) for their journey to school.

## 2.7 Greater Manchester


### 2.7.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| MCS 1 (CPH 1, CPH 7 → 2018-2022). Segregated "Dutch-style" Cycle Lanes: Chorlton Cycleway |  |
| MSC 2 (CPH 11, CPH 14, MUN 1 → 2018-2022). Influencing Behavioural Change via credit/debit, reward/fine systems and gamification. |  |
| MSC 3 (MUN 6, AMS 19 → 2018-2022). Providing Real-Time Feedback on Cycle Conditions, Safety and Infrastructure. |  |

Table 8: Solution overview of Greater Manchester

### 2.7.2 Detailed description of solutions

#### MSC1 – Segregated "Dutch-style" cycle lanes: Chorlton Cycleway

**Background information**

Greater Manchester has a vision to become the very first city region in the UK to have a fully joined up cycling and walking network (the Bee Network) covering 1000 miles to stimulate car drivers to cycle or walk. One of the keys to unlocking walking and

cycling's potential will be building major, fully segregated cycle ways on key routes. Part of this network is the Chorlton Cycleway which will create a 5 km cycle route including large sections of cycle segregation, also through several busy junctions, from Chorlton Park in South Manchester to Manchester centre. Phase 1 and 2 of this project is the northern 2.5km and this will be evaluated through the Handshake project. It includes the first fully protected junction for cycling in the UK, using TfGM's innovative 'CYCLOPS' junction design, which has been developed based on Dutch and Danish traffic management principles, in part learned through Handshake.

### Goals to be achieved

- Promote a mode shift to cycling.

### Groups targeted by the solution

Current non-cyclists, especially those using cars for short journeys.

### Changes in activities to be performed

The implementation phase extended to 2021, Phase 1a is complete, Phase 1b is currently on-site, and Phase 2 will be complete within 6-9 months. The evaluation stage maybe towards the end of 2021/ 2022 depending on COVID-19 and local lockdown restrictions.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | It will be significantly more difficult to transfer solutions if Greater Manchester practitioners are not able to see them at | **M** | **M** |

| | | | |
|---|---|---|---|
| | work in practice in the cycle capitals due to Covid-19. | | |
| **Political barriers** | There has been some public backlash (from motoring lobby etc) nationally in the UK over some cycling/walking schemes implemented at short notice as a Covid response measure, and some of these have been removed as a result. | **L** | **H** |
| **Bureaucracy/legislative** | The national roads legislation is very prescriptive in the UK and leaves little room for interpretation or experimentation by individual highway authorities. It is likely that some of the solutions we propose will require special authorisation from national government, leading to the need for extensive trials.<br>A key legislative weakness in the UK is the lack of a law which requires road users to give way to those going straight ahead when making a turn at a junction. This means that, currently, the type of cycling infrastructure employed at many junctions in Denmark, which relies on turning vehicles giving way to cyclists and pedestrians going straight on, would be unlikely to convey priority and safety to cyclists and pedestrians in the UK. | **L** | **H** |
| **Financial barriers** | Funding shortage | **H** | **H** |
| **Human resource barriers** | Dependent on National Lockdowns and whether construction can continue, this may impact on the scheme progressing. | **L** | **M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Infrastructure ideas/ solutions to be discussed in Team Copenhagen meetings over Microsoft Teams on a monthly basis. |
| **Political barriers** | Whilst this has not yet had an adverse impact on our 'Business As Usual' programmes, this is something we are monitoring closely. Nationally there has been public/ political support for walking and cycling schemes. |
| **Bureaucracy/legislative** | The Greater Manchester Cycling and Walking Commissioner, Chris Boardman, has the mandate to navigate the bureaucratic |

| | |
|---|---|
| | challenges which we face with 10 independent highway authorities in Greater Manchester. |
| **Financial barriers** | Funding already secured, business cases for the various stages of the Chorlton Cycleway on-going. Phase 2 expected to be completed within 6-9 months. |
| **Other types of barriers?** | The scheme forms part of the Chorlton to Manchester Bee Network route, which is a committed scheme within the Greater Manchester Mayor's Challenge Fund. |

## Evaluation

The bikenomics analysis will be updated in the ex-post report. The updated values of inputs on the project so far are stated in the table below. These values where provided by the city or based on expert judgement.

| Parameter | Value |
|---|---|
| *Investment costs* | € 1.569.572 |
| *Year(s) of investment* | 2019-2020 |
| *Maintenance costs per year* | € 13.613 |
| *Number of cycling trips per year* | 253.080 |
| *Number of car trips per year* | 4.262.835 |
| *Modal shift from car to bike* | 26% |
| *Modal shift from public transport to bike* | 58% |
| *Modal shift from walking to bike* | 16% |
| *Speed of cyclists (km/h)* | 12 |

## COVID-19 impact on measure development and evaluation

As previously stated in WP4, one issue when comparing the costs and benefits is the difference in time in which the effects occur, the investment costs are incurred at the start of the project whilst the benefits mainly occur after, and many years into the future.

Phase 1a of the Chorlton Cycleway is complete and now operational, with the first CYCLOPS Junction launched in July 2020. Phase 1b of the Chorlton cycleway is currently under construction, and Phase 2 has its Ful Business Case approved by the Greater Manchester Combined Authority on 30/10/2020. This will start construction early in 2021. This scheme will act as a blueprint for future cycling infrastructure as part of Greater

Manchester's Bee Network. COVID-19 did not really impact much in the construction phase for this scheme. Political pressure to deliver the scheme has, in fact, increased as a result of the pandemic. The COVID-19 pandemic has seen a push for the reallocation of road space in favour of walking and cycling to encourage modal shift from the car to more active modes of transport. Temporary cycle infrastructure measures along Deansgate in Manchester City Centre and other major roads have seen traffic cones used to create segregated cycle lanes.

Evaluating cycling trips during a time of COVID-19 is difficult, especially since Greater Manchester has been one of the most impacted areas in the UK for COVID-19 infection rates. Greater Manchester has seen a sharp increase in the number of cycling trips during COVID-19 due to people not wanting to take Public Transport and considering social distancing guidelines. Evaluating this scheme in the second half of 2021/2022 will probably give us a more realistic picture of the scheme and its benefits. It will be significantly more difficult to transfer solutions if Greater Manchester practitioners are not able to see them at work in practice in the cycle capitals due to Covid-19.

## MSC2 – Influencing behavioural change via credit/debit, reward/fine systems and gamification

### Background information

The city is very interested in influencing behavioural change via credit/debit, reward/fine systems or other 'behaviour change' innovations to encourage more people to cycle. Also, as part of Cityverve, they are keen to continue to set Open Innovation calls on cycle challenges.

### Goals to be achieved

- Made to Move aims to transform Greater Manchester by changing the way we get around.
- Specifically, it aims to quadruple cycling levels and to make walking the natural choice for as many short trips as possible.

### Groups targeted by the solution

People who currently use the car for short trips.

### Changes in activities to be performed

The implementation phase may continue into 2022, while the evaluation until the end of the project.

## Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | How this behavioural system is implemented across Greater Manchester's transport network needs much more work/ clarification. It will be significantly more difficult to transfer solutions if Greater Manchester practitioners are not able to see them at work in practice in the cycle capitals due to Covid-19. | **M** | **H** |
| **Political barriers** | Possible political barriers/ support with introducing a credit/reward system for walking and cycling. This would also have to be agreed by each of Greater Manchester's districts to be approved. | **L** | **H** |
| **Bureaucracy/legislative** | The city regional political context will help overcome local political barriers. The Commissioner/Mayor has already succeeded in galvanising local political support for cycling and walking in a way not previously seen in Greater Manchester. | **L** | **M** |
| **Financial barriers** | There is funding available for behaviour change measures identified through the Mayor's Cycling and Walking, though much of this is likely to be associated with individual infrastructure projects. Funding for wider, county-wide initiatives could be more challenging to find. | **L** | **M** |

| | | | |
|---|---|---|---|
| **Human resource barriers** | COVID-19 potentially impacts TfGM's human resources and time to spend to this currently. Whilst there is funding available for behaviour change associated with cycling infrastructure schemes, we are often finding that there is a lack of (human) resource to deliver these behaviour change activities within the constituent district authorities. | **H** | **M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | |
| **Political barriers** | |
| **Bureaucracy/legislative** | GM is actively working with research organisations such as the UK's Transport Research Laboratory to undertake trials of new infrastructure solutions. Examples of practice in our European neighbours, such as Denmark, the Netherlands and Germany, will help make the case for changes in legislation in the UK. |
| **Financial barriers** | GM is actively exploring the use of 'commuted sums' to help redress the capital-revenue imbalance that we are currently experiencing. GM is developing an appraisal toolkit to enable us to appraise more easily a quantify the benefits of investment in cycling. Overall, the GM Cycling and Walking Commissioner can bring together funding opportunities to resolve resource challenges. |
| **Human resource barriers** | GM have developed a training programme to begin to increase the level of skill of our existing officers, both in Transport for Greater Manchester and within our district authorities. |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Behavioural change system plan | *Yes/no* | No | **No** | **No** | Yes |
| Number of cyclists | *Trips per year* | 40m | **45.6m** | **NA** | 60m |

### COVID-19 impact on measure development and evaluation

COVID-19 has impacted this solution through COVID-19 putting pressure on TfGM's resources. Internal discussions have taken place with TfGM's Sustainable Journeys colleagues and knowledge sharing via basecamp/ Team Copenhagen calls each month have been helpful. However, as the study tour to Copenhagen was cancelled in September 2020, this will definitely affect the timescales without letting senior decision makers to visit and experience behavioural strategies and campaigns in Copenhagen. A lot of the work from the Handshake project will stem from the study tour and without this, it has been particularly hard to push this solution along. It will be significantly more difficult to transfer solutions if Greater Manchester practitioners are not able to see them at work in practice in the cycle capitals due to Covid-19.

Despite this, COVID-19 has encouraged walking and cycling, and used active travel as a tool to tackle social distancing measures. In effect, this has encouraged walking and cycling numbers across Greater Manchester.

## MSC3 – Providing real-time feedback on cycle conditions to assess the feeling of road safety

### Background information

Manchester is interested in providing real-time feedback on cycle conditions to assess the feeling of road safety. This is why they are interested in knowledge share with Munich to improve traffic safety learning how the city addressed this issue.

### Goals to be achieved

- GMC wants to implement a real-time feedback on cycle networks in Greater Manchester to assist in prioritisation of future infrastructure spend.

### Groups targeted by the solution

Existing and future cyclists.

### Changes in activities to be performed

The design phase extended into 2021.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | It will be significantly more difficult to transfer solutions if Greater Manchester practitioners are not able to see them at work in practice in the cycle capitals due to Covid-19. | **M** | **M** |
| **Bureaucracy/legislative** | It is possible that the different legal context in the UK may mean that some solutions are not directly transferrable to the UK context. | **M** | **M** |
| **Financial barriers** | Funding for real-time feedback technology along the Bee Network not secured. | **M** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | The technical expertise of the Munich team, combined with the in-house innovation team in Greater Manchester, is likely to be the main enabler in this context |
| **Bureaucracy/legislative** | The technical expertise of the Munich team, combined with the in-house innovation team in Greater Manchester, is likely to be the main enabler in this context. |
| **Financial barriers** | The GM Cycling and Walking Commissioner can bring together funding opportunities to resolve resource challenges. |

## Evaluation

TfGM cannot provide any data for most of the indicators since both Behaviour Change and Smart Data Real-Time Feedback on cycling conditions is at a research stage. This has been delayed due to COVID-19, and there are currently no measurable outputs. 2020 data is not available at the moment, there is some provisional data until May but with 2020 figures subject

to change due to COVID, it is best not to report these as values are misleading. Moreover, TfGM record the number of casualties rather than collisions. These values only count fatal or seriously injured accidents because the 'slight' category is not recorded very well.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of casualties involving bicycles (fatal or seriously injured) in GM | *Per year* | 123 | **87** | **NA** | ND |
| Perceived comfort | *Scale 1-10* | NA | **NA** | **NA** | ND |
| Perceived safety | *Scale 1-10* | NA | **NA** | **NA** | ND |
| Perceived social security | *Scale 1-10* | NA | **NA** | **NA** | ND |
| User satisfaction with system | *Scale 1-10* | NA | **NA** | **NA** | ND |

### COVID-19 impact on measure development and evaluation

COVID-19 has impacted this solution through COVID-19 putting pressure on TfGM's resources. Internal research and discussions have taken place with TfGM's Innovation Team and knowledge sharing via basecamp/ Team Copenhagen calls each month have been helpful. However, similar to behaviour change, seeing in practice how real-time feedback is being used in Copenhagen would have been a real advantage for TfGM to help progress this solution with senior decision makers. It will be significantly more difficult to transfer solutions if Greater Manchester practitioners are not able to see them at work in practice in the cycle capitals due to Covid-19.

