CENTRAL EUROPEAN ACTIVE MOBILITY LAB

EVALUATION AND LESSONS LEARNT REPORT

CENTRAL EUROPEAN ACTIVE MOBILITY LAB (CEAML)

EVALUATION AND LESSONS LEARNT REPORT

December 2024

Responsible partner

Mobilissimus Ltd.
Zsófia GHIRA, Antal GERTHEIS

Contributing partners

Cyklokoalícia
Dan Kollar, Boris Valach

Hungarian Cyclists' Club
Dorottya Teveli-Horváth

Auto*Mat
Michal Šindelář

Client

European Climate Foundation

The evaluation framework and the reporting methodology highly counts on the CIVITAS SUNRISE project (received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 72 33 65) on evaluating neighbourhood-level mobility measures (Stanchev, Haufe, Fonzone and Franta, 2019).

Executive Summary

The *Central European Active Mobility Lab (CEAML) - Sustainable urban transport in the Visegrad region* project aims to move the decarbonisation of the transport sector forward in Czechia, Hungary, and Slovakia. Making electricity generation greener is well on its way throughout Europe and has even gained some momentum in the Visegrad region, but there is a need to simultaneously tackle other pervasive areas, including the transportation sector. At the EU-level, emissions from transportation amount to a quarter of total figures, with road transport responsible for nearly three quarters of these. Emissions from transport have constituted a slightly lower portion (approx. 18%) of emissions in the aforementioned Visegrad countries when compared to EU averages, but values have been rising as motorisation progresses (ACEA, 2022; Eurostat, 2022b).

Our project addresses the rising number of passenger vehicles and respective negative externalities by providing evidence and momentum for (potentially) carbon-free modes of transportation that bring multiple benefits. Reconfiguring transportation in a manner that is friendly towards both humans and the environment carries immense benefits ranging from preventing premature deaths to economic benefits valued at billions of euros (OECD, 2015).

The project conducted a comparative analysis of three pilot sites in Prague, Bratislava, and Budapest. At each site, ex-ante and ex-post measurements were performed using a variety of indicators to assess both tangible impacts, such as changes in traffic patterns and air quality, and intangible impacts, such as perceptions of safety and public space quality. The evaluation also included a thorough analysis of the implementation process to identify factors contributing to success or hindrance.

Findings from these methodologies have informed a set of key lessons learned. Strategic timing emerged as a critical factor, with early election terms identified as optimal for implementing potentially controversial policies, such as reducing parking spaces. Combining incentives and restrictions was shown to be effective in overcoming public resistance. Small-scale interventions demonstrated measurable local benefits but

highlighted the need for integration into broader, city-wide strategies to achieve larger impacts. The importance of quality control in execution was underscored, as implementation errors can undermine public support. Additionally, fostering inclusive public debate was essential to ensure that supportive but quieter user groups were represented, balancing opposition from vocal detractors.

Local advocacy groups played a pivotal role in sustaining momentum for urban transformation projects, but long-term success ultimately depended on strong political support. By leveraging these insights, CEAML aims to establish a sustainable framework for transforming urban transport systems in the Visegrad region, contributing to decarbonization while enhancing liveability and resilience in cities.

Contents

Executive Summary 5

A Introduction of the measures 8

- A.1 The CEAML project 8
- A.2 Objectives of the evaluation 8
- A.3 Pilot selection 9
- A.4 Measures 11
  - A.4.1 Bratislava 11
  - A.4.2 Budapest 16
  - A.4.3 Prague 17

B Evaluation framework 21

- B.1 Basics of the evaluation framework 21
  - B.1.1 The CIVITAS Evaluation Framework 21
  - B.1.2 The CEAML Evaluation Approach 22
- B.2 Used methodologies and indicators 22

C Evaluation findings 25

- C.1 Tangible impacts 25
  - C.1.1 Volume and speed of motorized traffic 25
  - C.1.2 Behavioural shift with soft cycle lanes 28
  - C.1.3 Modal shift and active mobility 29
- C.2 Intangible impacts 30
  - C.2.1 Perceived safety 30
  - C.2.2 Quality of public space 33
  - C.2.3 Noise perception 35
- C.3 Process evaluation findings 36

D Lessons learnt 39

- D.1 Recommendations: measure replication 39
- D.2 Recommendations: process 40

Annex 42

A Introduction of the measures

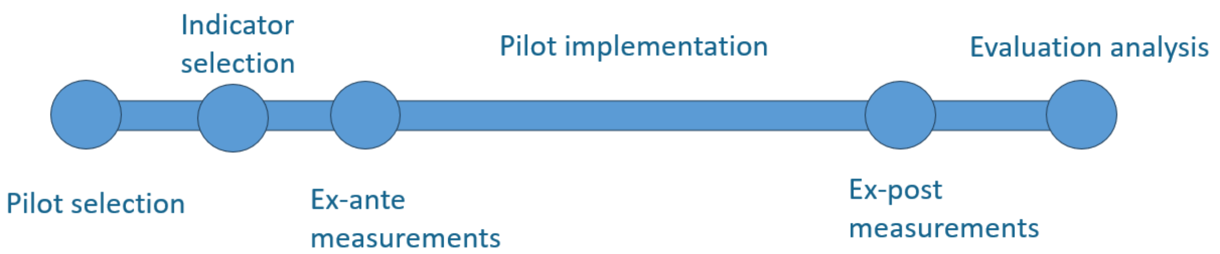
A.1 The CEAML project

The *Central European Active Mobility Lab (CEAML)* project addressed the challenge of promoting sustainable mobility by facilitating strategic alterations in public spaces across selected partner municipalities in the Czech Republic (in Prague), Hungary (in Budapest), and Slovakia (in Bratislava). The initiative focused on measuring the impact of the measures that favour sustainable transportation modes, with the goal of generating insights to inform policy advocacy and capacity-building efforts.

Pilot studies were conducted to evaluate the impact of various public space alterations. These alterations included the reallocation of public space, creation of new crossing, or the construction of a pedestrian-cyclist bridge.

The timeline of the project was structured around two key evaluation periods. The ex-ante surveys were conducted between May and June 2023, providing a baseline for understanding the initial conditions before the interventions. The ex-post surveys and evaluation took place in May and June 2024, assessing the impacts of the implemented measures compared to the baseline.

Figure 1. Project timeline



A.2 Objectives of the evaluation

The impact evaluation process was designed with several specific objectives in mind:

1. Measuring and quantifying impacts: The evaluation aimed to measure and quantify the impacts of the implemented mobility measures based on specific indicators. These indicators were

carefully chosen to reflect the social, technical, economic, and other relevant impacts that the interventions might have on the urban environment.

2. Clarifying external influences: A further objective was to analyse and clarify which other activities, movements, or initiatives might influence the evaluation process. It was essential to distinguish between changes directly resulting from the mobility interventions and those stemming from other sources, ensuring that the evaluation accurately reflected the true impact of the project's interventions.
3. Identifying connections between impacts: The evaluation also aimed to identify the connections between various observed effects. Understanding these connections was crucial for developing an accurate and helpful assessment of the impacts, which could then serve as a foundation for informed policy advocacy and future capacity-building efforts.

Throughout the project, close cooperation with partner municipalities and relevant stakeholders was crucial in navigating challenges, including the need to replace the Budapest pilot. Despite this adjustment, the strong relationships established with municipalities and responsible partners allowed for a smooth transition and ensured that the selected alterations were effectively implemented and evaluated.

The impact of these measures was evaluated through ex-ante and ex-post surveys, with the findings compiled in this Evaluation and Lessons Learnt Report. These results also informed subsequent phases of the project, particularly in the areas of policy advocacy (Work Package II) and capacity building (Work Package IV).

A.3 Pilot selection

When selecting pilot interventions for this project, five key principles guided the decision-making process to ensure the effectiveness, relevance, and future applicability of the measures. These principles were:

1. High potential of the measure at the neighbourhood/city level

The chosen interventions were required to significantly alter the status quo of local mobility at either the neighbourhood or city level. This meant targeting areas with high pedestrian traffic, such as -for example- those near educational institutions, where the impact would be most noticeable. By focusing on such high-potential areas, the interventions would produce measurable results, providing a strong foundation for impactful communication and further advocacy. On the other hand, when interpreting the results, it must be considered that they refer to such areas and should not be considered general.

2. Comparability between pilots

To ensure that the results from different pilot sites could be meaningfully compared, a consistent methodology was applied across all locations. Factors such as relevance, potential impact, and time frame were critical to achieving comparability. Additionally, the unique social, economic, and environmental dynamics of each neighbourhood were considered to clarify the goals of each measure and select appropriate impact indicators. Ensuring the availability of relevant data was also essential, as the pilots needed to be conducted in spaces that were representative rather than highly specific to one city's unique characteristics.

3. Transferability of the measures to other cities

One of the project's aims was to ensure that the measures could be adapted and implemented in other cities, regardless of the country or specific urban context. Therefore, while the interventions needed to have a significant impact locally, they also had to be generalizable enough to be applicable elsewhere. This required finding a balance between the high potential of the measure to influence the status quo and its ability to be replicated in different environments.

4. Cooperation by the municipality

Successful implementation of the interventions relied heavily on cooperation with local municipalities, which, although not official members of the consortium, some had expressed their support during the application phase. Smooth collaboration with these partners was anticipated, with expectations of good communication, data sharing, and reliable partnerships. The involvement and support of local actors were crucial to the successful realization of the interventions.

5. Time frame

The selected interventions were required to be implemented between July 2023 and March 2024. This time frame was critical to aligning with the project's overall schedule and ensuring that all stakeholders had a common understanding and approval of the measures. Local consortium partners were expected to clearly communicate any risks or potential delays in implementation to ensure that all consortium members were informed and could address any challenges promptly.

These principles were foundational in guiding the selection of pilot interventions, ensuring that each chosen measure was not only impactful within its specific context but also comparable across different sites and transferable to other cities in the future.

It is important to note that during the selection process it became clear that the pool of potential pilot measures available does not allow to meet all principles at the same level. Therefore, based on the decision of the consortium, the four other principles were prioritised over comparability, i.e. high-potential and transferable measures from cooperative municipalities to be implemented in the given time window were selected, although they are different in nature and therefore the comparability of their impacts is limited.

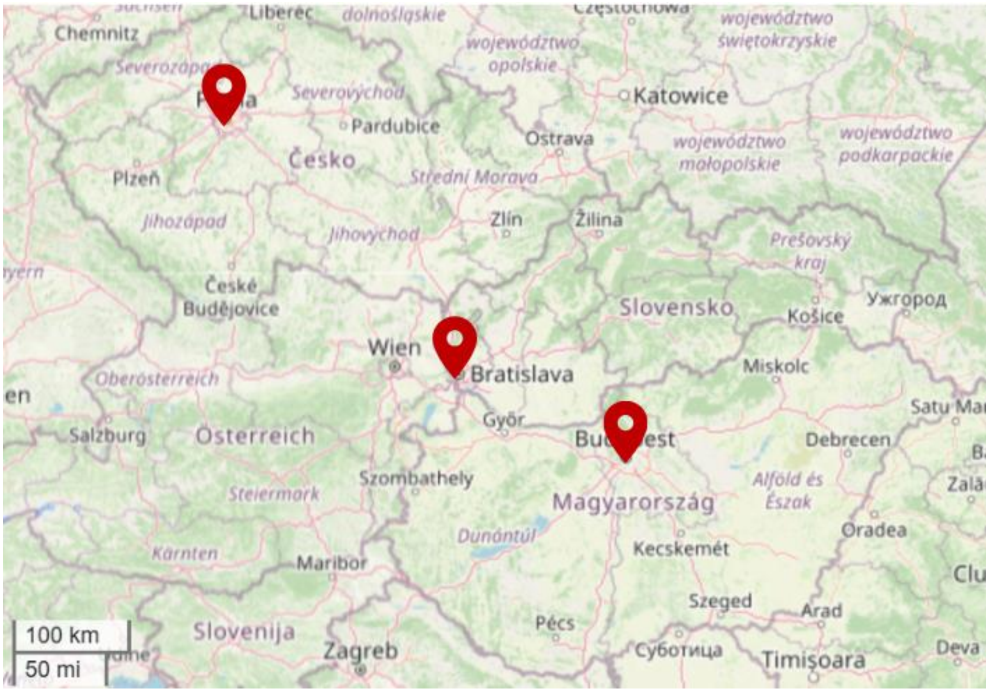


Figure 2. Overview of pilot sites

A.4 Measures

A.4.1 Bratislava

The pilot site is situated in one of the peripheral neighbourhoods of Bratislava called Lamač, where a construction of housing estate Podháj started in 1974. The works included also reconstruction of road infrastructure, including the main street of the same name, in line with the modernism urban planning and traffic planning of 70's in Czechoslovakia, with its typical elements such as wide street profiles, infrastructure designed with focus on motorised traffic and generous road widths.

When it comes to the traffic infrastructure, the street remained with no significant changes until recent years. In 2018, the City of Bratislava announced reconstruction of the street in terms of renovating the asphalt surface of the road. According to Cyklokoalícia, the level of traffic safety was unsatisfactory that time, and the design of the street was over-dimensioned in favour of motorised traffic in context of the purpose of the street. Undesirable and potentially dangerous behaviour of both drivers and pedestrians were frequent, documented in a video back in 2018.[1]

Figure 3. Crossing of Podháj street with Studenohorská and Podlesná street

To improve the situation and use the full potential of road reconstruction, Cyklokoalícia prepared the project for a redesign of the street (using traffic marking, without a need for building works),[2] including some of the best practice elements, such as road diet, creation of safe cycle lanes and shortening of zebra crossings. The project was rejected by the municipality and different project was implemented instead, without

[1] Premávka pred školou na Podháji (Lamač, Bratislava). Cyklokoalícia, 29.06.2018. https://www.youtube.com/watch?v=n38_-R6XhYw

[2] Návrh cyklotrasy na ulici Podháj. Cyklokoalícia, 06.08.2018. https://cyklokoalicia.sk/2018/08/navrh-cyklotrasy-na-ulici-podhaj/

traffic calming measures and with dangerous, narrow cycle lanes in “door zone”.

In 2021, the municipality (led by the new mayor) decided to revive the project from Cyklokoalícia and updated several elements to current needs, as well as all road marking according to the new Slovak Traffic signs law, adopted in 2020. In addition, the municipality have chosen Malokarpatské námestie Elementary School, adjacent to Podháj street, to be a part of the Streets for Kids project, focused on improving safety in the school surroundings, which came in the synergy with CEAML project.

Figure 4. Intersection Podháj x Podlesná x Studenohorská in September 2023 and August 2024 (Source: Google Maps)

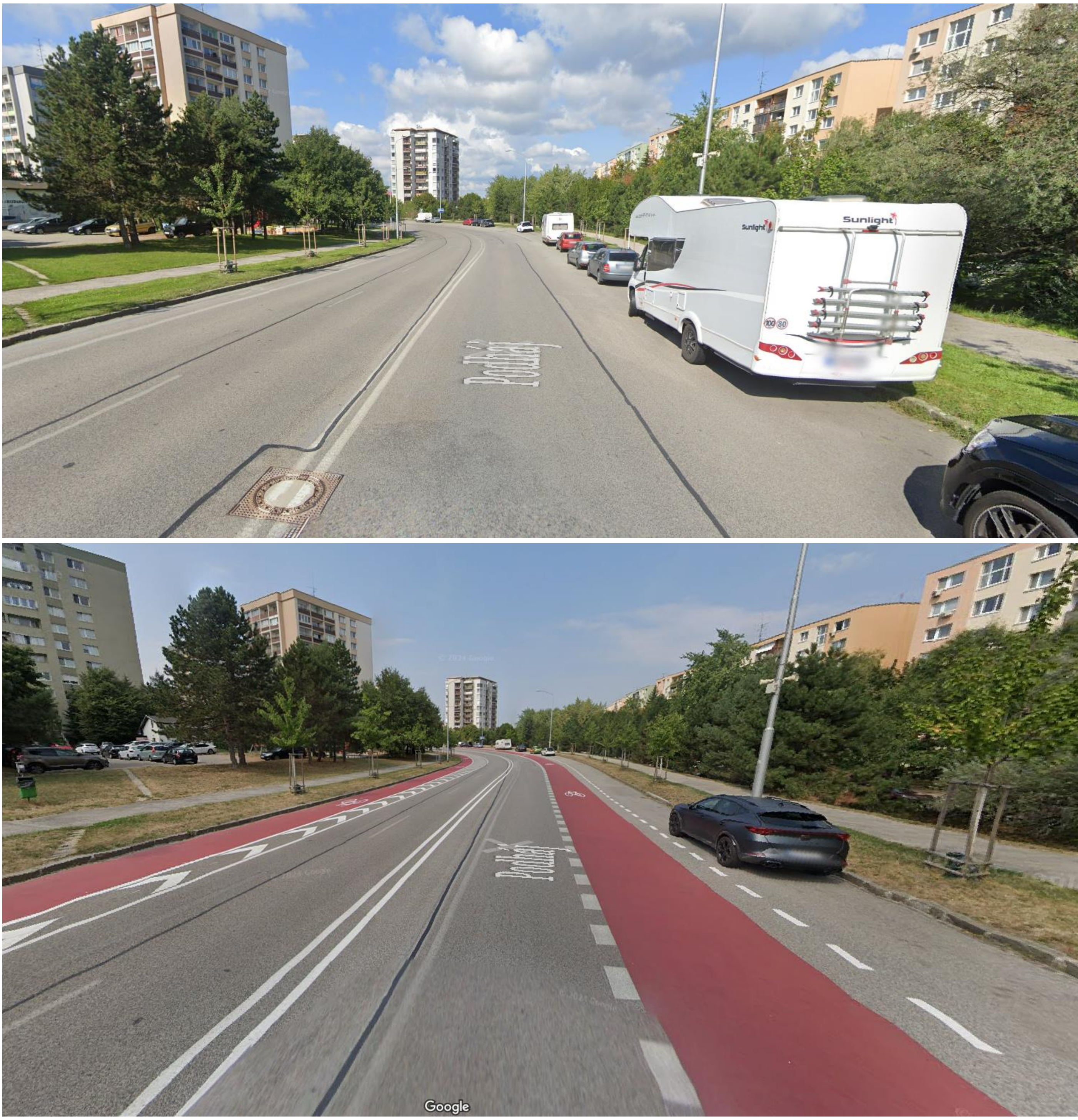


Figure 5. Road section at western part of Podháj street in September 2023 and August 2024 (Source: Google Maps)

A.4.2 Budapest

In the framework of the CEAML project, the project partnership would have followed the transformation of Trefort Street into a School Street in the Józsefváros district of Budapest, with ex ante and ex post investigations on site. However, while the ex-ante surveys were conducted, at a later stage it became clear that the public space transformation was not to be completed on schedule, so the partnership had to look for another site.

Taking into account the time constraints of the project (it was not possible any more to conduct ex-ante and ex-post surveys of a measure implementation), the choice was made to measure the impact of a transformation by comparing the already transformed Déri Miksa Street and the not yet transformed Német Street. Of the two streets in the same neighbourhood, while a section of Déri Miksa Street is completely closed to traffic, Német Street has a higher volume of traffic and a significant number of target users due to the elementary school located there.

Figure 6. View of the Déri Miksa Street

Figure 7. View of the Német Street

A.4.3 Prague

In Prague, two significant interventions were evaluated as part of the project, each addressing different aspects of sustainable urban mobility: the Štvanice footbridge and the Černokostelecká Bike Lane. Both interventions were designed to enhance the safety and accessibility of non-motorized transport modes, specifically for pedestrians and cyclists.

1. *Štvanice footbridge*

The Štvanice footbridge, connecting two dense urban areas separated by the Vltava River, has been in planning for over 20 years before its completion. Prior to the bridge's existence, pedestrians and cyclists had limited options for crossing the river, all of which involved significant detours using either one of two other bridges, a ferry, or the subway. These options were often inconvenient and time-consuming.

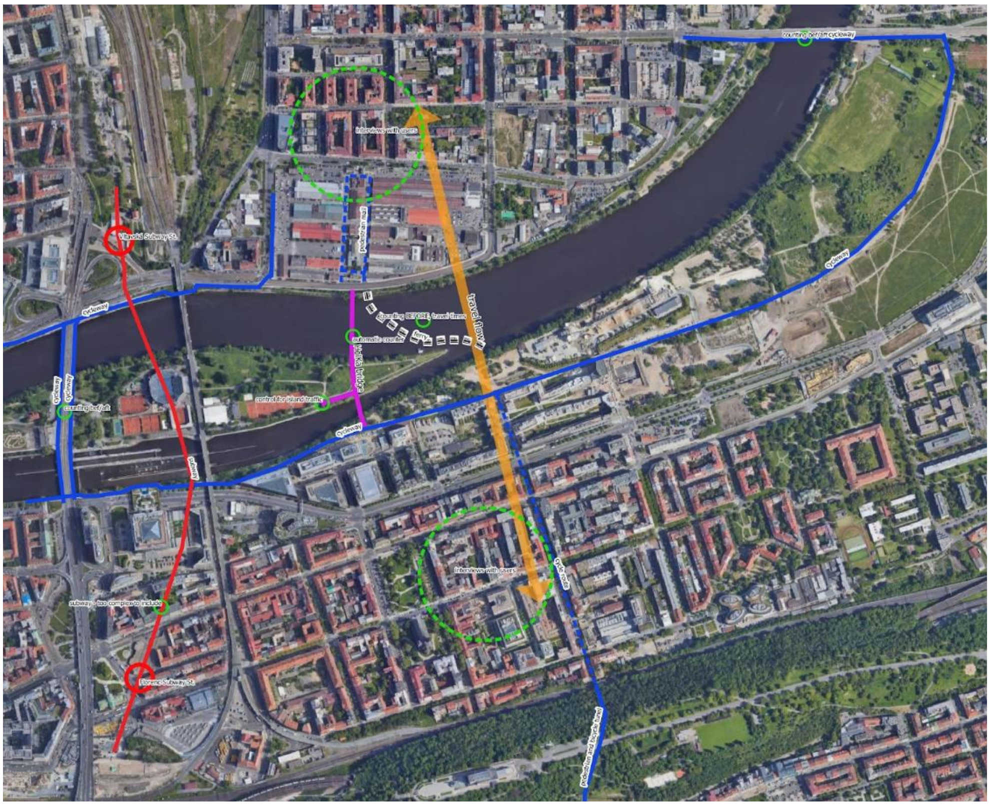


Figure 8. Visualization of Štvanice footbridge and alternative routes for pedestrians

The Štvanice footbridge now provides a direct connection between these areas, with a crucial feature being the complete separation from motor traffic, as vehicles are not permitted on the bridge. This design ensures a safe and efficient route for pedestrians and cyclists, significantly improving the ease of travel across the river and encouraging more sustainable transportation choices in the city.

Figure 9. Štvanice footbridge (Source: Petr Vodička, Wikipedia)

Figure 10. View of the Német Street

2. Černokostelecká Bike Lane

The second pilot intervention focused on the Černokostelecká Street, a radial urban collector road that features a two-way tramline in the middle, flanked by a single motor vehicle lane and a parking lane on each side. Before the intervention, cycling was accommodated by sharrows—shared lane markings—positioned between the parking and motor vehicle lanes. However, this measure provided minimal safety benefits, both objectively and subjectively, for cyclists.

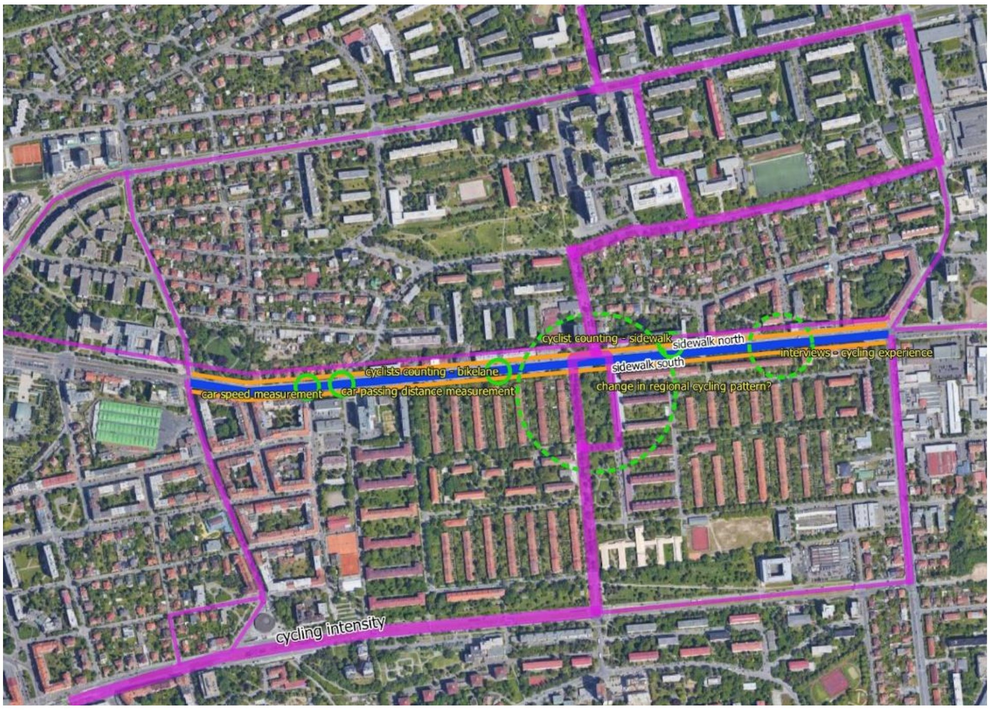


Figure 11. Visualization of Černokostelecká Bike Lane

As part of Prague's broader programme to enhance cycling infrastructure across the city, the sharrows on Černokostelecká Street were replaced with dedicated bike lanes. This change is part of an ongoing effort to improve cyclist safety on all urban collector roads. By introducing bike lanes, the intervention aimed to provide a safer, more defined space for cyclists, thereby encouraging more people to choose cycling as a mode of transport and reducing conflicts between cyclists and motor vehicles.

B Evaluation framework

B.1 Basics of the evaluation framework

The *Evaluation framework* outlines the comprehensive approach to evaluating the interventions implemented in this project, including the formulation of research questions and the selection of appropriate methodologies. This plan draws heavily on established frameworks and best practices, particularly the *CIVITAS Evaluation Framework*, as developed by the CIVITAS SATELLITE project. It also integrates insights from the EU's SUMI indicator set (European Commission, 2022) and previous experiences from the SUNRISE[3] project, which focused on evaluating neighbourhood-level mobility measures.

B.1.1 The CIVITAS Evaluation Framework

The *CIVITAS Evaluation Framework*,[4] published in 2020, serves as the foundational guide for our evaluation approach. This framework is built on the extensive experience of evaluating public space and mobility-related interventions across Europe. Its primary objective is to provide a robust tool that demonstrates the effectiveness of various interventions, making their impacts quantifiable and understandable. By linking specific measures to their outcomes, the framework aids decision-makers in assessing the efficiency and impact of different mobility strategies.

The framework's credibility is underpinned by contributions from 80 demonstration cities or sites across Europe, which provided data on implemented and evaluated projects. Additionally, over 150 cities involved in Research and Innovation Action (RIA) projects contributed insights that informed the development of the framework. The interventions evaluated under this framework encompass a wide range of mobility solutions, including new infrastructure, services, organizational strategies for commuting, and activities aimed at raising awareness or changing public attitudes and behaviours.

---

[3] Source: https://civitas-sunrise.eu/

[4] Source: https://civitas.eu/sites/default/files/satellite_d2.3_refined_evaluation_framework-final_version_2017-08-31.pdf

B.1.2 The CEAML Evaluation Approach

Our project’s evaluation approach, known as the CEAML evaluation approach, is based on Chapter 2.1.5 of the CIVITAS Evaluation Framework. The primary goal of this approach is to provide decision-makers with evidence-based insights into the expected impacts of mobility measures implemented in public spaces. The focus is on offering transparent, data-driven proof of the positive outcomes that these measures can generate.

The CEAML evaluation approach not only aligns with the CIVITAS framework but also allows for more in-depth analyses, such as social impact assessments, replicability studies, and considerations for upscaling the interventions. These extended analyses are designed to enhance the overall understanding of the interventions' broader implications and potential for wider application.

However, the approach recognizes certain limitations. Specifically, it does not extend to long-term follow-up beyond the project's timeframe. Consequently, the focus remains on assessing impacts that are measurable within a relatively short-term period, during the duration of the project. This ensures that while the evaluation is thorough, it remains feasible within the given constraints.

B.2 Used methodologies and indicators

To ensure consistency and comparability, the surveys were conducted during the same period each year (May-June), using the same methodology. This approach enables a reliable comparison of results across different time points, ensuring that observed changes reflect real shifts in the variables of interest rather than differences in data collection methods.

Additionally, local partners were provided with a standardized reporting template, which ensured uniformity in data collection and reporting across all locations. The evaluations for each site, based on this template, can be found in the annex.

No.	Impact	Indicator	Data used	Pilot
1	Higher traffic safety	Percentage of speeding vehicles	Own measurements with the speed gun	Bratislava
2	Higher traffic safety	Average speed of motor vehicles	Own measurements with the speed gun	Bratislava
3	Higher traffic safety	Number of transport accidents	Data from the Police	Bratislava
4	Higher traffic safety	Number of people killed and seriously injured (KSI) caused by transport accidents	Data from the Police	Bratislava
5	Higher traffic safety	Perceived safety - pedestrians	Own on-street survey	Bratislava
6	Higher traffic safety	Perceived safety – parents of schoolchildren	Survey by MIB	Bratislava
7	Higher share of pedestrians using the street, Higher share of cyclists using the street	Number of pedestrians	On-street traffic count	Bratislava
8	Higher share of pedestrians using the street, Higher share of cyclists using the street	Number of cyclists	On-street traffic count	Bratislava
9	Higher share of pedestrians using the street, Higher share of cyclists using the street	Number of cars	On-street traffic count	Bratislava
10	Higher share of cyclists and pedestrians among schoolchildren	School commuting modal share	Survey by MIB	Bratislava
11	Higher traffic safety (cyclists)	Percentage of woman cycling	On-street traffic count	Bratislava
13	Higher traffic safety (cyclists)	Number of cyclists carrying a child	On-street traffic count	Bratislava
14	Other impacts	Noise perception	Own on-street survey	Bratislava
15	Other impacts	Arrogance of space	Arrogance of space mapping	Bratislava
16	Other impacts	Frequency of traffic law violations by cyclists and pedestrians	On-street observations	Bratislava
17	Perceived comfort and safety	sensored observations (sight, smells, noises etc.)	Field survey, Researcher observation	Budapest
18	Perceived comfort and safety	structure of the space	Field survey, Researcher observation	Budapest
19	Perceived comfort and safety	human activities	Field survey, Researcher observation	Budapest
20	Perceived comfort and safety	characteristics of passengers	Field survey, Researcher observation	Budapest
21	Perceived comfort and safety	characteristics of traffic	Field survey, Researcher observation	Budapest

No.	Impact	Indicator	Data used	Pilot
22	Perceived comfort and safety	Healthy Street Evaluation	Field survey, Researcher observation	Budapest
23	Traffic volume	Vehicle, bicycle and pedestrian traffic	Traffic counting	Budapest
24	Traffic volume	Vehicle speed	Traffic counting	Budapest
25	Noise pollution	Noise level	accredited noise measurements	Budapest
26	Creating a new, attractive path for pedestrians and cyclists	Counting pedestrians and cyclists	two adjacent bridges with combined traffic ferry new bridge	Prague a)
27	Reducing travel times	Travel times	Measuring and modelling travel times for typical trips utilizing the bridge.	Prague a)
28	Traffic calming	Car Speed	own speed measurement	Prague b)
29	Cycling Safety	Cyclist counting	cyclist counting on the road (bike lane) cyclist counting on the sidewalk	Prague b)
30	Perceived safety	Interviews	interviews with pre-selected users regularly travelling on this Street (Bike to Work Challenge participants addressed by specific survey in April/May 2023, contacts utilised later on in 2024)	Prague b)
31	Perceived safety	Quantitative Survey	Quantitative survey (1300 participants, data collected) among cyclists in Prague, evaluation safety perception of different cycling measures	Prague b)

C Evaluation findings

This section provides an overarching summary of conclusions drawn from analysing the results across all three pilots. It does not aim to detail the specific results of each pilot or track shifts in indicators based on ex-ante and ex-post measurements: individual outcomes and detailed metrics are available in the Annex for further consultation.

