ReVeAL

ReVeALing the implementation of Vehicle Access Regulations

The story of six cities

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 815008.

CIVITAS
Sustainable and smart mobility for all

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Photos on cover:

Helmond: The development of the Brainport Smart District.
Credits: Gemeente Helmond

City of London: During the Covid-19 lockdown, the City of London created temporary cycling lanes to allocate more space to active mobility.
Credits: City of London

Vitoria-Gasteiz: Cyclists in Vitoria-Gasteiz on a segregated cycling path.
Credits: Quintas

Padova: Pupils of the Ricci Curbastro Institute taking part of in a public event in the SuperGuizza superblock in 2021.
Credits: Comune di Padova

Bielefeld: Bielefeld tested a range of physical interventions, including bollards, to prevent car access to some streets, during its ReVeAL pilot. These are planned to be made permanent in 2023.
Credits: Stadt Bielefeld

Jerusalem: A tram in the centre of Jerusalem.
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Introduction

The future of cities presents many challenges. Cities should be lively locations for trade, gastronomy, accommodation, leisure, work, living, culture and education. They should be easily accessible and at the same time address urgent issues such as climate protection and health. The interests and expectations in urban societies are correspondingly diverse and sometimes opposed to each other. However, this does not reduce the pressure to act: cities have to find a strategy, to reconcile the various functions and interests as well as overriding necessities.

Regarding mobility, cities are taking action for clean air, more space for walking and cycling, less congestion etc. Urban Vehicle Access Regulations (UVARs), which regulate vehicular access to urban infrastructure, constitute a powerful tool in that sense. UVARs generally prioritise active mobility and limit access to certain types of vehicles. UVARs can take the shape of Low Emission Zones (LEZs), congestion charges, Limited Traffic Zones (LTZs), and parking regulations, amongst others. Nevertheless, their implementation isn´t easy, as limiting access to an area of the city for specific vehicles or users can lead to resistance and sparkle criticism.

Bielefeld tested a range of physical interventions, including bollards, to prevent car access to some streets, during its ReVeAL pilot. These are planned to be made permanent in 2023.
Credits: Stadt Bielefeld

UVAR signage in Vitoria-Gasteiz.
Credits: Centro de Estudios Ambientales, Vitoria-Gasteiz

What is ReVeAL?

The goal of ReVeAL is to add Urban Vehicle Access Regulations (UVARs) to the standard range of urban mobility transition approaches of cities across Europe.

The overarching goal of the project is to enable cities to optimise urban space and transport network usage through new and integrated packages of urban vehicle access regulations, policies and technologies. These can lead to fewer emissions, less noise and improved accessibility and quality of life, which especially benefits the people living in these cities. These regulations and policies can also encourage more sustainable transport choices, enabling cities to become more liveable, ultimately healthier and more attractive for all.

To this end, ReVeAL combined conceptual work and case study research with hands-on UVAR implementation in six pilot cities, as well as systematic stakeholder interaction and the creation of a tool.

The project started in June 2019 and ran until the end of November 2022.

What are UVARs?

Urban Vehicle Access Regulations (UVARs) are one of the most effective levers to achieve the collective goals of carbon neutrality, air quality and urban liveability, and one of the inevitable pillars of the urban mobility transition.

There is a need to concretely demonstrate that state-of-the-art UVAR approaches are - if planned and executed in smart ways – effective, financially viable, make productive use of the latest technologies, fit into modern governance structures, can gain public acceptability and are compatible with legacy systems as well as with emerging mobility patterns, concepts and business models. UVARs are in a strict sense understood as regulations for traffic entering cities or defined areas of a city. They can focus on limiting access of motorised traffic, restricting entry of (high) emitting vehicles in an area, and covering a range of other variables based on permits, time of the day, vehicle size or street functionalities.

Bielefeld

Description of the city

- Bielefeld is one of the 20 largest German cities with 340,000 inhabitants. The city is the centre of one of the five strongest economic regions in Germany. World-famous brands and fast-growing medium-sized companies have their home here. As one of the most modern locations for science and education in Germany, Bielefeld is a young city with 37,000 students attending university and technical colleges.

- Bielefeld is called 'The Green City' because the city is in the Teutoburg Forest and it is a paradise for hiking, running and mountain biking. The lively old town with countless boutiques, street cafés, restaurants and bars attracts guests from all over the region. Within the ReVeAL project, Bielefeld's old town became a pilot site.