## 2.8 City of Helsinki


### 2.8.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| HEL 1 (AMS 8 → 2018-2022) Measures for bicycle traffic priority |  |
| HEL 2 (AMS 10 → 2018-2022) Cost-effective large bicycle parking |  |
| HEL 3 (CPH 2, CPH 7 → 2018-2022). High quality bicycle network. |  |
| HEL 4 (CPH 4 → 2018-2022). Cycle-friendly traffic signaling system. |  |
| HEL 5 (CPH 1 → 2018-2022). Redesign of major thoroughfare Hämeentie |  |

Table 9: Overview of solutions for Helsinki

### 2.8.2 Detailed description op solutions

## HEL1 – Measures for bicycle traffic priority

### Background information

The city declared they have a lot to learn when it comes to giving cyclist priority in traffic. There are efforts made already but there is room for improvement. Learning from Amsterdam on how they did it and what has worked/not worked will accelerate the process and make Helsinki a better cycling city. When space is tight on main thoroughfares, compromises in favour of cycling are a rarity and are not seen as acceptable. This results in suboptimal cycling infrastructure or directing cyclists to another route, which is contrary to our mode prioritization. On the other hand, compromises in favour of car traffic and public transportation are acceptable. Finally, there is a lack in systematic approaches with right of ways of separate bicycle paths. It is also very common for cyclists to have to yield when a cycle path crosses a street even if the cycle path is classified as a cycle highway and has a higher priority than the street.

### Goals to be achieved

- Improving rights of way on the cycling network.

### Groups targeted by the solution

Executive directors, Chief planners, Transport planners, Urban planner, Potential cyclists, Cyclists.

### Changes in activities to be performed

The cycling network prioritization action plan will be finished in early 2021. In this action plan we have used both BRUTUS traffic model in order to compute the demand for cycling infrastructure in different parts of the network and a citizen survey to get qualitative data on where cyclists regard the most significant deficits in the network. These analyses provide us with a comprehensive understanding where to invest next and where the investment will have the biggest impact.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |

| | | | | |
|---|---|---|---|---|
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Doing compromises with widths contrary to Helsinki design guidelines can prove hard to realize as this will require a shift in design philosophies. Narrow implementations also require special attention from maintenance crews. | **H** | **H** |
| **Resistance from local residents/shop owners** | With all new facilities for cycling being implemented, on street parking is removed. Despite of continuous efforts by marketing, many shop owners still see drivers as a major source for income and will resist infrastructure improvements that result in the reduction of parking spaces. | **H** | **M** |
| **Political barriers** | Helsinki has a strong political will in favour of sustainable forms of transportation. Walking is the highest priority as a mode in the city of Helsinki. If case specific implementation requires a narrower sidewalk, a critical discussion considering priorities given to different modes will ensue. Political interests are split between walking and cycling at times, so if cycling implementations require apparent compromises made to walking, a political debate will follow. Car favouring politicians are also in power in some of the centre and more so, in the right-wing parties, and they continuously resist major renewals in favour of cycling especially if driving is restricted. These parties represent a minority, however. | **M** | **M** |
| **Bureaucracy/legislative** | Bureaucracy in Helsinki makes everything slow, but it is not an actual barrier. A new national road traffic Act is set to come into effect on June 6th, 2020, | **L** | **M** |

| | | | |
|---|---|---|---|
| | which will ease the barriers on many cycling advancements. | | |
| **Financial barriers** | The budget for cycling promotion in Helsinki is acceptable (approximately 14 million € for 2019 and nearly 20 million € for 2020). At the rate the city is currently prepared to implement new infrastructure, the budget is sufficing, but by no means excessive. As the city works on expediting infrastructure improvement, it is clear the annual cycling budget cannot be lowered but increased instead. At a national level, funding for cycling is minimal to say the least, but the new government has increased funding. | **L** | **L** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Taking maintenance needs into account in infrastructure planning by utilizing co-planning methods. In this way, a common ground will be established where both infrastructure planners and maintenance officials can take each other's' needs into account. |
| **Resistance from local residents/shop owners** | Presenting local residents and shop owners with facts regarding the benefits of promoting cycling. One concrete piece of evidence is the Bikenomics analysis of Hämeentie reconstruction. |
| **Political barriers** | Presenting politicians and other decision makers with facts regarding the benefits of promoting cycling. One concrete piece of evidence is the Bikenomics analysis of Hämeentie reconstruction. When it comes to conflicts of interest between walking and cycling, concrete examples of how best practice cycling solutions equally enhance walking conditions need to be presented. |
| **Bureaucracy/legislative** | The processes within the city of Helsinki are undergoing a major renewal. The aim of the renewal is to switch to a project oriented working culture. This should lead to a more efficient organization where processes and the projects within it have a clear framework and are completed faster. |
| **Financial barriers** | Continued negotiations with decision makers to ensure that the budget for cycling does not decrease. |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Satisfactory building capacity completed | *Yes/no* | no | **no** | **no** | no |
| Cycling prioritization plan designed | *Yes/no* | yes | **yes** | **yes** | yes |

## HEL2 – Cost-effective large bicycle parking

### Background information

Helsinki is developing cycle parking every year by building more parking racks. They also had a map-based questionnaire for citizens, where they collected data for further planning. The city still has a long way to go and they especially need more insight into big parking hubs. How to make them in a cost-efficient way and mistakes to avoid are things they could learn from Amsterdam.

### Goals to be achieved

- Helsinki would like to develop higher quality and quantity of bicycle racks and parking facilities.

### Groups targeted by the solution

Residents, cyclists and potential cyclists.

### Changes in activities to be performed

The main objective in 2020-2025 is to add annually 900 and in total 4500 new bicycle parking spots to public areas. We have a large bicycle parking facility plan starting in the central railway station underground bicycle tunnel in 2021. We have put a thread on this to Basecamp and intend to follow up this question when the planning process proceeds. Also we did a comparison via Basecamp between Helsinki and the CCs Copenhagen and Amsterdam on the pace and goals of building new bicycle parking facilities.

The developing of new bicycle parking facilities has not gotten the attention that was initially intended as we have focused more on street space allocation for bicycle tracks and lanes and on the other hand focusing on the street space as a whole (traffic

calming and making street a pleasant place for people) so that people would feel safe cycling on the carriage way. However, we do intend to utilize our networks in Handshake as we are planning the details of larger bicycle parking facilities.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Bicycle racks need to be implemented in a fashion that allows for enough winter maintenance. Poorly placed racks cannot be cleared of snow. | **M** | **H** |
| **Resistance from local residents/shop owners** | Car owning residents generally resist the reduction of on street parking, which are often allocated for bicycle parking on local streets. Shop owners over-estimate the number of customers arriving by car, resulting in systematic resistance. | **M** | **M** |
| **Political barriers** | Improving bicycle parking facilities in the city is in line with the city's strategy and the bicycle strategy in effect, which have been approved in the city government. Political argumentation may come into question in case specific situations, such as an entrepreneur being unhappy about lost car parking spots in front of their store. | **M** | **L** |
| **Bureaucracy/legislative** | Bureaucracy in Helsinki makes everything slow, but it is not an actual barrier. A new national road traffic Act is set to come into effect on June 6th, | **L** | **M** |

| | | | |
|---|---|---|---|
| | 2020, which will ease the barriers on many cycling advancements. | | |
| **Financial barriers** | The budget for cycling promotion in Helsinki is acceptable (approximately 14 million € for 2019 and nearly 20 million € for 2020). At the rate the city is currently prepared to implement new infrastructure, the budget is sufficing, but by no means excessive. As the city works on expediting infrastructure improvement, it is clear the annual cycling budget should not be lowered but increased instead. At a national level, funding for cycling is minimal to say the least. | **L** | **L** |
| **Human resource barriers** | Currently the employees who work exclusively with cycling are working at the upper limits of their resources, meaning that there is a need for additional personnel and improvement on organization-wide productivity. The biggest scarcity has to do with the maintenance of the current infrastructure, as there is no dedicated human resource concentrating on cycling issues relevant to maintenance and construction work. A new employee specified to that task started in a newly established position in September of 2019, so improvements are expected. | **M** | **H** |
| **Other types of barriers?** | In a dense urban environment, parking and loading fight for the same limited street space. Implementations must be made in favour of both. | **M** | **M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Taking maintenance needs into account in infrastructure planning by utilizing co-planning methods. In this way, a common ground will be established where both infrastructure planners and maintenance officials can take each other's' needs into account. |
| **Resistance from local residents/shop owners** | Ensuring that car owning residents have an opportunity to park their car in accordance with the city's parking policy. In a broader picture, city owned infrastructure needs to be development in alliance with the city strategy and this needs to be clearly communicated – removing parking spots in favour of sustainable transport is good for the city and its inhabitants in many ways even though it does not please everyone. Concrete evidence also needs |

| | |
|---|---|
| | to be shown on how cycling customers bring more money (> 80%) into businesses annually than driving customers, which legitimizes removing on-street parking and replacing them with bicycle parking. |
| **Political barriers** | Presenting politicians and other decision makers with facts regarding the benefits of promoting cycling. One concrete piece of evidence is the Bikenomics analysis of Hämeentie reconstruction. Concrete evidence also needs to show on how cycling customers bring more money into businesses annually than driving customers, which legitimizes removing on-street parking and replacing them with bicycle parking. One good piece of material is a newly completed Downtown Commerce Study, which showed that most of the income for businesses in the city comes from sustainable transport users. |
| **Bureaucracy/legislative** | The processes within the city of Helsinki are undergoing a major renewal. The aim of the renewal is to switch to a project oriented working culture. This should lead to a more efficient organization where processes and the projects within it have a clear framework and are completed faster. |
| **Financial barriers** | Continued negotiations with decision makers to ensure that the budget for cycling does not decrease. |
| **Other types of barriers?** | The Cycling Strategy that is currently being updated addresses this issue. An immediate need to increase personnel resources is clear and the long-term goal is to raise human resources to the same levels with the CCs. |

## Evaluation

The value of occupancy rate of bike racks in 2018 is based on the most current calculations from 2017. The on-street parking is not monitored while the total amount of bike parking spots is calculated according to new bike parking standards.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Big parking hub planned | Yes/no | No | **Yes, to Tripla Mall** | **No** | Yes |
| Bike parking | Total number | 1250 (new, on streets | **1700 (new spots in Herttonimenrant** | **NA** | 2750 |

| | | | | | |
|---|---|---|---|---|---|
| spots available | | in Centre, Kallio, Töölö) | **a, Ruoholahti and Ullanlinna)** | | |
| Occupancy rate of bike racks | Average percentage of total available spots | Park-and-ride stations in Helsinki: 31% of spots availabl e on average . | **Park-and-ride stations in Helsinki: 31% of spots* available on average.** | **Park-and-ride stations in Helsinki : 31% of spots* availabl e on average .** | All park-and-ride stations to have available spots (in 2017 seven out of 31 stations had an availability of 0%) |
| Number of bikes outside dedicated parking | Total per year | NA | **NA** | **NA** | Bike parking satisfaction rate increases according to our biannual Cycling Barometer “Pyöräilybarometri” |

## HEL3 – High quality bicycle network

### Background information

Helsinki has a bicycle network plan covering the entire city including cycle highways, which they are building piece by piece. They need guidance and advice on systematically achieving high standards and quality in infrastructure design and implementation. On-site construction according to the network plan has not progressed as scheduled. Newly built sections of the target network are scattered throughout the city, resulting in lack of continuity and coherence. On top of that, the quality of new bicycle paths is not always up to par.

### Goals to be achieved

- Construction of new bicycle paths based on the network plan need to be expedited and quick, temporary fixes need to be implemented to improve continuity and coherence.

