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More information about GRETA can be found on https://www.interreg-central.eu/greta/

Abbreviation table	
Abbreviation	**Definition**
CE	Central Europe
FUA	Functional Urban Area
SUMP	Sustainable Urban Mobility Plan

1. The GRETA project

GRETA project aims to decarbonise the last mile delivery in Functional Urban Areas (FUAs) in Central Europe (CE) and create liveable and accessible cities for all by 2030. The project seeks to implement joint sustainable solutions in CE FUAs using zero-emission vehicles and cargo bikes and reorganize urban spaces with curb management. The pilot actions in the cities of Maribor, Reggio Emilia, Verona, Poznan, and Budapest (with Berlin FUA as an observer) have the potential to quickly deploy as pop-up measures in combination with existing measures. GRETA provides capacity-building activities, strategies, action plans, and tools for public authorities, enterprises, and relevant organizations to ensure financial, environmental, and social sustainability beyond the project's lifetime.

Last-mile delivery generates negative impacts, including emissions, noise, and congestion. Due to the COVID-19 crisis, global parcel distribution volume nearly doubled, further adding inefficiencies in the peripheral areas. GRETA's FUAs recognize the problems that generate pollution, nuisance, noise, congestion have jointly recognised three main problems: the lack of use of green zero-emission last-mile vehicles, conflicts between freight and public vehicles, and the lack of knowledge and strategies for a flexible and shared use of the curb and public space. Despite having SUMPs/SULPs, FUAs struggle to activate fitting measures while keeping their centres attractive and alive for residents and tourists.

GRETA addresses the common challenges of all CE FUAs by creating the conditions to promote ZE logistics using micro-hubs, cargo bikes, light e-vehicles, and curb management strategies. Additionally, the project also focuses on paving the way to innovative concepts such as regional collaborative logistics, physical internet, and freight curb management. GRETA facilitates the dialogue towards the acceptance of a business and governance as a service model, where cities must equip themselves with a network of innovative services to guarantee seamless experiences for their users and a mobility plan considering different functions and priorities of the services.

GRETA's objective is to support the urban mobility transition in CE FUAs by jointly developing solutions and strategies with a huge potential for decarbonization of the last mile in line with the EU Green Deal and the Urban Mobility Package, abating congestion, pollution, and nuisance. The project's success relies on capitalising on previous experiences, exploiting synergies with ongoing initiatives, testing innovative pilots, improving competences and knowledge among PPs and stakeholders.

2. Executive summary

BKK has developed a comprehensive Curbside Management Framework and a Function Assessment Methodology. The framework lays the foundation for a structured, data-driven, and future-oriented approach to curbside planning, aiming to balance competing demands and create flexible, multifunctional public spaces. The Curbside Management Framework introduces a complex, multi-phase methodology tailored for three planning contexts: comprehensive, project-based, and temporary interventions. The process starts by defining strategic goals and spatial boundaries based on city-level development plans. It continues with extensive on-site data collection – static (what is there) and dynamic (how it is used) – combined with stakeholder input and local business surveys. The collected data supports the creation of current function maps, demand maps, and problem maps for the area. Based on this, a **Future Function Map** is developed, providing a strategic spatial arrangement of desired curbside functions aligned with local needs, mobility networks and municipal goals.

This **data-driven and modular design** makes the curbside assessment methodology innovative. It integrates extensive curbside-specific data collection – including both static function mapping and dynamic activity observation – with stakeholder engagement, focusing on logistics demands such as loading, deliveries, and emerging services like micromobility and e-commerce. A key feature of the methodology is its forward-looking perspective: analyses and proposals not only address current conditions but anticipate mid- and long-term mobility trends, including the integration of new mobility services, green infrastructure, and climate-adaptive curbside functions.

Curbside pilot actions in Budapest:

The methodology was tested through two pilot locations in Budapest (IV. district and VIII. district) during autumn and winter of 2025, where various curbside functions were introduced and monitored. The implementation plans were prepared by Budapest Közút Zrt, the city's public road operator. These plans were based on discussions with the affected districts, combined with initial data collection and needs assessment, leading to the elaboration of the Future Function Map. This process ensured that both local priorities and citywide goals were reflected in the design.