In our analysis comparability was among our principles, however, it was not fully realized in the context of the pilots. We made efforts to compare the different pilots, taking into account the available data and methodologies. Based on the analysis, we identified specific aspects (e.g., traffic volume and speed reduction, noise pollution) that are worth highlighting to better understand the pilots' impacts and their potential for future applications. To provide a more structured assessment, we categorized the impacts into three distinct groups: tangible impacts, intangible impacts, and process evaluation.

- Tangible impacts include measurable outcomes such as changes in traffic patterns, reductions in noise levels, and improvements in air quality. These are direct, observable effects of the interventions.
- Intangible impacts refer to more subjective effects, such as increased perceived safety, comfort in public spaces.
- Process evaluation focuses on the implementation process itself, assessing how effectively the interventions were carried out, the challenges faced, and the lessons learned during the execution of the pilots.

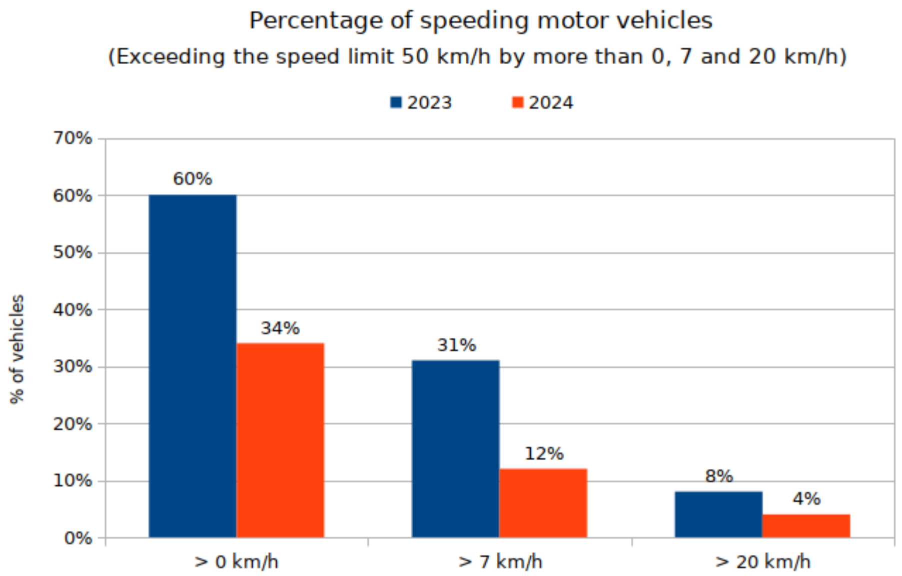
C.1 Tangible impacts

C.1.1 Volume and speed of motorized traffic

Bratislava

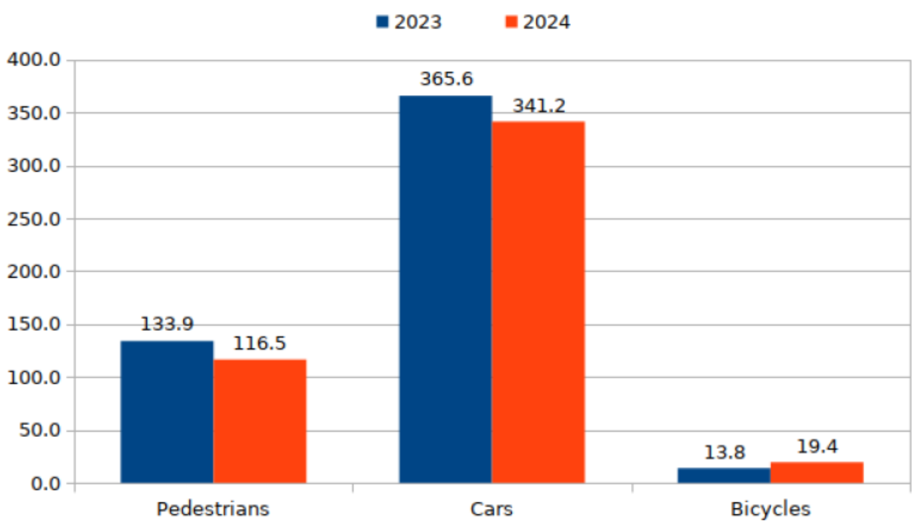
The measures aimed to increase traffic safety by reducing vehicle speed. Speed reduction was confirmed by the surveys, with both average and median speeds decreasing by around 4 km/h. The percentage of speeding vehicles decreased significantly, from 60% to 34% (see Figure 12 for details).

Figure 12. Percentage of speeding motor vehicles in Bratislava, Podháj street



This drop likely contributes to a safer environment for all road users, aligning with the objective to promote active modes of transport like walking and cycling. More details about perceived safety are in chapter C2.1.

Figure 13. Traffic volumes during the week



Budapest

In Budapest, traffic-calmed areas saw vehicle speeds drop below 10 km/h, mainly due to camera placement and the highlighting of intersections, reinforcing safety in critical areas. It also needs to be mentioned that in Német street the average speed does not reach the speed limit either.

Prague

While the opening of the Štvanice footbridge did not affect the volume of speed of motorised traffic, it diverted pedestrian and cycling traffic away from bridges with high level of motorised traffic, reducing exposure. The footbridge's heavy usage shows the effectiveness of designated spaces for active transport in reducing conflicts with motorized traffic. More details are mentioned in chapter C1.3.

Bicycle, scooter and personal electric vehicle (PEV) traffic was measured on the street. There were no changes in absolute numbers for any of these vehicles. The relative change indicator is affected by the low number of measured passes.

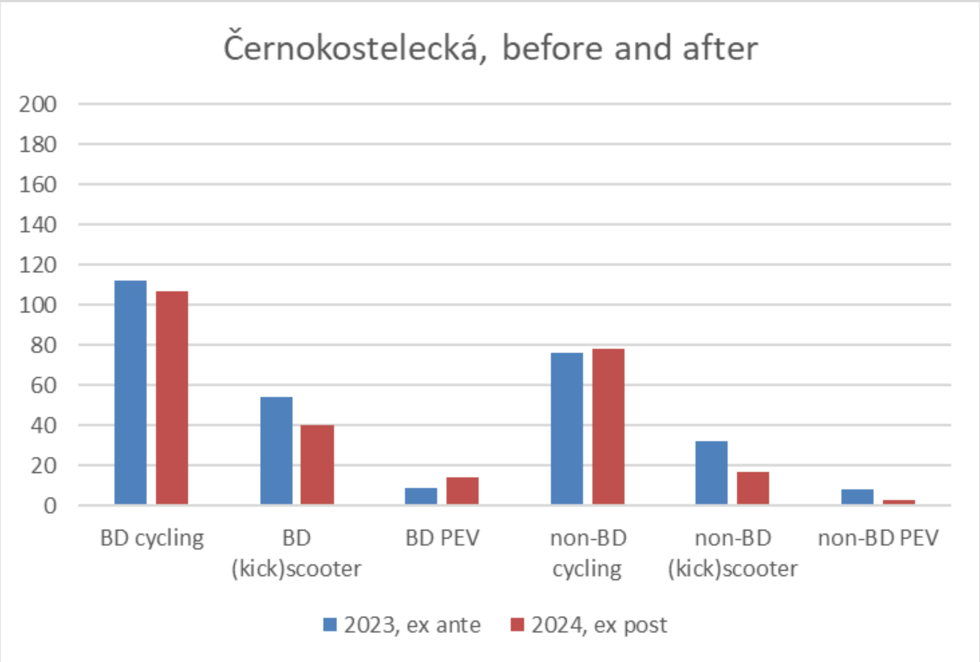


Figure 14. Černokostelecká before and after

In Bratislava and Budapest impacts were measured on public space redesign, while in Prague in the newly built bridge and the soft bike lane was under the analysis. All three approaches demonstrate improvement in increased safety, either by reducing speed or redistributing traffic to avoid motor-vehicle conflicts.

Key findings:

- **Street redesign with light solutions (road diet) in Bratislava reduced the percentage of speeding cars from 60% to 34%**
- **New cycle and pedestrian bridge in Prague induced 2600 more pedestrian trips on weekdays, showing the need for short and traffic-free pedestrian connections**

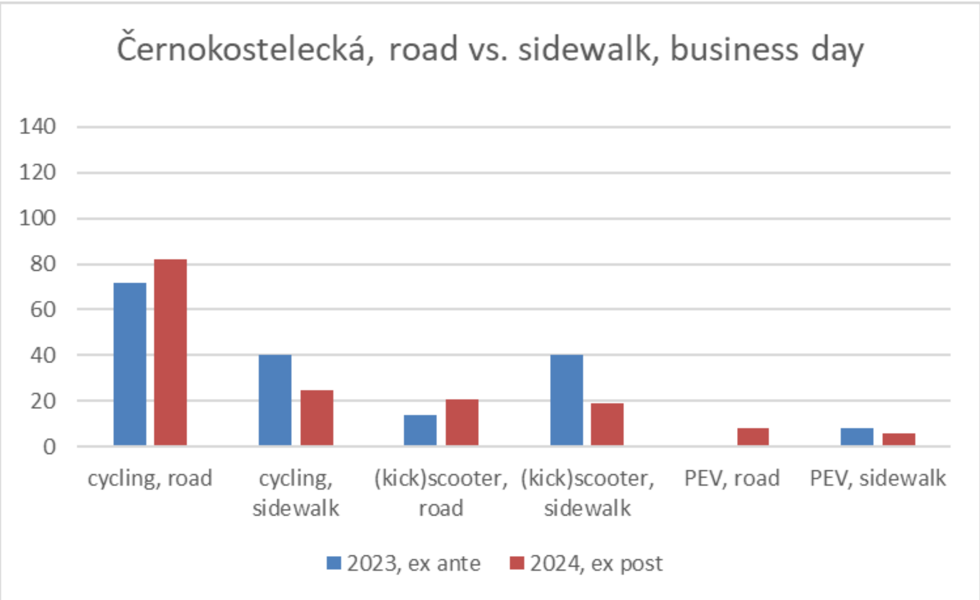
- **New cycle and pedestrian bridge in Prague induced 1000 more cycling trips on weekdays, showing the need for short and traffic-free cycling connections**

C.1.2 Behavioural shift with soft cycle lanes

Prague

The introduction of a soft cycle lane on Černokostelecká Street resulted in a minor improvement in cyclists' perceived safety but did not significantly attract new cyclists (see above in C.1.1.). However, the cycle lane did encourage some existing cyclists and users of scooters or personal electric vehicles (PEVs) to shift from sidewalks to the roadway. While it hasn't led to an overall increase in cycling trips, it has resulted less conflict between cyclists and pedestrians on the sidewalks. On weekdays, the data showed a 28% increase in traffic on the roadway, coupled with a 43% decrease in traffic on the sidewalk. On non-working days, the results indicated a 27% decrease in sidewalk traffic, but no change in roadway traffic. These findings suggest that while the soft cycle lane may attract more cyclists, it did contribute to a safer pattern, reducing the number of cyclists on the sidewalk.

Figure 15. The infrastructure helps avoiding conflicts on sidewalk



Key findings:

- **Cycling mode share changes: To evaluate the overall effect of the soft cycle lane on the transfer of traffic from the sidewalk to the roadway, all**

measured modes were combined. On weekdays, there was a 28% increase in traffic in the roadway and a 43% decrease in traffic on the sidewalk. On non-working days, a 27% decrease in traffic on the sidewalk and no change in traffic in the roadway were measured.

- **Safety Benefits: The redistribution of cyclists and PEV users away from sidewalks mitigates potential pedestrian-cyclist conflicts, an important step in urban safety and walkability.**
- **Encouragement of Micro-mobility: While the lane hasn't drawn new users to cycling, it supports the growing adoption of PEVs, aligning with trends in sustainable urban transportation.**
- **Usage Trends: The difference between weekday and non-working day data suggests that the soft lane is more effective in shifting commuter traffic than recreational users.**
- **Limitations in Attracting New Cyclists: The absence of new cyclists points to possible barriers, such as connectivity, infrastructure quality, or perceptions of safety beyond minor improvements. Addressing these could amplify the benefits.**

C.1.3 Modal shift and active mobility

Bratislava

The reduction in speed potentially made streets more attractive for pedestrians and cyclists, indirectly promoting a modal shift toward active transport. However, no direct data on increased pedestrian or cycling traffic was measured (see data above in C.1.1). Follow-up analysis should be done to explore longer-term results on this.

Budapest

The comparison between the two streets didn't show modal shift.

Prague

The introduction of the footbridge resulted in a clear increase in pedestrian and cyclist numbers, with induced trips significantly boosting active mobility. After the opening of the footbridge, bicycle traffic increased by 47% from 2000 to 3000 passes per business day. Pedestrian traffic increased even more significantly by 82% from 3200 pedestrians to 5800 pedestrians per business day. The footbridge itself accounts for 1500 cyclists and 4000 per business day. (For 2023, the Hlávek bridge, Libeň bridge and ferry are summed, for 2024 the Hlávek bridge, Libeň bridge and Štvanice footbridge are summed.)

During the non-business day, pedestrian traffic increases further by 96%, with over 4,000 pedestrians using the footbridge alone in both directions. Cycle traffic is up 34% overall on non-business day compared to the previous period, with 900 people using the footbridge on this day. The data shows an increase in the use of scooters and strollers. For strollers, traffic is up by more than 80% on both business and non-business days, with most stroller traffic taking place on the Štvanice footbridge.

The soft cycle lane did not appear to be attractive enough to engage a significant increase in the number of cyclists. However, to assess the overall impact of the soft cycle lane on the redistribution of traffic from the sidewalk to the roadway, all measured modes of transport were combined.

While Bratislava and Budapest saw potential improvements in safety and environmental quality, Prague's new infrastructure had a more pronounced effect on encouraging active transport, indicating that dedicated facilities may be more effective in actively promoting modal shifts. The new footbridge demonstrates how dedicated pedestrian and cyclist infrastructure can drive a substantial increase in active transport. Purpose-built pathways attract users by offering safe, attractive alternatives, thus supporting broader goals for sustainable urban mobility.

Key findings:

- **New cycle and pedestrian bridge in Prague induced 4000 pedestrian trips, showing the need for short and traffic-free pedestrian connections**
- **New cycle and pedestrian bridge in Prague induced 900 cycling trips, showing the need for short and traffic-free cycling connections**
- **Replacing sharrows with soft cycle lane in Prague did not have a measurable impact on bicycle traffic levels**

C.2 Intangible impacts

C.2.1 Perceived safety

Bratislava

In Bratislava, the introduction of new pedestrian infrastructure near the Malokarpatské nám. Elementary School significantly enhanced parents' and children's perceptions of safety. Redesigned crossing points with staggered islands provide children with a clear, controlled path across busy roads, allowing them to travel independently without parental supervision. This improvement in perceived safety has impacted daily routines, enabling parents to feel confident about letting their children walk to school alone, highlighting how targeted interventions can foster community trust in local infrastructure and improve pedestrian autonomy.

One of the parents described the impact of the measure on their child's commute in the online survey as follows:

"Before the changes, I walked my son to school every morning because the traffic was unbearable. After the changes, my son started going to school on his own in the morning. The situation on the road is clearer. You can cross in "stages" - cross one lane, hide behind the island, then cross the other lane safely."

Answers of the parents of schoolchildren attending Malokarpatské nám. Elementary School shows improvement in perceived pedestrian and cyclists' safety is visible in Figure 16. More than 80% of parents agree that after the intervention increased pedestrian safety. At the same time almost 80% of parents think likely regarding bicycle traffic safety.

Figure 16. Online survey among parents

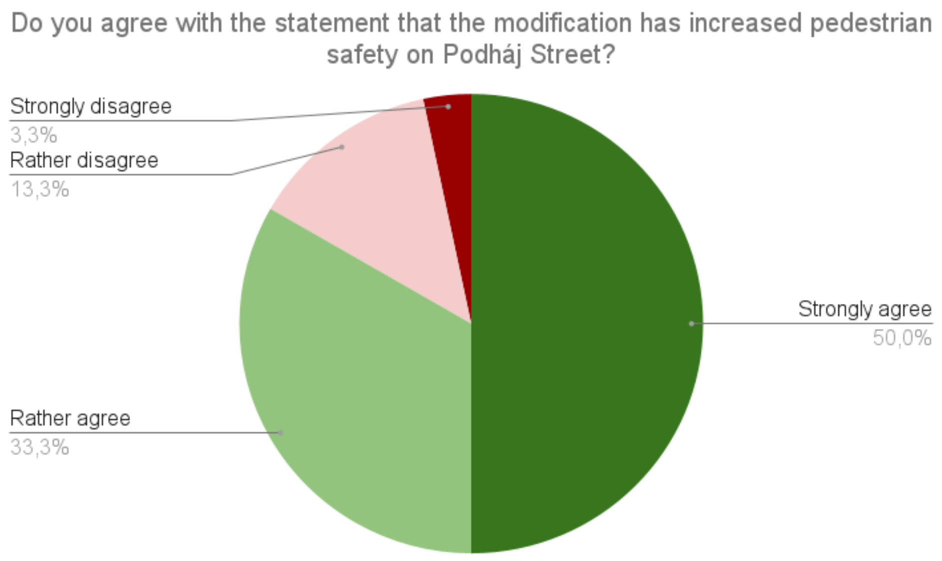
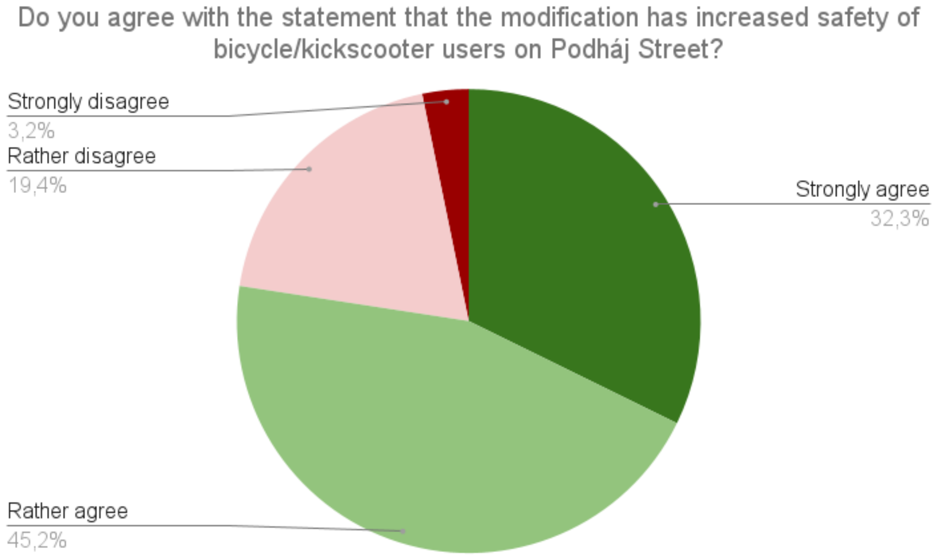


Figure 17. Online survey among parents



Prague

In Prague, the installation of a soft cycle lane on Černokostelecká Street led to a slight improvement in perceived safety among cyclists, with safety ratings rising from 3.9 to 5.2 on a ten-point scale. Despite this increase, the soft cycle lane lacked the physical separation necessary to attract new users or make a substantial impact on cyclists' sense of security. Most cyclists continued using the sidewalk rather than the designated lane, indicating that without full protection from vehicle traffic, perceived safety improvements are limited. This case suggests that for cycling infrastructure to shift behaviour and perception meaningfully, a more robust, protective design is essential.

Figure 18. Černokostelecká Street before the intervention

Figure 19. Černokostelecká Street after the implementation

The objective impact of local interventions on traffic safety is difficult to measure, as the number of accidents in such small areas remains low even over extended periods, making it statistically unreliable to draw definitive conclusions. However, a significant local effect can be observed on road users' subjective sense of safety.

Key findings:

- **Street redesign with light solutions (road diet, safe cycle lanes and shorter zebra crossings) in Bratislava resulted in higher perceived safety for pedestrians and cyclists according to 83% and 78% of school parents respectively**
- **Replacing sharrows with soft cycle lane in Prague increased perceived safety 3.9 to 5.2 on a ten-point scale – a significant increase but still showing the need for more protective design**

C.2.2 Quality of public space

Budapest

Budapest's Déri Miksa Street saw a marked improvement in its ambiance and social dynamics following traffic calming measures and renovations. This well-maintained, greened space has attracted more people to linger, with many passersby stopping to admire the plants or take photos. However, the presence of individuals misusing public space and occasional cleanliness issues still influence perceptions of safety and comfort.

"The street is nicely renovated, it has a good atmosphere, but in the shady areas there are one or two homeless/drunk people, they are usually avoided by passers-by, but some people from the clinic approached them while smoking, they obviously knew them. The area is quiet, the air is clean. If there are better-off people sitting on the benches, more people use the benches."

"The square is well organised, it gives a good impression, there were people who stopped to look at the plants and take pictures, but it could be cleaned a bit better, especially around the surgery, the street is cleaned every morning at Rákóczi Square and a street cleaning machine went in front of the surgery, but it only cleaned half of the square.

People who came to the surgery also complained that the benches were dirty (they were not in a very bad condition, but after the rain they did look cleaner)."

The results of the Healthy Streets evaluation[5] indicate how the redesign of a street can influence comfort level among residents. The redesigned Déri Miksa Street scores three times more points than Német Street where no interventions were undertaken.

Table 1. Healthy Streets evaluation of Német street and Déri Miksa Street

		Német Street	Déri Miksa Street
1	Speed limit for motor vehicles	1,0	2,0
2	Motor vehicle traffic volume	3,0	3,0
3	Provision of cycle traffic at intersections	1,0	1,0
4	Pedestrian crossings at the entrances to parking areas and at the mouths of minor side streets connected to the route	0,3	3,0
5	Provision of pedestrian crossings between intersections	0,7	3,0
6	Provision of pedestrian crossings at intersections	0,3	3,0
7	Accessibility, equal opportunities	0,3	3,0
8	Quality of the pavement surface	1,0	3,0
9	Space requirements for pedestrian traffic	0,7	3,0
10	Quality of pavement	1,0	3,0
11	Space requirements for cycling	0,0	3,0
12	Public cycle storage facilities	0,0	2,0

[5] Source: https://www.healthystreets.com/

13	Seating	1,3	2,0
14	Street lighting	1,3	3,0
15	Trees	1,3	3,0
16	Green infrastructure	0,3	3,0
17	Drinking fountains	0,0	0,0
18	Storm water drainage, utilisation	0,7	2,0
	Summary	**14,3**	**45,0**

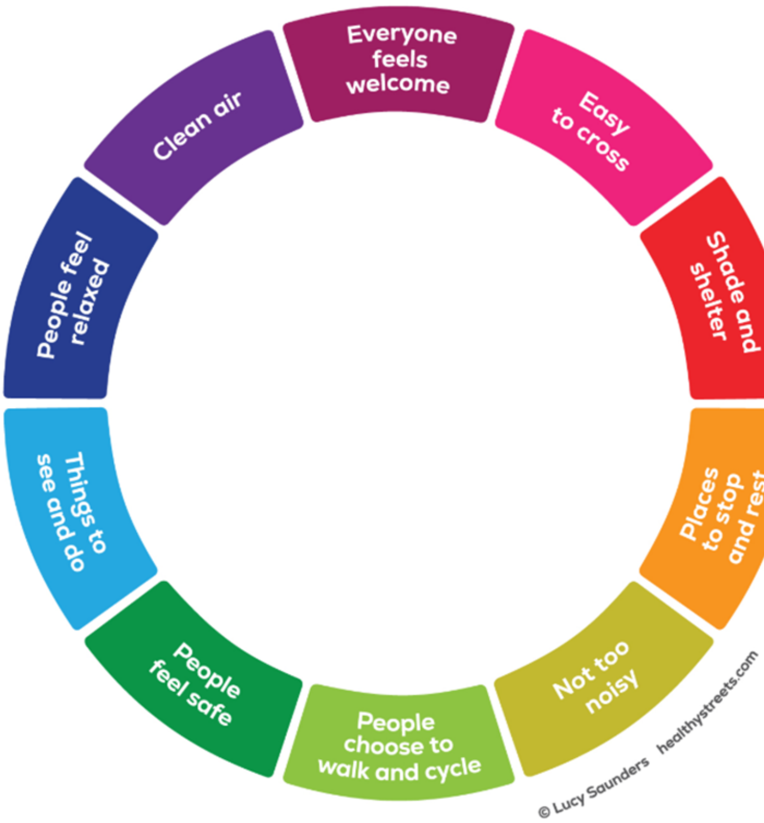


Figure 20. Healthy Streets Matrix used for visual representation of the street scores (www.healthystreets.com)

C.2.3 Noise perception

Bratislava

Despite a decrease in vehicle speed and traffic volumes following safety measures near the Malokarpatské nám. Elementary School, there was minimal change in the public's perception of noise. While technical data suggested a likely reduction in actual noise levels due to reduced traffic speed, the subjective perception among pedestrians in the area did not significantly shift. The results of the research also show that noise pollution is not among the mostly disturbing factors among residents.

Key findings:

- **Street redesign with light solutions (road diet) in Bratislava did not have a measurable impact on perceived noise level, despite of speed reduction**

C.3 Process evaluation findings

The process evaluation is based on the CIVITAS Evaluation Framework chapter 4.

Process evaluation includes evaluation of planning and implementation processes. The goal is to understand why an action succeeded or failed and to detect which activities contribute to and impede the process. Such aspect can come from information, communication and participation roles:

- How were the measures implemented?
- What obstacles and drivers have you observed in your implementation?
- How the support activities worked in the implementation of the measures? How could you avoid or mitigate the unwanted effects?

The outcome of CEAML project and the measure is influenced not only by its technical solutions, but also by optimizing its preparation and implementation processes, including accompanying activities. Process evaluation deals with the process of how the initial proposal for intervention is developed into a workable design, and how they are constructed or implemented.

Bratislava

The project in Bratislava faced multiple delays due to political and financial challenges:

- Timeline and delays: Project documentation was completed in 2022, but local elections at the end of that year led to political hesitation about implementing the changes, as they were seen as controversial. Financial difficulties further postponed the work to early 2024.

- Partial implementation: When the project finally began in May 2024, only part of the planned changes was executed, particularly in the busier western section of the street near the Podháj x Studenohorská x Podlesná crossing. Local leaders avoided measures that would reduce parking, opting instead to wait until a new parking regulation system (PAAS) could help secure parking for residents.
- Operational issues: Minor mistakes in the project's implementation, such as incorrect painting of cycle crossings and lack of temporary signage, caused safety issues and frustrated residents. For instance, one car collided with a yet-to-be-completed traffic island due to lack of signage.
- Public reception: The project sparked debate on social media and traditional media, with some drivers concerned about the safety and proliferation of traffic islands. However, the changes were positively received among pedestrians and parents, with 77% of survey respondents viewing the modifications favourably.

Budapest

Budapest's CEAML pilot encountered political and logistical challenges that impacted its implementation. A political decision delayed the transformation of Trefort Street to avoid potential controversy before local elections. A small group with controversial interests stopped the local government implementing the measure. This led the project team to seek alternative sites within Józsefváros after the elections to maintain project momentum.

Prague

In Prague, the project encountered various delays, affecting different aspects of implementation. The construction of the footbridge was delayed by six months due to challenges with the pillars in the Vltava River. Similarly, the cycle lane was only implemented four years after the first version of its technical drawings was completed. While such delays are generally undesirable, they also provided an opportunity to improve the design of the footbridge, allowing for its width to be expanded by an additional meter.

The presence of local advocacy groups is crucial in counterbalancing political decisions and sustaining momentum for urban transformation projects. These groups can help push forward ideas over the long term, maintaining public awareness and support even when political will fluctuates. However, achieving significant, lasting impact ultimately requires political endorsement. Only with political support can transformative interventions be implemented fully and effectively.

Key findings:

- **Local elections can lead to political hesitation, avoiding implementation of measures seen as controversial before the election**
- **Parking, especially that of local residents is a controversial issue and therefore politicians are usually not ready to reduce supply in favour of other uses of public space. Packaging "carrots" and "sticks" can be a way out of this dilemma.**
- **Financial difficulties can lead to the postponement or partial implementation of projects, but well-prepared project still have the opportunity to be implemented**
- **Mistakes in implementation can lead to frustration, making quality control and overview of the construction works important for success.**
- **It is important to understand that while there may be loud opponents, other user groups may quietly support an intervention. These voices should be articulated in the public debate to avoid bias.**

D Lessons learnt

D.1 Recommendations: measure replication

The interventions in Bratislava, Budapest and the soft cycle lane in Prague are all easily replicable and could be adapted to other areas of these cities or other Central European cities with similar streets designed predominantly for motorized traffic. While such measures might not have significant extended impact, improvements on a local level support strategic objectives like enhancing traffic safety and encouraging a modal shift, supported by policies like Plan Bratislava 2030. In addition, these types of interventions often involve relatively low costs and quicker implementation timelines, making them feasible even under budget constraints.

While the reach of such micro-interventions may be localized, they play a significant role in creating safer and more pleasant environments. These small adjustments foster a sense of safety and accessibility, making streets and public spaces more appealing to residents and visitors. Bringing together these measures with broader city policies, such as traffic safety and modal shift goals, they not only meet local needs but also contribute to wider strategic objectives.

However, it's essential to set realistic expectations for the impact of small-scale, local interventions. With micro-interventions, we cannot expect large-scale or city-wide changes. The limited reach of a single intervention is not a disappointment or a failure—local projects are designed to impact their immediate surroundings.

When aiming for substantial outcomes, particularly in traffic reduction, we must be mindful of the scale. Micro-interventions can achieve broader impacts when embedded in a larger, system-wide strategy. For meaningful, city-level changes, it’s crucial to implement these interventions as part of a comprehensive, city-wide approach. Only then can we maximize their potential to contribute to larger-scale transformations. In the case of the footbridge, it is visible how larger-scale (in time and financially) investment goes hand in hand with larger impact.

Reducing traffic and calming speeds require a system-wide approach rather than isolated street redesigns. Introducing a network-wide traffic calming system, such as filtering out non-destination vehicles and redesigning areas like the vicinity of Német Street School, is crucial. This approach not only addresses safety but also discourages through-traffic, fostering a safer and more liveable urban environment. Without such systemic changes, localised measures may fail to achieve significant reductions in traffic and speed.

The Štvanická footbridge is a unique project embedded in a specific urban environment with its specific characteristics of the given location. The project has resulted in an unprecedented increase of active mobility, with a significant increase in the number of journeys by bicycle and an almost doubling of journeys on foot. Transferability can be thought of in the more abstract context of connecting two densely populated urban areas through a corridor dedicated only to active mobility, which overcomes a significant barrier.

- **Small-scale public space alterations can be implemented quickly and at a low cost**
- **Small-scale public space alterations have a measurable local impact on subjective safety and the perception of the quality of public space**
- **Small-scale interventions cannot have large-scale or city-wide impacts, only if rolled out area-wide**
- **Measures should be embedded in a larger, city-wide strategy**

Local small-scale projects can improve specific areas in the local context, but they alone aren't enough to create large-scale change. To achieve broader impact, they must be combined with larger, strategic urban interventions. Therefore, while the analysed interventions might have increased perceived safety, they didn't result to be enough to increase active mobility users. On the other hand, the dedicated pedestrian and cycle bridge generated a boom of travels. Safe, secure and inclusive infrastructure brings increase in active mobility numbers.

D.2 Recommendations: process

To implement micro-interventions effectively in urban environments, each project should support overarching goals such as traffic safety, modal shift, and green infrastructure.

Collaborating with advocacy groups and forming cross-sector partnerships can significantly enhance the credibility and reach of micro-interventions. Partnering with organizations that specialize in urban design, cycling, and pedestrian safety—such as local advocacy groups, non-profits, and experts—provides valuable insights and resources.

Managing expectations is another crucial aspect of implementing micro-interventions. It is important to communicate clearly that while these small-scale projects can create noticeable improvements in specific areas, substantial city-wide changes require a cumulative and systemic approach. By setting realistic goals and educating stakeholders about the incremental nature of these interventions, project leaders can avoid perceptions of failure when immediate, large-scale impacts are not evident.