### Groups targeted by the solution

Residents, cyclists and potential cyclists.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Comprehensive knowledge on planning, designing and implementing high quality best practices is still at a relatively low level when compared to the CCs. Problems particularly emerge with places where a holistic approach is required. A good example is paying attention to other utility planning involved with the street (water, arrogation, etc.) when implementing a curb separated cycle track. Additionally, the network plan is not being implemented fast enough due to restrictions for roadworks within the city and insufficient personnel resources. | **H** | **H** |
| **Resistance from residents/shop owners** | With all new facilities for cycling being implemented, on street parking is often removed. Despite of continuous efforts by marketing, many shop owners still see drivers as a major source for income and will resist infrastructure improvements that result in the reduction of parking spaces. | **H** | **M** |
| **Political barriers** | Major construction sites always pose a political challenge in a large city where construction sites obscure traffic at a network level. As a result, a decision has | **M** | **M** |

| | | | |
|---|---|---|---|
| | been made not to have too many simultaneous street constructions in effect. Finland also has presidency of the council of the European Union in 2019, which has set restrictions for planned construction on main arteries, such as the main street downtown, Mannerheimintie. | | |
| **Bureaucracy/legislative** | Bureaucracy in Helsinki makes everything slow, but it is not an actual barrier. A new national road traffic Act is set to come into effect on June 6th, 2020, which will ease the barriers on many cycling advancements. The slowness of city progresses does contain the risk of delays in set schedules. | **L** | **M** |
| **Financial barriers** | Similar to HEL1 - 2 | **L** | **L** |
| **Human resource barriers** | Currently the employees who work exclusively with cycling are working at the upper limits of their resources, meaning that there is a need for additional personnel and improvement on organization-wide productivity. The biggest scarcity has to do with the maintenance of the current infrastructure, as there is no dedicated human resource concentrating on cycling issues relevant to maintenance and construction work. A new employee specified to that task started in a newly established position in September of 2019, so improvements are expected. | **M** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | All technical design manuals need to be updated to take cycling into account as an equal traffic mode. This requires benchmarking Copenhagen's technical manuals and illustrations. In order to bring new guides into practice, co-planning is required to turn goals related to cycling into a more common goal with the city's technical administration and Urban Environment Division. |
| **Resistance from local residents/shop owners** | |
| **Political barriers** | Presenting politicians and other decision makers with facts regarding the benefits of promoting cycling. One concrete piece of evidence is the Bikenomics analysis of Hämeentie reconstruction. Politicians need to be shown study-based evidence on how quality of infrastructure matters, such as |

| | |
|---|---|
| | changes to volumes before and after implementations and satisfaction rates. Additionally, a stronger link between the promotion of cycling and Helsinki's carbon neutrality goals need to be presented to politicians. |
| **Bureaucracy/legislative** | The processes within the city of Helsinki are undergoing a major renewal. The aim of the renewal is to switch to a project oriented working culture. This should lead to a more efficient organization where processes and the projects within it have a clear framework and are completed faster. |
| **Financial barriers** | Continued negotiations with decision makers to ensure that the budget for cycling does not decrease. |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Cycle highways build | *Km's per year* | 6 | **0** | **11** | 15 |
| Number of cyclists | *Trips per day (Helsinkiläisten liikkumistottumukset)* | 189000 | **176000** | **No data yet** | 229460 |
| Number of cars | *Trips per day (Helsinkiläisten liikkumistottumukset)* | 336000 | **332000** | **No data yet** | 317715 |
| Average speed - Bike | *Average km/h peak hour (HELMET-model)* | 18,8 km/h | **18,8 km/h** | **18,8 km/h** | 18,8 km/h |
| Average speed - Car | *Average km/h peak hour (HELMET-model)* | 15 km/h | **15 km/h** | **15 km/h** | 15 km/h |
| Number of accidents involving bike | *Per year (TARE-traffic accidents) *latest information from 2018* | 150 | **150** | **150** | 150 |
| CO2 emissions | *Kilogram CO2 per year (HSY Kasvihuonekaasupäästöt)* | 2,7 M tonnes | **639,7 1000t CO2-ekv** | **No data yet** | 2,0 M tonnes |

| | | | | | |
|---|---|---|---|---|---|
| Perceived comfort | *Scale 1-10 (Pyöräilybarometri)* | 7,8 | **7,8** | **7,8** | 7,6 |
| Perceived safety | *Scale 1-10 (Pyöräilybarometri)* | 7,2 | **7,2** | **7,2** | 7,1 |
| Perceived social security | *Scale 1-10 (Pyöräilybarometri)* | 8,1 | **8,1** | **8,1** | 8,2 |

## HEL4 – Cycle-friendly traffic signal management

### Background information

Traffic signal management is rarely cycle friendly in Helsinki, even though some specific signals for cyclists exist and they plan it themselves. There is also not that much knowledge in the matter, and they would stand to benefit greatly from the experience from Copenhagen. Timing and phasing at intersections have been planned and implemented in the favour or motorized traffic. Cycling and walking have well protected phases too, but the longest green phase is always given to the direction with most car traffic.

### Goals to be achieved

- Traffic lights need to take cycling into account in an equal fashion with car traffic.

### Groups targeted by the solution

All road users including cyclists, potential cyclists, pedestrians.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Safe timings for pedestrians and bicycle traffic increase total cycle lengths in traffic lights. Adjusting phasing in favour of bicycle traffic could increase total cycle lengths, which is not desirable, as current light cycle lengths are too long. The traffic light system requires a holistic renewal. Additionally, the placement of current traffic light posts has been made with car traffic in mind and the renewal will require physical upgrades. | **H** | **H** |
| **Resistance from residents/shop owners** | Occasional resistance from residents who mainly travel by car can be expected if/when traffic light renewal reduces green times for cars. | **H** | **L** |
| **Political barriers** | A hot political topic is updating traffic lights in favour of public transit. This be a conflict of interest when cycling is brought into the conversation. Traffic flow for cars is still regarded as important as well with the supporting argument that some people simply need to drive. | **M** | **M** |
| **Bureaucracy/legislative** | The new national traffic act will allow for the required traffic light renewals using Copenhagen as an example. The slow bureaucracy within the city can act as an obstacle, but not as a barrier. | **M** | **H** |
| **Financial barriers** | Same as HEL1 | **L** | **L** |
| **Human resource barriers** | Same as HEL1 | **M** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Examples of how traffic lights are holistically planned and implemented in Copenhagen need to be shown to traffic light professionals in Helsinki. Combining these examples with concrete evidence of the traffic system's functionality in Copenhagen will prove why these changes are needed and how they benefit the system as a whole. A plan on implementing such a system in Helsinki needs to be made. |

| | |
|---|---|
| **Resistance from local residents/shop owners** | Effects of traffic light renewals need to be studied by traffic simulations and impact assessments to prove their worth and functionality. Justification of these changes should rely on the city strategy and everything affiliated with it. |
| **Political barriers** | Forming a synergy link between favouring public transportation and cycling in traffic lights is crucial. Examples can be taken from Copenhagen where green waves for cyclists have been implemented on streets where public transportation and cycling are prioritized, improving conditions for both simultaneously. Additional proof needs to be shown that even if traffic lights in cities do not favour cars, they do not cause unnecessary delay either. Another important fact to bring to discussion is that the more traffic lights favour sustainable forms of transportation, the less people drive. |
| **Bureaucracy/legislative** | A comprehensive plan for traffic light renewal needs to be made based on the new traffic act. Benchmarking Copenhagen for their best practices regarding traffic lights will act as a supporting factor. |
| **Financial barriers** | Continued negotiations with decision makers to ensure that the budget for cycling does not decrease. |
| **Human resource barriers** | The Cycling Strategy that is currently being updated addresses this issue. An immediate need to increase personnel resources is clear and the long-term goal is to raise human resources to the same levels with the CCs. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of cycle friendly traffic signalled junctions | *Total number* | 8 | **6 Be Polite traffic lights and 40 traffic lights for cyclists.** | | 6 Be Polite traffic lights and 60 traffic lights for cyclists |

## HEL5 – Redesign of major thoroughfare Hämeentie

### Background information

Helsinki has a comprehensive network plan covering the entire city. The network consists of main routes (including bicycle superhighways), secondary routes and other routes, which mainly consist of traffic calmed streets. They need guidance and advice

on systematically achieving high standards and quality in infrastructure design and implementation.

### Goals to be achieved

- prioritizing walking, cycling and public transit in traffic planning by making these transport choices convenient, fast and comfortable.
- increasing bicycle traffic according to the Cycling Master Plan and the city's strategy.

### Groups targeted by the solution

Residents, cyclists and potential cyclists.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | The project is complex due to the age of the infrastructure, but all variables have been considered as comprehensively as possible, and the construction has commenced. No major technical barriers were expected, as the planning was conducted in accordance with best practice principles. Specific technical implementations have posed a challenge during construction, however. The most recent issue has been drainage as wires under the bicycle tracks have made it hard to place drain covers on the side of the bicycle track. This has led to pressure to | **H** | **H** |

| | | | |
|---|---|---|---|
| | install old style drains in the middle of the bicycle track, as has been customary for decades. | | |
| **Resistance from residents/shop owners** | Fear of losing customers due to car traffic restrictions. This fear is prominent amongst entrepreneurs and the right-wing party, but all impact assessments have lessened these fears enough to pass the project at the local government. | **H** | **M** |
| **Political barriers** | Helsinki has a strong political support towards bicycle promotion, but some centre and the more so the right-wing parties have a more conservative if not an opposing attitude towards bicycle urbanism if it means taking space away from cars. With major main street renewals, the Chamber of Commerce joins the discussion using the distress of entrepreneurs as an argument. | **M** | **H** |
| **Bureaucracy/legislative** | Bureaucracy in Helsinki makes everything slow, but it is not an actual barrier. A new national road traffic Act is set to come into effect on June 6th, 2020, which will ease the barriers on many cycling advancements. | **L** | **L** |
| **Financial barriers** | See HEL1 | **L** | **L** |
| **Human resource barriers** | See HEL 2 | **H** | **M** |
| **Other types of barriers?** | Traffic planning knowledge is primarily based on car traffic flow and the knowledge level in bicycle issues, traffic calming, and their relation is minimal on a broad scale. | **M** | **M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | |
| **Resistance from local residents/shop owners** | Knowledge of bikenomics, improved marketing and communication. |
| **Political barriers** | |
| **Bureaucracy/legislative** | Our aim is to use the knowledge gained in Handshake to improve the use of funding in order to improve efficiency in infrastructure implementation. One major step towards this goal is updating the Cycling Master Plan between 2019 and 2020. |

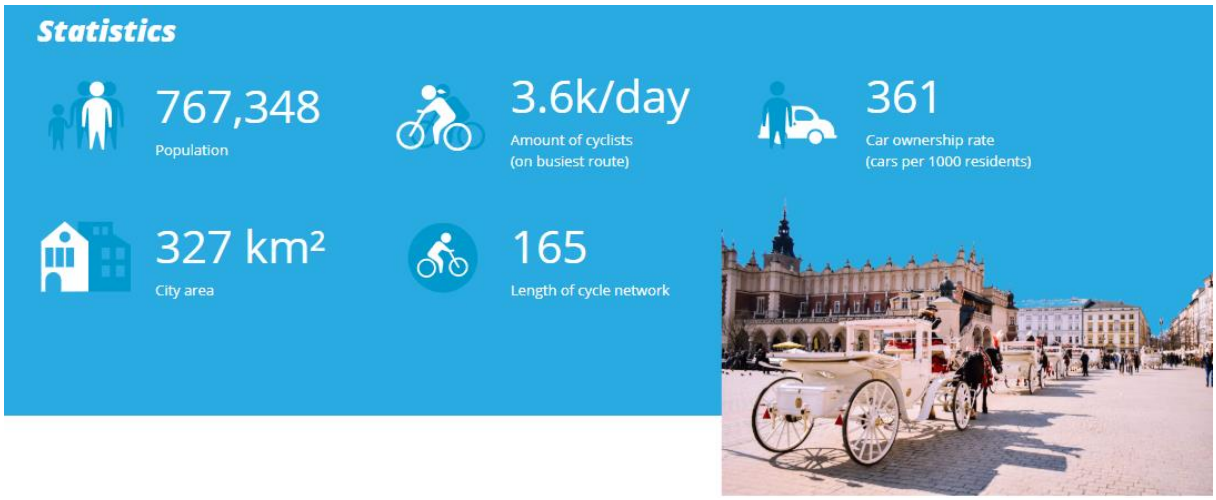
| | |
|---|---|
| **Financial barriers** | Active involvement with the appropriate political parties will improve the chances of keeping annual cycling funding at the 2020 level at least. In order to increase the funding, justified arguments need to be made in order to create a concrete case for the required funding. The key is emphasizing the fact that improving cycling conditions benefits all modes of traffic not to mention the quality of city life. |
| **Human resource barriers** | Updating the Cycling Master Plan should indicate a need for increased resources related to the promoting of cycling. The goal is to spread the word within the city organisation via data supported arguments and open-minded discussions with key personnel. |
| **Other types of barriers?** | Education of lack-there-of for planners in the City of Helsinki. |