At the pilot sites several dedicated curbside functions were introduced, including:

- **Designated waiting area for food delivery cyclists**, supporting the rapidly expanding bike-based logistics sector.
- **Short-term parking bays** for quick (max. 30 minutes) errands.
- **Kiss & Ride spot** (max. 15 minutes) to facilitate passenger drop-off and pick-up
- **Space for residential waste containers**, creating more orderly and predictable waste management.
- **Loading areas** to accommodate urban freight while reducing conflicts with passenger traffic.
- Pedestrian and cycling zone

These interventions were operated between September and December 2025. During this period, feedback from users and systematic data measurements will be collected. The results are used to validate and refine the Curbside Management Framework and the Function Assessment Methodology, ensuring that the tools are both practically applicable and responsive to local realities.

3. Pilot action set up

3.1. General information

Table 1 General information

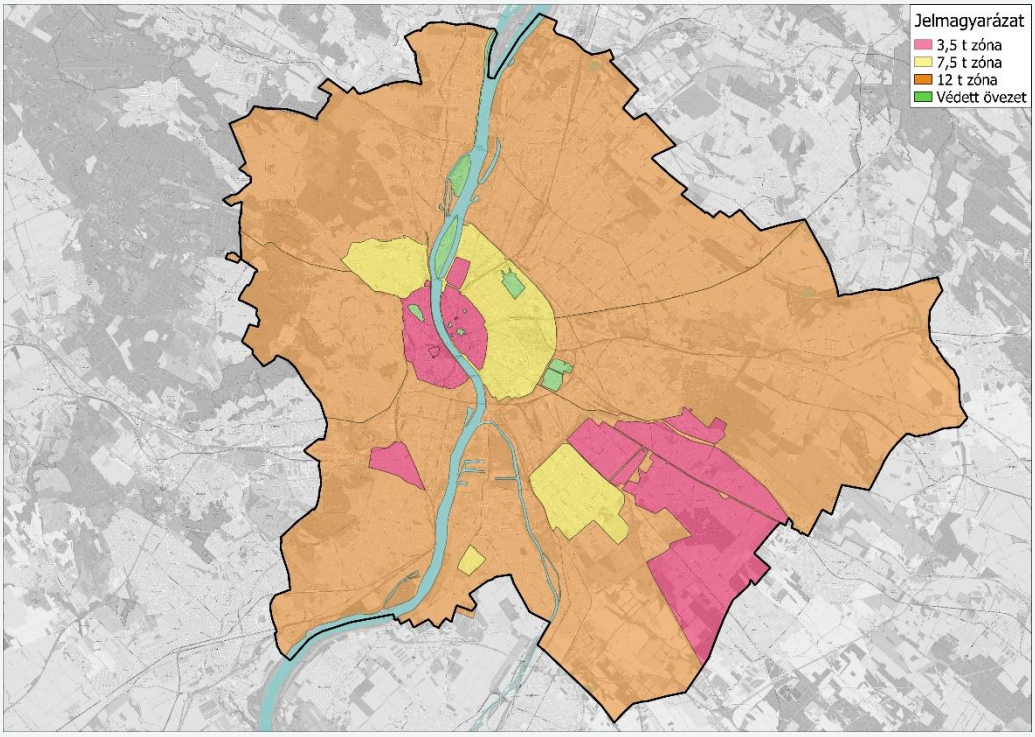
Location	Budapest with a population of approximately 1.7 million inhabitants faces pressing challenges in public space usage and allocation and urban logistics, particularly in the densely populated and busy inner city and last mile deliveries. The Functional Urban Area (FUA) of Budapest experiences notable traffic congestions, often aggravated by irregularly parked vehicles and inefficient use of available curb spaces.
Map (general + detailed)	 *Figure 1 Map of Budapest* Two pilot areas:

Figure 2 1st pilot area in District 8

Figure 3 2nd pilot area in District 4

Area characteristics	The pilot areas are located in the inner-city (8th district) and suburban area (4th district). The functions available in the inner-city pilot area are a mix of shops, restaurants, residential buildings, and business offices. The area has access restrictions, freight vehicles over 7,5t need access permit to enter. The size of the affected area is 137,364 m^2. The suburban pilot area functions as a local district centre, functions are also mixed with market, shops, restaurants and residential buildings. The area has access restrictions, freight vehicles over 12t need access permit to enter. The size of the affected area is 52,135 m^2.