- **The years at the beginning of local election terms are better fit to implement measures seen as controversial, so that they can already show their impact by the election time**
- **Controversial issues, like parking spaces could be approached by packaging „carrots" with „sticks"**
- **Even if financial conditions are unpredictable, it is important to have well prepared projects which can be implemented quickly when funding is available**
- **Expectations towards small-scale interventions should be managed to stay realistic**
- **Quality control and overview of the construction works important for success**
- **Thes voice of the „quiet" user groups should be articulated in the public debate to avoid bias towards the „loud"**

Annex

Czechia

A. Description of the measure

A.1 Situation before CEAML

A.1.1.1 Štvanice footbridge

The bridge construction plans were first conceived 20 years before its completion. The bridge connects two dense urban areas separated by the Vltava River. To travel between those areas pedestrians and cyclists have to use one of two other bridges, ferry or subway, each of which meant a complicated detour. Štvanice footbridge now offers a direct connection between the areas with complete separation from motor traffic which is not allowed on the bridge.

A.1.1.2 Cernokostelecka Soft cycle lane

Cernokostelecka Street is a radial urban collector road consisting of two-way tramline in the middle, and a single motor vehicle and parking lane on the sides. Sharrows placed between the parking and motor vehicle lane were used to accommodate cycling before.

City of Prague has a programme to provide cycling measures, typically bike lanes, to all urban collector roads to improve safety of cyclists. Historically sharrows were used as a cycling measure, however its effect on safety, both objective and subjective, was marginal, and are being now replaced by bike lanes.

A.2 Objectives

The measure objectives are:

A.2.1.1 Štvanice footbridge

- multiplying number of pedestrian trips, shortening travel times for pedestrians, a highly improved attractivity of walking
- removing barrier for cycling and simplifying of cycling travel patterns, reducing number of bicycle trips on two nearest bridges with car traffic

A.2.1.2 Černokostelecká soft cycle lane

- traffic calming due to optical narrowing of car lane adjacent to newly installed bike lane
- improved attractiveness of the street for cycling
- lowering number of people cycling on sidewalk in favour of people cycling on road using bike lane

- exploring what effect on safety can we expect from sharrows, which are perceived as at least somewhat problematic among cyclists and mobility professionals

A.3 Description

A.3.1.1 Štvanice footbridge

„The footbridge is now a simple link for pedestrians and cyclists between the Prague 7 and Prague 8 districts, with direct access to the Štvanice island. The three-hundred-metre-long structure made of white ultra-high-quality concrete with an anti-graffiti coating is unusual in its curvature. Construction began in January 2022 and its width is four metres, with a width of three metres at the ramp to Štvanice Island.

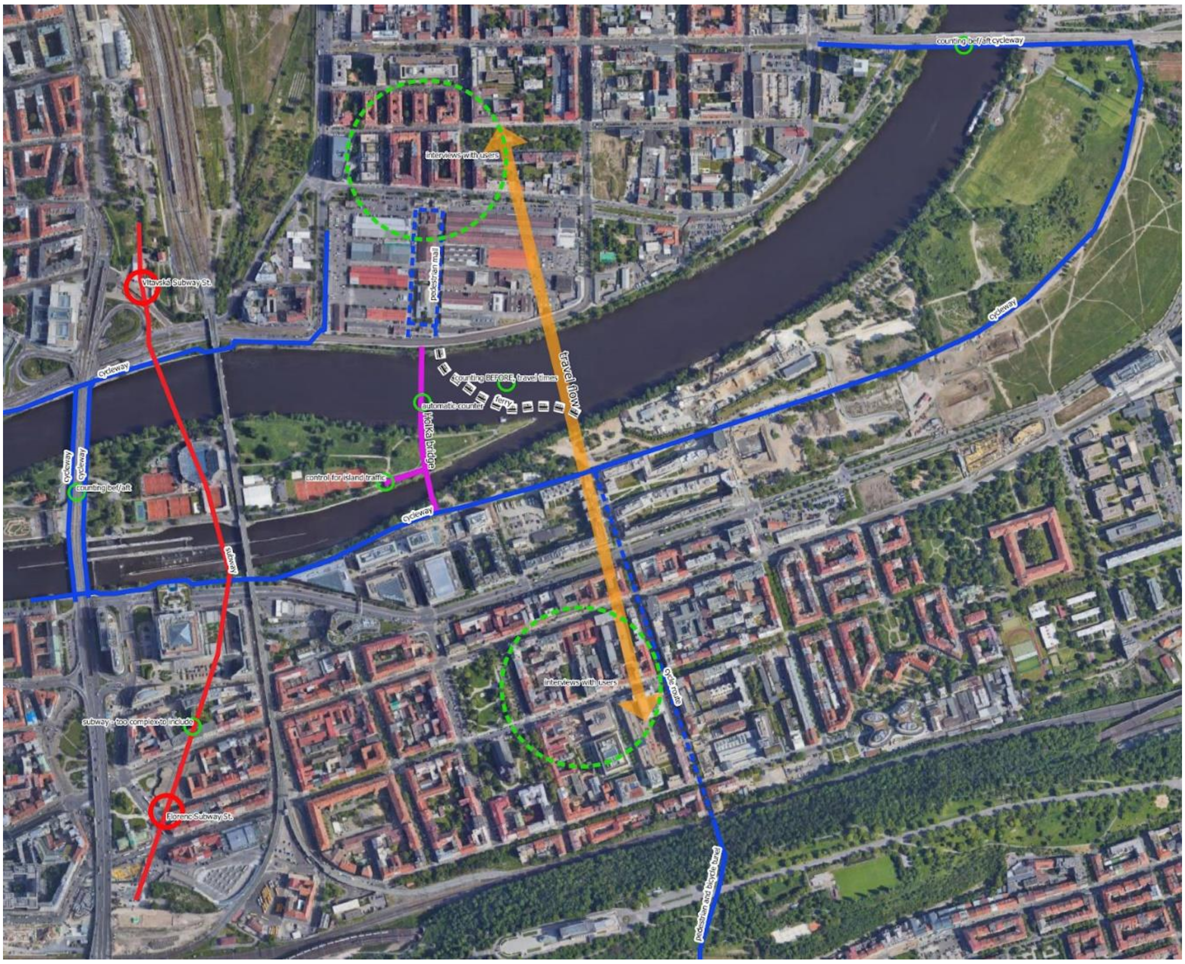
Between Karlín and Štvanice the footbridge bridges the Vltava riverbed, which is 38 metres wide, and between Štvanice and Holešovice the width of the riverbed is 149 metres. The last span of the bridge on the Holešovice side can be raised to withstand the flow of a thousand years of water. The structure also has small joints through which rainwater will flow.“[6]

Location: https://en.mapy.cz/s/besokumame

Project elements:

https://drive.google.com/file/d/1BgB_Fey2S4KcmyP97QqN6anT2ugriiow/view?usp=sharing

[6] Source: https://iprpraha.cz/stranka/4295/stvanicka-lavka-uz-slouzi-prazanum-zastupci-mesta-a-ipr-praha-otevreli-lavku-spojujici-karlin-stvanici-a-holesovice



Photos:

Figure 21. Source: Petr Vodička, Wikipedia

Figure 22. Source: IPR Praha

Figure 23. Construction of the footbridge, source: IPR Praha

A.3.1.2 Černokostelecká soft cycle lane

Location: https://en.mapy.cz/s/kudokuboku

Technical Drawing https://drive.google.com/file/d/15waRQQ-EOLi0eTBiXvPG5fH6N9X6cSXG/view?usp=sharing

Project Elements:

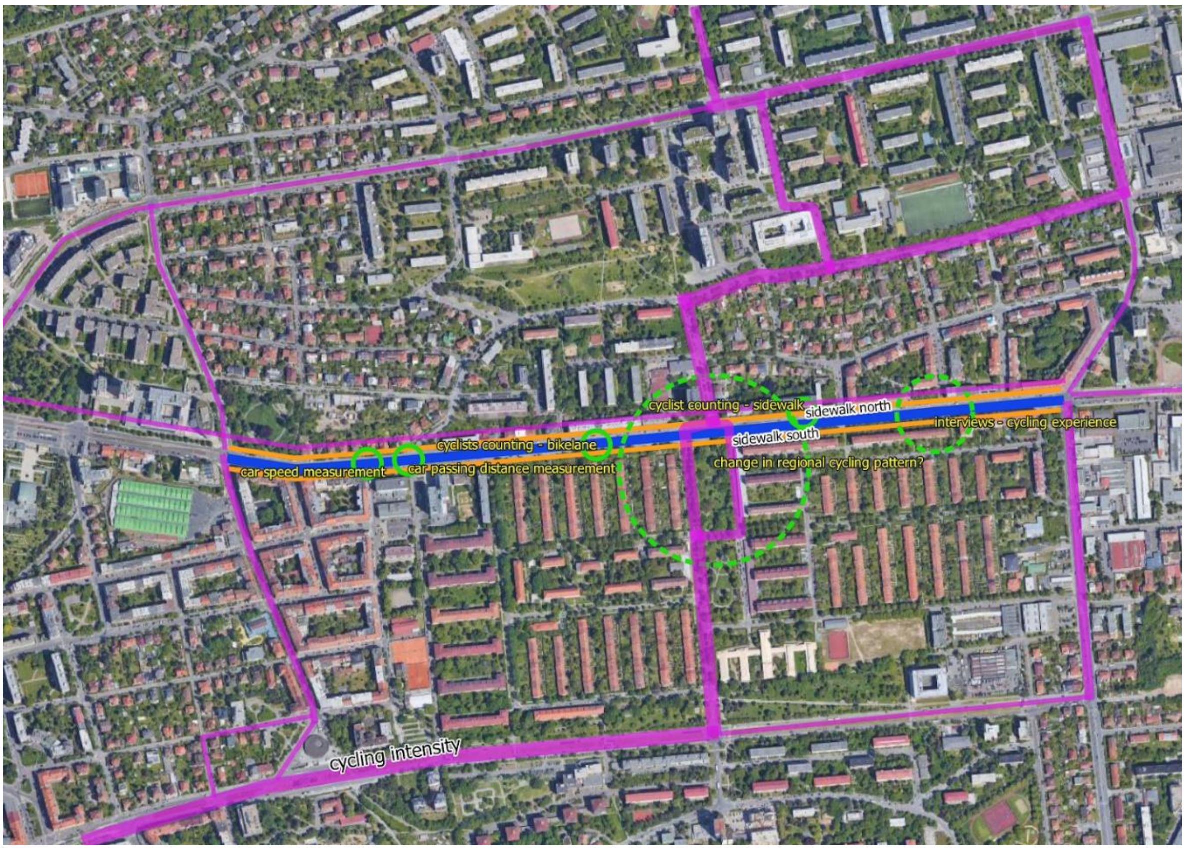
https://drive.google.com/file/d/1BgGIT7dxeHrSclRTqNBc_pO8JQF8DW0J/view?usp=sharing

BEFORE:

https://en.mapy.cz/s/pufucuvupo

AFTER:

https://en.mapy.cz/s/kusahunoka


cyclist counting - sidewalk
sidewalk north
interviews - cycling experience
cyclists counting - bikelane
sidewalk south
car speed measurement
car passing distance measurement
change in regional cycling pattern?
cycling intensity

B. Implementation of the measure

B.1 Stage 1: Preparation

B.1.1.1 Štvanice footbridge

2016 – administrative preparation starts

2017 – public competition for bridge design announced and started

2022 – construction starts

2023 – 28th July bridge opening

B.1.1.2 Černokostelecká soft cycle lane

2019 – original technical drawing

2023-05 – revised technical drawing

2023-07 – implementation of cycle lane

B.2 Stage 2: Implementation

Both measures were selected due to their finalisation this year; there are all kinds of delays, the bridge construction was delayed by 6 months due to pillars construction challenges in Vltava River; the cycle lane was implemented four years after the first version of technical drawings was finished.

B.3 Stage 3: Operation

Please mention if any experience during the operation phase happened that is relevant from the CEAML project's perspective.

B.3.1.1 Štvanice footbridge

Outside of the scope of pilot study.

B.3.1.2 Černokostelecká soft cycle lane

Not applicable.

B.4 Cost and Financing of the Measure

B.4.1.1 Štvanice footbridge

Total Construction Cost: 352 mil. CZK (eq. 14.4 mil. EUR)

B.4.1.2 Černokostelecká soft cycle lane

The cost of bike lane installation is difficult to estimate. Usually, there is no specific budget item for concrete installation and the cost is covered from common operational budget of city company TSK. There are estimates of cost per 1 km for sharrows and bike lane from 2009[7], since then the costs are likely higher.

The cost for the “exclusive” type of cycle lane in 2009 ranged from 250 000 to 750 000 CZK per kilometre. However, “soft” cycle lane was installed at Cernokostelecka street; soft cycle lane is budget wise less demanding due to missing vertical traffic signs and more modest horizontal markings. Therefore, we could expect cost for this type of cycle lane to be at lower limit of cost of exclusive cycle lane, 250 000 CZK per km in 2009 costs.

Now, our arbitrary estimate of 2009 to 2023 change of costs is +100%; therefore, cost estimate is 500 000 CZK per kilometre for “soft” type of cycle lane. One-way length of new cycle lane is 1250 meters, lane is installed in both ways, therefore total length is 2500 meters. Our estimate cost of this measure is therefore 2,5 * 500 000 CZK = 1,25 mil. CZK (eq. 51 000 EUR).

[7] https://www.praha.eu/jnp/cz/doprava/cyklisticka/cyklisticka_old_zaloha/orientacni_ceny_stavebnich_a_dopravnich.html

C. Impact Evaluation Findings

C.1 Measurement methodology

C.1.1 Impacts and Indicators

C.1.1.1 Štvanice footbridge

category	specific	before (05/2023)	after (cca 05/2024)	status before
HolKa Bridge				
travel times	walk	☑	☑	
	cycling Hlavek Bridge	☑	☑	
	cycling Liben Bridge	☑	☑	
	Ferry	☑	☐	
	HolKa Bridge	☐	☑	
	change in accumulated travel time	☐	☑	
traffic counting - walking, cycling; on the road, on the cyclepath	Hlavek Bridge	☑	☑	data collected
	Liben Bridge	☑	☑	
	Ferry	☑	☐	
	HolKa Bridge	☐	☑	
User Experience	interviews with people who cycle on this specifc route and who will benefit from the HolKa Bridge	☑	☑	data collected

Table C1.1: Indicators

No.	Impact	Indicator	Data used	Comments
	Creating a new, attractive path for pedestrians and cyclists	Counting pedestrians and cyclists	• two adjacent bridges with combined traffic • ferry • new bridge	
		Travel times	Measuring and modelling travel times for typical trips utilizing the bridge.	

C.1.1.2 Černokostelecká soft cycle lane

category	specific	before (05/2023)	after (cca 05/2024)	
Černokostelecká Bike Lane				
traffic counting - cycling; on the road (sharrows, cycle lane), on the sidewalk	Černokostelecká - west - east direction	☑	☑	data collected
	intersection Tuklatská/Park Na Solidaritě	☑	☑	
car traffic	overtaking distance from cyclists	☑	☑	
	speed of cars	☑	☑	data collected
User Experience	interviews with people who cycle on this specifc route and who will benefit from the cycle lane	☑	☑	data collected

Table C1.1: Indicators

No.	Impact	Indicator	Data used	Comments
	Traffic calming	Car Speed	own speed measurement	
	Cycling Safety	Cyclist counting	• cyclist counting on the road (bike lane) • cyclist counting on the sidewalk	
		Interviews	• interviews with pre-selected users regularly travelling on this Street (Bike to Work Challenge participants addressed by specific survey in April/May 2023, contacts utilised later on in 2024)	
		Quantitative Survey	Quantitative survey (1300 participants, data collected) among cyclists in Prague, evaluation safety perception of different cycling measures	

C.1.1.3 Detailed description of the indicator methodologies:

C.1.1.3.1 Cyclist and pedestrian counting

Ex ante cycling and pedestrian count took place on following days:

25th May 2023, Thursday

26th May 2023, Friday

27th May 2023, Saturday.

Ex post cycling and pedestrian count took place on following days:

23rd May 2024, Thursday

24th May 2024, Friday

25th May 2024, Saturday.

Those are two workdays and a weekend day. Counting locations are detailed in formerly provided document - https://docs.google.com/document/d/1QYePUeus5G80zsL0fheAkp_ELxQA0TGODuzjbBy4suY/edit?usp=sharing .

The counting took place each day from 6 AM to 8 PM and represents a total of 14 hours of traffic per day. The values presented represent the number of passes and passes for this time period, there was no calibration to 24 hours. The actual values will therefore be slightly higher.

The data collected during Thursdays and Fridays have been averaged into a single business day value, the Saturday counts then represent the values for a non-business day.

For the number of bicycles, (kick)scooter and PEV (personal electric vehicle) passes, the data has been calibrated using automated counters to make it comparable year-on-year. During the 2024 data collection period, the total volume of bicycle traffic recorded by the automated counters in Prague represented 80% of the volume compared to the 2023 data collection period. Thus, the 2024 data was standardized to be comparable to 2023.

In the case of the Štvanice footbridge, the data presented are only for the direct directions between Holešovice and Karlín. The footbridge also leads to the island of Štvanice, the presented data are adjusted for traffic going to and from the island.

C.1.1.3.2 Quantitative Survey

A quantitative survey of 1200 respondents was used to evaluate the perception of the safety of the cycle lane on Černokostelecká Street. A separate research report in Czech language (with an executive summary in English) is available here https://auto-mat.cz/auto-mat.cz/wp-content/uploads/Vyzkumna-zprava-Vnimani-bezpecnosti-integracnich-opatreni-v4.2-1.pdf .

C.1.1.3.3 Travel times

The original intention was to evaluate the impact of the Štvanická lávky on the travel time saved using a matrix of sources and destinations based on the routes recorded in the Prague by Bike app. This task proved to be complicated in the course of the solution without collecting additional data. Moreover, as the results below show, the opening of the footbridge is associated with a strong traffic induction and a high number of new trips that did not take place in the study area before the opening of the footbridge. Therefore, an evaluation of the impact of the footbridge on travel times was not carried out.

C.1.2 Project Budget Cut Impact

The project budget was reduced by 20% for the second year of implementation, which also reflected the reduction in resources for the implementation of the pilot studies. The priority was to maintain, as far as possible, the collection of data on cycling and walking traffic volumes, which are key to evaluating the impact of the measures under study. However, the reduction in resources meant that a second round of data collection for some indicators and their evaluation was not possible. These are the following indicators.

C.1.2.1 User Experience

During the first year of the project, in-depth interviews were conducted with bicycle users moving around the study sites. During the second year it was planned to conduct a second round of interviews with the same people and to evaluate them. Resource reductions did not allow for a second round of interviews and evaluation.

C.1.2.2 Car Speed

During the first year, vehicle speed measurements were carried out on Černokostelecká Street. During the second year, the measurements were to be taken again to evaluate the effect of the cycle lane on vehicle speeds. The reduction in resources did not allow for a repeat measurement and evaluation of the effect of the measure on vehicle speeds.

C.2 Measure results

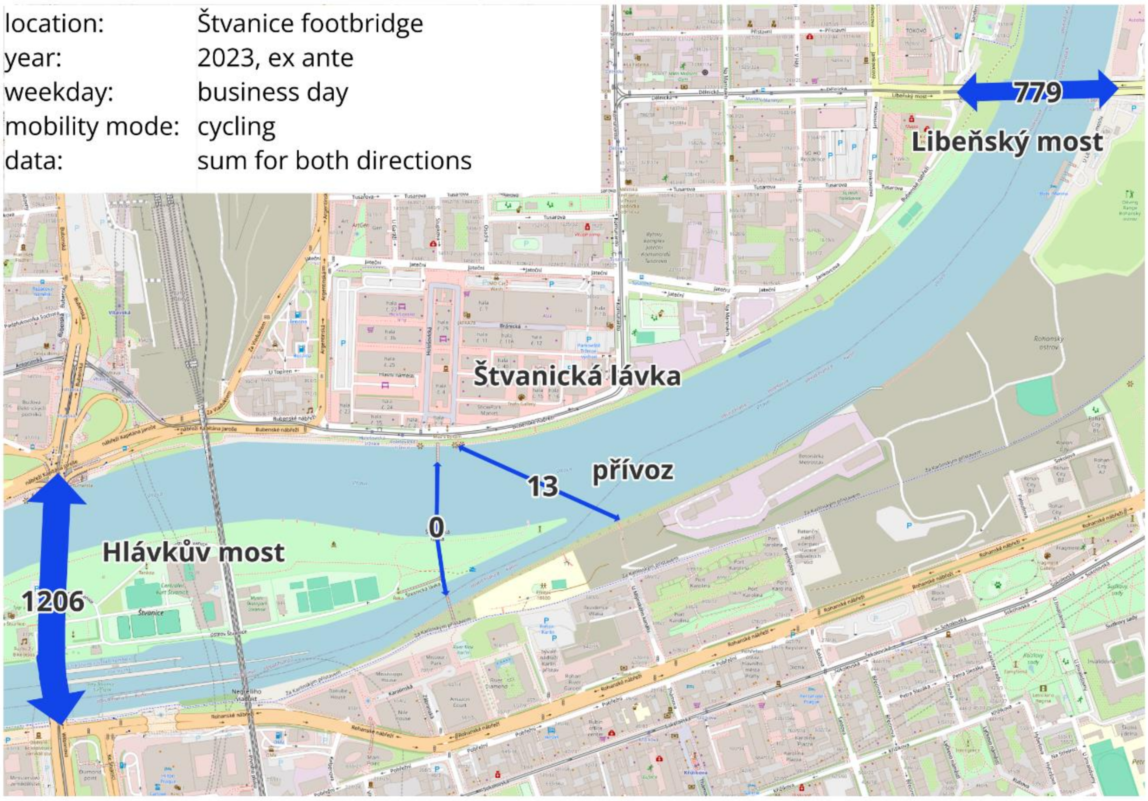
C.2.1 Stvanice footbridge

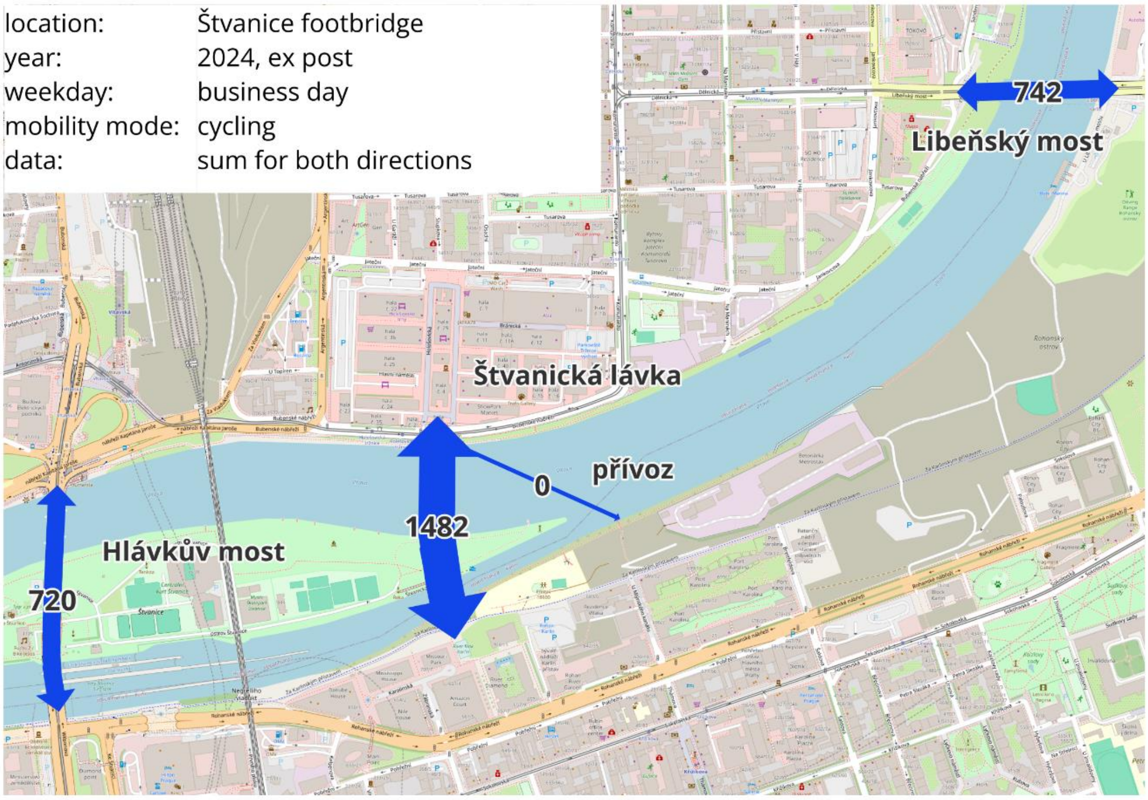
C.2.1.1 Impact on cycling

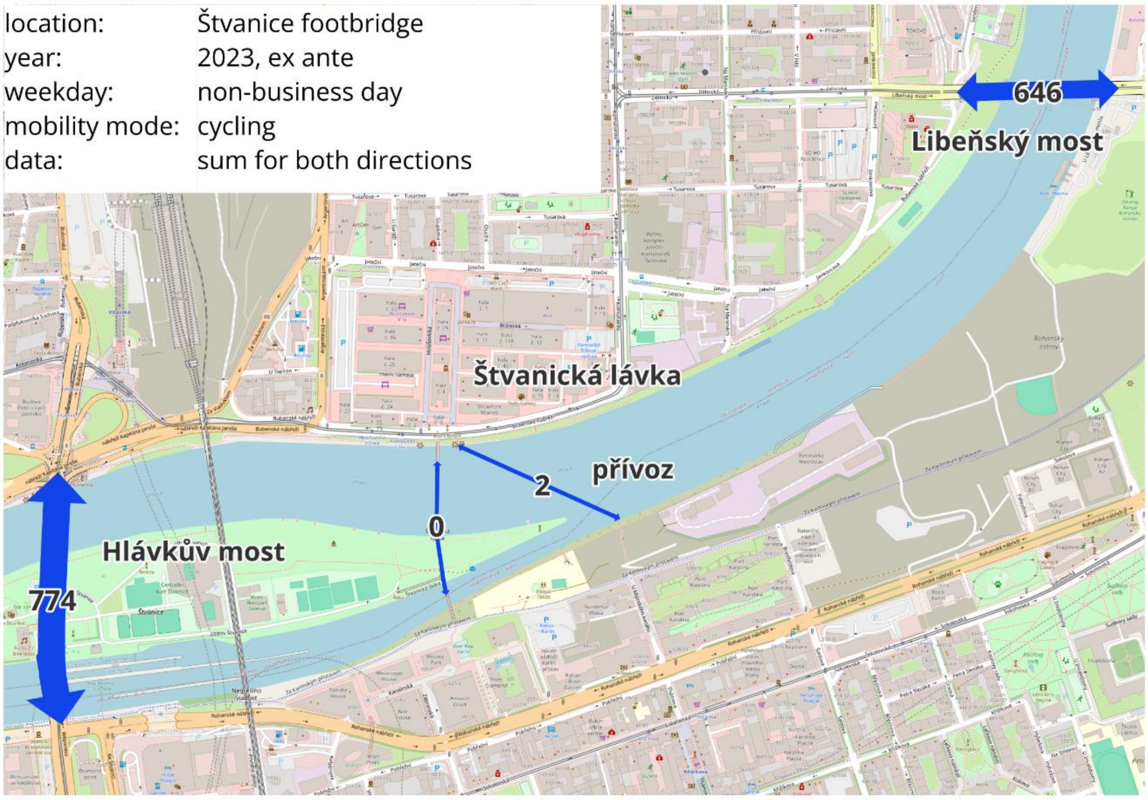
C.2.1.1.1 Cycling, total volume

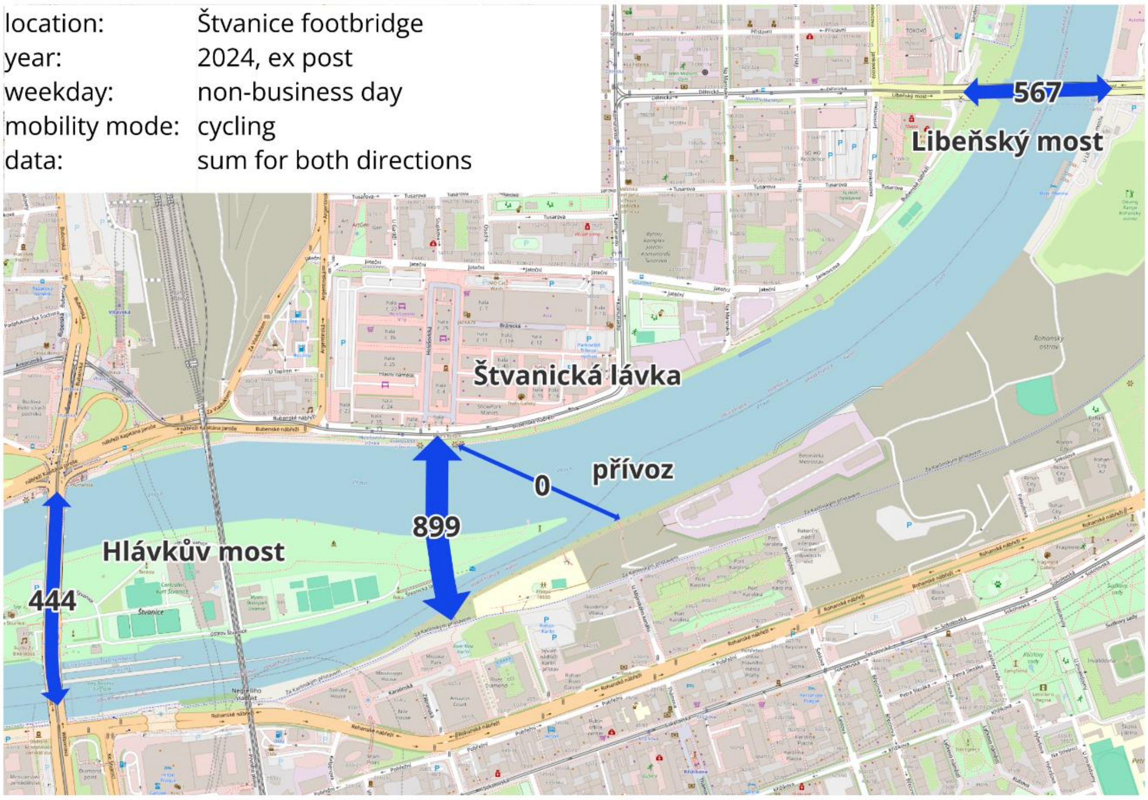
After the opening of the Štvanice footbridge, there was a decrease in cycling traffic on the Hlavkův Bridge, and to a lesser extent on the Libeň Bridge during the non-business day. Relatively high volumes of cycling traffic were recorded on the footbridge after its opening, especially on business days.

The ferry, whose operation was terminated with the opening of the footbridge, was only minimally used for transporting bicycles.









C.2.1.1.2 Cycling, directional volumes

The directions of cycling traffic are balanced on all measured profiles, with only a slight predominance of the direction from Holešovice outwards.