## Evaluation

The bikenomics analysis will be updated in the ex-post report. The updated values of inputs on the project so far are stated in the table below. These values where provided by the city or based on expert judgement.

| Parameter | Value |
|---|---|
| *Investment costs* | € 9.352.230 |
| *Year(s) of investment* | 2019-2020 |
| *Maintenance costs per year* | € 190.000 |
| *Number of cycling trips per year* | 58.400 |
| *Number of car trips per year* | 3.504.000 |
| *Modal shift from car to bike* | 33% |
| *Modal shift from public transport to bike* | 29% |
| *Modal shift from walking to bike* | 33% |
| *Cars taking detour* | 5.167 |
| *Speed of cyclists (km/h)* | 14 |
| *Time savings for cars on Hämeentie (sec)* | - 28 |
| *Length of project (km)* | 1,4 |

## 2.9 City of Krakow




### 2.9.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| KRA 1 (AMS 18, CHP 15 → 2018-2020). Knowledge transfer about high-quality on-street bicycle parking |  |
| KRA 2 (AMS 11 → 2018-2022). Socio-economic assessment of bike-to-work campaign. |  |
| KRA 3 (MUN 1, MUN 2, MUN 3 → 2020-2021). Awareness campaigns to enhance traffic safety |  |
| KRA 5 (MUN 1, MUN 3 → 2020-2021). Mobility education - night-time biking (modelled on Munich's actions). |  |

Table 10: Overview of solutions for Krakow

### 2.9.2 Detailed description op solutions

#### KRA 1 – High-quality on-street bicycle parking

**Background information**

Krakow moves to clarify that the solution although classified under the "Infrastructure and Services" solution category, does not involve any actual infrastructural implementation within Handshake's timescale. It entails an intense and targeted

knowledge exchange with Amsterdam, which will lead to the deployment of a quality cycling parking system after the end of the project.

### Goals to be achieved

- Kraków would like to extend its knowledge about bicycle parking systems, their qualities, problems and solutions.

### Groups targeted by the solution

Present and future cyclists.

### Changes in activities to be performed

The initial plan was to start dealing with the measure right after IST organized in Munich (planned on May 2020, cancelled due to Covid-19). The unit responsible for bike parking does not belong to the municipality of Kraków. The idea was to have their representatives invited to the IST and then have them acquainted closely with the project, particularly with KRA-1. The newest scenario assumes to follow the above steps in 2021 (if only a new date for IST works).

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Problems with organization of the IST as a physical meeting | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|

| | |
|---|---|
| **Technical barriers** | Not much can be done about potential barriers connected to Covid-19 restrictions. On-line meeting is a kind of alternative but not of high quality. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Knowledge exchange (direct contacts e.g. mails, physical meetings, phone calls) | *Number* | 0 | **0** | **0** | 2 |

### COVID-19 impact on measure development and evaluation

The initial plan was to start dealing with the measure right after IST organized in Munich (planned on May 2020, cancelled due to Covid-19). The unit responsible for bike parking does not belong to the municipality of Kraków. The idea was to have their representatives invited to the IST and then have them acquainted closely with the project, particularly with KRA-1.

## KRA 2 – Assessment of Bike-to-Work campaign

### Background information

Socioeconomic assessments of investments in cycling are a currently untouched aspect, so it was found to be an interesting activity for the city to investigate and to have another argument for cycling promotion and cycling infrastructure extension. Krakow has decided to test this method to evaluate its 'Bike to work' campaign, which is aimed at encouraging employees to use their bicycle to commute. In this campaign, employees of companies taking part in the campaign can earn gifts and educational meetings are organised to inform employees about advantages and do's and don'ts of cycling in Krakow.

### Goals to be achieved

- Raise the number of employees cycling to work, especially previous car-drivers.

### Groups targeted by the solution

Employees.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | Regularly every year | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Over the past year, a detailed concept of the Internet tool was developed, and soon the so-called technical dialogue will be announced, in order to select a potential contractor. Unfortunately, due to the uncertain financial future of the city caused by Covid-19, the financing of the application is under a big question mark. | **H** | **M** |
| **Bureaucracy/legislative** | Administrative burden, public tenders, time-consuming administration activities. | **H** | **L** |
| **Financial barriers** | Due to the uncertain financial future of the city, the financing of the campaign, even in its basic form (i.e., without the use of applications) may be questioned. | **M** | **H** |
| **Human resource barriers** | A big barrier was the lack of people working in the campaign team with IT experience, which is needed when preparing an Internet tool. | **M** | **H** |
| **Other types of barriers?** | In the worst-case scenario, in case of a progressive/non-pandemic, resulting in e.g., a total order to work remotely and/or severe financial constraints on the city's non-mandatory tasks, the campaign can | **M** | **H** |

| | | | |
|---|---|---|---|
| | be conducted to a very limited extent or even completely suspended. | | |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | The IT tool is not necessary to have the campaign implemented every year. Nevertheless, it would enhance the whole process of data gathering and monthly awarding especially when the campaign is going to be extended on a larger scale. |
| **Bureaucracy/legislative** | Not much can be done about that but there are some ways to avoid sometimes the most time-consuming actions (like starting preparations in appropriate advance) |
| **Financial barriers** | The ratio of the costs of the campaign (relatively low) to its effects is so good that the city authorities will decide to continue the campaign. It will also be consistent with the city's policy of promoting bicycle policy more than ever before due to the pandemic. One of the solutions to ensure that the campaign continues next year is to use all possible savings from 2020 to buy gifts for 2021. |
| **Human resource barriers** | The IT Department came to the aid and delegated one employee to constant assistance and taking care of the issues strictly related to IT issues/preparation of the contract etc. |
| **Other types of barriers?** | One of the solutions to ensure that the campaign continues next year is to use all possible savings from 2020 to buy gifts for 2021. |

## Evaluation

The bikenomics analysis will not be updated because the campaign is already completed.

## COVID-19 impact on measure development and evaluation

COVID-19 had a significant impact on this year's campaign. On one hand, many companies withdrew from the campaign due to the permanent remote work of employees. In many of the institutions that stayed in the campaign, very often most of the employees work remotely, so the number of campaign participants and the average number of bicycle rides automatically decreased. On the other hand, it can be assumed that at least some of the employees who have to commute could opt for a bicycle (e.g., instead of public transport). The impact of the pandemic was also evident e.g., in the choice of souvenirs for cyclists (e.g., previously so desired tickets to the cinema lost their popularity). Moreover, the pandemic made it almost impossible to organize an annual series of educational meetings in companies participating in Bike to Work.

## KRA 3 – Awareness campaigns to enhance traffic safety

### Background information

The number of cyclists in the city is growing and traffic safety is becoming more and more problematic issue. Raising the level of knowledge concerning traffic regulations, cycling infrastructure solution etc. is necessary. So is care for technical safety of cyclists (or rather their bikes).

### Goals to be achieved

- One series of bike checks organized in 2020.
- Two series organized in 2021 and in 2022 (financed by municipal budget)

### Groups targeted by the solution

City officials and cyclists.

### Changes in activities to be performed

Initially, the bike checks were planned to be implemented in 2021, but the plans changed due to the overall ITS suspension in 2020.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Bureaucracy/legislative** | Administrative burden, public tenders, time-consuming administration activities | **H** | **L** |

| | | | |
|---|---|---|---|
| **Financial barriers** | In usual circumstances there should be none, but it is hard to say in/after the pandemic time | **M** | **H** |
| **Human resource barriers** | Problem with selecting a contractor; lack of human resources available to carry out the measure | **M** | **H** |
| **Other types of barriers?** | Further COVID-19 restrictions | **M** | **H** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Bureaucracy/legislative** | Preparations started in appropriate advance |
| **Financial barriers** | If, for example, there is a total blockade of non-mandatory expenses, there is not too many enabling factors (unless some measures are done with no extra costs, even if on a lower quality level) |
| **Human resource barriers** | Preparations started good time in advance, careful market research, readiness to pay higher costs |
| **Other types of barriers?** | It is necessary to find any possible time gap (e.g. in the spring or summer time) to have the measure implemented. It is advisable to include all the relevant provisions of the contract. |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of measures performed | *Number per year* | 2 | **2** | **2** | 2 |

### COVID-19 impact on measure development and evaluation

COVID-19 made it almost impossible to organize an annual series of educational meetings in companies participating in Bike to Work. Indirectly, COVID-19 could (and it probably did) influence the willingness to participate in bicycle trips or to take advantage of the offer of bicycle checks.

## KRA 5 –Mobility education - night-time biking (modelled on Munich's actions)

### Background information

The night-time biking is a huge event which aim is to promote cycling among citizens with a special attention paid to the fact of biker's safety at night.

### Goals to be achieved

- To have a big event warmly perceived and organized well and in a safe way with a lot of participants in order to promote cycling in the city and safe cycling during night-time.

### Groups targeted by the solution

Citizens.

### Changes in activities to be performed

the measure was planned to be fully designed, implemented and evaluated in 2020, but it changed due to COVID-19.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Closure of the streets, formal notification of the ride, obtaining permissions from all necessary services, medical security | **L** | **H** |
| **Bureaucracy/legislative** | Selection of contractors, conclusion of contracts | **H** | **M** |
| **Financial barriers** | In usual circumstances there should be none, but it is hard to say in/after the pandemic time | **H** | **H** |

| | | | |
|---|---|---|---|
| **Human resource barriers** | Problem with selecting a contractor who will take care of the complex organization of the event; lack of human resources available to carry out the measure | **M** | **H** |
| **Other types of barriers?** | Further COVID-19 restrictions | **H** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Preparations started in good time in advance, precise planning of activities, consultations with persons experienced in organizing such rides |
| **Bureaucracy/legislative** | Preparations started in appropriate advance |
| **Financial barriers** | If, for example, there is a total blockade of non-mandatory expenses, there is not too many enabling factors (unless everything is done with no extra costs, even if on a lower quality level) |
| **Human resource barriers** | Preparations started in good time in advance, careful market research |

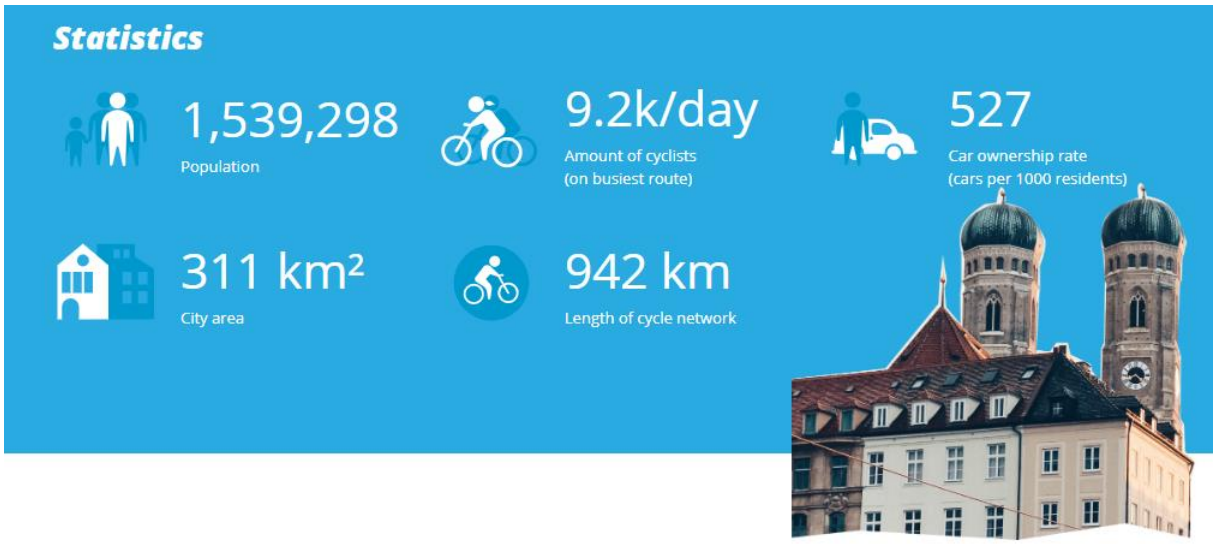
## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of participants | *Number per ride* | 0 | **0** | **0** | 2000 |
| Number of rides | *Number per year* | 0 | **0** | **0** | 2 |
| Number of press releases | *Number per ride* | 0 | **0** | **0** | 4 |
| | *Number of lightings handed out to participants* | 0 | **0** | **0** | 600 |

## COVID-19 impact on measure development and evaluation

All the preparatory process stopped due to restrictions on public gatherings.