Young residents of Bielefeld spend time together in a new form of public space: a parklet.
Credits: Stadt Bielefeld

Bielefeld's mobility strategy has set the goal to reduce the proportion of car traffic from currently 51% to 25% by 2030.

less **motorised traffic**

What did they do?

Bielefeld's mobility strategy has set the goal to reduce the proportion of car traffic from currently 51% to 25% by 2030. Side by side with ReVeAL, the flagship project to convert the central traffic junction Jahnplatz into an attractive inner-city square was completed in the summer of 2022. The fact that Jahnplatz is directly on the edge of the old town has strengthened the interest in upgrading the old town.

Bielefeld started its ReVeAL pilot project 'altstadt. raum' to make the old town more attractive and worth living in with more space for recreation, leisure, culture, trade and gastronomy, as well as fewer exhaust fumes and noise, less traffic and space for motorized transport. However, "restricted access" or "conversion of parking spaces" are topics that can create a lot of resistance. Therefore, an intensive participation process and a test phase took place to find out which kind of measures would work to reach the aims set out by the municipality.

An essential success factor in Bielefeld is that, from the beginning, a political decision in the city council was made to carry out the UVAR measures. A sufficient budget is imperative, and goals should be defined from the start (less motor vehicle traffic, more space for outdoor gastronomy, pedestrians, greenery, etc.).

Bielefeld found it very useful to get in touch early on with the association of local shop owners, who are one of the most concerned groups with the measures. This highlights the need to include, as much as possible, all relevant stakeholders in public participation. In this city, it was crucial to come to a joint understanding and agreement among stakeholders from the start concerning the project's goals as adopted by the city council as well as the project's impacts for all stakeholders. This forms the basis from which involved stakeholders can effectively work together on solutions and ideas for the implementation of the UVARs. The stakeholders include businesses, schools, restaurants, office users, residents, taxi companies, local politicians, craftsmen, and citizen groups.

Since the project met high public interest, participation activities were extended through a project-specific website that allows the general public to take part in the UVAR development process. The website is also a platform for the public to access the most recent information.

Contracting external experts to support communication and participation (building websites, writing press releases, social media) turned out as an

Residents of Bielefeld playing ping pong in a parklet.
Credits: Stadt Bielefeld

> Testing any measure before starting permanent implementation is highly recommended."

important factor to ensure awareness raising and a successful implementation.

The collection of data (noise, air pollution, number and satisfaction of customers, sales) before and after the implementation of measures was very effective to arrive at evidence-driven discussions and illustrate the advantages of the project.

During Bielefeld's old town pilot, restaurant owners could extend their terraces on parking spaces.
Credits: Stadt Bielefeld

Stakeholders need to have a say in setting up the data collection scheme and the type of data that gets collected to increase acceptance levels for the actual surveys and measurements. Data collection may include traffic counts, tailored satisfaction surveys and interviews with specific stakeholder groups as well as the collection of opinions from the public. Interactions with the public are a good opportunity to promote information on pilots, like cycling interventions in the tested UVAR area.

The results from the data collection bring useful information to improve the tested activities. They are best presented and discussed in a workshop with the pilot area's stakeholders, specifically retailers, car park operators and residents, to arrive at feasible adaptations.

Testing any measure before starting permanent implementation or installations is highly recommended. After the test phase has been completed, the second phase of data collection and workshops with stakeholders can take place to assess the success of the measure. Only then the city council can decide on the permanent and final implementation of the measures.

Lessons learnt

- Get in touch with the key players – including business operators, schools, local politicians, and citizens' groups - as early as possible.
- Build UVAR measures together with all those affected and the general public.
- Provide as much information as possible to the public through as many channels as necessary.
- Discuss the data collection results in a stakeholder workshop to assess if the tested measures are successful.

Following the ReVeAL pilots, the city is preparing the roll-out of tested UVARs permanently.

Pilot to **Permanent**

Going from building blocks to a UVAR package

A first action prior and during ReVeAL was the low-traffic zone redesign of the Jahnplatz, a major traffic intersection located at the edge of the Old Town. It was changed because it exceeded air pollution limits at the location year after year. An intensive test period of a low-traffic design for two years showcased that the new design favouring sustainable mobility modes to the detriment of cars, vans and lorries, results in better air quality levels and a more liveable public space foremost for pedestrians but as well to the benefit of local businesses.