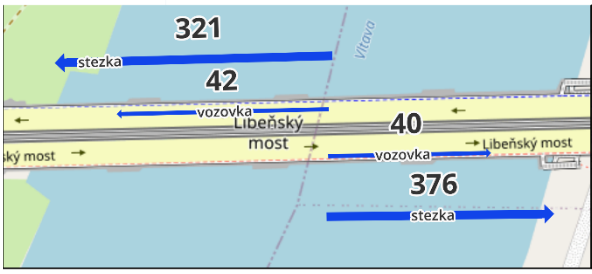

location: Štvanice footbridge
year: 2023, ex ante
weekday: business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)
Štvanická lávka
přívoz
7
6
lávka
0
0
Hlávkův most
vozovka
stezka
34
548
616
8


location: Štvanice footbridge
year: 2024, ex post
weekday: business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)
Štvanická lávka
přívoz
0
0
lávka
695
787
Hlávkův most
vozovka
stezka
15
338
362
5

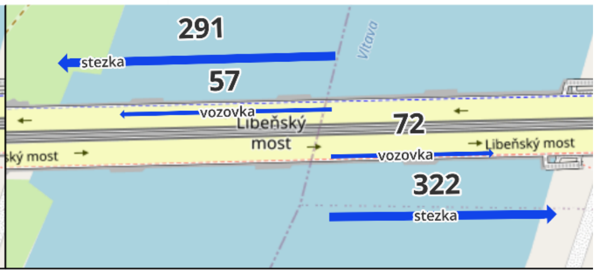
location:	Štvanice footbridge
year:	2023, ex ante
weekday:	non-business day
mobility mode:	cycling
data:	directional, road (vozovka) & path (stezka)

location:	Štvanice footbridge
year:	2024, ex post
weekday:	non-business day
mobility mode:	cycling
data:	directional, road (vozovka) & path (stezka)

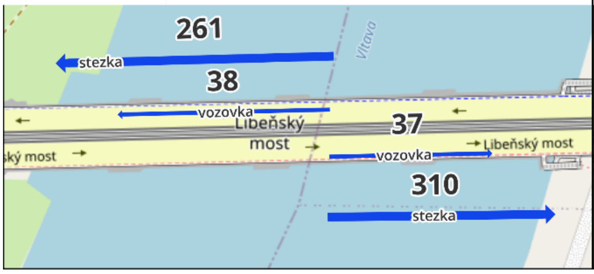
location: Štvanice footbridge, Libeňský most
year: 2023, ex ante
weekday: business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)



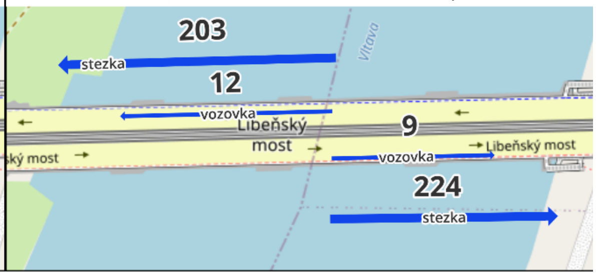
location: Štvanice footbridge, Libeňský most
year: 2024, ex post
weekday: business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)



location: Štvanice footbridge, Libeňský most
year: 2023, ex ante
weekday: non-business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)

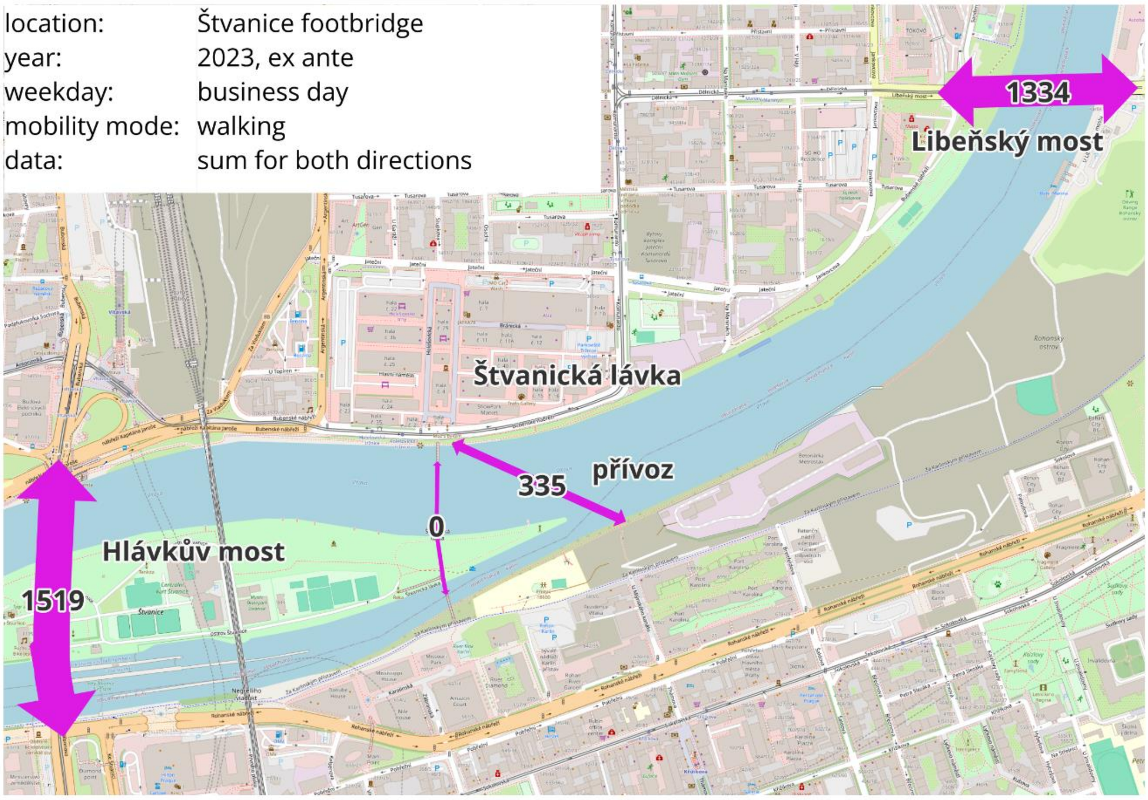


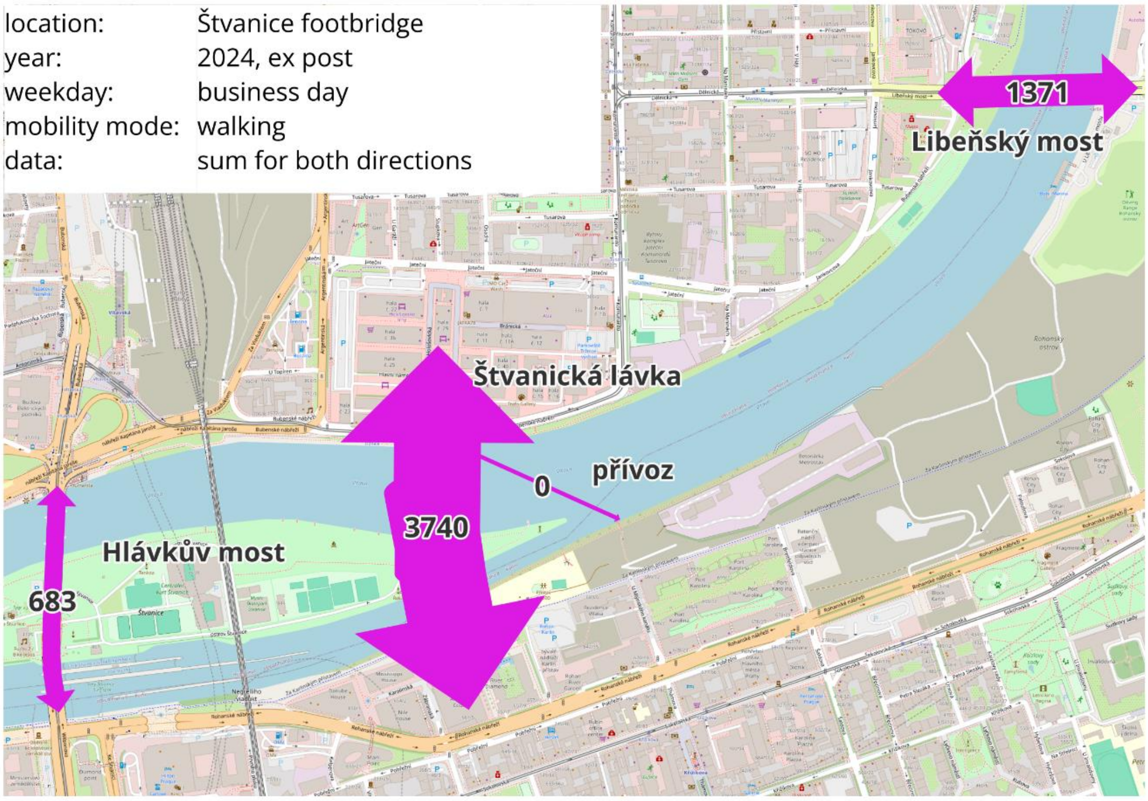
location: Štvanice footbridge, Libeňský most
year: 2024, ex post
weekday: non-business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)

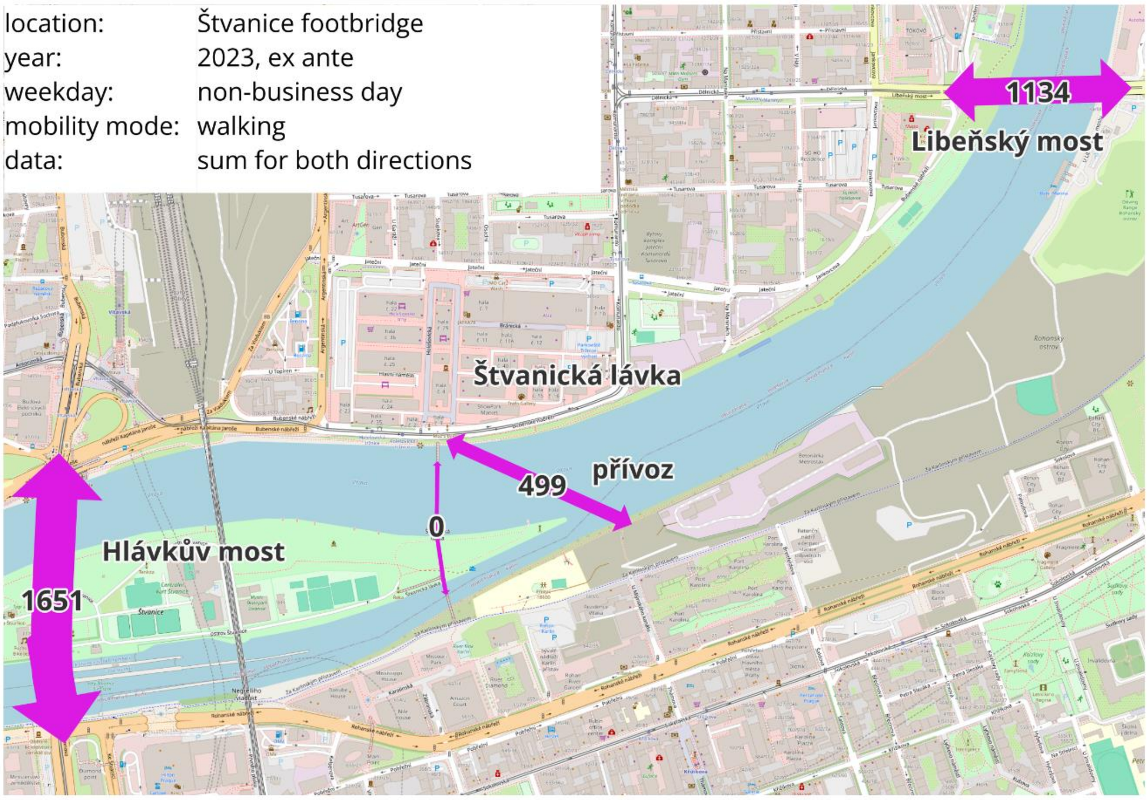


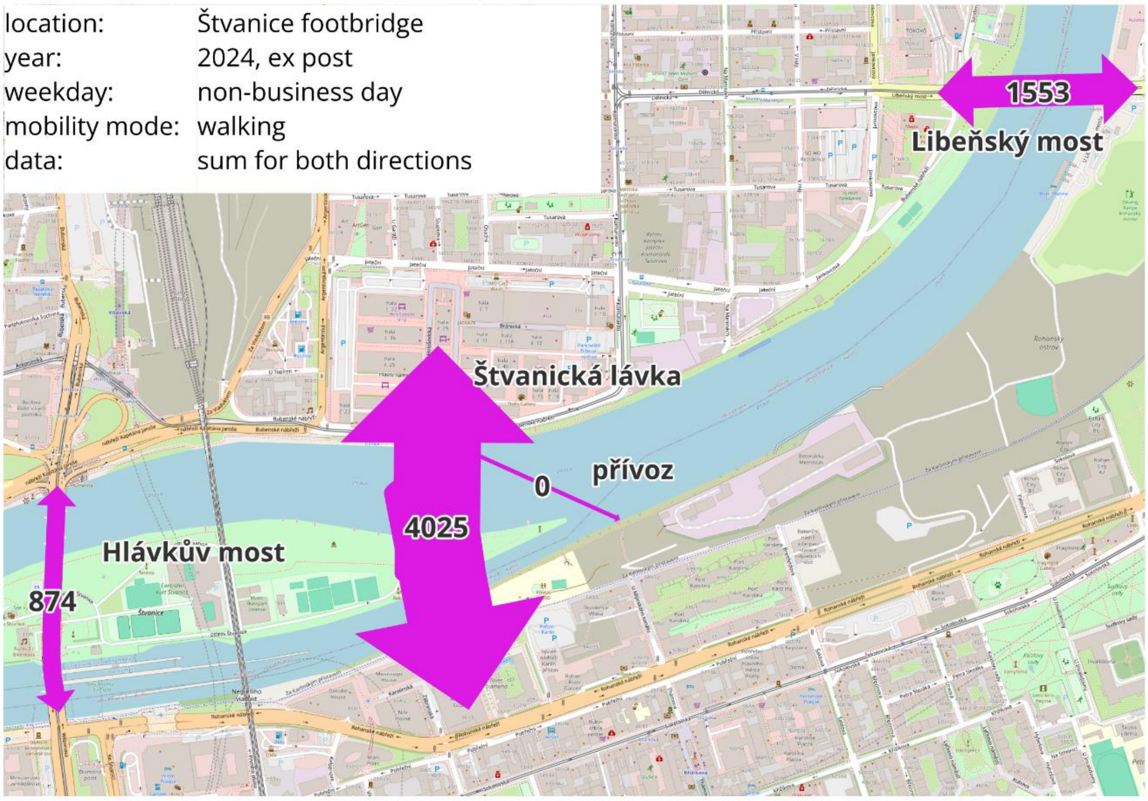
C.2.1.2 Impact on walking

The opening of the footbridge had a strong impact on pedestrian traffic on the Hlávek Bridge, where it was significantly reduced on both business and non-business days. Traffic on the Libeň Bridge remained unchanged. The increase on a non-business day in 2024 is related to higher pedestrian traffic on the measurement day due to the Ice Hockey World Championship match.


location: Štvanice footbridge
year: 2023, ex ante
weekday: business day
mobility mode: walking
data: sum for both directions
1334
Libeňský most
Štvanická lávka
335
přívoz
0
Hlávkův most
1519

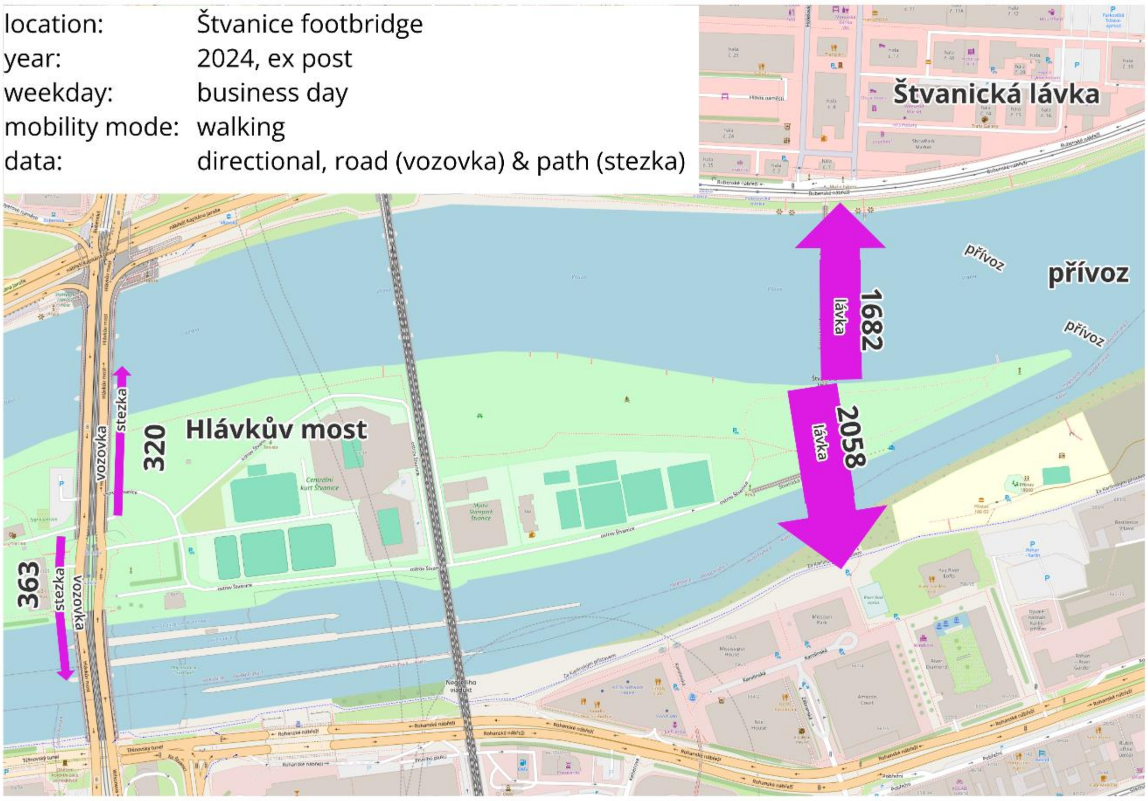

location: Štvanice footbridge
year: 2024, ex post
weekday: business day
mobility mode: walking
data: sum for both directions
1371
Libeňský most
Štvanická lávka
0
přívoz
3740
Hlávkův most
683

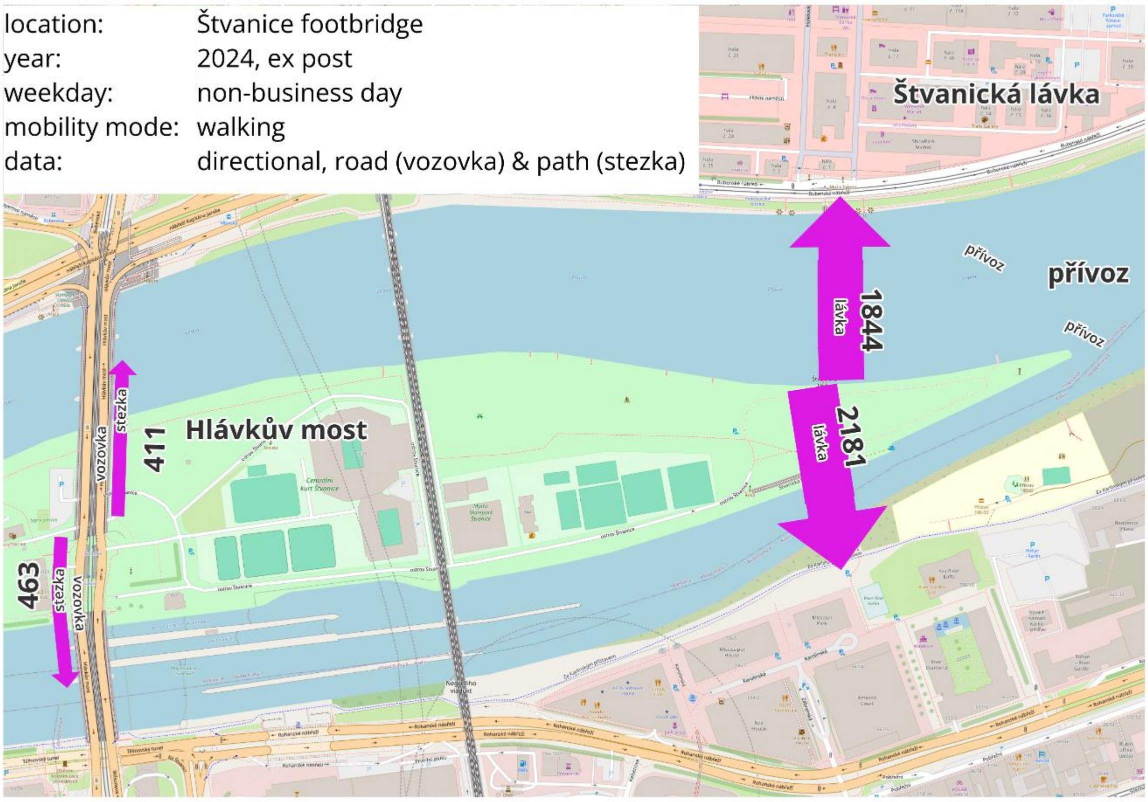




C.2.1.2.1 Walking, directional volumes

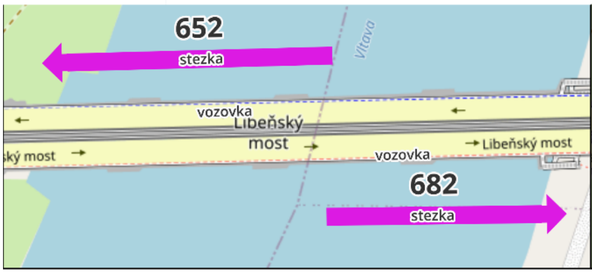
Compared to cycling, the ferry was relatively heavily used by pedestrians in both directions, more so on non-business days. Following the opening of the footbridge there was a reduction in pedestrian traffic on the nearby Hlávek bridge in both directions. The Štvanice footbridge is heavily used by pedestrians in both directions, with the direction from Holešovice to Karlín predominating.



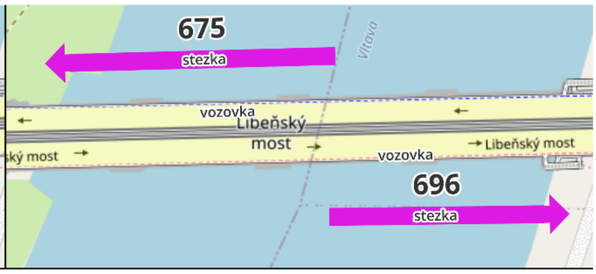


Pedestrian traffic to the Libeň bridge was not affected by the opening of the footbridge on weekdays. The increase in traffic on non-business days is related to the hockey match on the day of the measurement.

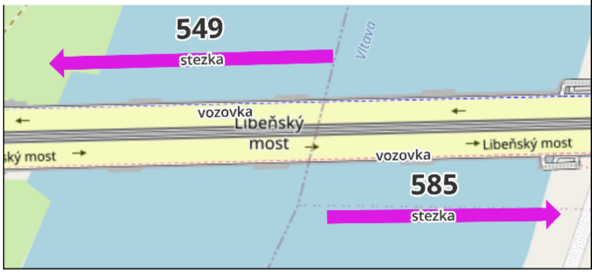
location: Štvanice footbridge, Libeňský most
year: 2023, ex ante
weekday: business day
mobility mode: walking
data: directional, road (vozovka) & path (stezka)



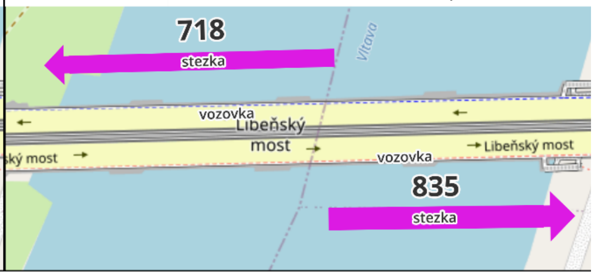
location: Štvanice footbridge, Libeňský most
year: 2024, ex post
weekday: business day
mobility mode: walking
data: directional, road (vozovka) & path (stezka)



location: Štvanice footbridge, Libeňský most
year: 2023, ex ante
weekday: non-business day
mobility mode: walking
data: directional, road (vozovka) & path (stezka)

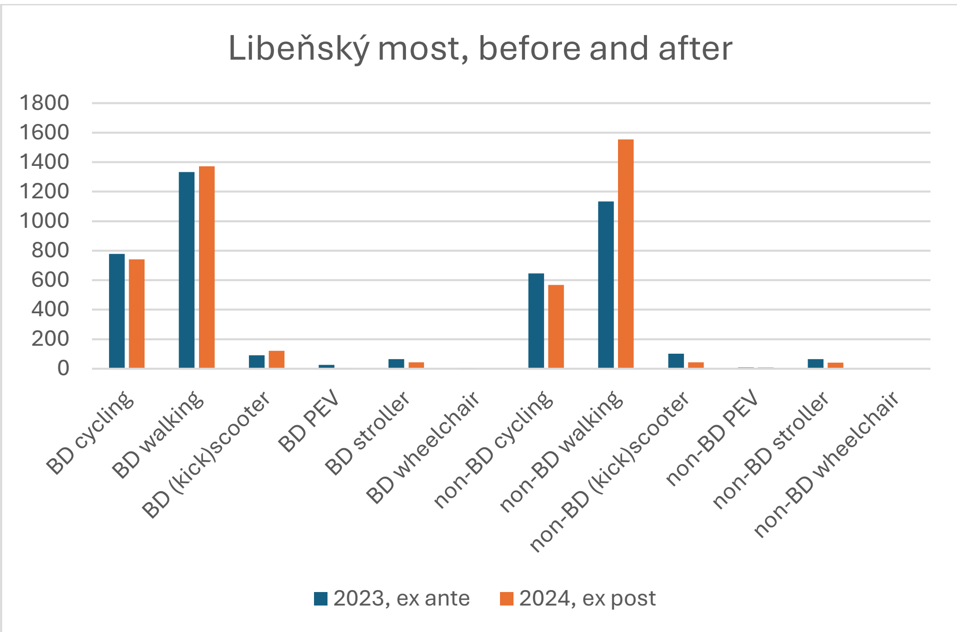


location: Štvanice footbridge, Libeňský most
year: 2024, ex post
weekday: non-business day
mobility mode: walking
data: directional, road (vozovka) & path (stezka)



C.2.1.3 Stvanice footbridge total results

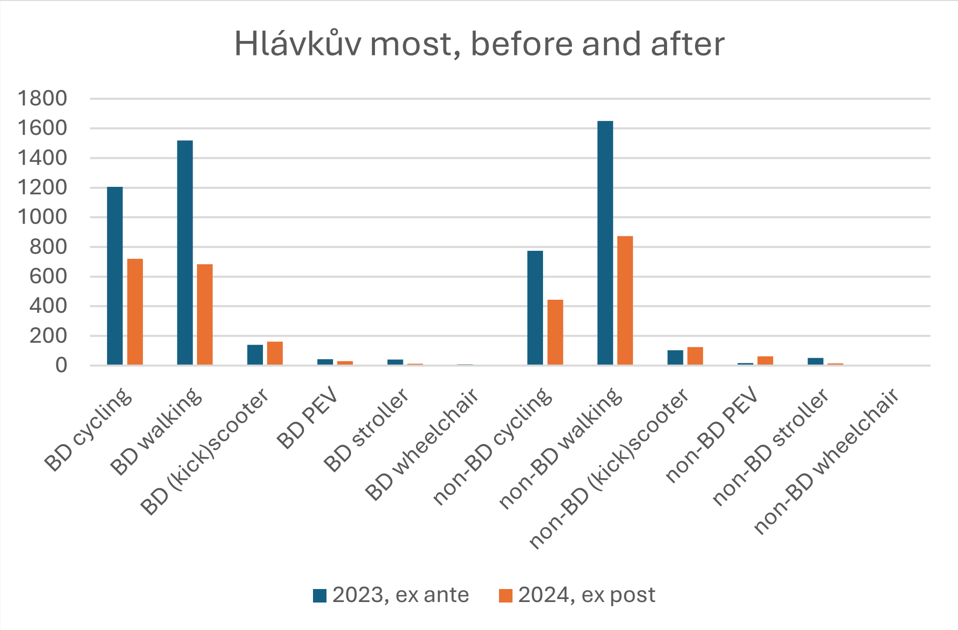
As already mentioned, traffic on the Libeň Bridge was only minimally affected by the opening of the footbridge, the increase in pedestrian traffic on non-business day is related to the hockey match. The graph and table below show the year-on-year comparison.



Libeňský most, before and after						
		count			difference	
		2023	2024		abs.	rel.

BD	cycling	779	742		-37	95%
	walking	1334	1371		37	103%
	(kick)scooter	92	122		30	133%
	PEV	25	6		-19	24%
	stroller	64	43		-21	67%
	wheelchair	7	1		-6	14%
non-BD	cycling	646	567		-79	88%
	walking	1134	1553		419	137%
	(kick)scooter	102	44		-58	43%
	PEV	8	8		0	100%
	stroller	65	42		-23	65%
	wheelchair	0	0		0	

There has been a significant reduction in traffic on the Hlávek bridge, especially in cycling and pedestrian traffic. Most strollers with children have also disappeared from the bridge.



Hlávkův most, before and after						
		count			difference	
		2023	2024		abs.	rel.
BD	cycling	1206	720		-486	60%
	walking	1519	683		-836	45%
	(kick)scooter	140	161		21	115%
	PEV	42	29		-13	69%
	stroller	40	13		-27	33%
	wheelchair	8	1		-7	13%
non-BD	cycling	774	444		-330	57%
	walking	1651	874		-777	53%
	(kick)scooter	104	125		21	120%
	PEV	17	63		46	371%
	stroller	52	14		-38	27%
	wheelchair	2	0		-2	0%

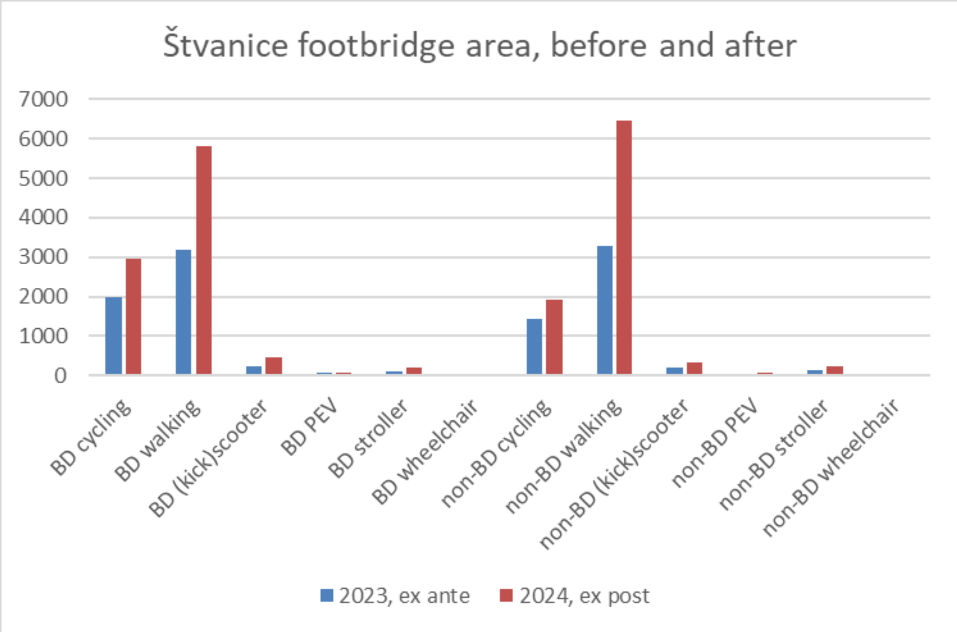
For completeness we attach the measured values of the traffic on the ferry and on the footbridge.

Ferry (2023), Štvanice footbridge (2024)			
		count	
		2023, ferry	2024, footbridge
BD	cycling	13	1482
	walking	335	3740
	(kick)scooter	1	194
	PEV	1	27
	stroller	2	144
	wheelchair	0	0
non-BD	cycling	2	899
	walking	499	4025
	(kick)scooter	0	170
	PEV	1	10
	stroller	12	183
	wheelchair	0	2

The following is a presentation of the overall differences in traffic across all measured profiles in the studied area of the Štvanice footbridge. For 2023, the Hlávek bridge, Libeň bridge and ferry are summed, for 2024 the Hlávek bridge, Libeň bridge and Štvanice footbridge are summed. After the opening of the footbridge, bicycle traffic increased by 47% from two to three thousand passes per business day. Pedestrian traffic increased even more significantly by 82% from three thousand two hundred pedestrians to five thousand eight hundred pedestrians per business day. The footbridge itself accounts for fifteen hundred cyclists and four thousand pedestrians per business day.

During the non-business day, pedestrian traffic increases further by 96%, with over 4,000 pedestrians using the footbridge alone in both directions. Cycle traffic is up 34% overall on non-business day compared to the previous period, with nine hundred people using the footbridge on this day.