## 2.10 City of Munich




### 2.10.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| MUN 4: Improving safety and attractiveness of cycling lanes by red colouring |  |
| MUN 5: Improving comfort and service for cyclists (e.g. by installing air pumps and self-service stations). |  |
| MUN 6: App-based reporting tool to locate danger areas (objective and subjective, emotionally) and damages to cycling facilities. |  |
| MUN 7: Bicycle streets: Redesign Clemensstraße into a Bicycle Street |  |
| MUN 8: Events and campaigns to raise awareness for bicycle streets |  |
| MUNI 9: Awareness campaigns for car drivers with and without cycling affinity |  |

Table 11: Overview of solutions for Munich

### 2.10.2 Detailed description of solutions

## MUN 4 – Improving safety and attractiveness of cycling lanes by red colouring

### Background information

According to a decision of the city council of Munich in 2018 two cycling lanes (length approx. 2 km) were painted in red colour in a pilot project. The hypothesis is that safety and attractiveness of cycling infrastructure can be improved this way. It is a pilot project, and an evaluation is undertaken and will be finished soon.

### Goals to be achieved

- Improvement of safety and attractivity on cycling lanes.

### Groups targeted by the solution

Road users (cyclists, drivers of motorized vehicles, pedestrians).

### Changes in activities to be performed

The measure will be evaluated, so that an up-scaling of the measure can be regarded. The evaluation can be finished only in 2021 due to COVID-19.

### Timeline of roll-out

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Know how to implement the measure with a reasonable budget. | **L** | **L** |

| | | | |
|---|---|---|---|
| **Resistance from local residents/shop owners** | Just with another colour is likely easy to be accepted. | **L** | **L** |
| **Political barriers** | Explicit city council mandate. | **L** | **L** |
| **Bureaucracy/legislative** | Some different units and local partners are involved in the topic. | **M** | **M** |
| **Financial barriers** | Funds provided by the city council | **L** | **M** |
| **Human resource barriers** | There is a responsible person within the administration for this topic | **L** | **L** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Try to use cost-efficient methods |
| **Resistance from local residents/shop owners** | Communication, offering alternatives |
| **Political barriers** | Convince politicians & population by information (a &b) |
| **Bureaucracy/legislative** | Set up a round table for interdepartmental exchange |
| **Financial barriers** | Reserve budget in time to have degrees of freedom to decide |
| **Human resource barriers** | Engage personal who can steer the tasks (scientific evaluation) |

## Evaluation

The lethal or heavily injured is measured by the official accident static of Bavarian police. At the same time, expert interviews assess the feeling of safety.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Accidents (lethal or heavily injured) | *Number per year* | 1 (precedent period) | **1** | **NA** | 0 |
| Feeling of safety (an estimation) | *Scale 1-10* | 6 | **7** | **NA** | 9 |

## COVID-19 impact on measure development and evaluation

The implementation was finished in October 2019. The evaluation of the measure, undertaken mainly in spring-summer 2020, was influenced by COVID. The bias/distortion is quantifiable and estimates for correction can be done but need some more time.

## MUN 5 – Improving comfort and service for cyclists

### Background information

The municipality wants to ensure accessibility to a repair and inflating service independent from shop opening hours. For example, by improving comfort and service for cyclists (e.g., by installing air pumps and self-service stations with tools for repairing). In addition to measures to improve cycling infrastructure, service activities play an important role to make urban cycling more attractive. Installing air pumps and self-service-stations contributes to enhance comfort of cyclists.

### Goals to be achieved

- Installation of 9 air pumps and 2 self-service stations including repair tools; establishing a service network for cyclists with local hotels, restaurants, banks, shops etc.

### Groups targeted by the solution

Everyday cyclists, vacation / leisure cyclists (wheelchair users, parents with buggies).

### Changes in activities to be performed

Budget shifts due to COVID-19 blocked the evaluation till 10/2020

### Timeline of roll-out

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Technical barriers** | There is till now only few experiences regarding stability, wear of components etc. | **M** | **M** |
| **Resistance from local residents/shop owners** | Lack of interest for setting up a service network | **L** | **L** |
| **Political barriers** | Not to be expected (explicit city council mandate) | **L** | **M** |
| **Bureaucracy/legislative** | Many different units and local partners are involved in the topic | **M** | **M** |
| **Financial barriers** | Funds provided by the city council | **L** | **M** |
| **Human resource barriers** | Additional task with no own personnel resources | **L** | **M** |
| **Other types of barriers?** | Technical challenges – eventually frequent repairing necessary, spare parts difficult to organise and expensive | **M** | **M** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Experience helped to find pragmatic solutions, workshop on maintenance was held; one pump was heavily damaged by an accident. |
| **Resistance from local residents/shop owners** | Early communication and involvement |
| **Political barriers** | Communication, reporting, evaluation |
| **Bureaucracy/legislative** | Exchange helped that colleagues work now better and more efficient together |
| **Financial barriers** | Fundraising activities, communication of positive effects to stakeholders |
| **Human resource barriers** | Recruiting additional personnel particularly in case the pilot is positive and a scale-up is planned |
| **Other types of barriers?** | Spare parts are not that expensive nor difficult to obtain |

## Evaluation

All values are based on estimation based on only a few interviews. The users of facilities are based on few observations: average 10 users per day in season per pump.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Users of facilities | *Number of users per year (for the year 2019)* | Approximately 30 000 users per year | **NA** | **NA** | 3 times more due to densified network: 90 000 users |
| Rating on user friendliness | *Scale 1-10* | 7 | **7** | **NA** | 8 |
| Perceived comfort | *Scale 1-10* | 7 | **7** | **NA** | 8 |

### COVID-19 impact on measure development and evaluation

Yet not enough quantitative data available to monitor significant changes. Proving causality due to COVID might be difficult/impossible. Existing qualitative data show that the solution is appreciated. However, this solution has not the highest priority, COVID-driven budget shifts might impact that solution, so that extending the network won´t be possible in the near future. Planned evaluation for spring 2020 was shifted now to next season due to blocked finances.

## MUN 6 – App-based reporting tool to locate danger areas

### Background information

The solutions aim at rolling out app-based reporting tool to locate danger areas (objective and subjective, emotionally) and damages to cycling facilities. Cyclists in Munich shall actively support to make their daily cycling routes safer by making their needs and emotional impressions visible. In this way, politics and administration gain a better insight in daily traffic situations and are able to use this knowledge to improve continuously the conditions for cyclists.

### Goals to be achieved

- Zero road fatalities and serious injuries.

### Groups targeted by the solution

Everyday cyclists.

### Changes in activities to be performed

The implementation phase has been conducted only in 2019, and within a half year, we achieved to design and to implement this measure. A workshop with the results has been carried out at the end of December, and the outcomes are generally positive.

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | IT-Management, proper communication with the users and adequate data processing | **M** | **H** |
| **Resistance from local residents/shop owners** | Minor importance | **L** | **H** |
| **Political barriers** | Politicians might not like to deal with too many complaints | **M** | **H** |
| **Bureaucracy/legislative** | Complaint management system needs resources and integration in other systems | **M** | **H** |
| **Financial barriers** | Additional funds are needed | **L** | **H** |
| **Human resource barriers** | The project is commissioned and supervised because the city suffers from staff shortage due to Covid-19 emergency. | **H** | **H** |
| **Other types of barriers?** | Privacy issues | **M** | **H** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Trial run and fast troubleshooting |

| | |
|---|---|
| **Resistance from local residents/shop owners** | Integration and participation |
| **Political barriers** | Information |
| **Bureaucracy/legislative** | Information, scheduling |
| **Financial barriers** | Explore further financing options |
| **Human resource barriers** | Registering personnel requirements |
| **Other types of barriers?** | Close consultation with data protection officer of the department |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of participants in the pilot-project | *Persons* | 200 | **47** | **NA** | Further implementations and an upscale is not excluded |
| "Pings" (report of dangerous points) | *Number* | 3000 | **1552 (commented "Pings")** | **NA** | 30´000 (upscaled project) |
| Perceived safety | *Scale 1-10* | 4 | **4** | **NA** | 9 |
| Perceived social security | *Scale 1-10* | 6 | **6** | **NA** | 9 |
| Safety map defined | *Yes/No* | No | **No** | **NA** | Yes |

### COVID-19 impact on measure development and evaluation

The project has been carried out 2019. So, there hasn't been an impact on the implementation of the pilot-project so far. But based on the results we would have decided whether to upscale the project or not. Due to COVID-19 we suffer from budget consolidation and staff shortages. A continuation of the project is therefore currently not planned.

## MUN 7 – Redesign Clemensstraße into a Bicycle Street

### Background information

Clemensstraße was transformed in a "Fahrradstraße" – bicycle street in the year 2012. In 2017 some improvements (e.g., bigger signs) were implemented. A bicycle street is considered to be a route in a residential area that is a main route for cycling. Motorised traffic is still allowed, but this is the minority. The route is clearly designed for cycling (with signs) to make it immediately clear to drivers of a motor vehicle that they are guest in a space that is not theirs.

### Goals to be achieved

- Create a safer environment for cycling.

### Groups targeted by the solution

Cyclists and drivers of motorised vehicles.

### Evaluation

The bikenomics analysis will not be updated because the redesign of the Clemensstraße into a Bicycle Street is already completed.

### COVID-19 impact on measure development and evaluation

| |
|---|
| The Clemensstr was redesigned in spring 2019. It helped thus to improve cycling conditions in that area during the pandemic. The intended evaluation is not realized yet due to COVID-19. |

## MUN 8 – Events and campaigns to raise awareness for bicycle streets

### Background information

By 2025 Munich will have realized 100 bicycle streets according to a decision of the City Council. However, the rules for bicycle streets are still relatively unknown by the population. Marketing activities will help to achieve a better understanding among the various road users (cyclists, pedestrians and car-drivers).

### Goals to be achieved

- Better awareness for bicycle streets, in order to improve safety and usage of this street type.

### Groups targeted by the solution

cyclists and drivers of motorised vehicles.

### Changes in activities to be performed

The current activities are designed to be repeated every year while the evaluation is not planned. The activities are manly street events combined with bike-safety-checks, quizzes, info-material, catering, music.

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Difficulty to find suitable location | **L** | **L** |
| **Resistance from local residents/shop owners** | Complaints | **L** | **L** |
| **Political barriers** | Politicians will not support the implementation of bicycle streets anymore | **L** | **H** |
| **Bureaucracy/legislative** | National guidelines, internal administration | **L** | **L** |
| **Financial barriers** | No funding | **L** | **H** |
| **Human resource barriers** | No staff for supervising | **L** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Careful choice of locations |
| **Resistance from local residents/shop owners** | Communication |

| | |
|---|---|
| **Political barriers** | Showing positive perception of bicycle streets |
| **Bureaucracy/legislative** | Good coordination, encouraging to implement |
| **Financial barriers** | Political awareness |
| **Human resource barriers** | |

### Evaluation

The number of participants at each event is an estimation.

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Bicycle events carried out | *Number* | 0 | **1** | **0** | 20 |
| Participants | *Number* | 0 | **120** | **0** | 150 |

### COVID-19 impact on measure development and evaluation

Munich has planned 5 bicycle street events. Due to Covid-19 it wasn't able to carry out one. Instead, some bicycles with information / rules regarding bicycle streets have been placed along newly designated bicycle streets.