Additional information	The SUMP of Budapest (Budapest Mobility Plan) includes freight and city logistics measures and sets up goals to ensure sustainable transport. To further deepen the focus on sustainable urban logistics and to develop and implement an integrated plan (derived and in line with the SUMP), Budapest needs to focus on public space management (on both sides of the curb) encouraging environment-friendly mobility solutions. BKK is actively participating research and innovation projects to develop and pilot innovative, new solutions in real life living-labs, test regulatory measures & new policies for all modes of local transport. The interventions in Budapest offer an opportunity to develop sustainable urban mobility and public space regulation, fully in line with the city's plans (building on previous projects SULPiTER), giving opportunity to better understand user and stakeholder needs, collect data on areas where it is currently a weak point, and test different curb management solutions in real life environment.

3.2. Vision and problems/needs to be addressed in GRETA

3.2.1. Pilot action objectives

The overall objective of the pilot actions is to create green and liveable public spaces in Budapest, have a deep understanding of curbside functions and their effects on city-logistics and to understand curbside management methods considering upscale ability. New arrangement of spaces was made using the guidelines of the curb side management concept that is also developed during the GRETA project. The goal of the Curb Management Pilot in Budapest is to optimise the use of public space in the Budapest FUA, encouraging environment-friendly mobility solutions.

3.2.2. Specific vision & ambition and the pilot action problems/needs to be addressed by GRETA

Table 2 Problems addressed

Problem(s) addressed	The main challenges and problems to be addressed during the pilot: • Lack of data on urban freight transport, measurement of KPIs • Limited public space available for all the functions separated • Irregular parking, loading activities • Inflexible public space regulations • Growth in the e-commerce, not followed by regulatory framework • Low utilisation rate of environmentally friendly vehicles and technologies
Causes of the problem(s)	• No regular, unified and systematic, (FUA-) city-wide data collection regarding freight transport • Streets were mainly designed for car traffic and parking, not considering the changing needs of loading and other functions necessary for a liveable city

	• Not enough opportunity for trucks and delivery vans to stop for loading • Regulatory frameworks are not updated fast enough to follow changes and new technologies • Not enough incentives to support the use of environmentally friendly delivery vehicles
Rationale for implementation	A curbside assessment methodology and management framework can provide a good basis for understanding the workflows happening in public space around the curbside, related to city-logistics.
Future outlook	The experiences of the pilots and the well-working segments of the implemented solutions will be upscaled to the city-wide area, and based on the experiences, new regulation can be outlined.

3.2.3. Governance analysis

3.2.3.1. Local, regional, national and EU government policies and regulations that influence the pilot action

Local policies and regulations:

Sustainable Urban Mobility Plan (SUMP):

The primary goals of the Sustainable Urban Mobility Plan (SUMP) in Budapest are to address the mobility needs of a sustainable and resilient city while fostering integration with urban regional transport systems. To achieve the climate targets and serve these goals, the SUMP has 44 actions in 4 intervention areas. The 4 intervention areas that have been identified are: improved connections, attractive vehicles, customer experience, enhancement services and effective institutional system.

Sustainable Energy and Climate Action Plan (SECAP) of Budapest:

The SECAP document is in preparation, adoption expected in 2026: https://archiv.budapest.hu/sites/english/Documents/BP_klimastrategia_SECAP_EN_final.pdf

Healthy Streets:

The Healthy Streets Approach is a human-centred framework for embedding public health in transport, public realm and planning. Published in September 2022, this tool has been developed for the City of Budapest to support designers deliver better streets for people.