The data shows an increase in the use of scooters and strollers. For strollers, traffic is up by more than 80% on both business and non-business days, with the vast majority of stroller traffic taking place on the Štvanice footbridge.



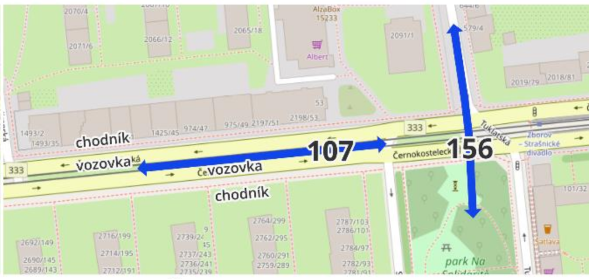
Štvanice footbridge area						
		count			difference	
		2023	2024		abs.	rel.
BD	cycling	1998	2944		946	147%
	walking	3188	5794		2606	182%
	(kick)scooter	233	477		244	205%
	PEV	68	62		-6	91%
	stroller	106	200		94	189%
	wheelchair	15	2		-13	13%
non-BD	cycling	1422	1910		488	134%
	walking	3284	6452		3168	196%
	(kick)scooter	206	339		133	165%
	PEV	26	81		55	312%
	stroller	129	239		110	185%
	wheelchair	2	2		0	100%

C.2.2 Černokostelecká street

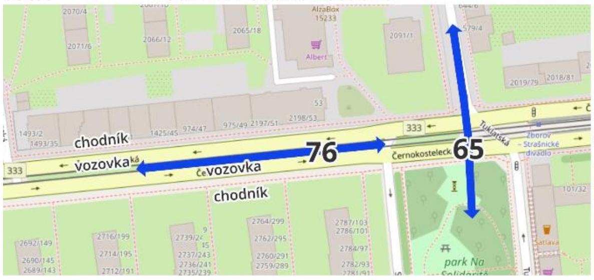
A new soft cycle lane has been installed on this street in a longitudinal direction from east to west on both sides of the street. The map also shows control measurements in the crossing direction. As evidenced by the measurements visualized in the map below, one year after the installation of the soft cycle lane there has been no change in bicycle traffic, which has remained about the same on both business day and non-business day.

location: Černokostelecká street
year: 2023, ex ante
weekday: business day
mobility mode: cycling
data: sum for both directions

location: Černokostelecká street
year: 2024, ex post
weekday: business day
mobility mode: cycling
data: sum for both directions

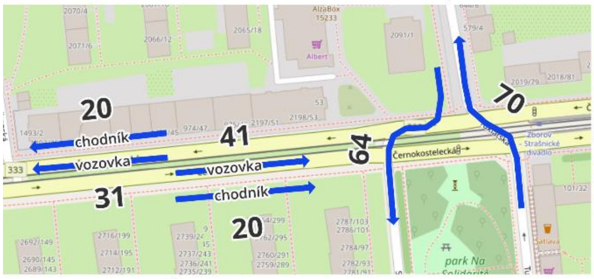


location: Černokostelecká street
year: 2023, ex ante
weekday: non-business day
mobility mode: cycling
data: sum for both directions

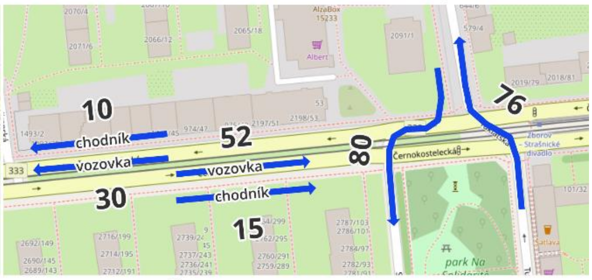


location: Černokostelecká street
year: 2024, ex post
weekday: non-business day
mobility mode: cycling
data: sum for both directions

location: Černokostelecká street
year: 2023, ex ante
weekday: business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)



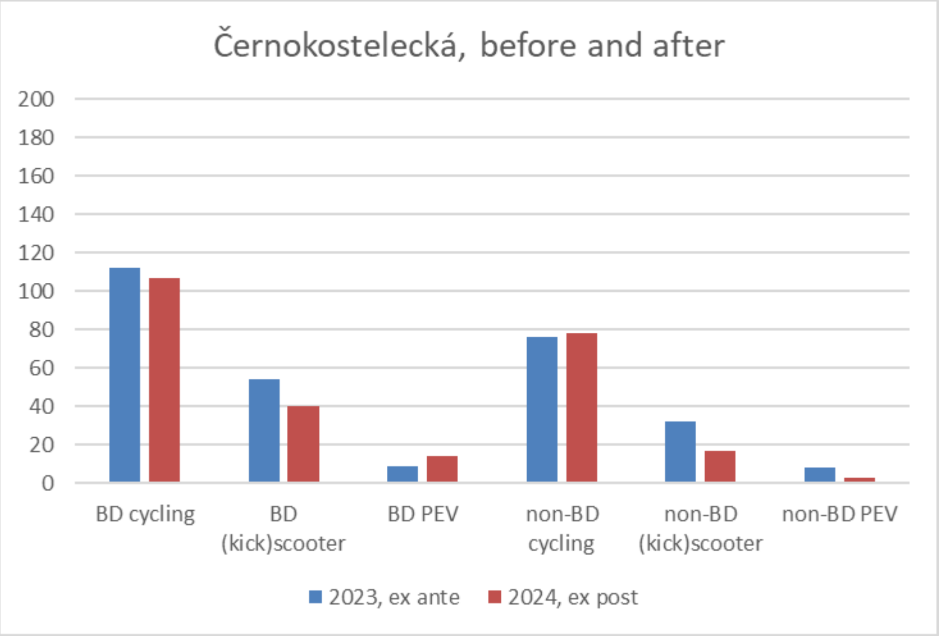
location: Černokostelecká street
year: 2024, ex post
weekday: business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)



location: Černokostelecká street
year: 2023, ex ante
weekday: non-business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)

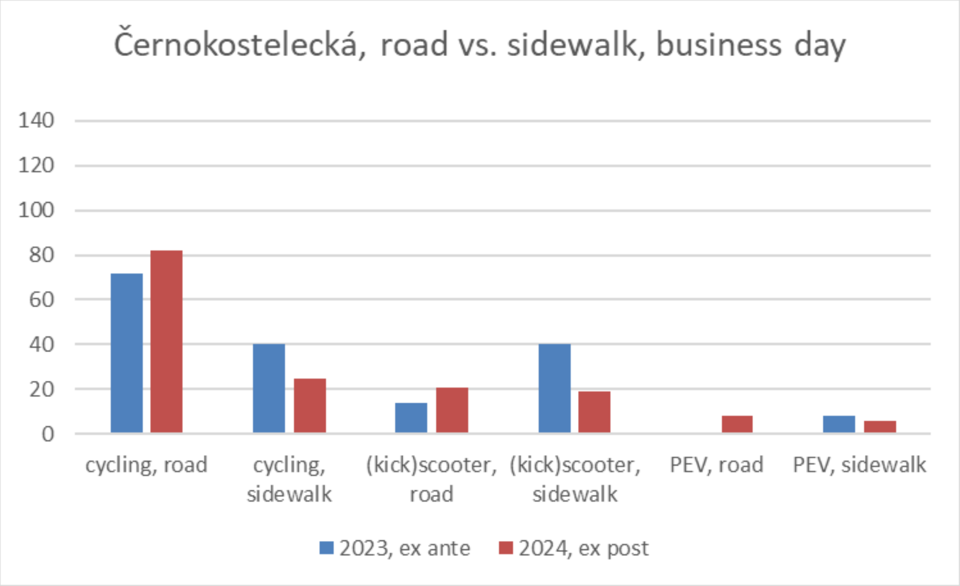
location: Černokostelecká street
year: 2024, ex post
weekday: non-business day
mobility mode: cycling
data: directional, road (vozovka) & path (stezka)

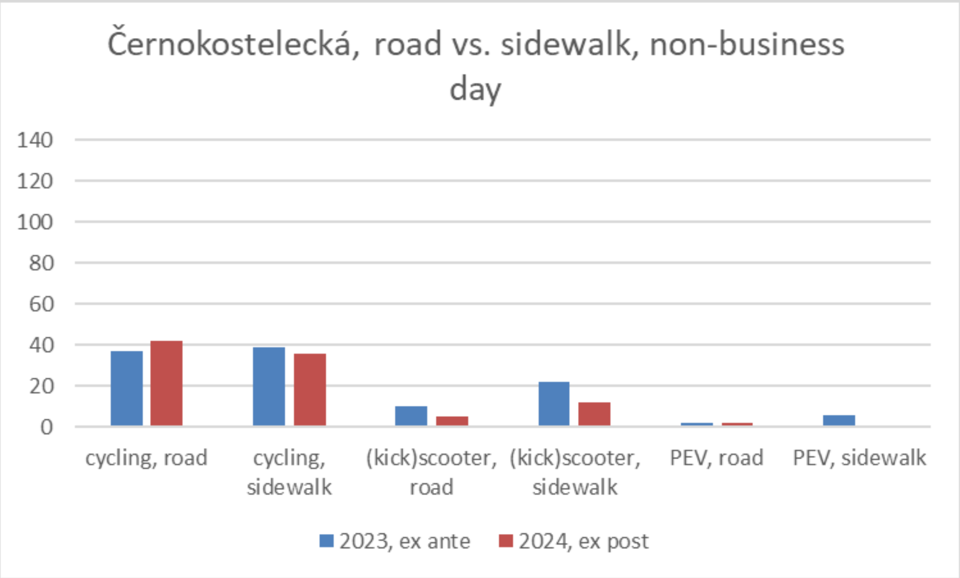
Bicycle, scooter and personal electric vehicle (PEV) traffic was measured on the street. There were no changes in absolute numbers for any of these vehicles. The relative change indicator is affected by the low number of measured passes.



Černokostelecká, before and after						
		count			difference	
		2023	2024		abs.	rel.
BD	cycling	112	107		-5	96%
	(kick)scooter	54	40		-14	74%
	PEV	9	14		5	156%
non-BD	cycling	76	78		2	103%
	(kick)scooter	32	17		-15	53%
	PEV	8	3		-5	38%

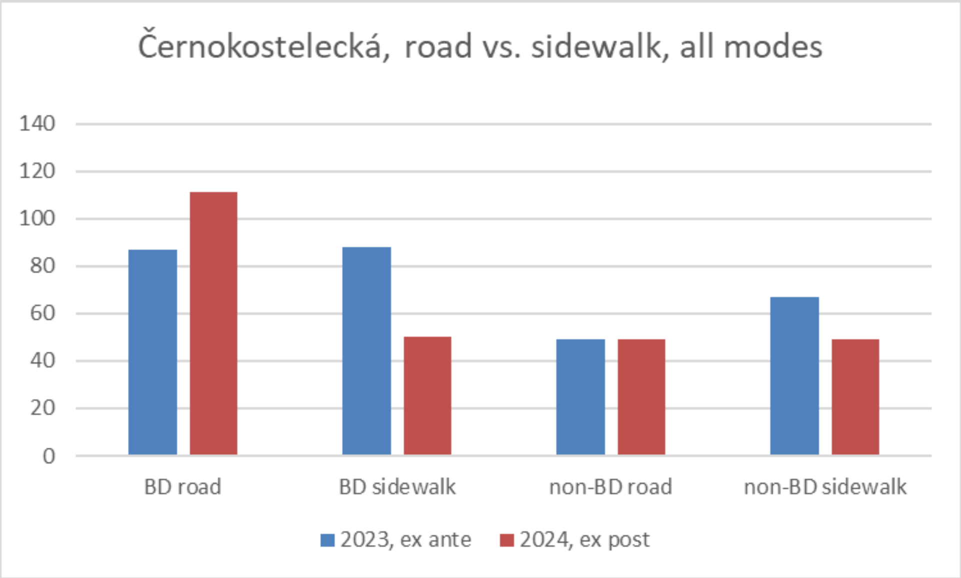
The next variable monitored on this street was the distribution of traffic in the roadway and on the sidewalk to evaluate the extent to which the installation of a soft cycle lane would result in a shift of traffic from the sidewalk to the roadway. In most cases, there was a decrease in sidewalk traffic and an increase in roadway traffic across the board, both on business day and non-business day.





Černokostelecká, road. vs sidewalk						
		count			difference	
		2023	2024		abs.	rel.
BD	cycling, road	72	82		10	114%
	(kick)scooter, road	14	21		7	150%
	PEV, road	1	8		7	800%
	cycling, sidewalk	40	25		-15	63%
	(kick)scooter, sidewalk	40	19		-21	48%
	PEV, sidewalk	8	6		-2	75%
non-BD	cycling, road	37	42		5	114%
	(kick)scooter, road	10	5		-5	50%
	PEV, road	2	2		0	100%
	cycling, sidewalk	39	36		-3	92%
	(kick)scooter, sidewalk	22	12		-10	55%
	PEV, sidewalk	6	1		-5	17%

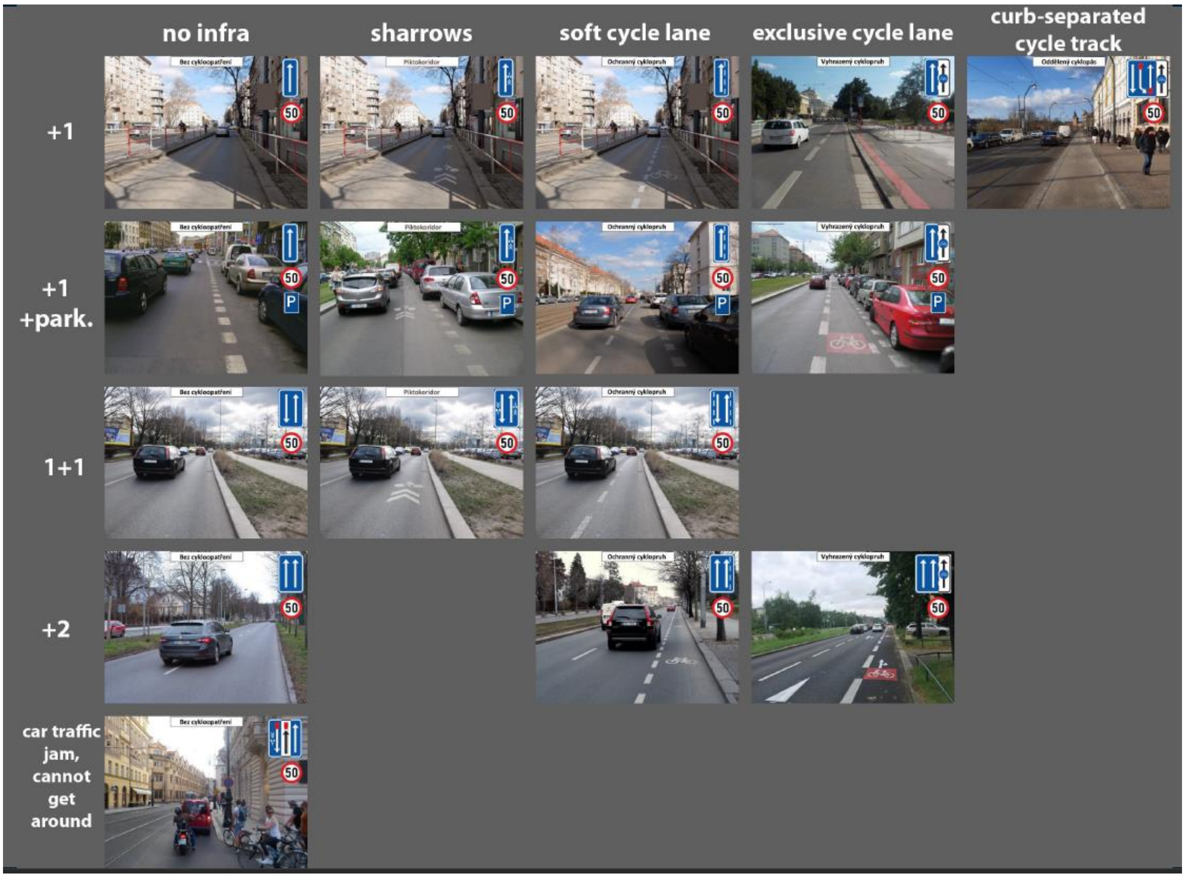
To evaluate the overall effect of the soft cycle lane on the transfer of traffic from the sidewalk to the roadway, all measured modes were combined. On weekdays, there was a 28% increase in traffic in the roadway and a 43% decrease in traffic on the sidewalk. On non-working days, a 27% decrease in traffic on the sidewalk and no change in traffic in the roadway were measured.



Černokostelecká, all modes combined, road. vs sidewalk						
		count			difference	
		2023	2024		abs.	rel.
BD	road	87	111		24	128%
	sidewalk	88	50		-38	57%
non-BD	road	49	49		0	100%
	sidewalk	67	49		-18	73%

C.2.2.1 Safety evaluation of the measure

A sample of 1,200 respondents from Prague was used to test how bicycle users perceive the safety of cycling on different types of streets. In total, respondents had the opportunity to rate sixteen different situations, which varied according to the cycling facility, the number of lanes and the routing alongside parked motor vehicles. The graphic below represents all the situations evaluated.

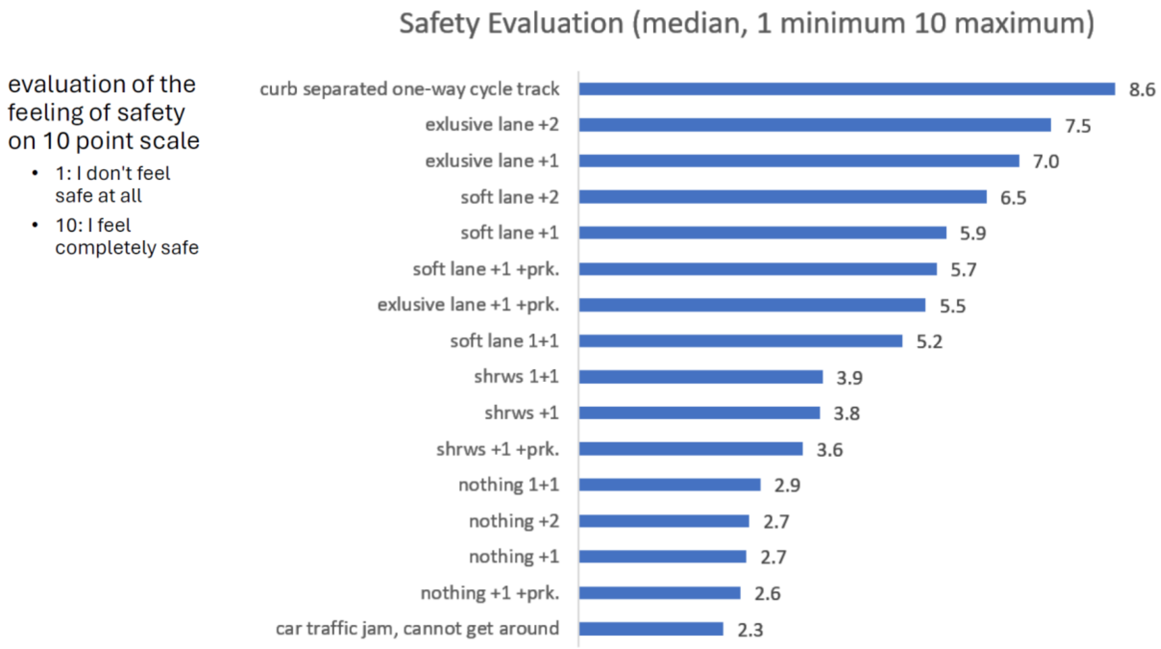


On Černokostelecká Street, sharrows were first established to guide cycle traffic, which were subsequently replaced by a soft cycle lane. In the street, the original sharrows, now soft cycle lane, were placed between the motor vehicle lane and the motor vehicle parking lane. In terms of the situations evaluated, this is the following type of arrangement:

24 BEFORE, 2023

25 AFTER, 2024

According to the respondents' assessment, there is only a minor difference in the perception of safety between the two situations. On a ten-point scale, where point 1 represents the rating "I don't feel safe at all" and point 10 represents the rating "I feel completely safe", the situation on Černokostelecká Street achieves a safety rating of 3.9 before the soft cycle lane and a rating of 5.2 after the soft cycle lane. This is an improvement in the feeling of safety, but only to a lesser extent.



C.3 Up-scaling and transferability of measure

C.3.1.1 Štvanice footbridge

The Štvanice footbridge is a unique project embedded in a specific urban environment with its specific characteristics of the given location. The project has resulted in an unprecedented increase of active mobility, with a significant increase in the number of journeys by bicycle and an almost doubling of journeys on foot. Transferability can be thought of in the more abstract context of connecting two densely populated urban areas through a corridor dedicated only to active mobility, which overcomes a significant barrier.

In the case of the examined footbridge, it is about overcoming a natural barrier formed by the Vltava River. However, the barriers preventing comfortable and safe movement in the city do not have to be only of river character. They can be the division of urban units by an urban highway, a railway body, a closed industrial area, terrain, or very often a network of streets with intensive motor traffic. The Štvanice footbridge shows that the construction of a high-quality corridor for active mobility, which in this case is completely segregated from motor vehicle traffic, leads to a strong enhancement of active mobility. This induction is linked to the connection of two urban units that contain sources and destinations of trips or are connected to other protected corridors for active mobility.

C.3.1.2 Soft cycle lane at Černokostelecká street

In terms of scalability and portability, cycle lanes are a less demanding measure for a cycling facility to implement and finance. In fact, Prague has been continuously establishing cycle lanes on collector roads for over a decade. In terms of achieving results, however, it is noticeable that the effect of the measures varies depending on the nature of the road where the cycle lanes are established. A pilot study examining the case of Černokostelecká suggests a mixed effect of soft cycle lanes.

The soft cycle lane installed on the studied street did not lead to the induction of new cycle trips, the number of which remained roughly the same as before the measure was implemented. However, there was a shift of a small proportion of trips from the sidewalk to the cycle lane in the roadway. If the objective is to increase the attractiveness of cycling in the city, then a soft cycle lane placed between parked and moving vehicles is not a measure that will achieve this objective.

Bicycle users rate significantly better the safety of a cycling route that does not place them between moving and parked vehicles and where there is no close overtaking by cars. By a large margin, they rate as safest arrangements where they are separated from motor traffic by at least a curb. From the point of view of transferability and the enhancement of active mobility, it can then be recommended to establish those facilities on collector roads where there is more separation from motor vehicles, and which are perceived by bicycle users as the safest.

C.4 Summary of evaluation results

C.4.1.1 Štvanice footbridge

The Štvanice footbridge represents a newly built transport corridor for active mobility, which is completely segregated from motor vehicle traffic. The footbridge connects to a heavily used pedestrian and cycling path on the south side, and to the pavement and soft cycle lane in the roadway on the north side. The footbridge also provides the shortest link between two densely populated urban areas.

After the opening of the footbridge, there was a partial shift of traffic from the existing active mobility route and furthermore an intensive traffic induction. At the nearest Hlávek Bridge there was a significant decrease in pedestrian and bicycle traffic, which shifted to the newly opened footbridge. However, this decrease alone is not sufficient to explain the intense traffic on the footbridge. According to measured data, the footbridge induces one thousand new trips for bicycle traffic on weekdays and five hundred new trips on non-business days. In the case of walking, the number of induced trips is even significantly higher, with two thousand six hundred new trips on working days and three thousand one hundred new trips on non-working days. The footbridge has then significantly impacted on walking with strollers, with the majority of stroller trips on the Hlávek Bridge shifting to the footbridge, while at the same time the number of stroller trips has almost doubled due to the use of the footbridge.

C.4.1.2 Soft cycle lane at Černokostelecká street

The aim of the piloting on Černokostelecká Street was to evaluate the effect of the soft cycle lane on inducing new bicycle trips and increasing the attractiveness of riding in the roadway instead of riding on the parallel sidewalk. There is no significant cycle route along the studied street and the cycling traffic on it is very moderate compared to other streets in Prague.

The installation of a soft cycle lane on this street is not associated with an increase in the number of bicycle trips, which was measured at a similar level before and after the installation of the soft cycle lane. However, the measured data suggests that there was an order of magnitude lower tens of percent increase in the number of trips in the roadway and a decrease in the number of trips on the sidewalk. Thus, to a lesser extent, the soft cycle lane transfers some bicycle, scooter, and PEV traffic from the sidewalk to the roadway. The lack of induction of new bicycle trips may be partly explained by the safety ratings from the perspective of cyclists, where the introduction of soft cycle lane instead of the previous sharrows is not significantly associated with improved perceptions of safety (a difference of 1.3 points on a 10-point scale). Thus, a soft cycle lane placed between the moving and parked motor vehicles does not seem to be perceived as sufficiently attractive and safe to the extent that people would seek it out for their journeys or that its provision would lead to people who did not previously cycle to start cycling.

D. Process Evaluation Findings

n/a

Hungary

A. Description of the measure

In the framework of the CEAML project, the project partnership would have followed the transformation of Trefort Street into Iskola Street in Budapest, with ex ante and ex post investigations on site. However, the public space transformation intervention was not completed on schedule, so the partnership had to look for another site in Józsefváros. The choice was made between the already transformed Déri Miksa Street and the not yet transformed Német Street. While a section of Déri Miksa Street is completely closed to traffic, Német Street has a higher volume of traffic and also a significant number of target users due to the elementary school located there.

Figure 26. View of the Déri Miksa Street

Figure 27. View of Német Street

B. Implementation of the measure

N/A

C. Impact Evaluation Findings

C.1 Measurement methodology

C.1.1 Impacts and Indicators

Table C1.1: Indicators

No.	Impact	Indicator	Data used	Comments
1.	Perceived comfort and safety	sensored observations (sight, smells, noises etc.)	Field survey, Researcher observation	
2.	Perceived comfort and safety	structure of the space	Field survey, Researcher observation	
3.	Perceived comfort and safety	human activities	Field survey, Researcher observation	
4.	Perceived comfort and safety	characteristics of passengers	Field survey, Researcher observation	
5.	Perceived comfort and safety	characteristics of traffic	Field survey, Researcher observation	
6.	Perceived comfort and safety	Healthy Street Evaluation	Field survey, Researcher observation	
7.	Traffic volume	Vehicle, bicycle and pedestrian traffic	Traffic counting	
8.	Traffic volume	Vehicle speed	Traffic counting	
9.	Noise pollution	Noise level	accredited noise measurements	

During the field survey, a total of four observers surveyed the characteristics of Miksa Déri and Német Street. The dates of the surveys were 31 May 2024, 7.00-9.00, 15.00-17.00, 3 June 2024, 7.00-9.00, 15.00-17.00. The observers took separate notes and the tables below show some quotes on the characteristics of Miksa Déri and Német Street.

The Healthy Streets methodology questionnaire was completed by all four observers. The table below shows the average of the completions. There is therefore a visible difference between the subjective assessment of Német Street and Déri Miksa Street.

The traffic counting with cameras was carried out between 27 May and 9 June 2024 on Déri Miksa and Német Streets. During the measurement, the contractor placed a Raspberry Pi based sensor in the window of the lOffice community office and the Németh László Primary School building, which fed the data to our servers via a Wi-Fi connection. In addition to vehicle traffic, the sensors also measured bicycle and pedestrian traffic. The subject of the contract was to carry out continuous traffic counts in Déri Miksa and Német Streets, broken down by cyclist, car and lorry categories, for 2 weeks and to summarise and evaluate them in a traffic report.

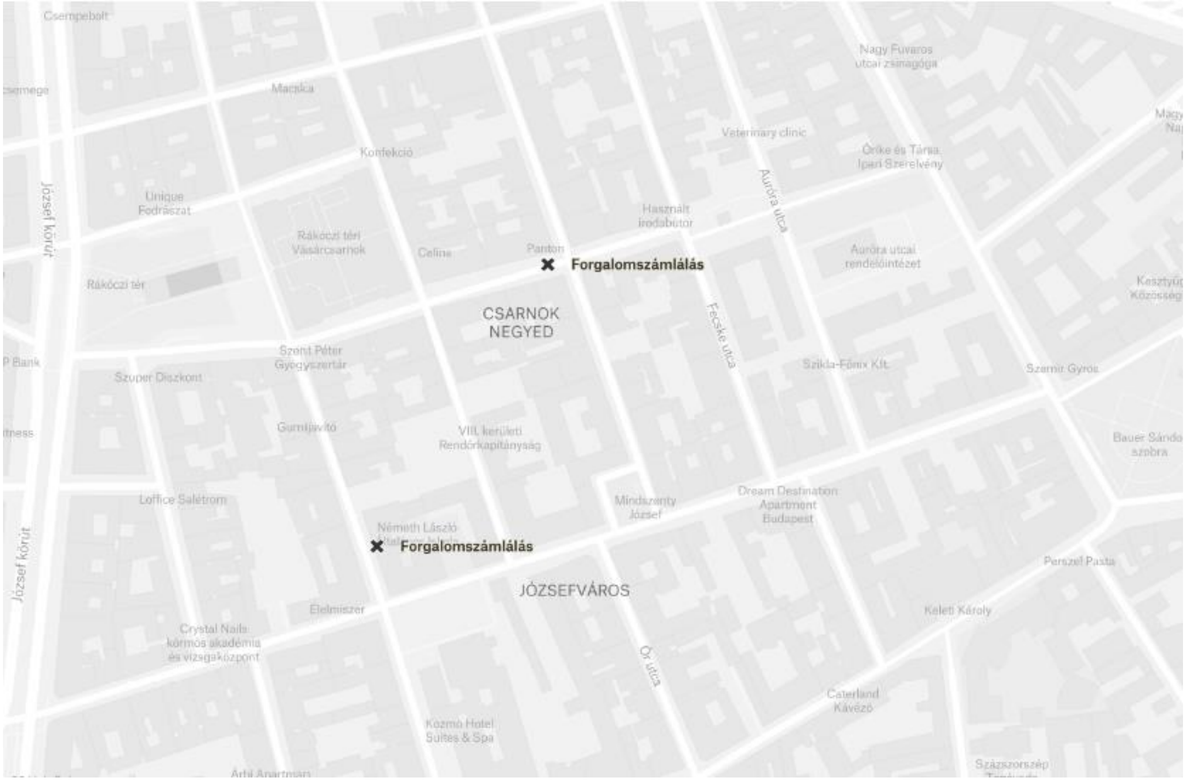


Figure 28. Locations of the traffic counting by camera

The measuring sensor is placed close to the beginning of the street, which means that the measured speed determines the turning speed more than the speeds measured in the middle or at the end of the street. The two locations have different traffic and built environment conditions, which is reflected in the traffic data. Déri Miksa Street carries significant through traffic through the Hall Quarter, which receives several complaints from residents each month. However, the speed of vehicular traffic is slower than that of Német Street due to the environmental design. The network role of Német Street is less important for vehicular traffic, as it is basically used only by local traffic, as it can only be used from József Street back to József Boulevard or back to József Street by car. The motor vehicle traffic passing along this street is about a third of that of Déri Miksa Street, but the environmental design - relatively wide roadway, without slowing pads and other slowing devices - allows for the relatively high speeds of the little motor vehicle traffic that does pass. This is a particular concern for child traffic at the Német Street Elementary School. In order to reduce and calm traffic on both streets, it is important to provide network traffic calming in the Hall District, i.e. to introduce a traffic calming system that filters out non-destination vehicles, and to redevelop the area around the Német Street School to slow or eliminate vehicular traffic. The study was carried out in due time.

The accredited noise measurements were carried out on 29 May and 30 May 2024, and the study examined daytime traffic noise exposure.

The measurements were carried out with the following instruments:

- noise level meter: Brüel & Kjaer 2250L
- Acoustic calibrator: Brüel & Kjaer 4230
- Wind speed meter: Kaindl Electronic Windmaster 2
- Hygrometer: Greisner Electronic GFTH200
- stopwatch: Greisner Electronic CG-501

The measurements were carried out in accordance with Decree 93/2007 (XII. 18.) KvVM on the method of establishing noise emission limits and monitoring noise and vibration emissions.