## MUN 9 – Awareness campaigns for car drivers with and without cycling affinity

### Background information

With its 2020- marketing campaign, Munich wants to sensitize car drivers to the needs of cyclists (e.g., avoid parking on the cycle path, comply to safety distances, avoid “dooring”). Another objective is to address car drivers with cycling affinity to get them on a bike.

### Goals to be achieved

- Drivers of motorized vehicles should be sensitized to the needs of cyclists.
- Contributing to the modal shift from car to bike.

### Groups targeted by the solution

Drivers of motorised vehicles.

### Changes in activities to be performed

The campaign is addressed to drivers of motorised vehicles.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Political barriers** | No support from politicians | **L** | **M** |
| **Bureaucracy/legislative** | Long coordination | **M** | **L** |
| **Financial barriers** | No funding | **L** | **M** |
| **Human resource barriers** | No staff for supervising | **L** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Political barriers** | Showing positive effects of marketing campaigns |
| **Bureaucracy/legislative** | Smart project processes |
| **Financial barriers** | |
| **Human resource barriers** | |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Campaigns carried out | *Number* | 0 | **0** | **1** | 2 |

## COVID-19 impact on measure development and evaluation

| |
|---|
| All events with physical contact have been cancelled. Events where there is a possibility that too many people come together has been cancelled, too. |

## 2.11 City of Riga


### 2.11.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| RIG 1 (AMS 8, AMS 9, CPH 7 → 2018-2022). Redesign of toroughfare Bruņinieku street |  |
| RIG 2 (CPH 4, CPH 5 → 2019-2021). Improvement of modelling and traffic signalling. |  |
| RIG 3 (CPH 4, CPH 5 → 2019-2021). Anchoring cycling traditions into everyday agenda |  |

Table 12: Overview of solutions for Riga

### 2.11.2 Detailed description of solutions

#### RIG 1 – Redesign of toroughfare Bruņinieku street

**Background information**

Riga is working on improving the connectivity of their bicycle network. One of the streets that will be reformed for this network is Bruņinieku Street. The street will be redesigned to be more bike friendly. Important changes that will be made are the establishment of a two-way cycling lane, a reduced speed limit for cars to 30 km/h and a decrease in parking spaces for cars.

### Goals to be achieved

- The city's goal is thus to create a safe and comfortable cycling connections in Riga.

### Groups targeted by the solution

All modes: Motorist – Bus - Cyclists – Pedestrians.

### Changes in activities to be performed:

Construction process has been delayed due to technical issues - not because of Covid-19.

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Due to prolonged water supply and sewerage communications reconstruction works, beginning of Bruninieku street construction works has been postponed to the middle of summer, which might mean, that it won't be finished in year 2019 | **H** | **M** |
| **Resistance from local residents/shop owners** | There have been signature gatherings by the local residents and some shop owners due to minimized amount of car parking spaces in the project. | **H** | **M/L** |
| **Political barriers** | Riga city council did not elect the new city Mayor the whole summer. | **H** | **M** |
| **Bureaucracy/legislative** | Still not | **L** | **M** |

| | | | |
|---|---|---|---|
| **Financial barriers** | The funding has been set aside for this project and hopefully will not be relocated elsewhere | **L** | **H** |
| **Human resource barriers** | Still not | **L** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | As soon as all the communications reconstruction works are finished (Department is working together with communications holders to make the work more efficient), road work construction will begin aiming to finish in year 2019 |
| **Resistance from local residents/shop owners** | The resistance from locals hasn't impacted the project so far. |
| **Political barriers** | A lot of decisions had to be postponed due to lack of City council and political policies |
| **Bureaucracy/legislative** | |
| **Financial barriers** | The project is ongoing, so there shouldn't be any financial problems |
| **Human resource barriers** | As soon as all the communications reconstruction works are finished (Department is working together with communications holders to make the work more efficient), road work construction will begin aiming to finish in year 2019. |

## Evaluation

The bikenomics analysis will be updated in the ex-post report. The updated values of inputs on the project so far are stated in the table below. These values where provided by the city or based on expert judgement.

| Parameter | Value |
|---|---|
| *Investment costs* | € 3.248.412 |
| *Year(s) of investment* | 2018-2019 |
| *Maintenance costs per year* | € 20.349 |
| *Number of cycling trips per* | 238.272 |
| *Number of car trips per year* | 3.781.692 |
| *Modal shift from car to bike* | 33% |

| | |
|---|---|
| *Modal shift from public transport to bike* | 53% |
| *Modal shift from walking to bike* | 14% |
| *Average speed bike (km/h)* | 14 |
| *Average speed car (km/h)* | 40 |
| *Length of project (km)* | 2,1 |

### COVID-19 impact on measure development and evaluation

| |
|---|
| Construction process has been delayed, but not because of Covid-19 (technical issues). |

## RIG 2 – Improvement of modelling and traffic signalling

### Background information

Concerning cycling traffic modelling and intelligent signal management, there are no such project being held in the city and the issue is very urgent. Though there are already some privileges and separate streetlight system set up on the cycling paths ensuring some additional safety to cyclists, a lot of additional work is required to make the cycling network integrated with the whole road system**.**

### Goals to be achieved

- Improvement of modelling and traffic signalling. At the present time, the objective still needs to be clarified.

### Groups targeted by the solution

City planners and citizens.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |

| | | | | |
|---|---|---|---|---|
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Repairs are prohibited for 3Y after the asphalt has been restored | **H** | **M** |
| **Resistance from local residents/shop owners** | Car drivers are not satisfied and not accepted yet the changing mobility priorities as well as changes followed by cycling development | **H** | **H** |
| **Political barriers** | Riga has the new city government since October 3rd | **M** | **H** |
| **Bureaucracy/legislative** | A lot of measures take long time implementing due to Latvia's legal contracting between subcontractors and public sector. | **H** | **M** |
| **Financial barriers** | Dependent on budget | **M** | **H** |
| **Human resource barriers** | Lack of qualified specialists | **H** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Mistakes in the planning phase leads towards incomplete solutions |
| **Resistance from local residents/shop owners** | Lack of knowledge, cycling culture and safety |
| **Political barriers** | Existing plans will be finished while new cycling plans and policy documents needs to be created and approved |
| **Bureaucracy/legislative** | All the plans need to be coordinated in time, so there wouldn't be problems with legal arrangements with subcontractors (can't have quick measures) |
| **Financial barriers** | It shouldn't be a problem; the question is about the amount of budget for the next year (taking into consideration we didn't fully use these years one because of covid-19) |
| **Human resource barriers** | |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Junctions with intelligent traffic signal management | *Number* | 17 | **33** | **25** | 20 |
| Pedestrian call buttons | *Number* | NA | **NA** | **100** | 130 |
| Two-way green wave for cyclists | *Number* | NA | **NA** | **1** | 2 |

## RIG 3 – Anchoring cycling traditions into everyday agenda

### Background information

Riga is aware that it is not only important to keep on with the campaigns or annual events already done by the city, but there would be a need for having some new and innovative ideas on how to create and anchor cycling traditions into everyday agenda.

### Goals to be achieved

- Anchoring cycling traditions into everyday agenda.

### Groups targeted by the solution

All citizens.

### Changes in activities to be performed

The planning and design phase delayed due to event restrictions because of Covid-19. Currently, the city has planned only for digital social campaigns and infographics.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |

| | | | | |
|---|---|---|---|---|
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Taking into concern covid-19, a lot of measures were creating public events or coming into schools, which weren't safe, thus everything got delayed. Now the second wave is rapidly increasing, so the planning has changed to work on social media campaigns and future information campaigns on cycling culture and safety | **H** | **H** |
| **Resistance from local residents/shop owners** | everything Department does is judged by cycling activists on social media platforms, so there can't be any media campaigns that don't correspond with city policies (for example we can't promote winter cycling not providing immediate snow cleaning etc) | **H** | **H/M** |
| **Political barriers** | The city didn't have city council for most part of the year, thus city policy on cycling and what scale of measures should be done not clear and approved. City council started officially working on 3rd of October, so just now they are laying groundworks on future policies and plans. | **M** | **M** |
| **Bureaucracy/legislative** | A lot of measures take long time implementing due to Latvia's legal contracting between subcontractors and public sector. | **H** | **M** |
| **Financial barriers** | There is a budget for this solution | **M** | **H** |
| **Human resource barriers** | There is a lack of human resource in Traffic department, so everything is slightly delayed, but there is a new social media person who can focus on some of the planned projects | **H** | **L** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | The mobility week was organised in the low covid-19 times taking all necessary precautions, right now the situation is very dire, so no public events for our necessities can be organised, work is being replanned with more of social media campaigns |
| **Resistance from local residents/shop owners** | We have a new social media project manager, which deals with all the resistance from all the activists by informing them with future plans and actively answering on social media |
| **Political barriers** | The city policies towards cycling and mobility are just being created, so they aren't there yet to work with |
| **Bureaucracy/legislative** | All the plans need to be coordinated in time, so there wouldn't be problems with legal arrangements with subcontractors (can't have quick measures) |
| **Financial barriers** | It shouldn't be a problem, the question is about the amount of budget for the next year (taking into consideration we didn't fully use this year's one because of covid-19) |
| **Human resource barriers** | Hopefully there will be more people hired in the future to better deal with the work amount |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| New marketing techniques/ events used | *Yes/no* | No | **No** | **No** | Yes |
| EU Mobility week 2020 | *Number of events – involved people* | NA | **NA** | **8 - 2000** | 12 - 60000 |
| Winter cycling info campaign | *Number of events – reached people* | NA | **NA** | **1 – 1000** | 3 - 20000 |

## 2.12 City of Rome


### 2.12.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| ROM 1 (AMS 3 → 2019-2023). Redesign of major thoroughfare Via Prenestina |  |
| ROM 2 (AMS 5, AMS 10 → 2019-2022). Actions to encourage intermodality |  |
| ROM 3 (MUN 1 → 2019-2021). Development of awareness and marketing campaigns. |  |
| ROM 4 (CPH 14 → 2019-2022). Development of gamification strategies |  |
| ROM 5 (MUN 3 → 2019-2022). Promoting bike-to-school campaigns |  |

Table 13: Overview of solutions for Rome

### 2.12.2 Detailed description of solutions

#### ROM 1 – Redesign of major thoroughfare Via Prenestina

**Background information**

Rome is already working on over 90km of brand-new bike lanes as well as three 30km/h zones to be implemented (ideally) in a 3-year timeframe. Such projects are aimed at both traffic calming and cycling/walking safety measures and the work done by Amsterdam is a fundamental point of reference. Of the whole 90km two infrastructures (Nomentana and Tuscolana) are already achieved, Prenestina will see the light next year and Grab should be done by 2022. In May, Rome's city council approved the construction of 150 km of transitory cycle routes on the city's main streets and along other key routes to support social distancing as well as general health and well-being. 20 km have been put in place so far (Nov 2020)

### Goals to be achieved

- The objective of the municipality is to increase cycling levels for all motives to 10% in the city centre and 4% in the whole city.

### Groups targeted by the solution

Mainly Residents

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Resistance from local residents/shop owners** | Most of the objections were made up by a small number of residents/shop owners due to the fear of losing car space = customers | **L** | **L** |
| **Political barriers** | Political opposition | **L** | **L** |
| **Bureaucracy/legislative** | None as the funds were immediately allocated | **L** | **L** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Resistance from local residents/shop owners** | Tuscolana suffered strong opposition by residents and shop owners |
| **Political barriers** | Part of the political opposition supported residents and shop owners |
| **Bureaucracy/legislative** | |

### Evaluation

The bikenomics analysis will be updated in the ex-post report. The updated values of inputs on the project so far are stated in the table below. These values where provided by the city or based on expert judgement.

| Parameter | Value |
|---|---|
| *Investment costs* | € 1.670.000 |
| *Year(s) of investment* | 2018 - 2019 |
| *Maintenance costs per year* | 1% |
| *Number of cycling trips per year* | 62.400 |
| *Number of car trips per year* | 4.000.000 |
| *Modal shift from car to bike* | 75% |
| *Modal shift from public transport to bike* | 12,5% |
| *Modal shift from walking to bike* | 12,5% |
| *Average speed bike (km/h)* | 12 |
| *Average speed car (km/h)* | 38 |
| *Length of project (km)* | 5,6 |

### COVID-19 impact on measure development and evaluation

| |
|---|
| The intervention suffered from a several months of work stalled due to the COVID-19 break out, works have now re-started in the month of October. |

## ROM 2 – Actions to encourage intermodality

### Background information

Rome has allocated a dedicated budget to invest in intermodal actions such as multimodal hubs at main train/metro stations, as well as new parking facilities at public schools and offices. The city wants to learn how Amsterdam dealt with parking facilities and cycling integration. Total of 400 bike parkings inside 7 metro stations and a new multimodal hub at the "stazione trastevere"

### Goals to be achieve

- The objective of the municipality is to increase cycling levels for all motives to 10% in the city centre and 4% in the whole city.