Budapest Design Check: https://www.healthystreets.com/europe#uk-alumni

Regional policies and regulations:

Integrated Urban Development Strategy:

"Home in Budapest - Integrated Urban Development Strategy (ITS)" is the main document outlining Budapest's development until 2027, aligned with the European Union's budgetary cycle. It defines the development goals where the Budapest Municipality takes a leading and initiating role, and it presents the planned measures of the Municipality as well as the key development locations in the capital. (otthonbudapesten.hu/english-summary)

National policies and regulations:

National transport infrastructure development strategy sets development objectives at national level, which influence the planning of the urban freight transport system as well. These objectives include strengthening those segments and modes of passenger and freight transport that are more socially beneficial, resource efficient and improving the quality and efficiency of transport services. Nemzeti Közlekedési Infrastruktúra-fejlesztési Stratégia.pdf (kormany.hu))

EU policies and regulations:

European Commission Transport White Paper setting the goal of a 'carbon-free urban freight distribution', i.e., zero direct carbon dioxide (CO2) emissions by 2030; the proposed **revision of TEN-T Regulation** is followed with great attention from the cities, especially the part related to the definition of the Urban Nodes, which will influence also city logistics planning, as well as the ambitious target of phasing out ICE vehicle sales by 2035.

100 Climate Neutral Cities Mission: Budapest has recently joined the mission, whose aim is to enable participating cities to act as innovation hubs for pursuing climate neutrality and to enable all European cities to follow suit by 2050. As part of the mission, Budapest is working on developing its Climate City Contract (CCC), which is going to be co-created by multiple stakeholders in the local ecosystem. Two of the main emissions sectors addressed in the CCC are going to be transport and green infrastructure, for which a detailed action and investment plan will be drawn up.

It supports EU goals for sustainability, decarbonisation of transport, and improved urban mobility while contributing to environmental and public health objectives. By aligning with the EU's Green Deal, urban mobility frameworks, clean Vehicle directive[1],and vision zero for road safety[2], the project can help meet broader EU targets for a greener, safer, and more efficient transportation system.

3.2.4. Solution description and technical specifications

BKK explored and contacted all the possible stakeholders to be involved in the pilot action, assess the base situation of curbside management in Budapest, to develop curb management framework for Budapest in cooperation of the stakeholders (especially the Municipality of Budapest, the public road operator, districts, shared mobility operators). According to the curbside management framework and function assessment methodology real-life testing was conducted for the pilot area and main inner-city ring road/ boulevard in Budapest. BKK prepared and operated curbside demo sites and activities based on the curb management framework and function assessment methodology, with the involvement of all stakeholders with focus on city logistics. These actions included the physical reallocation of curb space and the introduction of new curbside functions such as:

- dedicated loading and servicing areas for urban freight,
- waiting areas for food delivery cyclists,
- short-term parking and Kiss & Ride zones,
- organised waste container locations,
- and pedestrian and cycling priority zones.

[1] DIRECTIVE (EU) 2019/1161 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles

[2] European Commission: Directorate-General for Mobility and Transport, *Next steps towards 'Vision Zero' – EU road safety policy framework 2021-2030*, Publications Office, 2020, https://data.europa.eu/doi/10.2832/391271

3.2.5. Transnational Cooperation

Table 3 Information on joint development

Main implementor of the pilot action	BKK
Contributor[2]	ZAILOG (IT) – Verona pilot
Process of joint development	In case of the Budapest pilot, one of the main actions is the development of Curbside management framework and curbside function assessment methodology. For this, the contributor was selected via tender process. The chosen contributor has knowledge about the field of city logistics, previous experiences and similar projects. The collaboration took place via weekly/bi-weekly consultations (online and on-site as well). During the process, workshop was organised to present and get feedback for the finalization of the curbside management framework. Besides this, on-site data collection was also made in order to assess the current curbside situation in the pilot areas. Regarding the curbside management pilots, it is very important to discuss the possible pilot implementations with district municipalities, as the area of pilot intervention is mainly within the district's management. Several consultations were organized with them, especially with District VIII (pilot in the inner-city area), from the very beginning of the pilot preparation. To better understand the characteristics of the area and identify the main problems, challenges, site visits were organized, and on-site data collections were also conducted. The detailed planning and implementation of the pilot intervention is carried out by the road operator of Budapest, due to their role in the functioning of the city.
Input received from contributor	BKK received insights and implementation experiences about creation of a platform to manage the loading bays in the Verona Limited Traffic Zone with the aim to optimize the use of these parking slots, to prevent double parking. The sensor-based infrastructure in Verona allows the municipality and its in-house mobility and parking management bodies to monitor curb usage continuously, verify compliance with reservations and improve enforcement activities.
Value of collaboration	Within the GRETA project, the collaboration with Verona offered a strategic advantage. This partnership improved the optimization of the curb use in the urban area (optimizing the allocation of curb spaces for deliveries and reducing traffic bottlenecks).