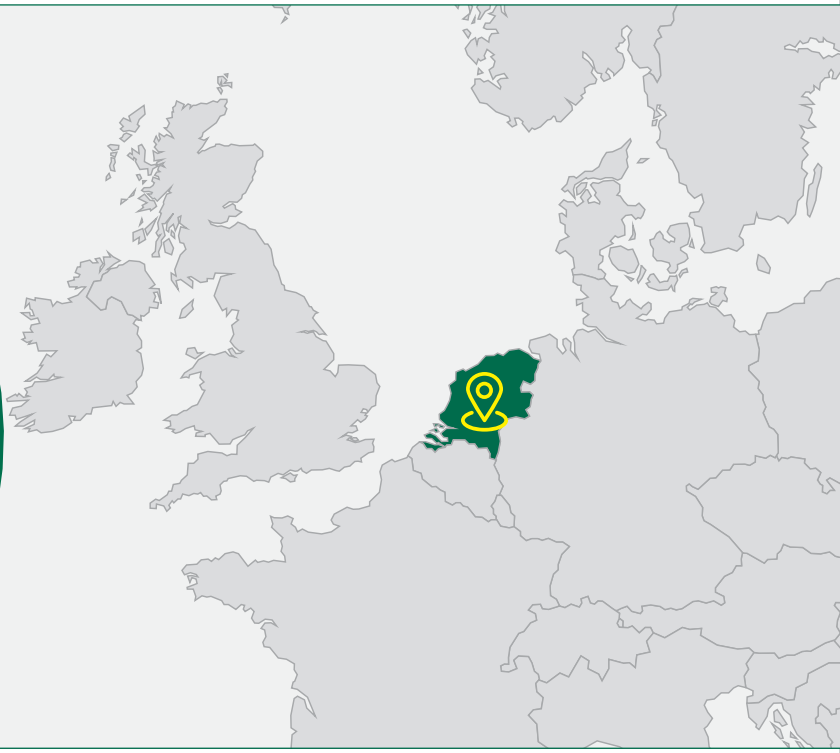
The city used the experience of the Jahnplatz to strive for a wider application of UVAR measures to answer to air pollution and the need to improve public space use options other than for motorised traffic. Political decision-makers and the administration discussed where to apply a larger test site for access restrictions to motorised vehicles and concluded that the highest need is present in the Old Town, directly next to the Jahnplatz. The decision was the starting point for the tests of UVAR measures in the Old Town within the frame of ReVeAL. Today, the city is using the results of these tests to work for permanent changes in the Old Town as well as to expand UVAR measures to other areas of the city.

Starting with Jahnplatz, expanding to the area-wide approach of the Old Town and now preparing a further roll-out to other areas of the city turned out to be a successful process to elaborate a UVAR package. It was particularly adapted to the local context and met reasonable acceptance rates by all stakeholders.

Potential for replication

- Start with a testing phase to find out the impacts of the UVAR measures and the public's opinions and perceptions.
- Make sure that tested measures allow quick reactions for needed adaptations if they don't work well.
- Involve all relevant stakeholders in public participation.
- Add a specific website for communication, mapping exercises and surveys for the wider public and hard-to-reach groups.
- Use data collection (noise, air pollution, number and satisfaction of customers in businesses, sales) before and after the implementation of measures to reach a higher acceptance of changes and gain better knowledge of the measures' effects.
- Integrating greeneries and outdoor furniture like seating to the street is highly appreciated by the public.

Helmond



Description of the city

- Helmond is a medium-sized city (around 95,000 inhabitants) located in the south-east of The Netherlands. Helmond is based in Noord-Brabant, one of the three most important economic areas in the country. The city is home to the Automotive Campus, where companies and education organisations work together on innovative mobility solutions.

- Though a relatively small city, Helmond receives international recognition for its ambitious goals and the realisation of innovative mobility solutions in the city. Helmond is offering its urban environment as a living lab for smart mobility solutions.