### Groups targeted by the solution

Mainly residents.

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | It was hard to properly define technologies to access, monitor e book the parking spots | **H** | **M** |
| **Bureaucracy/legislative** | Metro station overall safety | **H** | **H** |
| **Human resource barriers** | Several departments (with different roles) within Atac involved | **L** | **L** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Modest commitment shown by partners involved, Cycling is still seen with scepticism |
| **Bureaucracy/legislative** | Metro stations security norms |
| **Human resource barriers** | Lack of committed resources |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of dedicated bike parking spots | *Total number* | 3500 | **NA** | **400** | 5000 |
| Average search time for parking spot | *Minutes per trip* | 2’ | **2’** | **2’** | 2’ |
| Occupancy rate of parking facility | *Average percentage of total available spots* | 1% | **1,5%** | **2,5%** | 3% |

## ROM 3 – Development of awareness and marketing campaigns

### Background information

As highlighted in the recently approved Urban Cycling Plan, the city wants to invest in awareness campaigns and cycling marketing to facilitate a behavioural change. Thanks to the EU PASTA project, the city has already experienced the success of targeting campaigns (2000 users reached). A road safety campaign has just been launched https://romamobilita.it/it/sicurezza-prima-tutto

### Goals to be achieved

- Encourage behaviour change.

### Groups targeted by the solution

Families, tourists, students and youngsters in general.

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Lack of dedicated channels | **M** | **M** |
| **Political barriers** | Lack of commitment | **L** | **M** |
| **Financial barriers** | Little budget currently allocated | **M** | **M** |
| **Other types of barriers?** | Lack of committed resources | **M** | **M** |

### Evaluation

The survey for the initial structuring of awareness campaigns has still to be set up

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Awareness campaigns set up | *Yes* | Local target | **No** | **No** | Wider and higher target |
| New marketing techniques /events used | *Yes* | None | **Bike share scheme** | **Bike and e scooters share scheme** | Bike share scheme |
| Number of cyclists | *Trips per year* | 1% | **3%** | **4%** | 5% |

### COVID-19 impact on measure development and evaluation

| |
|---|
| COVID-19 break out slowed down the process. |

## ROM 4 – Development of gamification strategies

### Background information

Thanks to the European Cycling Challenge (ECC), Rome has experienced the so-called ‘gamification approach’. The approach of the ECC was revealed to be a good "gamified tool" to motivate people to use the bicycle in their daily commuting. Rome wants to learn more about how to design gamification. Since the end of ECC no such initiatives were launched though through the 2015-2017 editions a lot of datas were collected. A new initiative aimed to help new cyclists get around the city should be launched soon (2021)

### Goals to be achieved

- Raise awareness among citizens and stakeholders.

### Groups targeted by the solution

Students and youngsters in general. New cyclists

### Changes in activities to be performed

Due to covid break out planned acrivities are nowdays are stalled

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Political barriers** | Not interested in replicating ECC | **M** | **M** |
| **Financial barriers** | Budget not currently allocated | **M** | **M** |
| **Human resource barriers** | Lack of committed resources | **M** | **M** |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Gamified tool set up | *Not yet* | 0 | **0** | **0** | 2 |
| Number of cyclists attracted | *Trips per year* | 1% | **1%** | **3%** | 4% |

### COVID-19 impact on measure development and evaluation

| |
|---|
| COVID-19 break-out slowed down the process. |

## ROM 5 – Promoting bike-to-school campaigns

### Background information

Rome has followed and supported several #biketoschool initiatives, endorsing the core values of such campaigns with high cultural meaning and targeting youngsters. There were also many occasions where the administration promoted #biketoschoolday events. The city wants to invest more in these initiatives, learning from Munich's experience.

### Goals to be achieved

- Increasing bicycle use levels among children.
- Improve social acceptance of cycling.

### Groups targeted by the solution

Manly students and their families.

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Number of new schools and cycling children | Trips per year | 0.5% | **0,5%** | **1%** | 2% |
| Share of children cycling | Percentage of total children | 0.5% | **0,5%** | **1%** | 2% |

## COVID-19 impact on measure development and evaluation

| |
|---|
| COVID-19 break-out slowed down the process. |

## 2.13 City of Turin


### 2.13.1 Overview of solutions

| List of Handshake solutions | Type of Solution |
|---|---|
| TUR 1 (AMS 3, AMS 18 → 2019-2021). Develop standard bicycle design and traffic calming guidelines |  |
| TUR 2 (AMS 11 → 2019-2021). Redevelopment of major thoroughfare Via Nizza. |  |
| TUR 3 (CPH 3 → 2019-2021). Development of a bicycle parking plan. |  |
| TUR 4 (CPH 5 → 2019-2021). Turin needs to setup a real-time monitoring system with wireless sensors. |  |

Table 14: Overview of solutions for Turin

### 2.13.2 Detailed description of solutions

#### TUR 1 – Develop standard bicycle design and traffic calming guidelines

**Background information**

Currently a standard approach to design bicycle paths is missing. The City will thus develop a standardized approach about creating the right subdivision for the different

modes of transportation, cycling mobility, public transport and private motorized with particular attention on intersection design.

### Goals to be achieved

- Eating support for city officials in designing a cycling network.

### Groups targeted by the solution

City officials.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

No risks foreseen. The lack of human resources will be compensated by working together with the Metropolitan City of Turin and the Region of Piedmont which both are going to contribute to developing this standard set of guidelines.

### Evaluation

| **Indicator** | **Unit of measurement** | **Value (2018)** | **Value (2019)** | **Value (2020)** | **Expected (2022)** |
|---|---|---|---|---|---|
| Analysis of different types of bike lanes built in the city | *Yes/no* | No | **Yes** | **Yes** | Yes |
| Traffic Calming Manual designed | *Yes/no* | No | **No** | **No** | Yes |

| | | | | | |
|---|---|---|---|---|---|
| Street design manual updated | *Yes/no* | No | **No** | **No** | Yes. |

## TUR 2 – Redevelopment of major thoroughfare Via Nizza

### Background information

The street is unsafe for cycling due to high volumes of traffic and high level of car parked in a double row are issues that have to be faced. Moreover, there is a strong opposition by shop owners and residents for reducing car space and parking. The city is unable to justify this intervention without bikenomics. The socioeconomic assessment of investment in cycling is something very urgent and never used in the past. Learning from Amsterdam will help the city to use it as tool for decision making at political level and in the planning process. Thanks to this, the city will be able to evaluate the economic benefit consequent of investing on cycling infrastructures and services.

### Goals to be achieved

- Redistributing space between many actors: pedestrian, bicycle, cars.
- Improve the cycling experience in terms of travel times, safety, easy connection
- Improving safety for all.
- Promote a modal shift to cycling.

### Groups targeted by the solution

Daily links home- school, homework (commuters), citizens.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Presence of dèhors, little space for all kind of mobility | **L** | **L** |
| **Resistance from local residents/shop owners** | Yes, resistance from residents and shop owners for the loss of parking places. Shop owners also for their fear to lose clients connected with the loss of parking places | **L** | **L** |
| **Political barriers** | Some from the politics of local decentralised authority (see previous point) | **M** | **M** |
| **Financial barriers** | Yes, few public funds, nearly no privates fund | **M** | **M** |
| **Human resource barriers** | Yes, to perform surveys and communication action towards stakeholders (residents, shop owners) | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | Detailed design solutions in the individual points of difficulty |
| **Resistance from local residents/shop owners** | Dialogue, campaign of communication, participatory design (shared, collaborative?) |
| **Political barriers** | Dialogue |
| **Financial barriers** | Public funds, private investments |
| **Human resource barriers** | Temporary contracts, graduate's thesis |

### Evaluation

The bikenomics analysis will be updated in the ex-post report. The updated values of inputs on the project so far are stated in the table below. These values where provided by the city or based on expert judgement.

| Parameter | Value | 2019 | 2020 |
|---|---|---|---|
| Investment costs | € 2.300.000 | 0 | 0 |
| Year(s) of investment | 2018 - 2019 | implementation | implementation/ end of the works |

| | | | |
|---|---|---|---|
| Maintenance costs per year | € 30.000 | 0 | 0 |
| Number of cycling trips per year | 357.000 | 350.000 (estimate, construction site under development) | 304.284 (until Oct 29th. To be considered the lockdown phase) |
| Number of car trips per year | 3.816.148 | 3.700.000 (estimate) | 2.195.337 (estimate value until October 2020. To be considered the lockdown phase) |
| Modal shift from car to bike | 5% | 0,09 | 0,13 |
| Average speed bike (km/h) | 12 | NA | NA |
| Average speed car (km/h) | 40 | NA | NA |
| Length of project (km) | 2,3 | 2,3 | 2,3 |

### COVID-19 impact on measure development and evaluation

| |
|---|
| COVID-19 affected influenced by slowing down the work of the construction site in via Nizza. |

## TUR 3 – Development of a bicycle parking plan

### Background information

Intermobility is a theme that is mandatory for Turin's future sustainable mobility. It is necessary to make an analysis of actual and future demand of public bike parking in correspondence of the metro and tram stops, and in the whole city to enforce the use of the mix of bikes and urban public transport. It's under development the implementation of two bike parking into the two main train stations. These analyses are mandatory to meet quality standard for bike parking and a correct planning for the bike parking in the whole city. Torino is poor of bike parks, there are no covered and safe structures. The distribution of bike parking in the city is not homogeneous and does not meet the needs.

### Goals to be achieved

- Development of a bike parking plan with a scale of priority of implementation.

### Groups targeted by the solution

Citizens, commuters, designers and planners, politics.

### Timeline of roll-out

| | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Planning | | | | |
| Design | | | | |
| Implementation | | | | |
| Evaluation | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Technical barriers** | Searching adequate spaces for big parking structure.<br>How to calculate the demand of parking (needs) | **M** | **M** |
| **Human resource barriers** | Lack of human resources | **M** | **M** |

### How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Technical barriers** | We will consider it during the design phase |
| **Human resource barriers** | Temporary contracts, graduate's thesis |

### Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Plan approved | *Yes/no* | No | **No** | **No** | Yes |
| Bicycle parking supply | *Total number of spots available* | 3.368 | **3.668** | **3.968** | **4.568** |

## TUR 4 – Turin needs to setup a real-time monitoring system with wireless sensors

### Background information

Turin needs to setup a real-time monitoring system with wireless sensors. At the moment, the only figures are derived from interviews and with daily monitoring campaigns, insufficient to model data. Data is needed to build the first cycling traffic model and to draw a complete picture of the bicycle modal share of the city.

### Goals to be achieved

Have detailed and widespread data on cycling mobility.

### Groups targeted by the solution

Metropolitan City of Turin, city officials.

### Timeline of roll-out

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Planning | | | | | |
| Design | | | | | |
| Implementation | | | | | |
| Evaluation | | | | | |

### Risks management

| Risk type | Description of Risk | Probability (H/M/L) | Impact (H/M/L) |
|---|---|---|---|
| **Financial barriers** | Difficult to find funding for other bicycle counters | **L** | **H** |

## How Risks will be addressed

| Barrier | Enabler |
|---|---|
| **Financial barriers** | The City of Turin will receive funding for developing cycling mobility |

## Evaluation

| Indicator | Unit of measurement | Value (2018) | Value (2019) | Value (2020) | Expected (2022) |
|---|---|---|---|---|---|
| Real-time monitoring system set up | **Yes/no** | No | **Yes** | **Yes** | 5% |
| Number of bicycle counter installed | **Total number** | 0 | **7** | **7** | 9 |
| Number of bicycles per route monitored | **Per day per route**<br><br>**Weekly average** | NA | **1.788** estimate | **1.249 Via Nizza** (construction site under development in 2020, now concluded)<br>**1.564 Corso Castelfidardo**<br>**2.250 Corso Francia**<br>**573 Lungo Dora Siena**<br>**1.036 Via Bertola** [3] | 2.500-3.000 |
| Cycling traffic model set up | **Yes/no** | No | **No** | **No** | Yes[4] |

[3] to be considered the 2 lockdown phases.