4. Stakeholders and their role

Table 4 Stakeholders' list

Organisation	Stakeholder type[3]	Role	Stakeholders' priority[4]	Engagement level[5]	Engagement activity		Feedback from stakeholder	Comments
					When	What		
Municipality of Budapest	Municipality	Owner of BKK, strategic decisionmaker	1	1	29/11/2023	Workshop about the curbside management concept	Long term vision, operational goals	-
City districts (District IV., VIII.)	Municipality	Owner of the pilot area lands	1	1	2024 - 2025	Preparation of the pilot	Vision and detailed expectations and limitations	-
Budapest University of Technology and Economics	Educational institutions and research	Professional support	1	2	2024-2025	Regular meeting about urban logistics elements	Technical support, professional expertise	-
Citizens/residents / shops in the pilot locations	Local users	Main users, information sources	2	2	August-September 2024 May-June 2025	Questionnaries related to urban logistics	Needs, problem, usage feedback	-

[3] Public institutions and authorities, local administration, neighbouring municipalities, regional administration, national and state administration, association and intermediaries, Chamber of Commerce, business association, private sector, other members and representatives, educational institutions and research institutes, local media and general public.

[4] High, medium, low.

[5] Engagement level 1 or 2, as reported in the stakeholders' mapping file

Logistics operators	Private companies	Main users, information sources	1	2	February 2024- January 2025	Workshops with the logistics operators	Operational experiences, needs	-
Logistics associations	Private actors	information sources	2	2	February - January 2025	Workshops where the representatives of the logistics associations were attended	General needs, and vision	-
Budapest Roads ("Budapest Közút Zrt")	Public authority	Public road operator of Budapest	1	1	29/11/2023 May-October 2025	Workshop about the curbside management concept + Involvement in planning and implementation	Operational expertise, detailed planning input	-
Mobilissimus Kft.	Private mobility planning and consultancy company	External expert on curbside management	1	1	July - Dec 2024 (regular meetings)	They are responsible for the preparation of the curbside management framework	professional input, suggestions, design	-

5. Pilot action implementation

5.1. Timeline

February-November 2024:

- Pilot location negotiation and identification in the following districts: 1 in the city centre (VIII. district) and 1 in the outer part of the city (IV. district)

- Assessment of the base situation: data collection, user needs assessment

April - November 2024:

- Technical preparation of the involvement of an external expert for the curbside management framework

June - December 2024:

- Development of Curbside management framework and curbside function assessment methodology (a curbside function test methodology that can be universally applied to any number of curbside function design needs and any design location)

Aug 2024 - February 2025:

- Pilot implementation details developed based on the prepared curbside management framework and methodology, with the Involvement of the public road operator in the planning and implementation
- Approval of the pilots by the municipality, and pilot site assessment according to the framework

March 2025 – September 2025:

- As a result of the procurement process (multiple iteration rounds due to the budget reallocation questions, and administrative reasons) the public road operator (Budapest Közút Zrt.) was chosen to plan and implement the pilot. In Budapest the public road operator is owned by the Municipality and inspected by BKK. All public space modifications in Budapest are approved by the road operator, and most of the small-scale changes in favour of BKK are made by them.
- Based on the developed curbside management framework and function assessment methodology, BKK outlined the main necessary interventions, functions and pilot actions, and the road operator prepared detailed plans and implemented the pilot curbside interventions in the selected areas.