Helmond has ambitious mobility goals for all.
Credits: Gemeente Helmond

Within ReVeAL, Helmond tested two separate actions that can build from each other.

designing a **zero emission district** and **testing ISA**

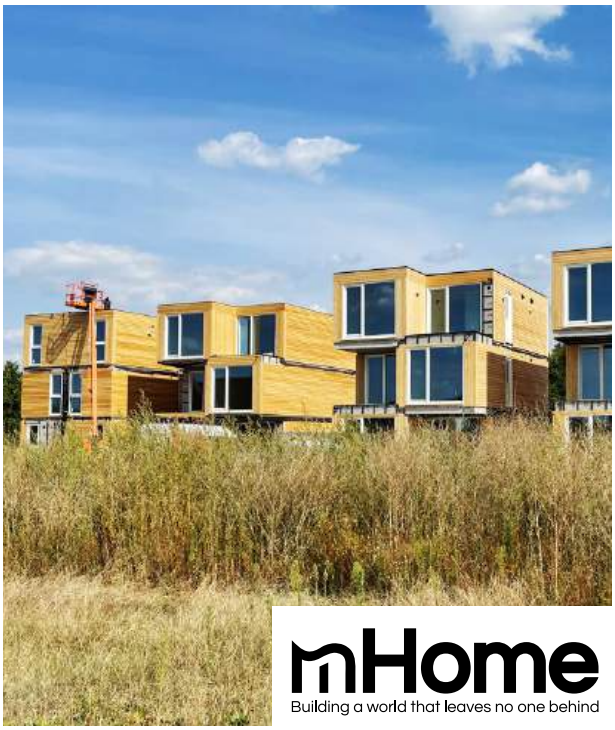
What did they do?

Brainport Smart District (BSD) is a smart living and working district in Helmond under development which received the support of ReVeAL. By 2030, 2,500 houses and a small business park will be built. This district intends to be a zero-emission zone – where no cars or trucks are allowed to circulate and park, where streets are designed for people, not cars, where active mobility is stimulated, and where efficient alternative solutions are proposed to citizens and companies. The development of BSD is occurring through a co-creation process between residents, professionals and other stakeholders. Through ReVeAL, Helmond created an adapted framework and implemented smoothly and efficiently these ambitious UVARs. Furthermore, the City of Helmond worked closely with V-tron to make sure that Intelligent Speed Assistance (ISA) systems can be used efficiently to reduce the speed in the city.

Helmond started its work on UVARs from a white page to design a zero-emission zone. Its prime factor is testing the application of Intelligent Speed Assistance (ISA) in the Brandevoort district.

A crucial success factor was to test ISA in a comprehensive testing environment to conclude how the technology can impact average traffic speeds. The vehicles circulated in different road environments to collect data before and during the test to gain comparable results. It was concluded that ISA was most impactful on high-traffic streets and less so in slow-traffic areas with 30km/h speed limits.

The development of the Brainport Smart District.
Credits: left: Mhomes, right: Gemeente Helmond.



> The exchange with peer cities in the frame of the ReVeAL project allowed to gather external views on the work for a Zero Emission Zone."

It was helpful to collect the feedback of test drivers since they can give valuable insights for the improvement of the ISA equipment. Public awareness of the new ISA technology was key to gather acceptance and knowledge which will be useful for a potential wider deployment at a later step. The use of easily accessible and consumable channels, such as a video, were well-suitable.

Additional data collection helped to determine if the available data quality on physical and digital infrastructure is adequate for an efficient use of the ISA system. It showed that the physical speed signs alone do not provide a sufficient basis for the efficient operation of ISA systems. Combining the physical and digital speed limit information offers some perspective for an improved operation of ISA systems in the city.

The exchange with peer cities in the frame of the ReVeAL project allowed to gather external views on the work for a Zero Emission Zone.

The variety of partners proved to be beneficial for Helmond in implementing the UVAR measures. Specifically, the Brainport Smart District Foundation gained knowledge on active mobility, cargo bike deliveries, and mobility hubs and services that are valuable when establishing a Zero Emission Zone.

Testing the ISA technology with V-tron.
Credits: V-tron

Lessons learnt

- Tap into the knowledge and experiences of other cities, for example by cooperating within an international project like ReVeAL. For Helmond, the information campaign in Jerusalem and enforcement technology in Padova (cameras, licence plate recognition systems, geofencing) were very valuable.
- Deepen the gained knowledge through site visits and reviews with experienced cities.
- Engage external experts that can share information on other cities' experiences and benchmark these with your plans and work, such as on Zero Emission Zones, car-free zones, spatial interventions, parking management and zero-emission construction vehicles.