C.2 Measure results

C.2.1 Field observation based on a set of criteria

Research aspect	Déri Miksa Street
sensored observations (sight, smells, noises etc.)	"The street is nicely renovated, it has a good atmosphere, but in the shady areas there are one or two homeless/drunk people, they are usually avoided by passers-by, but some people from the clinic approached them while smoking, they obviously knew them. The area is quiet, the air is clean. If there are better-off people sitting on the benches, more people use the benches."
structure of the space	"Most of the people passing through (mostly from Nagy Fuvaros Street) either passed in the middle or on the sidewalk on the opposite side of the street from the practice, people coming into the practice from Aurora, some passed under trees. The bicycle lockers are used, people who live in the street store their bicycles here overnight, but some people come to the surgery and leave their bikes here.
human activities	"We would pass by some with small children, the dog walkers were usually young or middle-aged.
characteristics of passengers	Many were pensioners, and a significant number of people were Roma. A lot of people come to the practice in pairs of 2 or 3, some people have a partner waiting for them before the practice. One or two of those coming to the surgery were visibly disturbed/intoxicated, some asked for a cigarette afterwards from passers-by. The more well-off people usually arrived and left the surgery in a hurry (probably on their way to work), this was also noted by the people collecting the signatures."

Research aspect	Déri Miksa Street
characteristics of traffic	"The square is well organised, it gives a good impression, there were people who stopped to look at the plants and take pictures, but it could be cleaned a bit better, especially around the surgery, the street is cleaned every morning at Rákóczi Square and a street cleaning machine went in front of the surgery, but it only cleaned half of the square. People who came to the surgery also complained that the benches were dirty (they were not in a very bad condition, but after the rain they did look cleaner)."

Table 2. Qualitative observations in Déri Miksa Street

Research aspect	Német Street
sensored observations (sight, smells, noises etc.)	"The school building looks nice, but the overall impression of the area and the streetscape is not very good, and the other buildings and pavements are not in good condition. There is no green space directly by the pavements, so the overall impression of the street is grey and dirty. There are two small flower boxes in front of the school entrance, but these are mostly used as toilets by the dogs, so they are smelly and not very attractive. The street feels very narrow because of the cars parked on both sides and the not very wide pavements."
structure of the space	"Pedestrians were passing on the pavement on both sides, however, early in the morning (7:15-7:45) there were a lot of people congested in front of the school, who thus occupied most of the pavement in front of the school, blocking passage. There were not so many cyclists turning around in the street, but I think that they may not be very comfortable to ride because of the cars parked on both sides. This is in contract with the approach taken in Déri street, where bike racks are more widely used. Parking is hampered by the bins on the road."
human activities	"Most people arrived at the school during the time period studied (children with adult chaperones mostly). Most people arrived on foot, but there were also several drivers who stopped near the school for only a few minutes to allow students arriving at the school to get out. Several children or groups of adults also stopped outside the school to chat for a few minutes, and presumably school staff came out to smoke in the area in front of the school."
characteristics of passengers	"The people who arrived at the school were mostly travelling in groups (child(ren) + chaperone(s)). This meant that in terms of age composition there was a mixture of young children of primary school age and adults. Adult chaperones were mixed in age with grandparents and parents, and there were perhaps more female chaperones, but not to a significant extent. In several (about 4) cases, the chaperones arrived with strollers; I do not think the sidewalk in front of the school provides enough room to comfortably accommodate such large families. In terms of social composition, I

Research aspect	Német Street
	did not observe any deviations from the average (no homeless people or behaviourally disruptive people on the street). A larger group of school children (about 15) also left the school accompanied by teachers. People not going to school were mostly walking alone or in pairs on the street, and there were several people walking dogs."
characteristics of traffic	"A minor traffic conflict has arisen due to the lack of parking spaces. A large lorry wanted to park in front of the school (for a school paper collection), but because of the bins and cars parked on the street in front of the school, it could only park further away from the entrance. The school is the main traffic hazard, especially if the cars on the street are moving fast. During the observation, I could not determine the exact speed of the cars, but in two cases I felt that the cars passing through were travelling at dangerously high speeds. Children are separated from parked cars and the roadway in front of the school entrance by a small barrier."

Table 3. Qualitative observations in Német Street

C.2.2 Healthy Streets Evaluation

		Német Street	Déri Miksa Street
1	Speed limit for motor vehicles	1,0	2,0
2	Motor vehicle traffic volume	3,0	3,0
3	Provision of cycle traffic at intersections	1,0	1,0
4	Pedestrian crossings at the entrances to parking areas and at the mouths of minor side streets connected to the route	0,3	3,0
5	Provision of pedestrian crossings between intersections (river section)	0,7	3,0
6	Provision of pedestrian crossings at intersections	0,3	3,0
7	Accessibility, equal opportunities	0,3	3,0
8	Quality of the pavement surface	1,0	3,0
9	Space requirements for pedestrian traffic	0,7	3,0
10	Quality of pavement	1,0	3,0
11	Space requirements for cycling	0,0	3,0
12	Public cycle storage facilities	0,0	2,0
13	Seating	1,3	2,0
14	Street lighting	1,3	3,0
15	Trees	1,3	3,0
16	Green infrastructure	0,3	3,0
17	Drinking fountains	0,0	0,0
18	Storm water drainage, utilisation	0,7	2,0
	Summary	**14,3**	**45,0**

Table 4. Comparison of Déri Miksa and Német Street from the perspective of the Healthy Streets methodology

C.2.3 Traffic counting

	Déri Miksa Street	Német Street
Per hour	During the day, 80-100 vehicles passed per hour, and 100-150 at peak times.	During the day, 20-25 vehicles passed per hour, and 40-50 at peak times.
Weekdays	On working days, we counted around 1000-1200 cars, around 250 lorries and around 500 two-wheelers.	On working days, we counted about 300-400 cars and a negligible number of trucks and about 250 two-wheelers.
Weekends	On weekend days we counted about 800-900 cars, about 250 lorries and about 250 two-wheelers.	On weekend days we counted about 250-300 cars, about 30 trucks and about 150 two-wheelers.
Speed	The majority of vehicles passed were under 10 km/h, due to camera placement close to intersection and raised intersection.	Most of the vehicles passed were travelling at 20 km/h, due to camera placement close to intersection.
Share of speed	The speed distribution shows that drivers were travelling faster, at 15-20 km/h, between 8-10am and on some days between 2pm and 4pm.	The distribution of speeds indicates that there were more relative fast drives in the morning and afternoon hours. As there were fewer vehicles passing during these times, the average speed could jump by a couple of vehicles.

Figure 29. Characteristics of the traffic in Déri Miksa and Német Street

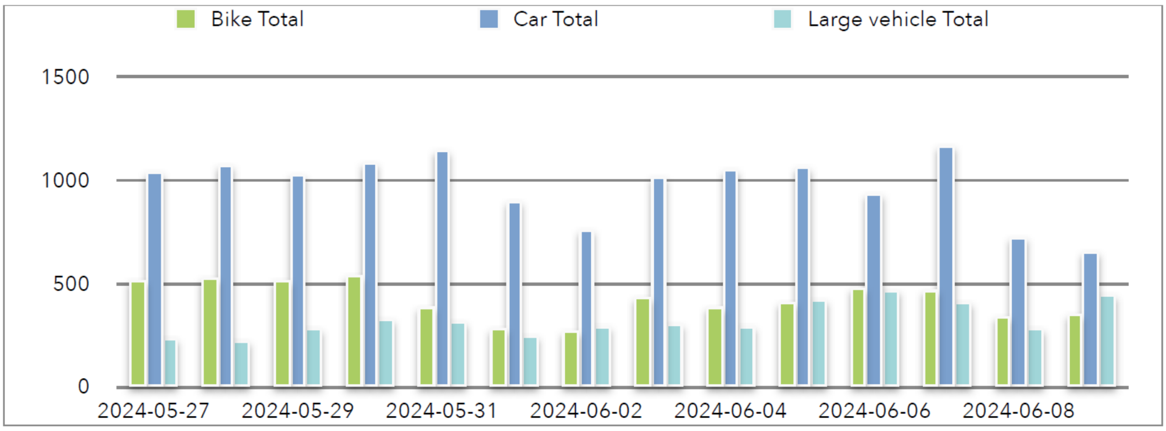


Figure 30. Traffic volume in Déri Miksa Street

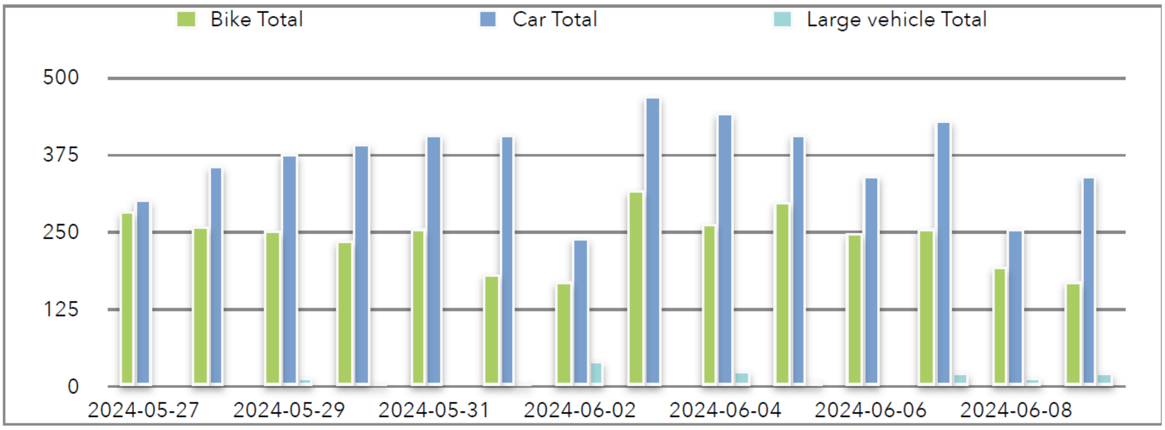


Figure 31. Traffic volume in Német Street

C.2.4 Analogue traffic measurement

During the analogue traffic counts, a total of four observers monitored the traffic on Déri Miksa and Német Streets, including cars, cyclists and pedestrians. The measurement dates were 31 May 2024, 7.00-9.00, 15.00-17.00, 3 June 2024, 7.00-9.00, 15.00-17.00. An overview of the traffic data measured during the peak periods is shown in the following figures.

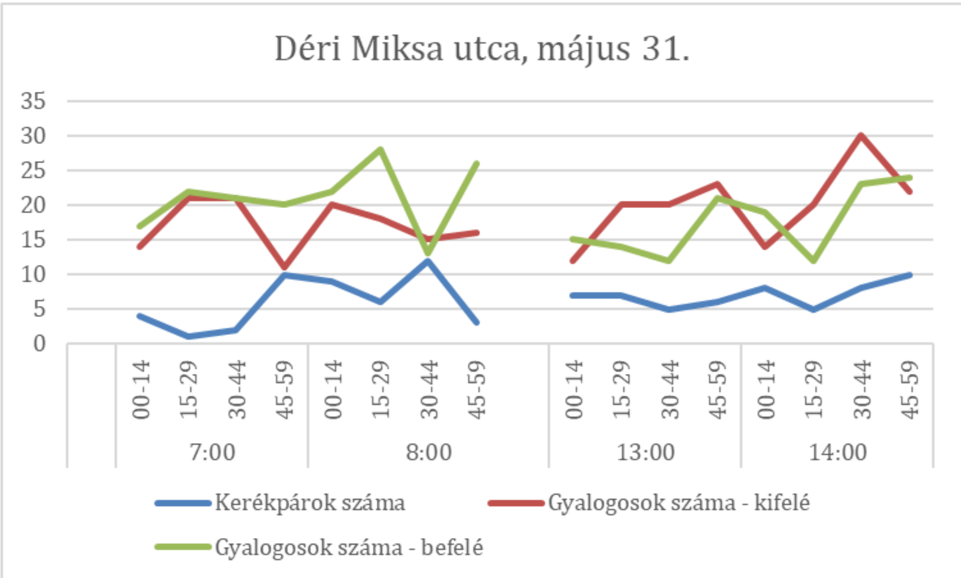


Figure 32. Traffic in Déri Miksa Street, 31 May

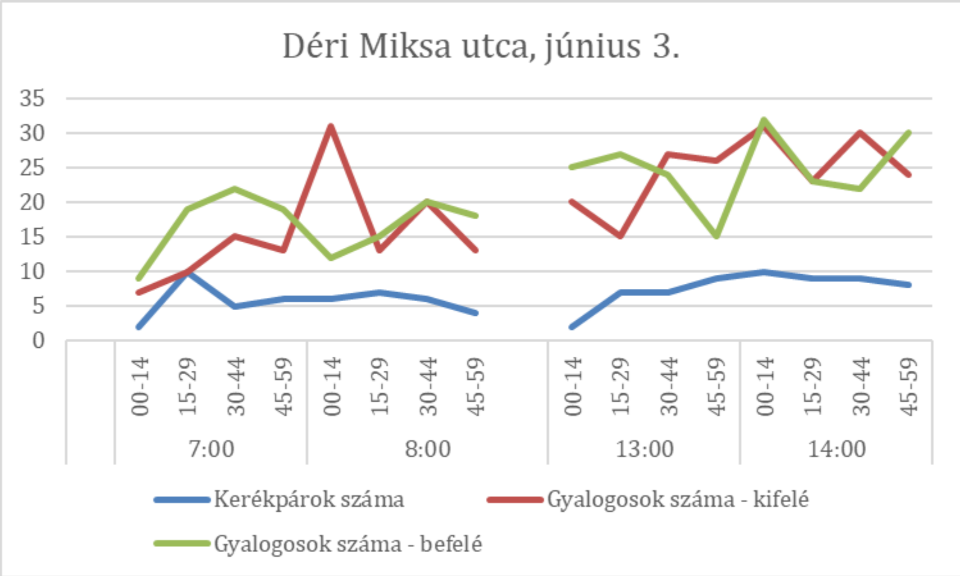


Figure 33. Traffic in Déri Miksa Street, 3 June

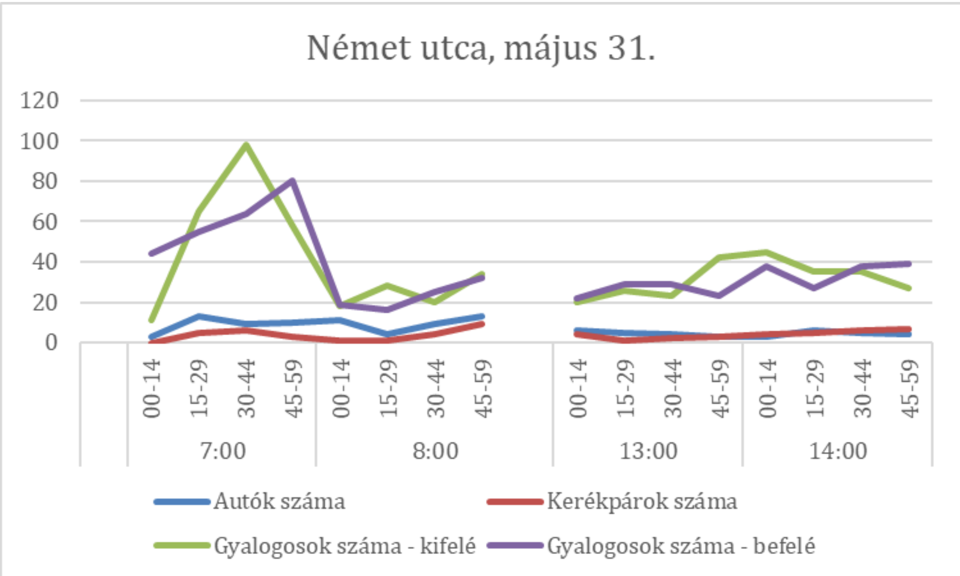


Figure 34. Traffic in Német Street, 31 May

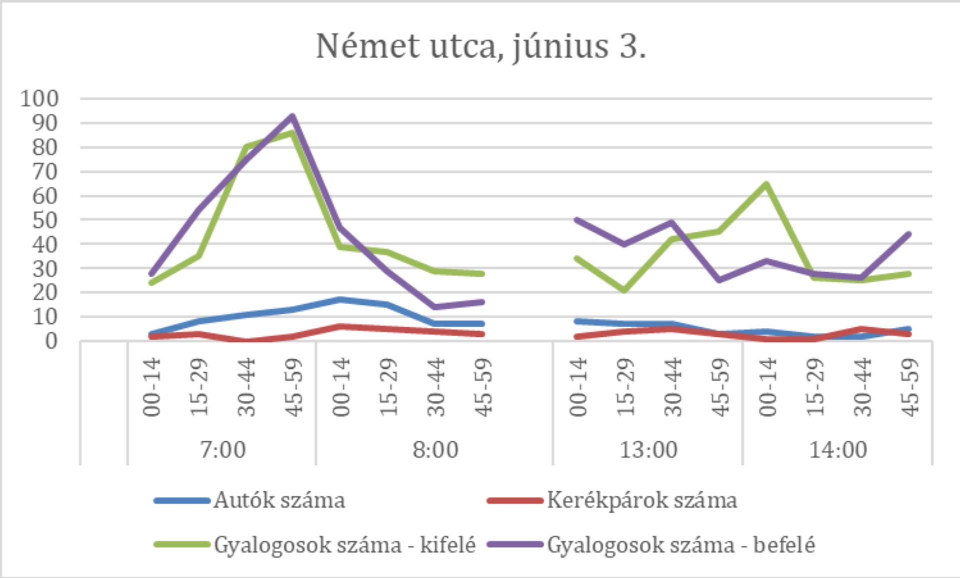


Figure 35. Traffic in Német Street, 3 June

C.2.5 Accredited noise measurement

The area is classified as a "high-intensity urban residential area, typically enclosed, with closed courtyards" according to the district zoning plan. The traffic noise exposure limits for the area are as follows:

- In Déri Miksa Street, the measured daytime traffic noise exposure is well below the daytime noise exposure limit of 52.3 dB.
- The measurement not far from the intersection of Német Street and József Street shows a daytime traffic noise exposure of 63.5 dB, i.e. below the limit value, but close to it.

C.3 Up-scaling and transferability of measure

N/A

C.4 Summary of evaluation results

N/A

D. Process Evaluation Findings

N/A

Slovakia

A. Description of the measure

A.1 Situation before CEAML

The measure is situated in one of the peripheral neighbourhoods of Bratislava called Lamač, where a construction of housing estate Podháj started in 1974. The works included also reconstruction of road infrastructure, including the main street of the same name, in line with the modernism urban planning and traffic planning of 70’s in Czechoslovakia, with its typical elements such as wide street profiles, infrastructure designed with focus on motorised traffic and generous road widths.

When it comes to the traffic infrastructure, the street remained with no significant changes until recent years. In 2018, the City of Bratislava announced reconstruction of the street in terms of renovating the asphalt surface of the road. According to Cyklokoalícia, the level of traffic safety was unsatisfactory that time, and the design of the street was over-dimensioned in favour of motorised traffic in context of the purpose of the street. Undesirable and potentially dangerous behaviour of both drivers and pedestrians were frequent, documented in the video back in 2018.

Figure 36: Crossing of Podháj street with Studenohorská and Podlesná street, 2021.

To improve the situation and use the full potential of road reconstruction, Cyklokoalícia prepared the project for a redesign of the street (using traffic marking, without building works), including some of the best practice elements, such as road diet, creation of safe cycle lanes and shortening of zebra crossings. The project was rejected by the municipality and different project was implemented instead, without traffic calming measures and with dangerous, narrow cycle lanes in “door zone”.

Figure 37: Poorly designed bicycle infrastructure implemented in 2018.

In 2021, the municipality (led by the new mayor) decided to revive the project from Cyklokoalícia and updated several elements to current needs, as well as all road marking according to the new Slovak Traffic signs law, adopted in 2020. In addition, the municipality have chosen Malokarpatské námestie Elementary School, adjacent to Podháj street, to be a part of the Streets for Kids project, focused on improving safety in the school surroundings, which came in the synergy with CEAML project.

A.2 Objectives

The measure objectives are:

- To increase the traffic safety of all street users
- To increase the modal share of active modes of transport in the area
- To increase perceived traffic safety
- To decrease other negative impact of car traffic, such as noise pollution

A.3 Description

Podháj is located in the Lamač neighbourhood in the west of Bratislava. The street serves as an arterial road for part of the neighbourhood, connecting it to the road I/2 on one end, which serves as a main road connection of Bratislava and its suburbia on the west (besides the highway). There are several less busy residential roads connecting to the street.

The whole street is part of the basic bicycle network as defined in the General Traffic Plan of Bratislava, 2016, as a cycle route "O7", which connects to the radial "R12" to the city centre. The importance of O7 route will rise with the completion of the cycle bridge above the highway in its continuation, which will connect Lamač with Dúbravka neighbourhood. Currently, the cycle route has meaning mostly for local transport. Thanks to its location at the foot of Small Carpathian with several recreational forest routes, it has also importance for recreational cycling.

Figure 38: Planned (red dashed line) and implemented (full line) cycle routes in Bratislava. Podháj on the right side of the picture. (Source: mapa.cyklokoalicia.sk)

Total length of the redesigned part of the street is cca. 1100 meters. The redesign consists of several key elements:

- Road diet – reducing number of lanes and/or width of the road section used by motor vehicles

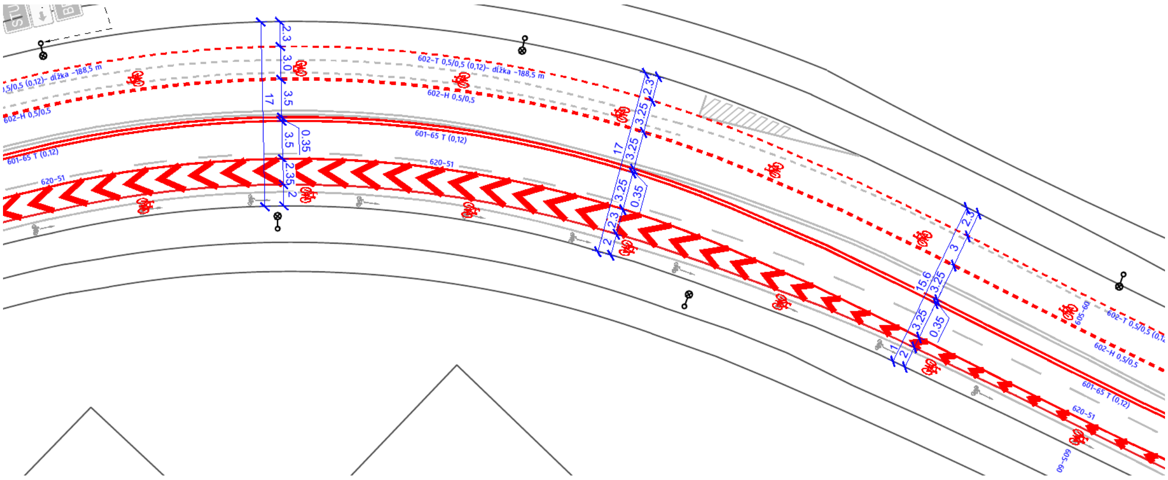


Figure 39: Project documentation (Source: Magistrát hlavného mesta SR Bratislavy)

- Reduced length of the pedestrian crossing with traffic islands

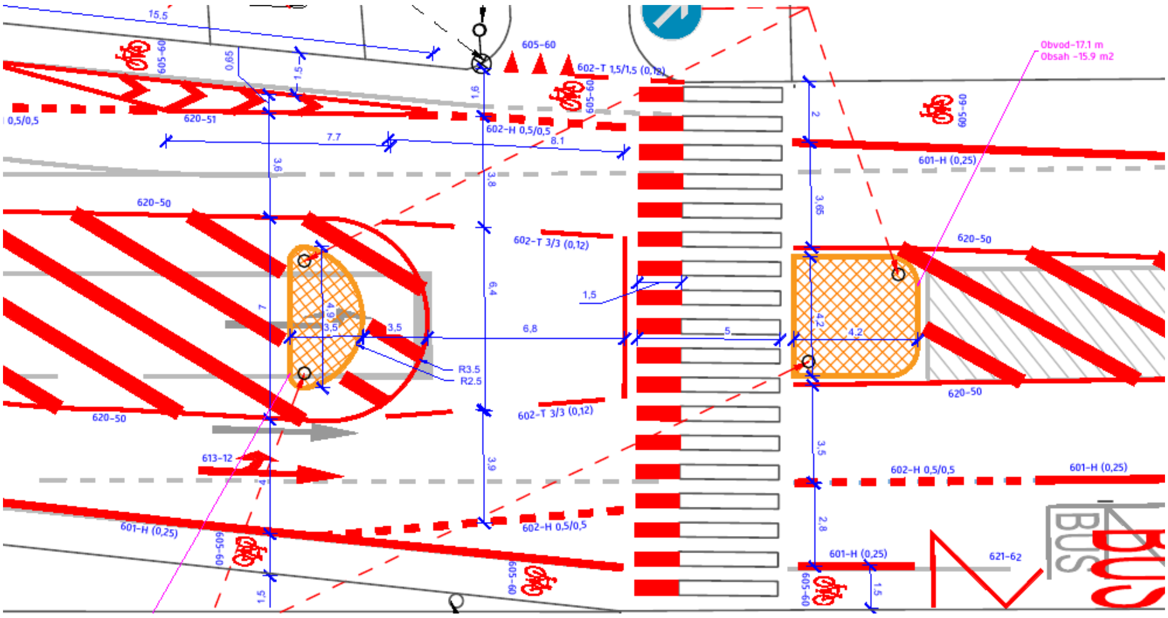


Figure 40: Project documentation (Source: Magistrát hlavného mesta SR Bratislavy)

- Bicycle lanes in both directions (varying width, in sections with parking the bicycle lane is protected by parking cars)

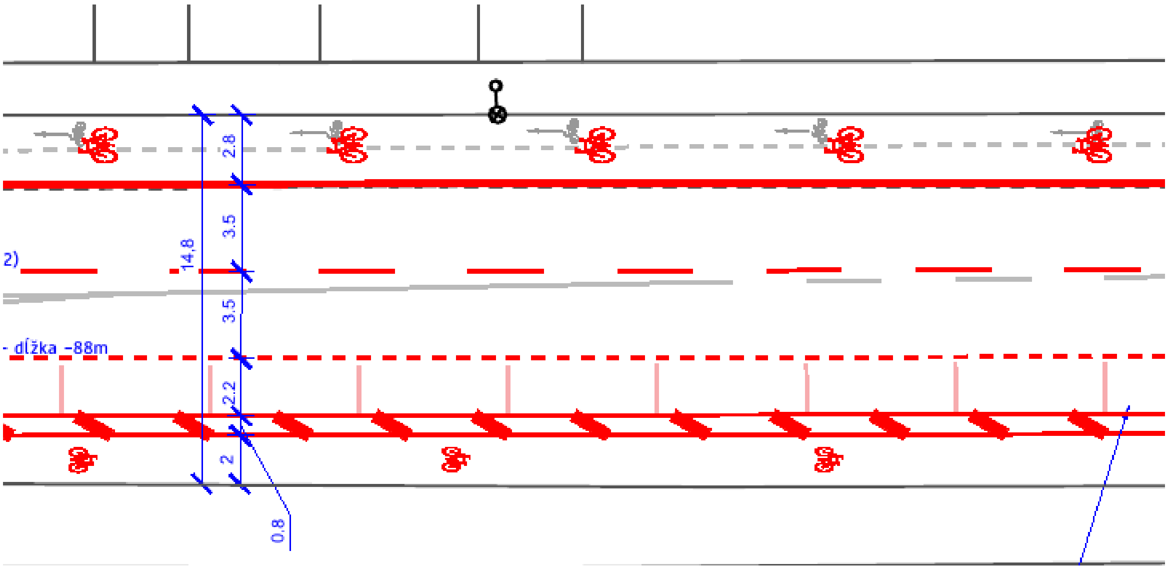


Figure 41: Project documentation (Source: Magistrát hlavného mesta SR Bratislavy)

- Reduced turning radius at several smaller intersections

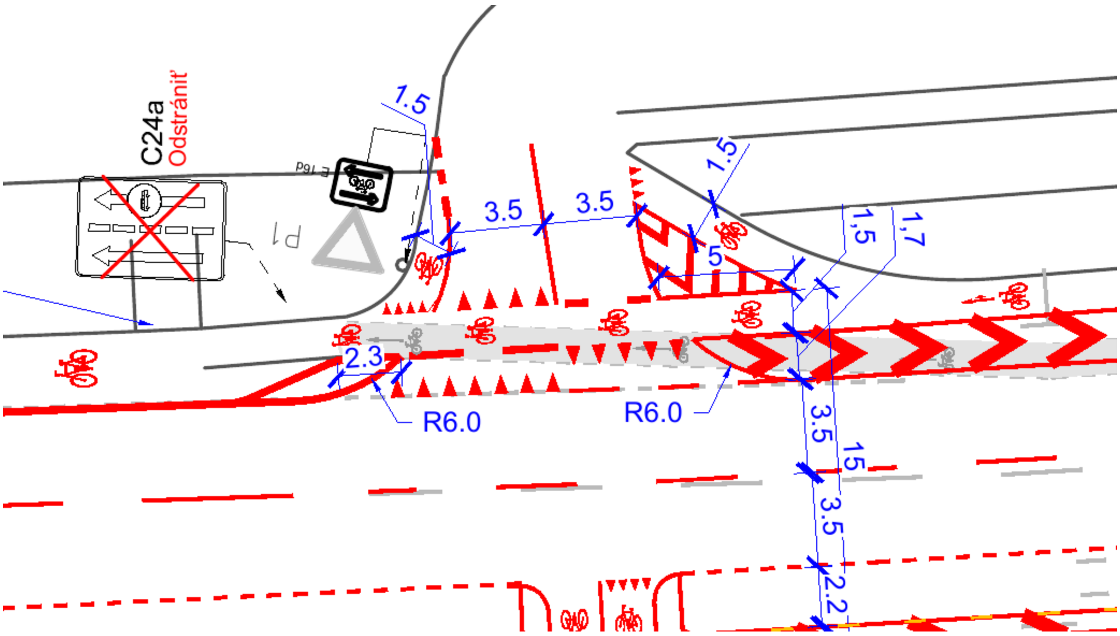


Figure 42: Project documentation (Source: Magistrát hlavného mesta SR Bratislavy)

- Complete redesign of the intersection Podháj – Studenohorská – Podlesná as the “Dutch intersection”, including protected bicycle lanes with possibility of indirect turn in all directions, physical traffic islands, reduced length of pedestrian crossings, lower speed of cars in the intersection, intuitive signage - shark teeth, etc.