[4] We planned a workshop with technical experts on modelling and assessment, we'd like to organize a mentoring meeting on how to approach cycling traffic modelling.

# 3 Conclusions

## 3.1 Overall progress table

The table below summarises the **progress of each solution** as described in the previous chapter. The values have been **estimated** as a the % of completed activities.

| Solution description | Status | Transfer completion | |
|---|---|---|---|
| ***City of Amsterdam*** | | | |
| AMS 13 - Wider and higher capacity bike lanes, smaller car lanes. | Delayed but in progress | | 40% |
| AMS 14 - Improvement in cycling methods: modelling and assessment | Delayed but in progress | | 60% |
| AMS 15: ICT system for cycle traffic flows improvement and cycling prioritisation at intersection. | Delayed but in progress | | 50% |
| AMS 16 - Assessment of the effect of behavioural interventions on cycling behaviour: the new way of cycling. | In progress, no major delays | | 70% |
| AMS 17 - Efficient use of parking facilities and bicycle parking spaces by better signing and (dynamic) wayfinding. | In progress, no major delays | | 70% |
| AMS 18 - Sharing test results of space-effective and/or multifunctional bicycle parking solutions. | In progress, change in format (online) | | 60% |
| AMS 19 - Assessment of experienced comfort of improved cycling routes. | In progress, no major delays | | 50% |
| ***Bordeaux Métropole*** | | | |
| BRD 1 - Develop higher capacity parking solutions. | Delayed but in progress | | 40% |
| BRD 2 - Develop economic appraisal techniques to assess cycling policies. | Delayed but in progress | | 60% |
| BRD 3 - Update current bicycle design guidelines. | Delayed but in progress | | 60% |

| | | | |
|---|---|---|---|
| BRD 4 - Cycling educational program for all generations. | Currently on hold, postponed in 2021-22 due to COVID19 |  | 10% |
| BRD 5 - Patch-up missing links in the network | In progress, boost due to COVID-19 |  | 70% |
| BRD 6 - Creating a 3rd Cycling Plan. | Delayed but in progress |  | 80% |
| ***City of Bruges*** | | | |
| BRG 1 - Solutions for strengthening / creating a cycling tangential around the historic city centre. | In progress, no major delays. Some activities shifted online. |  | 70% |
| BRG 2 - Evaluation of the new cycling connection centre – Sint-Michiels. | In progress, no major delays. Data collected during COVID-19 will need validation. |  | 70% |
| BRG 3 - Strengthen the cycling infrastructure near the train station, hereby coping with Unesco-concerns. | In progress, no major delays. |  | 60% |
| BRG 4 - Increase monitoring capacity and ability to communicate data for planning. | Delayed but in progress |  | 40% |
| ***City of Cadiz*** | | | |
| CDZ 1: Development of a Bicycles Municipal Ordinance. | Completed |  | 100% |
| CDZ 2 – Development of Director of Bicycle Plan. | Delayed but in progress |  | 50% |
| CDZ 3 – Development of the bicycle network | Delayed but in progress |  | 40% |
| CDZ 4 – Development of a mobility website and other interactive tools for participation purposes | Delayed but in progress |  | 50% |
| CDZ 5 – Development of training courses for children and adults | In progress, no mayor delays |  | 70% |

| | | | |
|---|---|---|---|
| ***City of Copenhagen*** | | | |
| CPH 11 - User-driven prototype tests as an innovative method to develop new concepts for campaigns, way finding solutions and bicycle parking. | Completed. Currently being monitored | ✓ | 100% |
| CPH 12 - Intelligent solutions for dynamic street lighting, right turn warning lights, data collection and flexible way finding. | Completed. Internal reporting phase | ✓ | 100% |
| CPH 13 - Customised traffic modelling tools developed to calculate bicycle traffic capacity and flow. | Final stages, minor remaining activities to be completed online. | ▶ | 70% |
| CPH 14 - Behavioural change via nudging and smart data. | First round completed. Second round to be completed in 2021 | ▶ | 50% |
| CPH 15 - Bicycle parking solutions that are space-effective and/or multifunctional. | In progress, no mayor delays. Some measurements may not be performed due to lack of budget. | ▶ | 70% |
| CPH 16 - Socioeconomic assessments of investments in cycling: Farum route. Comparison of Dutch and Danish approach | Completed | ✓ | 100% |
| ***City of Dublin*** | | | |
| DBL1 – Develop the main cycle network. | In progress, boost due to COVID-19. Other specific measures to be transferred will be defined with symposia. | ▶ | 70% |
| DBL2 – Optimizing bicycle data collection points. | On hold | ⏸ | 10% |
| DBL3 – Making space for additional bicycle parking and dock less bike share schemes. | Delayed but in progress | ▶ | 80% |

| | | | |
|---|---|---|---|
| DBL4 – Prioritized intersections for cyclists. | On hold |  | 50% |
| DBL5 – Use bicycle data for nudging | Deviation from previous objectives, in progress |  | 50% |
| ***Greater Manchester*** | | | |
| MSC1 – Segregated "Dutch-style" cycle lanes: Chorlton Cycleway | In progress, boost due to COVID1-9. Data collection on the mobility effects has encountered difficulties. |  | 70% |
| MSC2 – Influencing behavioural change via credit/debit, reward/fine systems and gamification. | On hold |  | 30% |
| MSC3 – Providing real-time feedback on cycle conditions to assess the feeling of road safety. | Delayed but in progress |  | 10% |
| ***City of Helsinki*** | | | |
| HEL1 – Measures for bicycle traffic priority. | Delayed but in progress |  | 50% |
| HEL2 – Cost-effective large bicycle parking. | In progress, no mayor delays |  | 70% |
| HEL3 – High quality bicycle network. | In progress, no mayor delays |  | 70% |
| HEL4 – Cycle-friendly traffic signal management. | In progress, no mayor delays |  | 70% |
| HEL5 – Redesign of major thoroughfare Hämeentie. | In progress, no mayor delays |  | 70% |
| ***City of Krakow*** | | | |
| KRA 1 – High-quality on-street bicycle parking | Stopped. Possible re-roll out in 2021. |  | 5% |
| KRA 2 – Assessment of Bike-to-Work campaign | Activity performed in 2019 but put-on hold for 2020 due to COVID-19. |  | 60% |

| | | | |
|---|---|---|---|
| KRA 3 – Awareness campaigns to enhance traffic safety | Activity performed in 2019 but put on hold for 2020 due to COVID-19. Possible changes in the action structure in 2021. |  | 50% |
| KRA 5 – Mobility education - night-time biking. | On hold due to COVID-19. |  | 10% |
| ***City of Munich*** | | | |
| MUN 4 – Improving safety and attractiveness of cycling lanes by red colouring | Delayed but in progress |  | 66% |
| MUN 5 – Improving comfort and service for cyclists | Delayed but in progress |  | 50% |
| MUN 6 – App-based reporting tool to locate danger areas | On hold due to COVID-19. Possibly discontinued |  | 45% |
| MUN 7 – Redesign Clemensstraße into a Bicycle Street | Completed. Mid-term evaluation of the impacts not possible due to COVID-19. |  | 100% |
| MUN 8 – Events and campaigns to raise awareness for bicycle streets | In progress, some deviation occurred in the form due to COVID-19 |  | 70% |
| MUN 9 – Awareness campaigns for car drivers with and without cycling affinity | On hold due to COVID-19 |  | 10% |
| ***City of Riga*** | | | |
| RIG 1 – Redesign of toroughfare Bruņinieku street | Delayed but in progress |  | 30% |
| RIG 2 – Improvement of modelling and traffic signalling | In progress, some activities performed online |  | 70% |
| RIG 3 – Anchoring cycling traditions into everyday agenda | On hold due to COVID-19. Currently only online activities. |  | 10% |
| ***City of Rome*** | | | |

| | | | |
|---|---|---|---|
| ROM 1 – Redesign of major thoroughfare Via Prenestina | Delayed but in progress |  | 50% |
| ROM 2 – Actions to encourage intermodality | On hold due to COVID-19 |  | 10% |
| ROM 3 – Development of awareness and marketing campaigns | Delayed but in progress |  | 30% |
| ROM 4 – Development of gamification strategies | On hold due to COVID-19 |  | 10% |
| ROM 5 – Promoting bike-to-school campaigns | On hold due to COVID-19 |  | 30% |
| ***City of Turin*** | | | |
| TUR 1 – Develop standard bicycle design and traffic calming guidelines | Delayed but in progress |  | 50% |
| TUR 2 – Redevelopment of major thoroughfare Via Nizza | Completed. Mid-term evaluation of the impacts ongoing. |  | 90% |
| TUR 3 – Development of a bicycle parking plan | Delayed but in progress |  | 50% |
| TUR 4 – Turin needs to setup a real-time monitoring system with wireless sensors. | Completed. Mid-term evaluation of the impacts ongoing. |  | 90% |

## 3.2 Final considerations

While the transfer and implementation of Handshake's solutions has been positively progressing through intensive collegial and bilateral knowledge share, the project has experienced delays due to external factors and particularly to the global COVID-19 pandemic, which forced all Handshake cities to concentrate energies and resources on the necessary health prevention measures.

In particular, major delays have been experienced by solutions that require face-to-face contacts and interactions such as educational activities, bike-to-work campaigns, behavioural campaigns, public events/gatherings and study tours. This has been the case for Bordeaux, Amsterdam, Copenhagen, Munich, Krakow.

Similarly, several solutions suffered from the suspension of important mentoring events, which were supposed to inform and occasionally even shape the specifications of several transferred solutions. Particularly damaging was the postponement of

instituting events such as the 3 immersive study tours, which in turn affected the plans of 6 of 10 FCC.

On the other hand, the pandemic coupled with the need to provide safe social distancing space as well as limiting a mass shift to car use also encouraged more cities to push harder on cycling solutions giving an overall boost to project objectives. This was particularly noticeable in Bordeaux and Turin, with Rome implementing at once a good number of pop-up cycling lanes but also a conflicting suspension of the local LTZ.

In several instances, the pandemic brought cities to withhold budget previously allocated to cycling solutions and divert it to COVID-19 emergency measures, with consequent delays in cycling solutions' rollout.

Only a few measures have been discontinued due to budget constraints or lack of personnel, while others have been tweaked or replaced with interventions deemed for effective in light of the new reality.

A significant issue regards the mobility effects that COVID-19 is having and will have, effects that may impeach on the originally set solutions' targets. Cities are monitoring traffic counting data to assess the impacts of the initial lockdown measures imposed by some countries. Cities also expect that a more fundamental change in mobility demand has occurred or will occur due to changing preferences and lifestyles, at both business and personal level. Our ex-post evaluation will benefit from this mid-term data collection as it should allow us to better take into account the effects of COVID-19.

## 3.3 Next Steps

This mid-term report will be followed by an ex-post evaluation that aims to assess the impacts of the transfer process enabled by Handshake, impacts that will be analysed and matched against the original project's targets. In drafting the final evaluation report, the following actions will be undertaken:

- Complete any missing ex-ante indicators by supporting partner organisations that experienced data collection/analysis difficulties.
- Perform an ex-post cost-benefit analysis of flagship solutions with Bikenomics to appreciate the socio-economic value of the implemented solutions. The results will be of great added value to understanding the impacts of cycling in urban areas and the communication of the project's benefits.
- Perform an ex-post governance analysis to measure the advancement in the governance capacity of partner organisations.
- Identify further knowledge gaps and room for improvement that other future projects may take into account and further explore.

In conclusion, this report shows that despite the momentous planetary changes induced by the pandemic, Handshake is heading in the right direction, with interesting results in store. While it is premature to anticipate, and certainly not a consistent assessment for all 13 Handshake cities, COVID-19 may prove to have been an accelerator of change in many urban contexts.