Stakeholders developed a better understanding of how to embrace UVARs as an integrated approach to shape a robust and sustainable strategy instead of a set of stand-alone measures.

comprehensive **UVAR strategy**

Going from building blocks to a UVAR package

The development of the Brainport Smart District was based on ambitious goals: to bring the most innovative interventions to improve people's lives while keeping an eye on creating an inclusive and easily accessible zero-emission urban district. The city defined which of the many UVAR measures were feasible to this ambition and the local context. A stakeholder group of various professionals ranging from energy, environment, data, and mobility as well as the public administration and the Brainport Smart District Foundation proved a highly useful setting to understand which combination of UVAR building blocks would be best suited. Stakeholders developed a better understanding of how to embrace UVARs as an integrated approach to shape a robust and sustainable strategy instead of a set of stand-alone measures. The group jointly defined scenarios for a mix of UVAR measures using variations of implementation in phasing and the use of regulations and exemptions. The work of the stakeholder groups is continuing beyond ReVeAL to reach further ambitions.

Testing the ISA technology in different road networks.
Credits: V-tron

Potential for replication

- Create pilots to learn technical settings and the impacts of the planned measure before elaborating an implementation plan. Use external experts for data collection and analysis to evaluate the pilot as well as the early implementation phase.
- Invest in communication and awareness raising to create understanding and acceptance of new measures. Make use of easy-to-consume communication means like videos.
- Use co-creative work groups to improve the expertise present and capacities at hand for the integrated planning process of UVAR measure packages.

Jerusalem

Description of the city

- The city of Jerusalem is the capital of Israel. It has a multicultural population of just under one million people. The total land area is 125 square kilometres with a population density of 6,789 inhabitants per square kilometre. The traffic volume is 1,070,000 trips per day, resulting in high levels of pollution from transportation.

- The municipality has been actively leading programmes aimed at sustainable development including a strategy for climate change adaptation/mitigation, sustainable mobility, renewable energy, and reduction of greenhouse gases.

Sign restricting polluting vehicles in Jerusalem.
Credits: Jerusalem Municipality

Extending the Low Emission Zone and regulating Non Road Mobile Machinery in Jerusalem.

Action!

What did they do?

Jerusalem's transportation plan (SUMP) is based upon a policy of inverting the mobility hierarchy by giving the highest priority to pedestrians and cyclists together with public transportation and lastly private vehicles.

The first stage of the ReVeAL program was the establishment of the city –centre LEZ that enabled testing and formulating the restrictive regulations. Based upon this first stage, the LEZ has now been expanded to be a city-wide LEZ. The enforcement is based on license recognition technology. A crucial factor at the early stage was the creation and adoption of the legal framework by a local by-law providing the necessary authority to plan and enforce the LEZ.

An additional component of the plan to reduce emissions has been the formulation of regulations that will limit NRMM (Non Road Mobile Machinery) which are major contributors to pollution.

The most important step at the start was the set-up of a multidisciplinary and multi-governance work team. The team is led by the Municipal Department of Environment and includes the Strategic Planning Unit, the Urban Planning /Engineering Department at the local level, the Ministry of Transport, the Ministry of Environmental Protection, the National Roads Authority at the national level as well as local consultants providing expertise in transport pollution mitigation.

A further crucial factor at the early stage was the creation and adoption of the legal framework by a local law providing the necessary authority to plan and install a LEZ. It was recognised as an important element in the comprehensive municipal development as it was connected with the municipal strategy for sustainable development, the plan to reduce air pollution of traffic and the municipal spatial planning principles on climate change mitigation and climate change adaptation. The municipal efforts also were in line with national-level policies like the "Air Pollution Reduction Policy" of the Ministry of Environmental Protection, which is amongst others assisting in the implementation of the LEZ.

A stepwise approach for preparing, starting, and running the LEZ proved a valid concept: before the kick-off of the first LEZ, the public got timely and clear information tailored to the different population groups in the city in their respective native language. It was useful to accompany the public awareness campaign with before and after surveys to assess and improve its effectiveness. Then, the first LEZ was installed as a pilot in the city centre

Collection of air pollution data in Jerusalem to monitor the impacts of the implemented UVARs, including the LEZ.
Credits: Jerusalem Municipality

> A gradual approach to enforcing the LEZ helped raise awareness and acceptance."

to allow intensive communication and testing. Only at a later stage, it was extended to the entire city.