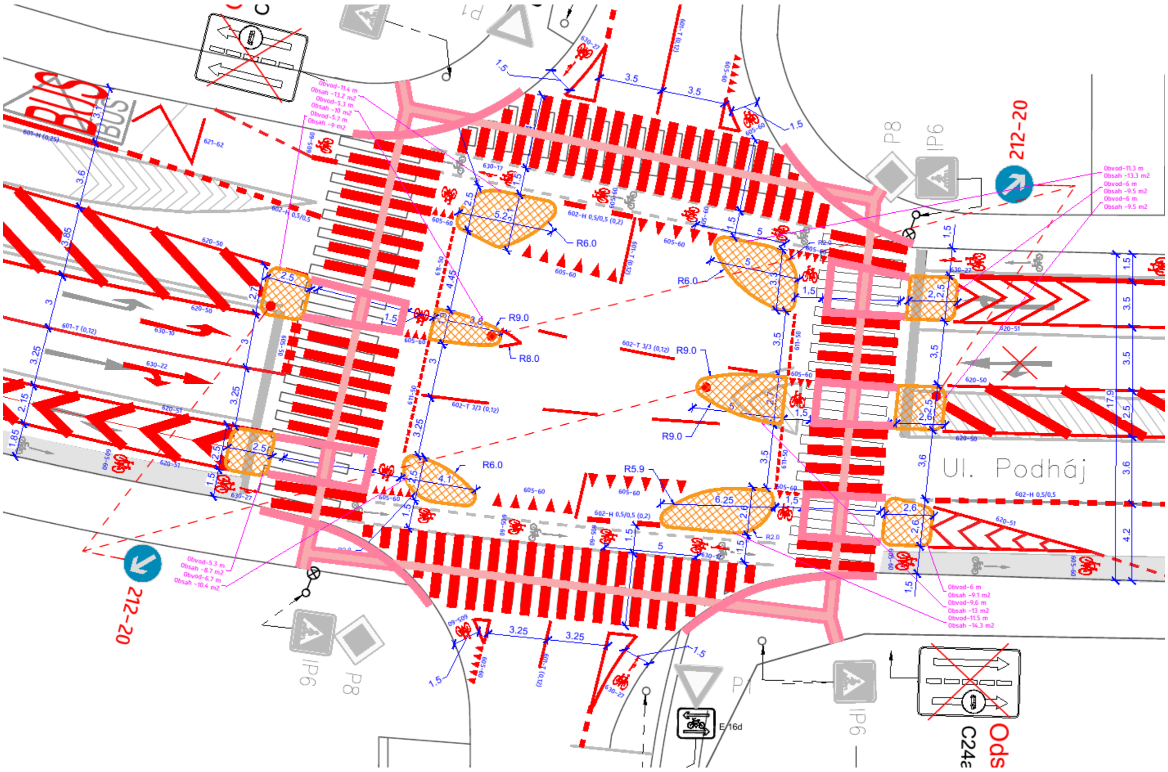


Figure 43: Project documentation (Source: Magistrát hlavného mesta SR Bratislavy)

- Mini-roundabout at the intersection Podháj – Cesta na Klanec

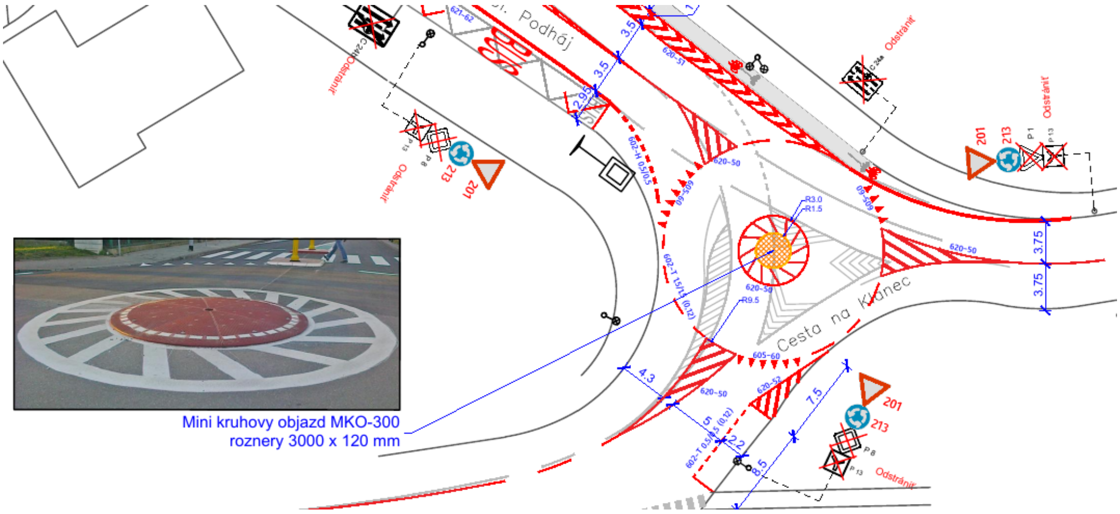


Figure 44: Project documentation (Source: Magistrát hlavného mesta SR Bratislavy)

The before – after comparison of the parts that were implemented in 2024 can be seen below:

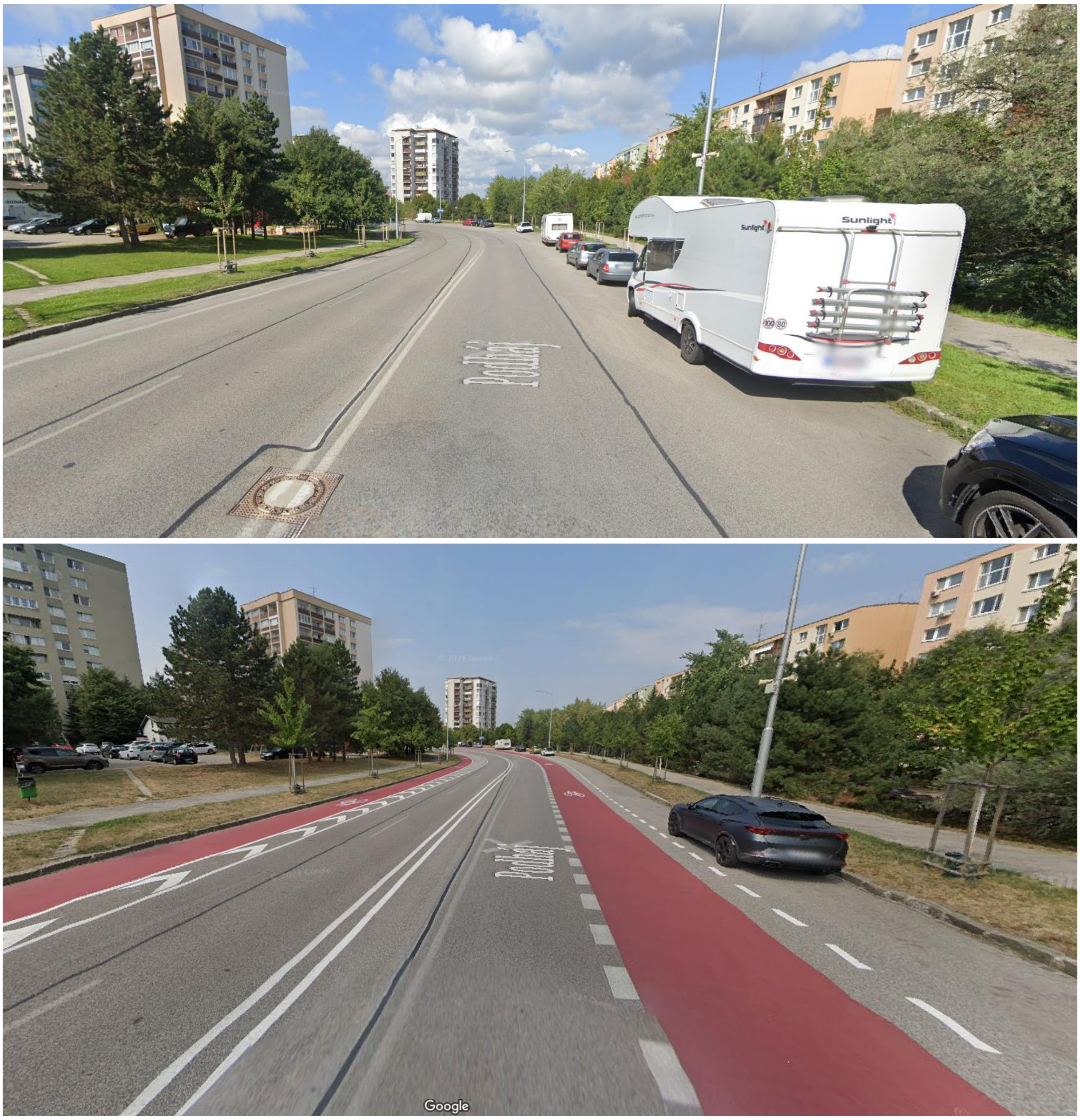


Figure 45: Road section at western part of Podháj street in September 2023 and August 2024 (Source: Google Maps)

Figure 46: Intersection Podháj x Podlesná x Studenohorská in September 2023 and August 2024 (Source: Google Maps)

Figure 47: Pedestrian crossing in front of Malokarpatské námestie Elementary school in September 2023 and August 2024 (Source: Google Maps)

B. Implementation of the measure

B.1 Stage 1: Preparation

The project documentation was ready in 2022, but the implementation was postponed to 2023, which can be connected to the local elections in the end of 2022 and the measure still considered controversial by local politics. Even though the implementation was planned for 2023, because of the unexpected financial problems of the municipality (interventions into mechanisms financing the municipalities from the state level), it was postponed again to early 2024.

The implementation in 2024 was delayed again and the changes were finally implemented in May 2024. However, only partially. Mainly due to local politicians' concerns about public acceptance, only those parts of the project where there is no reduction in parking spaces have been implemented. This means mostly the western (lower), busier part of the street, where Podháj x Studenohorská x Podlesná crossing is located. Implementation of the remaining part was postponed until the introduction of PAAS (parking regulation system) in the area, securing more parking spaces for the residents.

B.2 Stage 2: Implementation

During implementation, several minor mistakes were made which resulted in poorer public acceptance of the changes. These include, for example, the incorrect and subsequently obliterated underpainting of cycle crossings, or the lack of temporary signage highlighting the works, which resulted in a car colliding with a yet-to-be-completed traffic island.

B.3 Stage 3: Operation

Outside of the scope of pilot study.

B.4 Cost and Financing of the Measure

Planning	**unknown**
Material	**unknown**
Other costs	**unknown**
Total measure costs	***€ 82 445***

C. Impact Evaluation Findings

C.1 Measurement methodology

C.1.1 Impacts and Indicators

Table C1.1: Indicators

No.	Impact	Indicator	Data used	Comments
1	Higher traffic safety	Percentage of speeding vehicles	Own measurements with the speed gun	
2	Higher traffic safety	Average speed of motor vehicles	Own measurements with the speed gun	
3	Higher traffic safety	Number of transport accidents	Data from the Police	
4	Higher traffic safety	Number of people killed and seriously injured (KSI) caused by transport accidents	Data from the Police	
5	Higher traffic safety	Perceived safety - pedestrians	Own on-street survey	
6	Higher traffic safety	Perceived safety – parents of schoolchildren	Survey by MIB	
7	Higher share of pedestrians using the street, Higher share of cyclists using the street	Number of pedestrians	On-street traffic count	
8	Higher share of pedestrians using the street, Higher share of cyclists using the street	Number of cyclists	On-street traffic count	
9	Higher share of pedestrians using the street, Higher share of cyclists using the street	Number of cars	On-street traffic count	
10	Higher share of cyclists and pedestrians among schoolchildren	School commuting modal share	Survey by MIB	
11	Higher traffic safety (cyclists)	Percentage of woman cycling	On-street traffic count	
12	Higher traffic safety (cyclists)	Percentage of children cycling	On-street traffic count	
13	Higher traffic safety (cyclists)	Number of cyclists carrying a child	On-street traffic count	
14	Other impacts	Noise perception	Own on-street survey	
15	Other impacts	Arrogance of space	Arrogance of space mapping	
16	Other impacts	Frequency of traffic law violations by cyclists and pedestrians	On-street observations	

C.1.1.1 Detailed description of the indicator methodologies:

C.1.1.1.1 Percentage of speeding vehicles

The speed of motor vehicles was measured from the bus stop Bakošova at the southern side of the street. Only motor vehicles going straight through Podháj street were measured, excluding buses stopping at the bus stop. The speeds were measured with Bushnell Velocity Speed Gun. The accuracy of the device was checked with the certified speed radar.

Four measurements were done in June 2023 at various times of the day (22:15 – 23:00, 11:00 – 11:15, 12:00 – 13:00, 18:20 – 18:50). In total, the speed of 295 vehicles was measured. Similarly, four measurements were done in June 2024 at the same time slots. In total, 268 vehicles were measured.

C.1.1.1.2 Average speed of motor vehicles

See 1. Percentage of speeding vehicles.

C.1.1.1.3 Number of transport accidents

The indicator is only informative and not to be compared with the recent numbers of accidents in the ex-post evaluation as a main comparative indicator because of low absolute numbers in such a short time period after the implementation of the measure.

The data were planned to be obtained through direct request on the Police of Slovak republic on the number of reported accidents on Podháj street annually for the last 10 years. However, the Police of Slovak republic have not provided the information after request. According to the available data from the website of the Ministry of Interior on traffic safety, there were no accidents in years 2022 and 2023.

C.1.1.1.4 Number of people killed and seriously injured (KSI) caused by transport accidents

See 3. Number of transport accidents.

C.1.1.1.5 Perceived safety - pedestrians

The data were collected through on-street survey at the crossing Podháj – Studenohorská – Podlesná on the sample of 110 pedestrians using the street in 2023 and 114 pedestrians in 2024. The question was “Rate the traffic safety on the scale from 1 (I consider traffic at this street very safe) to 5 (I consider traffic at this street not safe at all)”, plus information on assumed age group and gender were collected.

In 2024 an additional question was asked “Podháj Street has been modified in recent weeks. Have these changes improved the safety or comfort of your movement on this street?” with possible answers “Yes” or “No”.

C.1.1.1.6 Perceived safety – parents of schoolchildren

The data were collected through the extensive online survey by the Metropolitan Institute of Bratislava (MIB) as a part of the City for Kids project in 2023 (before the implementation of the measure). The sample consisted of 197 people, parents of children attending Malokarpatské námestie Elementary School. Another set of data was collected in 2024 (after the implementation of the measure) on the sample of 31 people (participants of the first survey that marked their interest in further surveys), with partly same questions and partly new ones, focused specifically on the measure. The second online survey was prepared by MIB together with Cyklokoalícia. Both online surveys were completed by parents of children from all grades at the elementary school (1^{st} to 9^{th}).

C.1.1.1.7 Number of pedestrians

The data were collected by on-street traffic count. The counting took place on Podháj x Studenohorská x Podlesná crossing in June 2023 and June 2024. In total, traffic was count on 7 days (5 working days and 2 weekend days) for 2+2 hours (7:00 – 9:00 and 15:00 – 17:00) both years. Pedestrians, cyclists, cars and buses were counted in all directions of the crossing in 15-minute time slots. Gender and age distribution of cyclists, as well as number of cyclists carrying another person on a bicycle, were also noted.

C.1.1.1.8 Number of cyclists

See 7. Number of pedestrians.

C.1.1.1.9 Number of cars

See 7. Number of pedestrians.

C.1.1.1.10 School commuting modal share

Data were collected by MIB. See 6. Perceived safety – parents of schoolchildren.

C.1.1.1.11 Percentage of woman cycling

Data were collected during the on-street traffic counting. See 7. Number of pedestrians.

C.1.1.1.12 Percentage of children cycling

Data were collected during the on-street traffic counting. See 7. Number of pedestrians.

C.1.1.1.13 Number of cyclists carrying a child

Data were collected during the on-street traffic counting. See 7. Number of pedestrians.

C.1.1.1.14 Noise perception

The data were collected through on-street survey at the crossing Podháj – Studenohorská – Podlesná on the sample of 110 pedestrians using the street in 2023 and 114 pedestrians in 2024. The question was „Rate the noise from the traffic on the scale from 1 (The noise doesn't bother me at all) to 5 (The noise annoys me a lot)", plus information on assumed age group and gender were collected.

C.1.1.1.15 Arrogance of space

The indicator was evaluated through the Arrogance of space tool created by Cyklokoalícia (https://cyklokoalicia.sk/arrogance/) on the concept by Mikael-Colville Andersen, using the orthophoto and the technical drawings.

C.1.1.1.16 Frequency of traffic law violations by cyclists and pedestrians

Data were collected during the on-street traffic counting (see 7. Number of pedestrians). The frequency of undesired behaviour of pedestrians and cyclists (such as crossing the street not at the zebra crossing, sidewalk cycling etc.), which could indicate insufficient infrastructure for those mode of transport, were observed and quantified or noted.

Figure 48: An elderly person choosing the shortest route to the bus stop at Podháj street, 2023.

C.2 Measure results

C.2.1 Impact on the speed of motor vehicles

The positive impact of measure on increasing the traffic safety of all street users is clearly visible on the indicators n. 1 and n. 2, related to the speed of motor vehicles. The percentage of speeding motor vehicles significantly dropped after implementation of the measure (Indicator n. 1).

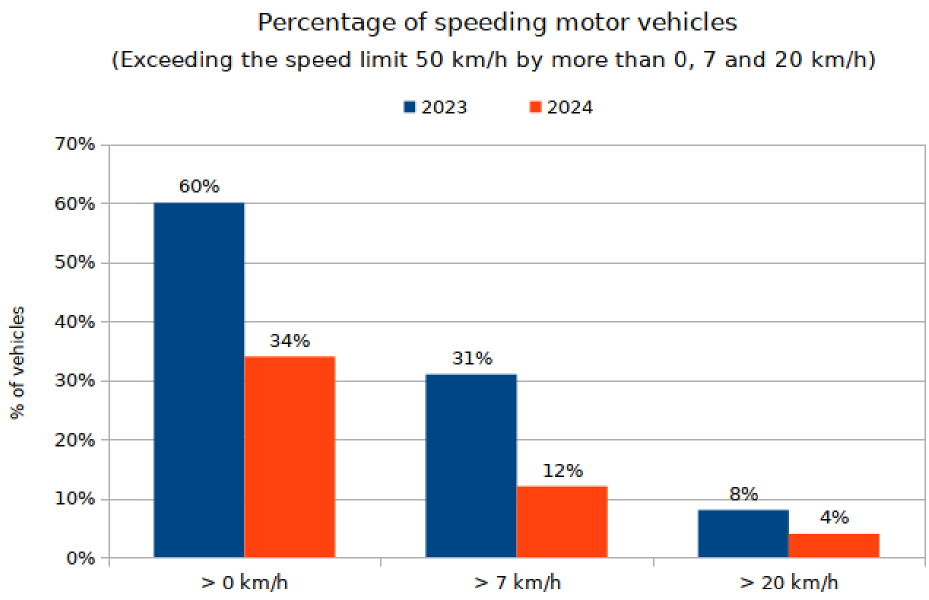


Figure 49: Percentage of speeding motor vehicles

The impact on lowering the speed of motor vehicles is also visible on the average (Indicator n. 2) that decreased from 52.3 km/h to 48.3 km/h and median speeds, that decreased from 52 km/h to 48 km/h.

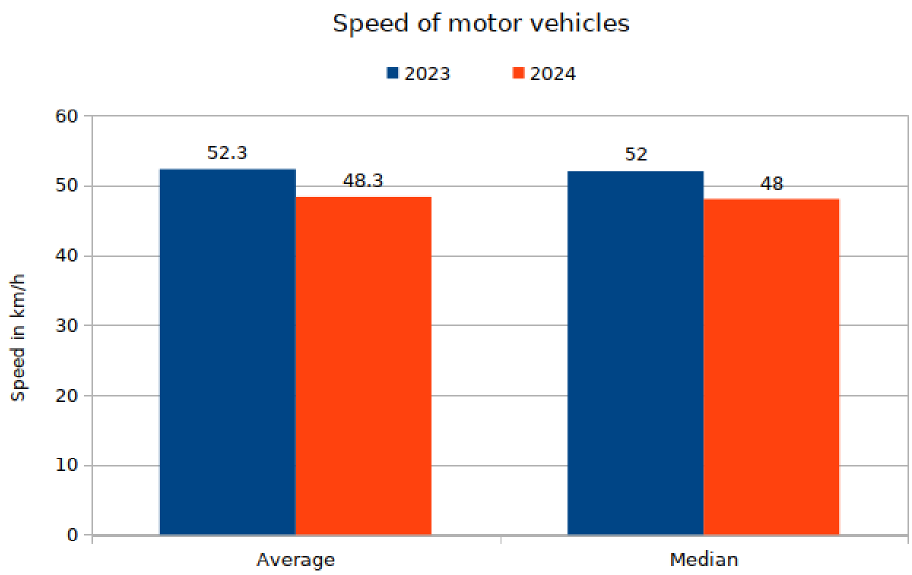


Figure 50: Speed of motor vehicles

Based on these results, it appears that the measure met its objective to increase the traffic safety of all street users, and indirectly also contributed to the increase the modal share of active modes of transport in the area and to decrease other negative impact of car traffic, such as noise pollution.

C.2.2 Modal share and volumes on Podháj street

One of the objectives of the measure was to increase the modal share of active modes of transport in the area, in line with the long-term strategy of the City of Bratislava in transport.

The traffic counting suggests significant increase in both volumes and modal share of cyclists (incl. E-scooters and kick scooters). Although difficult to draw definitive conclusions, this change could be explained as a result of increased perceived safety. However, the modal share of cars remains more or less the same and there is a slight decrease in walking. The comparison between 2023 and 2024 from both weekdays and weekend as well as the whole week can be seen below (Indicators n. 7, 8, 9).

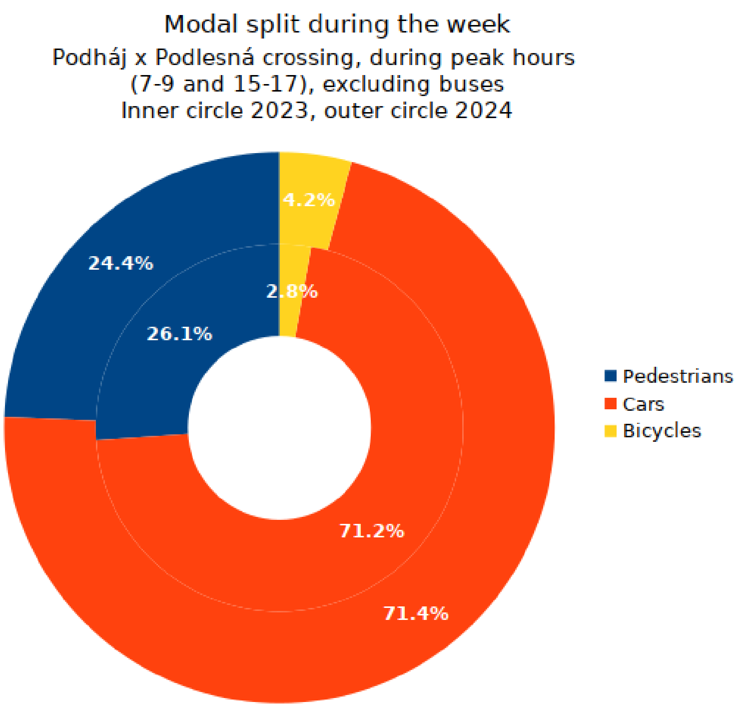


Figure 51: Modal split during the whole week

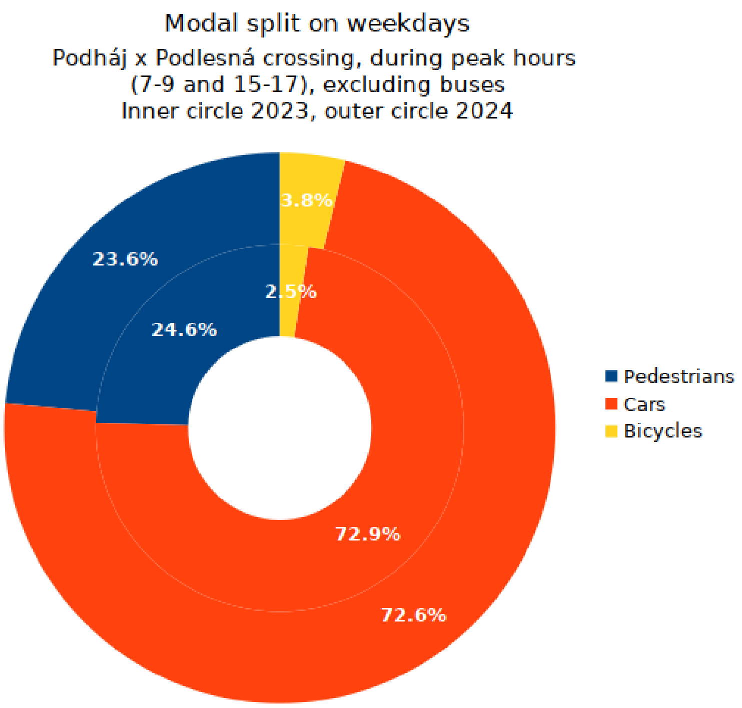


Figure 52: Modal split on weekdays

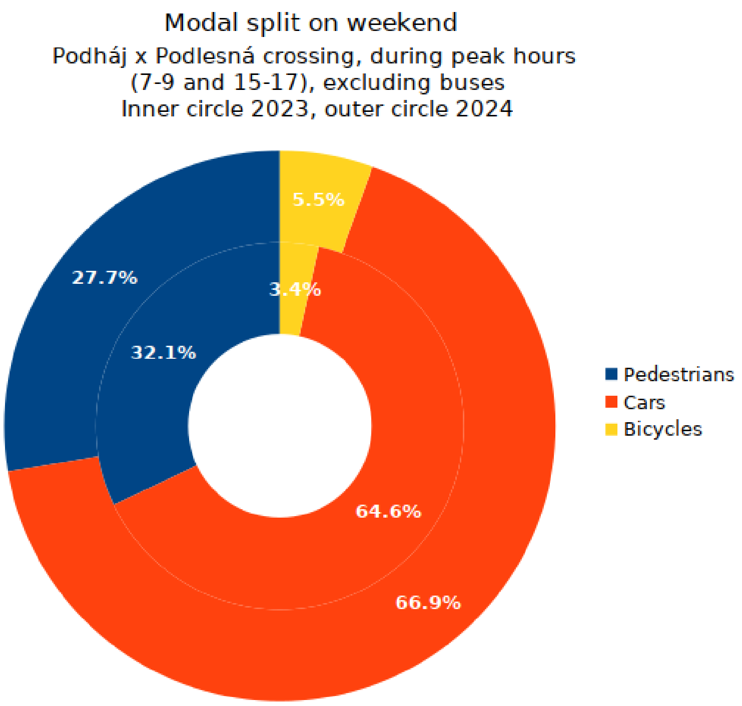


Figure 53: Modal split on weekend

The results show a decrease in absolute numbers of both cars and pedestrians between 2023 and 2024. The difference is even more significant during the weekend, which is probably caused by a sport event happening during the weekend in the school areal on Podháj street in 2023, compared to no mass event in 2024. However, the increase in volumes of cyclists is still present. In general, longer counting period would make the results more precise. Ideally, a permanent traffic counter should be placed in the location.

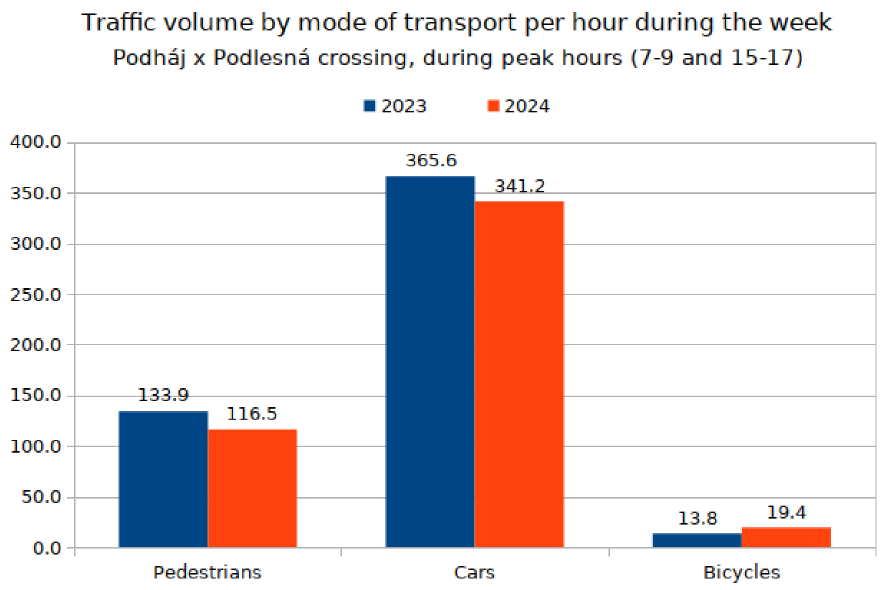


Figure 54: Traffic volumes during the week

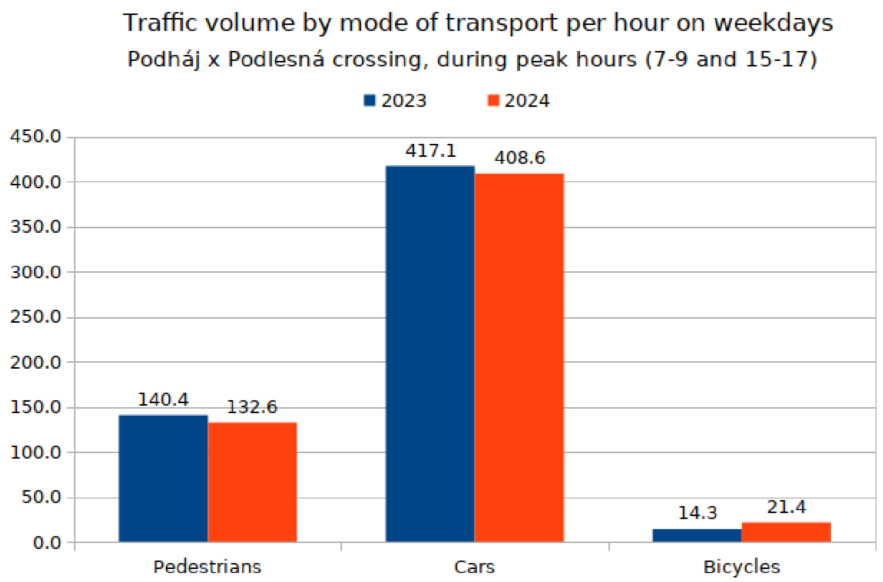


Figure 55: Traffic volumes on weekdays

It is important to highlight that Figures 54 and 55 show that the absolute number of bicycles has increased, and the proportion of car users and pedestrians has lowered, demonstrating a clear mode shift.

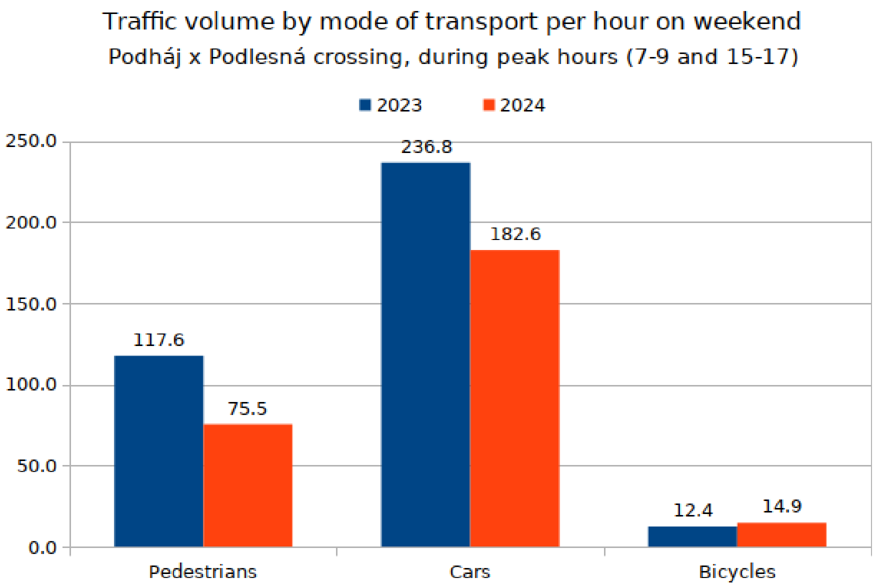


Figure 56: Traffic volumes on weekend

The value of these results is limited by short time between the implementation of the measure and the traffic counting. Some parts with minor influence on the traffic behaviour were even not fully finished (e.g. greenery in the traffic islands). Also, the change in mobility patterns typically requires longer period. Another traffic counting with a longer time gap from the implementation is needed for more accurate impact assessment.

The impact on the mobility patterns was also investigated among the parents of schoolchildren, with 9,7 % stating the actual impact.

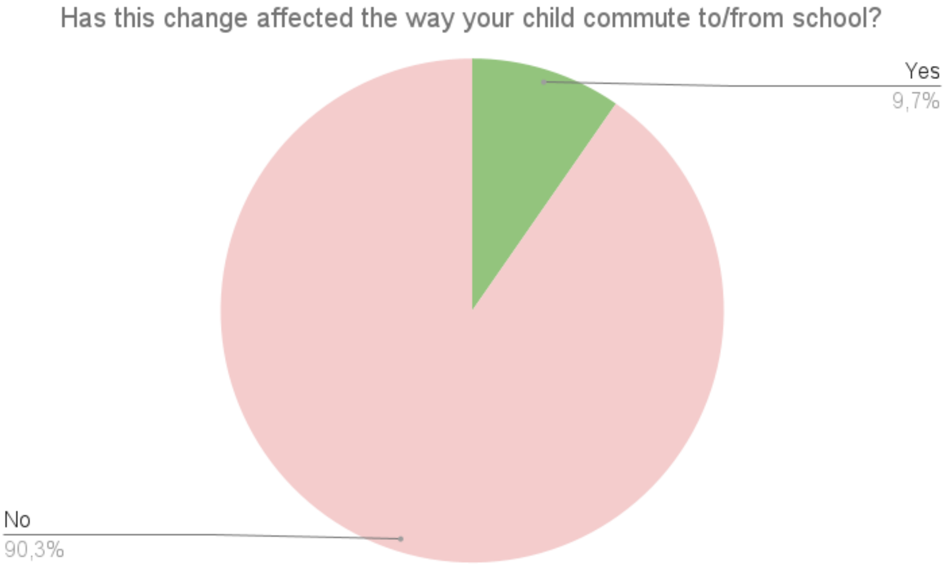


Figure 57: Online survey among parents

One of the parents described the impact of the measure on their child's commute in the online survey as follows:

"Before the changes, I walked my son to school every morning because the traffic was unbearable. After the changes, my son started going to school on his own in the morning. The situation on the road is clearer. You can cross in "stages" - cross one lane, hide behind the island, then cross the other lane safely. In the past, drivers often crossed in front of pedestrians who were already in the crosswalk. All it would take was for a child to run and a tragedy could occur. Now drivers are more disciplined, more focused on crossing the intersection, and that makes it easier for pedestrians."