October 2025 – December 2025

- Testing curbside functions and their connections, logistics effects (curbside pilot setup in the pilot areas, based on the framework and methodology developed previously in the project). After the implementation, the new items (signs, furniture etc) are operated and maintained by the road operator.
- The curbside interventions and new elements are free to use for road users, no payment is needed to use the curbside interventions. The usage and feedback of citizens is monitored and measured, based on those minor changes, corrections to be made during and after the project.

5.2. Planning

The Curbside Management Framework introduces a complex, multi-phase methodology tailored for three planning contexts: comprehensive, project-based, and temporary interventions. The process starts by defining strategic goals and spatial boundaries based on city-level development plans. The pilot locations were selected based on multiple discussions with more district municipalities (mapping local problematic areas, options for interventions and the willingness and openness for cooperation). It continues with extensive on-site data collection – static (what is there) and dynamic (how it is used) – combined with stakeholder input and local business surveys. The collected data supports the creation of current function maps, demand maps, and problem maps for the area. Based on this, a Future Function Map is developed, providing a strategic spatial arrangement of desired curbside functions aligned with local needs, mobility networks and municipal goals.

5.3. Implementation

As a first step multiple potential pilot locations were identified in districts VII., VIII. and IV., and initial data collection took place to have an overall picture of the current base situation in the areas. In parallel an external expert was selected to assist in curbside management framework planning to develop the curbside management framework and assessment methodology.

Curbside function assessment methodology provides a unified methodology for assessing, evaluating, and redesigning curbside areas. Steps of the Function Assessment and implementation:

1. Current situation map (current function and demand maps, problem map, description of operations)
2. Analysis (function evaluation map)
3. Recommendations (future function map)
4. Detailed design of interventions
5. Validating the function assessment methodology
6. Implement new functions, in several cases without an existing regulatory or legal framework, allowing the city to explore innovative curbside and mobility solutions under real-world conditions.
7. Monitoring, usage data collection and fine tuning

These interventions were operated between October and December 2025. During this period, feedback from users and systematic data measurements were collected. The results were used to validate and refine the Curbside Management Framework and the Function Assessment Methodology, ensuring that the tools are both practically applicable and responsive to local realities.

Additional data collection is planned to be procured in February/March 2025 to gather further information on the usage of new curbside functions.

By validating the Curbside Management Framework and methodology in real-world conditions, Budapest aims to create a curbside system that can be flexibly adapted to different urban contexts. Beyond the pilot interventions, the methodology is also providing input to the upcoming Grand Boulevard (Nagykörút) renewal project, one of the city's most complex public space transformations. Integrating logistics-friendly curbside design into this renewal is a priority, ensuring that freight and passenger needs can coexist within a multifunctional, climate-adaptive, and people-friendly street environment.

5.4. Monitoring

The usage and feedback of citizens is monitored and measured, based on those minor changes, corrections to be made during and after the project. Colleagues of BKK, the municipality and paring enforcement are collecting usage data and user feedback, and an additional data collection procurement is made in February 2026 to collect large scale real live usage data on multiple locations simultaneously.

The interventions are regularly observed and inspected by the parking enforcement colleagues of the Municipalities (in the first period they give only warnings and information flyers to the drivers that use the short-term parking spaces not as intended, and after that period fines can be given).

6. Digital and physical infrastructure

The curbside function assessment methodology was being tested through two pilot locations in Budapest (IV. district and VIII. district) during autumn and winter of 2025, where various curbside functions were introduced and monitored. The implementation plans were prepared by Budapest Közút Zrt, the city's public road operator. These plans were based on discussions with the affected districts, combined with initial data collection and needs assessment, leading to the elaboration of the Future Function Map. This process ensured that both local priorities and citywide goals were reflected in the design.

At the pilot sites dedicated curbside functions were introduced, including reorganization and reallocation of curbside functions in the pilot area (developing multifunctional public space, changing function and purpose within a day), providing proper and enough space for all the necessary functions based on the assessment methodology, curbside management framework and preliminary data collection:

- **Designated waiting area for food delivery cyclists**, supporting the rapidly expanding bike-based logistics sector. Food delivery cyclists can wait in this area for upcoming orders, or park here for the time they enter the mall to pick up the food to deliver.