A gradual approach to enforcing the LEZ helped raise awareness and acceptance among polluting car owners, who first got informed about the LEZ, then received warning letters in case of non-compliance and only then were fined. It was crucial to train inspectors well and carefully install equipment such as signs and cameras. Enforcement is backed by camera controls at ten sites with 2-3 cameras per site.

The Ministry of Environmental Protection played a key role in the process of establishing the LEZ. It provided professional and public support as well as additional funding for complementary measures, such as installing filters in high-polluting vehicles.

The Chairperson of the Municipal Committee for Environment Protection, also a Member of the City Council as Deputy Mayor, took an essential role in establishing and maintaining the needed political support for the creation of the LEZ. In addition, the Mayor showcased political will by declaring environmental policies a key field to push forward.

The involvement of the LEZ work in the frame of ReVeAL was helpful to keep timelines, make use of other cities' experiences and experts' knowledge, and add credibility to establishing the LEZ.

A further recommendation is to be ambitious but without exceeding the realistic. The initially planned Zero Emission Zone turned out to be too ambitious but gave valuable knowledge and results for establishing an Ultra-Low Emission Zone.

The main results in Jerusalem for the LEZ were increased awareness and level of concern on air quality in the city across all stakeholders, a reduction of air pollution from transportation and a considerable improvement of the capacities in the municipal environmental department in terms of staff and influence on air quality agendas.

Jerusalem undertook a comprehensive media campaign to create awareness on the city's high air pollution levels and on the creation of a new LEZ to help solve the problem.
Credits: Jerusalem Municipality

A key success factor in implementing their UVARs was the establishment of multidisciplinary and multi-level governance partnerships.

Local and **national** authorities

Lessons learnt

- Develop a clear understanding of the different types of UVARs from the start of the project to decide on an appropriate mix adapted to the local context.
- Communicate with diverse population groups in their native language to increase public acceptance and increase awareness of air quality issues.
- Use the frame of international cooperation to keep the process of keeping momentum in establishing UVARs.
- Involve local key political players as main actors for the entire planning and implementation process.
- Involve higher-level governance as supporters in terms of knowledge and power.

Going from building blocks to a UVAR package

The strategy to apply the LEZ started with the pilot of the smaller area in the city centre alongside intensive communication to stakeholders and evaluation of its impacts. The LEZ was extended to the entire city only once evaluation results were at hand and public awareness was well established.

The city council's approval of the new plan to reduce air pollution from traffic between 2021 – 2026 was the kickstart to move from a LEZ to an ultra-low emission zone (ULEZ). The first area earmarked is the old town of Jerusalem. The ULEZ adds further options for emission limitation and will apply to operational vehicles such as freight, communal services, and bus transportation as well.

Potential for replication

- Communicate with stakeholders like residents and inhabitants in their own language over the entire planning and implementation process. Use native languages and avoid professional jargon.
- Aim high for your detailed, accepted, and realised plans will meet drawbacks to the original intentions.
- Work with stakeholders as your allies to create a smooth work setting, avoid creating opponents as it is detrimental to the process in the long run.
- Involve external experts, like universities or the private sector, to support tasks like evaluation and cost-benefit analysis.
- Apply a push and pull approach that adds support and benefits to stakeholders, like subsidy programmes for installing filters to cars.
- Plan for enough time and budget to overcome bureaucratic barriers.

City of London

Description of the city

- The City of London Corporation provides local authority services for the City of London, the financial district and the historic centre of London. It is one of the 33 areas with local authority responsibilities into which London is divided. The City is home to a residential population of approximately 8,000 people; however, over 450,000 people commute into the City every day for work and over 10 million tourists visit each year.

- The City of London Transport Strategy, which was adopted on 23 May 2019, sets out how the City of London Corporation proposes to design and manage its streets to ensure it remains a great place to live, work, study and visit. It aims to prioritise the needs of people walking and cycling by making streets more accessible and safer, as well as to make the most efficient and effective use of street space by significantly reducing motor traffic.

During the Covid-19 lockdown, the City of London created temporary cycling lanes to allocate more space to active mobility.
Credits: City of London

Testing different types of traffic restrictions revealed alternatives to a cordon-style restriction around an area.