The modal split of schoolchildren was not investigated in 2024 due to late implementation of the project, already at the end of the schoolyear and is a subject of future surveys. In 2023, 21 % of schoolchildren stated they come to school by car, 3.5 % by bicycle/kick scooter, 47 % by walk and 10 % by bus.

C.2.3 Perceived safety

The on-street surveys among pedestrians indicate a possible improvement in perceived safety (Indicator n. 5). There is just a very slight improvement in the average score in question "Rate the traffic safety on the scale from 1 (I consider traffic at this street very safe) to 5 (I consider traffic at this street not safe at all)" – from 2,25 in 2023 to 2,20 in 2024. However, the question related to change suggest bigger impact. When asked "Have these changes improved the safety or comfort of your movement on this street?", 68 % of pedestrians answered "Yes" and 32 % answered "No".

Answers of the parents of schoolchildren attending Malokarpatské nám. Elementary School suggest even more significant improvement in the perceived safety, as shown on the charts below.

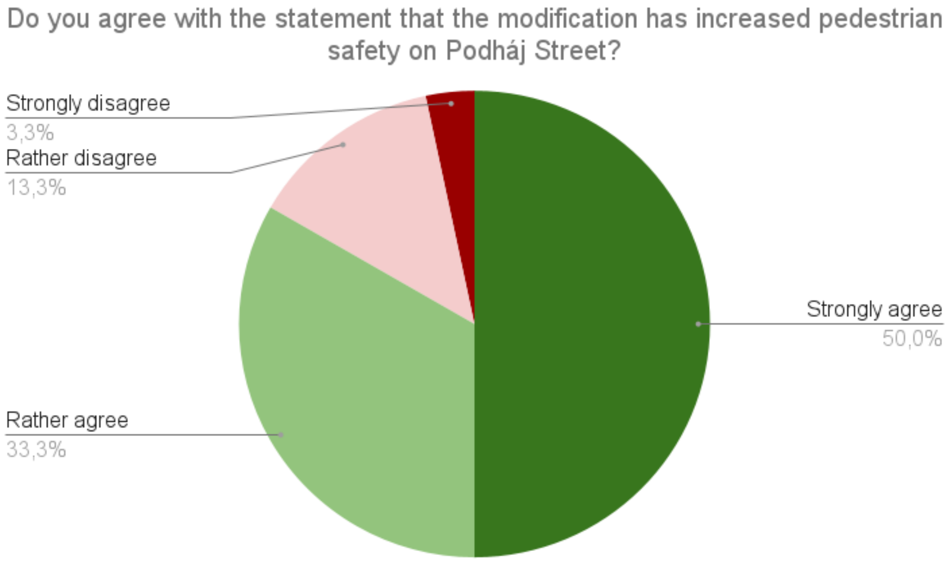


Figure 58: Online survey among parents

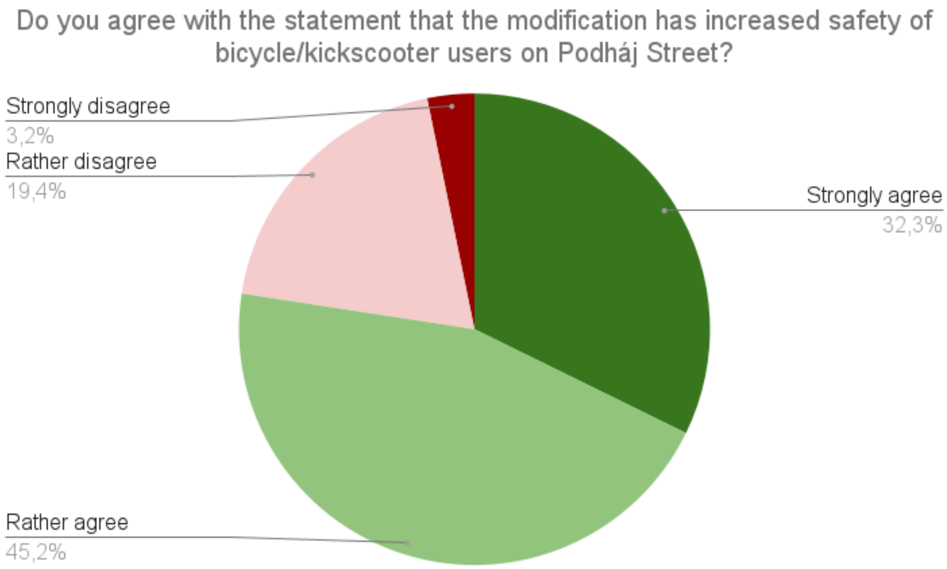


Figure 59: Online survey among parents

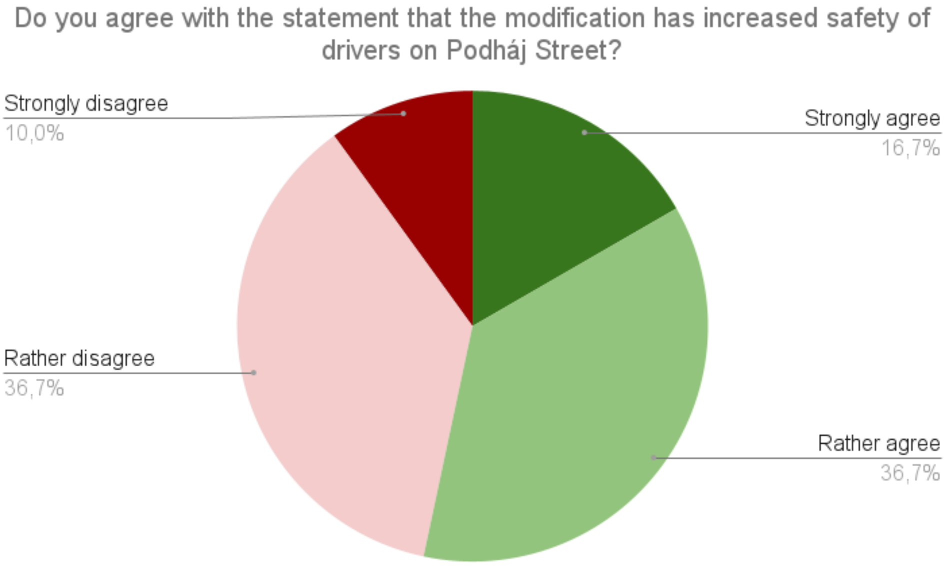


Figure 60: Online survey among parents

Other investigated factors that may have connection with the perceived safety were numbers of certain groups that are considered as more sensitive to traffic safety, such as women (Indicator n. 11), children (Indicator n. 12) and cyclists with a child in a child seat on their bicycle (Indicator n. 13). The results do not show a significant change when it comes to women (slight decrease) and children (increase). Significant decrease by half is present for cyclists with a child in a child seat, but considering low absolute numbers, no conclusions can be drawn from this result.

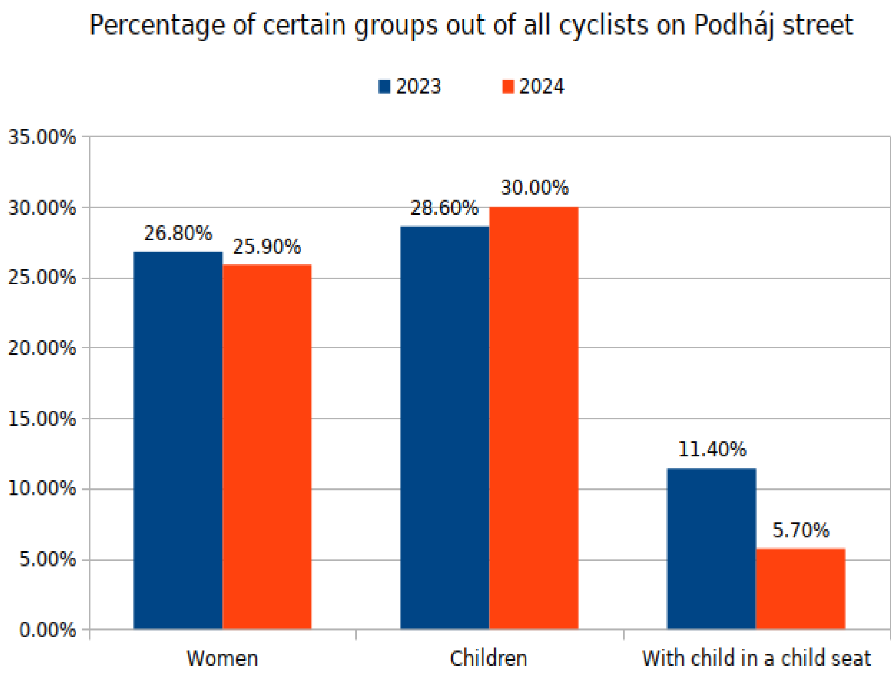


Figure 61: Percentage of certain groups in traffic counting

The pre-implementation survey of the children's parents also revealed the following:

- 29 % of parents consider school surrounding not safe, with the following most frequent reasons:
    - High speed of cars
    - Crossing Podháj x Studenohorská x Podlesná
    - Pedestrian crossing to the bus stop
- 17 % of parents said that they would consider change of their children’s mode of transport from car if the school surrounding was safer
- 7 % of parents said that they would consider change of their children’s mode of transport from car if there would be a safe cycle lane
- 10 % of parents are not happy about the way how their kid is commuting to school
- 75 % of them would be happier if the walking was safer and 20 % if there would be a safe cycle lane

The survey was not repeated due to aforementioned reasons and is a subject of future investigation. However, it appears that the measure answers to significant part of the parents (resp. their children) by providing safer cycle lane, reducing speed of cars or improving safety of walking.

C.2.4 Noise perception

Based on the decrease in the number and speed of vehicles, we assume that the noise levels from the traffic are lower after the implementation of the measure. However, perception of noise by pedestrians in the area (Indicator n. 14) doesn’t show a significant change.

The average score from the question „Rate the noise from the traffic on the scale from 1 (The noise doesn’t bother me at all) to 5 (The noise annoys me a lot)“ actually slightly increased from 1,45 in 2023 to 1,62 in 2024. These results shows that the noise perception is not considered a major problem by the users of the street, with low scores in both years.

The presence of noise from the highway nearby, that could be possibly considered as bigger problem than the noise from Podháj street itself, could also affect the results. For deeper insight in the topic of noise pollution on the street, the noise level measurements would be needed.

C.2.5 Distribution of public space

Excessive space demands can be considered as one of the negative impact of car-oriented infrastructure, which was secondary targeted by the measure. The “Arrogance of space” concept was used to compare the use of public space before and after the implementation (Indicator n. 15).

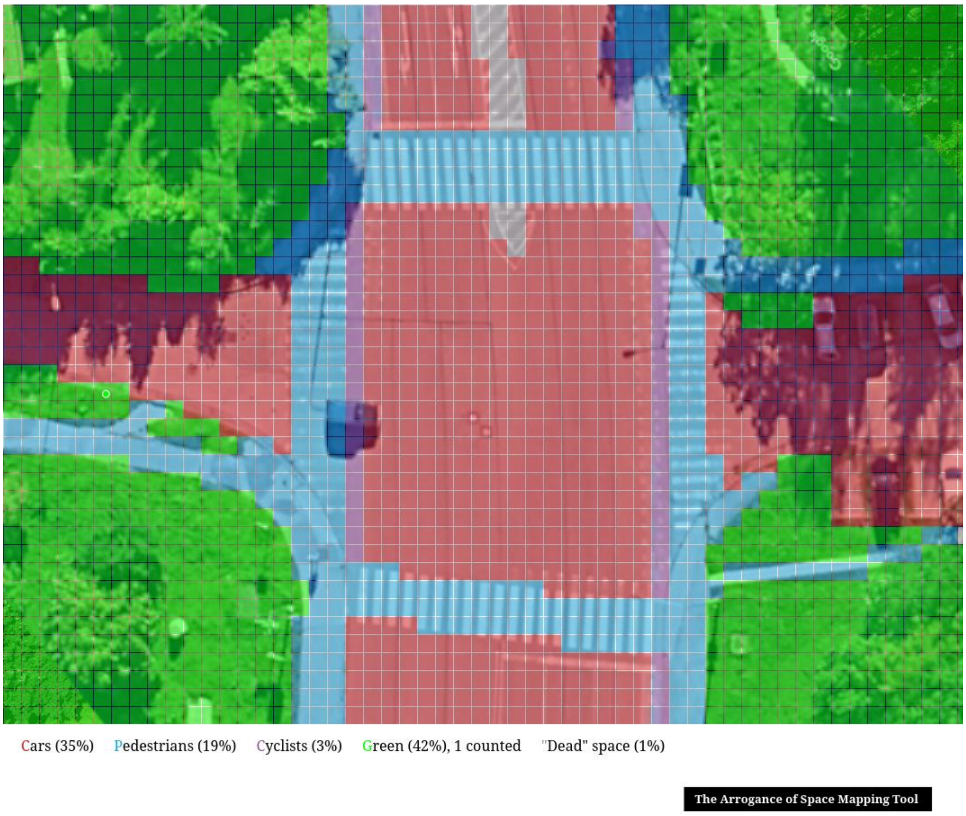


Figure 62: Arrogance of space mapping: Before the implementation (Source of image: Google Maps)

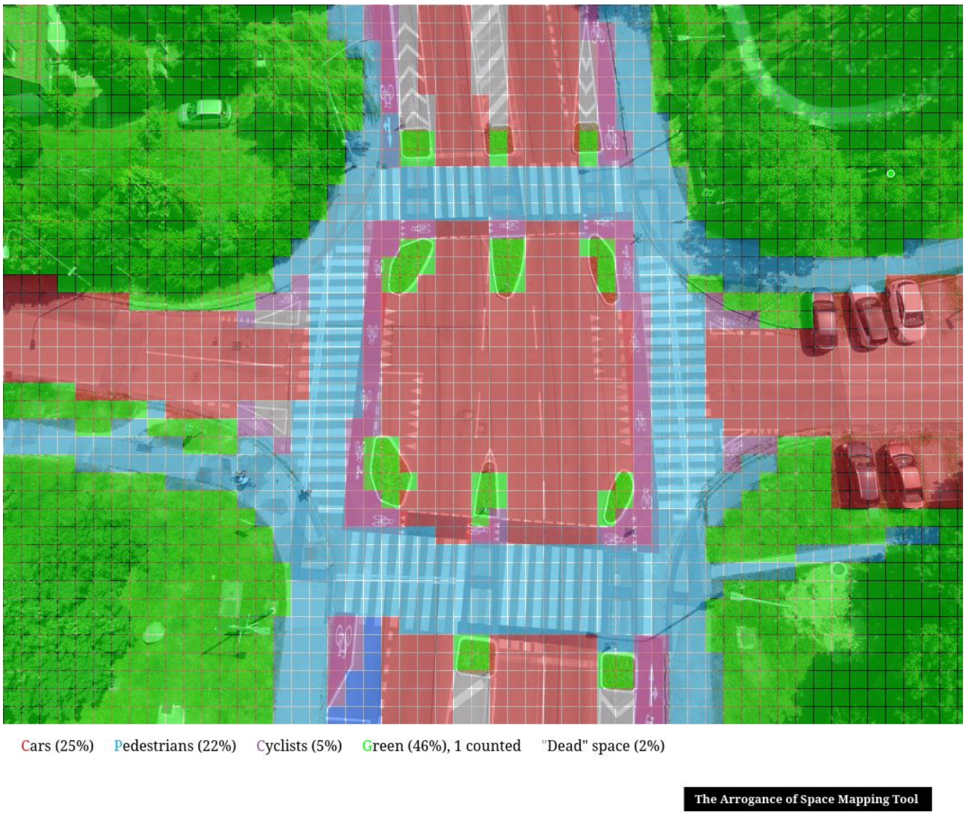


Figure 63: Arrogance of space mapping: After the implementation (Source of image: Magistrát hlavného mesta SR Bratislavy)

The results visualize redistribution of the space previously primarily allocated to cars to more space primarily allocated to greenery, pedestrians and cyclists, as well as “dead space”.

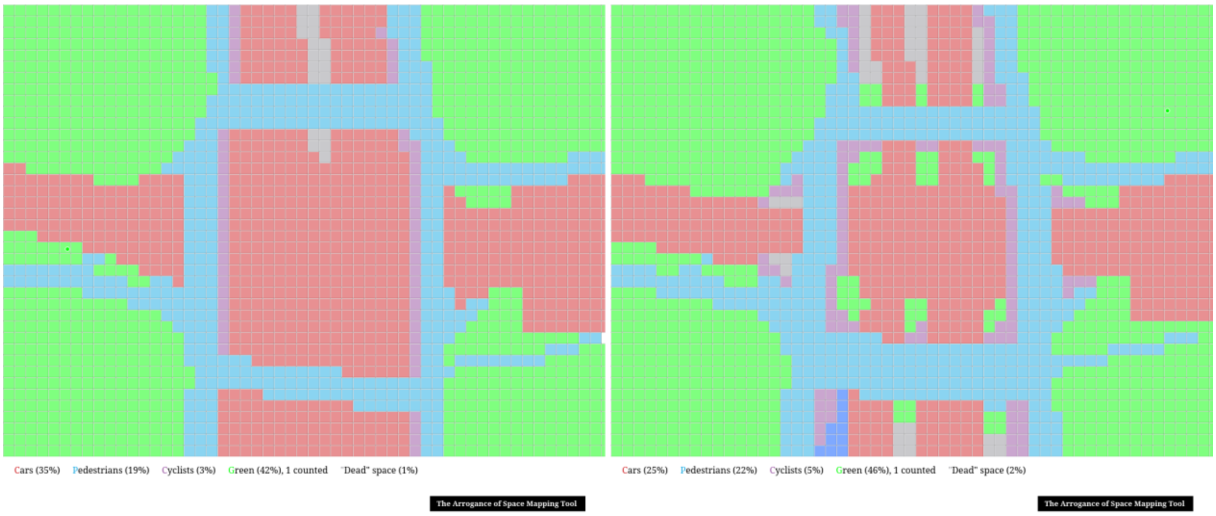


Figure 64: Arrogance of space mapping: Before and after

C.2.6 Undesired behaviour of pedestrians

Frequency of traffic law violations by pedestrians, specifically crossing the street nearby the zebra crossing towards bus stops, were also observed (Indicator n. 16). Before implementation of the measure, on average 9.2 pedestrians per hour in the peak hours were crossing the street nearby the zebra crossing. During the period from 7:00 to 7:30 during weekdays, on average 16.4 pedestrians crossed the street this way.

The behaviour change after the implementation was observed, with less undesired and potentially dangerous behaviour occurring. Unfortunately, this was not quantified due to the error in counting and is a subject of future measurements. Also, by narrowing the width of road ergo shortening the road section when collision between cars and pedestrians is possible and by reducing the speed of cars, the measure reduces the risk of both collision or it’s serious consequences even if pedestrians walk there.

C.2.7 General perception of change & other aspects

The change raised a controversy in both social media and traditional media, usually with concerns about the number of traffic islands and higher risk of collision for drivers. However, the perception of change among parents, as well as pedestrians using the street was mostly positive. 77 % of respondents in online survey assess the overall change very or rather positively.

A mentioned in C.2.3, also 68 % of pedestrians using the street answered that these changes improved the safety or comfort of their movement on this street.

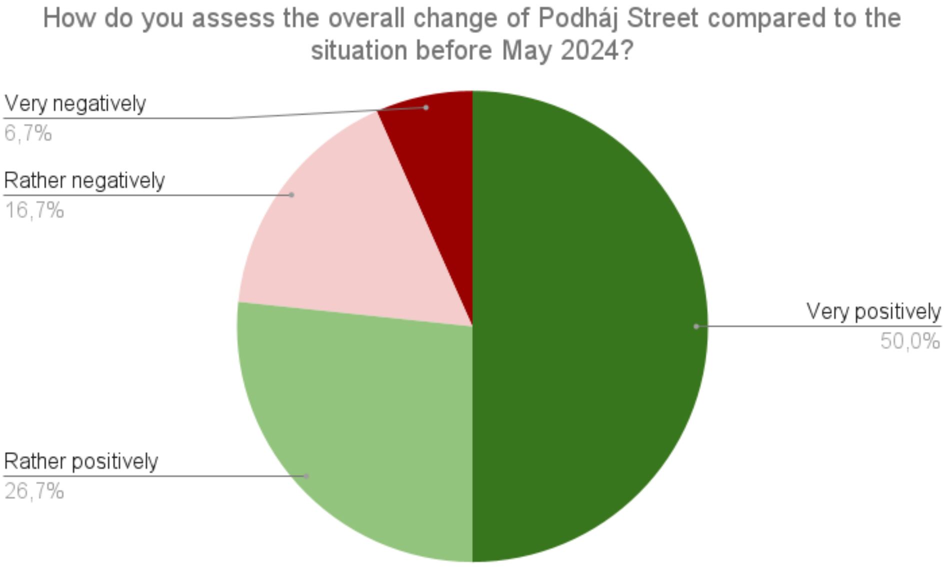


Figure 65: Online survey among parents

Based on the answers of surveyed parents, it appears that the change made movement of both pedestrians and cyclists/kick scooter users on the street more pleasant. However, the opposite results apply for driving.

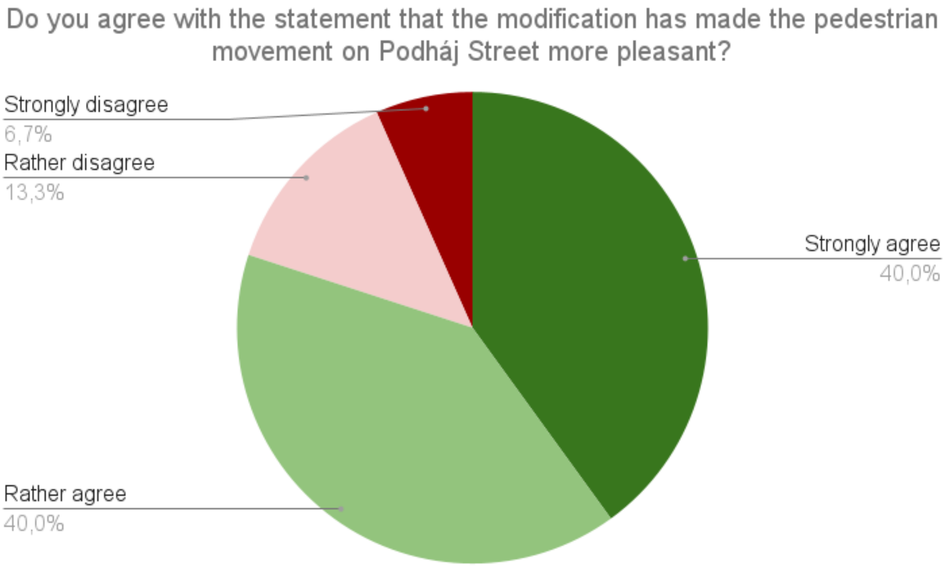


Figure 66: Online survey among parents

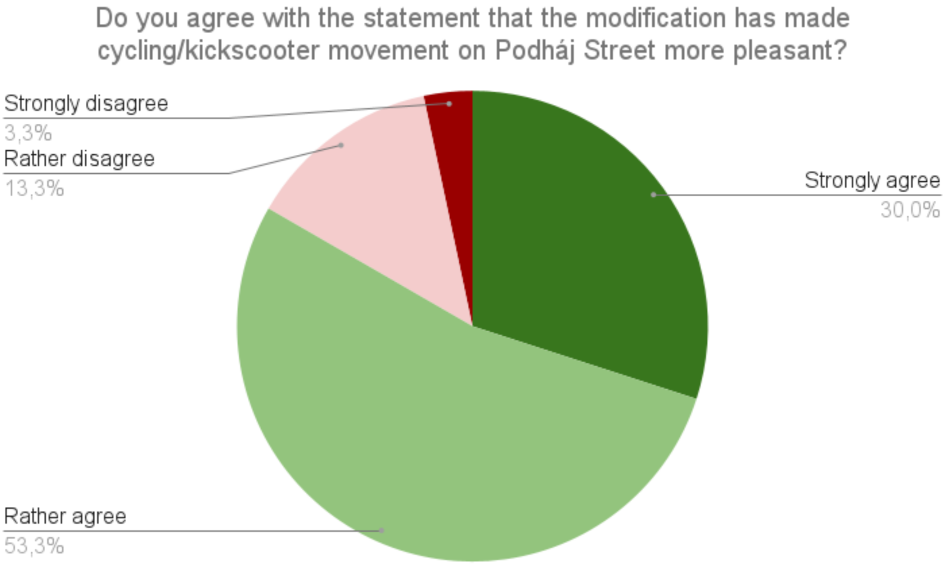


Figure 67: Online survey among parents

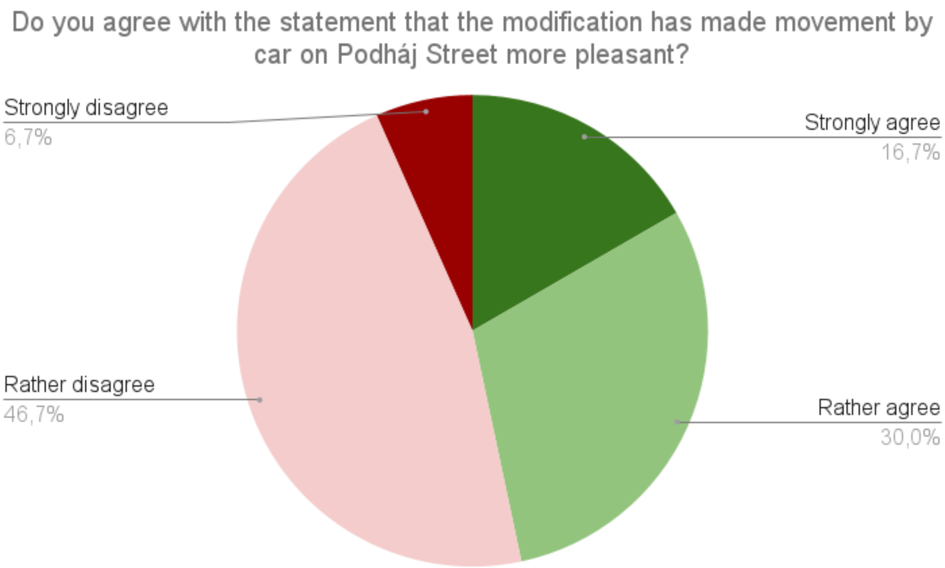


Figure 68: Online survey among parents

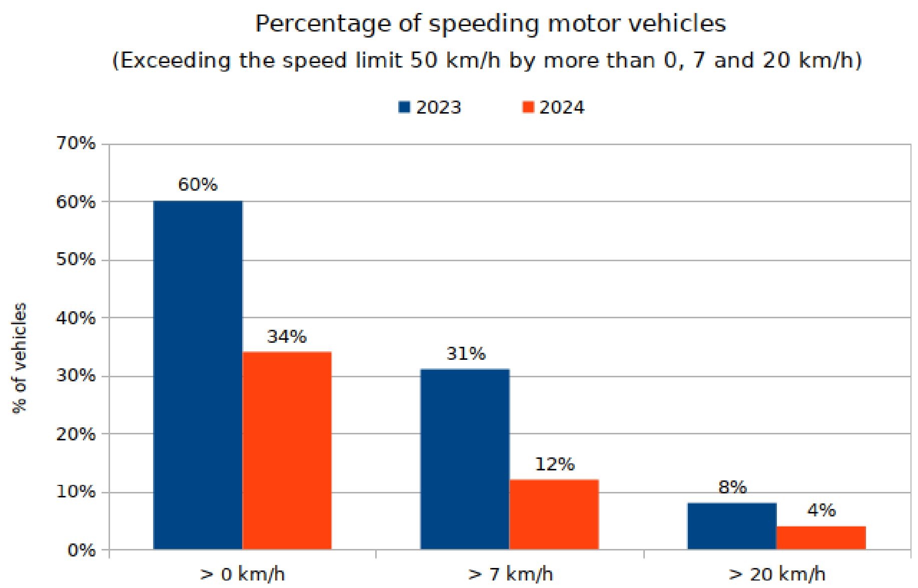
C.3 Upscaling and transferability of measure

The measure (or some of its elements) could be relatively easily expanded to other areas of the city (and other cities in Slovakia as well). Significant part of the built-up area in Bratislava has over-dimensioned streets in favour of motorised traffic. The measure would help city achieve its strategic objectives in traffic safety and modal shift (as stated in Plan Bratislava 2030). At the same time, it could be especially useful when it comes to shortening pedestrians' crossings, as there are an estimated hundreds of crosswalks in the city that do not meet the updated traffic sign regulations in Slovakia. Thanks to relatively low costs and faster process (no need for a building permit), such a measure is a solution even under budgetary constraints.

C.4 Summary of evaluation results

The aim of the redesign of Podháj street was to increase the traffic safety of all street users, including the perceived traffic safety and increase the modal share of active modes of transport in the area in longer term together with reducing negative impacts of car traffic. The process of change took several years and have been implemented only partially by 2024. However, the evaluation results already suggest positive impact of the measure in achieving its goals.

The most significant benefit of the measure is the reduction of car speeds, which are directly linked to road safety. This is best documented by the significant decrease in the number of speeding vehicles. A visible benefit is also the improvement of perceived safety and the overall acceptance of the change by users.



Although there has been a significant increase in the proportion of cyclists, the recorded data do not yet speak clearly of a change in the mobility behaviour. This usually requires changes of a larger scope, at least to the original scope of the project, and a longer follow-up period would be appropriate for the proper evaluation. As a result, the evaluation shows that the studied measure fulfils some of the desired results, especially in the field of traffic safety, and due to its relatively low cost and simple implementation it is suitable for use in other places as well.

D. Process Evaluation Findings

D.1 Drivers

NR	Driver field	Examples of drivers
1	**Political / strategic**	Presence of sustainable mobility and safe streets in the mayor's (resp. mayors party's) political agenda
2	**Institutional**	Sufficient capacities at the Road management department, able to implement the project internally Sufficient internal capacities at the Department of cycling at the City of Bratislava for project and engineering
3	**Cultural**	Engaged advocacy group – Cyklokoalícia Rising demand for safe infrastructure mainly for cycling and walking
4	**Problem related**	
5	**Involvement / communication**	Communication with Cyklokoalícia Communication with parents and teachers from Elementary school nearby within the Cities for Children project
6	**Positional**	Strategic visions such as Plan Bratislava 2030
7	**Planning**	
8	**Organisational**	
9	**Financial**	Availability of external funding from Recovery and Resilience Plan
10	**Technological**	
11	**Spatial**	
12	**Other**	

D.2 Barriers

NR	Barrier field	Examples of barriers
1	**Political / strategic**	Hesitation in changes restricting car traffic or parking at the political level Impact of a local elections
2	**Institutional**	
3	**Cultural**	No examples of such measures in whole country and fear of the unknown
4	**Problem related**	
5	**Involvement / communication**	
6	**Positional**	
7	**Planning**	Insufficient planning and determining requirements of the measure
8	**Organisational**	Weak leadership/ownership of the project
9	**Financial**	Cashflow problems at the responsible department at the municipality
10	**Technological**	Insufficient know-how on traffic signage of implementing workers
11	**Spatial**	