Figure 4: Designated waiting area for food delivery cyclists

- **Short-term parking bays** for quick (max. 30 minutes) errands. These areas help people arriving by car to find a free parking spot, as these areas are used for quick stops, and not for storing vehicles for hours.

Figure 5: Short-term parking bays

- **Kiss & Ride spot** (max. 15 minutes) to facilitate passenger drop-off and pick-up

Figure 6: Kiss & Ride spot

- **Designated space for residential waste containers**, creating more orderly and predictable waste management, to prevent waste containers to be put across the sidewalk, blocked by the parking cars

Figure 7: Designated space for residential waste containers

- **Loading areas** to accommodate urban freight while reducing conflicts with passenger traffic,
- Pedestrian and cycling zone.

7. Evaluation/Impact assessment and results of implementation

7.1. Primary and secondary quantitative and qualitative KPIs

Primary indicators:

- Available space - operational space (e.g. size of hub - storage, parking) - indoor and outdoor (~480 sqm)
- Utilization of public spaces (~480 sqm)
- Investment costs (and short description who is carrier of costs) (~4500 EUR-works done by the public road operator, no private investment)
- Operational costs (Operated by the public road operator as public service in a framework of a public operation service agreement)
- Forecast on revenues (Public spaces are accessible for free, no revenue is generated)
- Estimated Impact on carbon-emissions

Secondary quantitative indicators:

- Estimated Number of vehicles using the hub per day (No hub in Budapest)
- Fermi-estimate on number of deliveries / number of possible deliveries (No hub in Budapest)
- Additionally created job (as stated by operators) (No hub in Budapest)
- Number of operators (Accessible for all)

Secondary qualitative indicators:

- Impact of Neighbourhoods quality of life (Delivery vans and cars stopping less on pedestrian area, sidewalk, because of the short-term waiting area, frequently changing vehicles)
- Benefits for shops and other retail businesses (Easier to find a free parking spot near the shops)
- Satisfaction of the service users (drivers, micromobility device users, etc.): (No complaints received, signs are understandable (food delivery companies suggest using the designated areas for delivery colleagues -internal communication and onboarding education)).

7.2. Results

1. Curbside Management Framework developed:

Curbside function assessment methodology provides a unified methodology for **assessing, evaluating, and redesigning** curbside areas.

Steps of the Function Assessment:

1. **Current situation map** (current function and demand maps, problem map, description of operations)
2. **Analysis** (function evaluation map)
3. **Recommendations** (future function map)
4. **Detailed design**, implementation, and monitoring

2. Pilot curbside interventions on two locations (IV. and VIII. district)

Validating the function assessment methodology:

New functions were implemented and tested in Budapest, in several cases without an existing regulatory or legal framework, allowing the city to explore innovative curbside and mobility solutions under real-world conditions.

At the pilot sites dedicated curbside functions were introduced, including:

- **Designated waiting area for food delivery cyclists**, supporting the rapidly expanding bike-based logistics sector,
- **Short-term parking bays** for quick (max. 30 minutes) errands,
- **Kiss & Ride spot** (max. 15 minutes) to facilitate passenger drop-off and pick-up,
- **Space for residential waste containers**, creating more orderly and predictable waste management,
- **Loading areas** to accommodate urban freight while reducing conflicts with passenger traffic,
- Pedestrian and cycling zone.

3. Supporting the renewal of the Grand Boulevard

Function assessment and survey for shops:

During May and June 2025 field measurements and business surveys were carried out along the Nagykörút (10 selected sections and junctions observed for 3+3 hours by 4 people/section, and 243 shops interviewed). Across the measured sections the study recorded **140 loading events** (roughly half concentrated in a few hotspot locations) and **100 distinct parking activities** during the entire measurement campaign, with more than half of those parking events occurring near Blaha Lujza tér and Nyugati tér. Most loading operations were **short-duration (under 30 minutes)** and concentrated in the

early morning (approx. 05:00-09:00), while parking lanes were generally **highly occupied (commonly 90-100% occupancy)** but showed **low turnover** in the 3-hour observation windows (typically fewer than five parking movements per spot, except in hotspot locations with 10-12 movements). The data also document a large volume of **micromobility activity on sidewalks** (measured sidewalk cycling and scooter counts varied by section – e.g. measured values include 46-147 cyclists on sidewalks and dozens of scooter movements in sample sections) and show that **concentrated loading bays are frequently unused** while illegal or ad-hoc loading in parking lanes and on sidewalks is common. These quantified findings support the proposed measures (expanded short-term/30-minute bays, designated delivery waiting areas, dedicated residential waste container spots and improved enforcement / app-based management) and will be used to validate and refine the curbside framework during the pilots.

7.3. Summary of the environmental and social impact assessment of GRETA pilot actions and solutions

The outcomes of the Budapest curbside management pilot align with the objectives defined, confirming the relevance and effectiveness of the implemented measures.

- Efficient use of limited public space and improving liveability and greening of public spaces: By reallocating curb space away from long-term parking towards multifunctional uses, pedestrian areas and organised service zones, the pilot contributed to a more liveable, predictable and human-scaled street environment.
- Resolving opposing stakeholder interests: The methodology's strong emphasis on stakeholder involvement, local business surveys and on-site observation proved effective in identifying conflicts early and developing balanced solutions that reflect multiple user needs.
- Data collection for curbside management and SULP development: The pilot generated high-quality static and dynamic data on curbside usage, logistics demand and behavioural patterns, directly supporting both the refinement of the curbside management framework and the preparation of Budapest's Sustainable Urban Logistics Plan.
- Creation of an upscalable and unified planning tool: The validation of the Function Assessment Methodology in real-world conditions confirmed its applicability beyond the pilot sites, fulfilling the objective of creating an upscalable tool for citywide and corridor-level planning, including major projects such as the Nagykörút renewal.

8. Lessons learnt

- Curbside management topic is unique and neglected in European cities based on benchmarks, yet very important for achieving organized and liveable public space
- Stakeholder engagement can be fostered with clear communication putting emphasis on the stakeholder's gains and interests and letting long enough time for involvement, processing and responses
- Think globally, act locally Have a long-term vision and strategy, but first act on small scale / tactical urbanism, Instead of 'predict and provide' do 'aim and manage'

9. Conclusion

Through the GRETA project, Budapest has moved beyond isolated experiments and laid the foundations for a systematic, data-driven approach to curbside management that directly supports decarbonisation, liveability and efficient last-mile logistics.

The curbside management pilot confirmed that the curb is a critical and limited urban resource, where competing demands from freight, micromobility, public transport, private vehicles and public life must be actively managed rather than passively regulated. By developing and validating the Curbside Management Framework and Function Assessment Methodology, BKK created a unified planning guide that bridges the gap between strategic policy objectives and street-level implementation. This represents a significant step forward in aligning Sustainable Urban Mobility Planning with day-to-day public space operations.

The pilot actions showed that effective curbside management can contribute simultaneously to multiple policy goals: reducing emissions from last-mile delivery, improving traffic efficiency, increasing the quality and predictability of public spaces, and supporting emerging logistics and mobility services. The Budapest pilot also demonstrated the importance of stakeholder involvement and inter-institutional cooperation, proving that conflicts around curbside use can be addressed through transparent, evidence-based planning processes.

The validated methodology is not limited to the pilot locations. Its modular and scalable nature enables application across different urban contexts and planning scales, from temporary interventions to complex corridor renewals. The planned integration of the methodology into the Nagykörút Grand Boulevard renewal illustrates how pilot results can directly inform major, long-term urban transformation projects, reducing risks and increasing the effectiveness of public investments.

In conclusion, the GRETA project experiences in Budapest confirm that well-designed pilot actions, supported by robust methodologies and strong governance, can catalyse lasting change. The Budapest approach offers a transferable model for other cities seeking to reconcile logistics needs with liveable, climate-resilient urban environments and provides a solid foundation for scaling up sustainable urban freight solutions across the Functional Urban Area.

10. References

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