Testing is **essential**

What did they do?

Designing new local policies to support the installation and use of UVARs is incredibly valuable. In the case of London, the Climate Action Strategy facilitated the creation of the environment for walking and cycling in the UVAR area, alongside supportive measures for businesses concerning last-mile deliveries by cargo bikes and electric vehicles (EVs).

Installation of such delivery schemes demands the involvement of the businesses as final clients and delivery service providers. Talking to delivery services is important to understand the volume of deliveries that can be done using Zero Emission Zone compliant vehicles. To maximise deliveries by these vehicles, the location of the consolidation centre needs to be as close as possible to the actual UVAR area. Deciding on the location of the centre comes along with taking care of needed permits such as the reuse of the building as a delivery hub.

The COVID-19 pandemic hampered the progress of UVAR development, but it also provided an opportunity to close roads in a way which could then be utilised as trials for UVAR implementation. External players, such as Transport for London, also applied traffic restrictions to a road which was not planned to have UVARs, making it a further test site.

A useful legal setting was also to work with experimental traffic orders as implemented in the Bishopsgate scheme, where vehicle movement was restricted and priority was given to buses.

It is important to manage the impacts of the UVAR and any traffic restrictions for people with mobility disabilities from the outset. Equality impact assessments are a useful tool for this. These got replaced later in the test process by a new audit tool assessing priorities from the perspective of disabled users which was created in collaboration with a panel of disabled users.

Testing different types of traffic restrictions revealed alternatives to a cordon-style restriction around an area. The pilot of traffic restrictions in Beech Street operated with a single-entry point as a gate to the area, here only zero-emission vehicles could pass through the gate which cut polluting through traffic. A gated entry is easier to manage and enforce, however, it works best in small areas, as larger areas will require a number of restriction points.

Closing streets to motorised vehicles, except buses, on Bishopgate.
Credits: City of London

> The COVID-19 pandemic hampered the progress of UVAR development, but it also provided an opportunity to close roads in a way which could then be utilised as trials for UVAR implementation."

Complementary measures/achievements

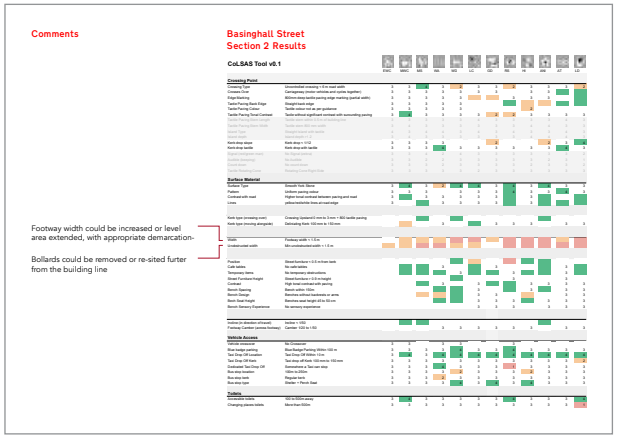
City of London Street Accessibility Tool – link to a usable version of this tool, with an explanation of how to use it.

(https://www.cityoflondon.gov.uk/services/streets/city-of-london-street-accessibility-tool)

The City of London Street Accessibility Tool (CoLSAT) enables street designers to easily identify how street features impact the different needs of disabled people. The tool's key feature recognises that the needs of different groups of disabled people can be contradictory; that improving accessibility for one group may decrease accessibility for another. CoLSAT identifies the trade-offs that may be needed to ensure no one is excluded from using the City's streets and provides the basis for engagement and discussion to maximise the benefits for all.

The tool is an Excel file and is available to download and use. It is split into two parts for space efficiency.

Screenshots of the City of London Street Accessibility Tool.



Lessons learnt

- Exploit external developments (in this case COVID-19); they may prove useful for testing traffic restrictions or road closures.
- Carefully plan for the need of specific user groups. UVARs must cater for a range of freight and passenger transit, like deliveries for businesses and people with different mobility needs.
- Integrate elements of UVARs directly into policies and plans such as climate action plans.
- Make use of single-entry point access gates as an alternative to cordon-style restrictions for easier management and enforceability.
- Be clear and precise in informing drivers as to which vehicles can and cannot access a restricted area. Online communication and street signing need to be harmonised across the country to ease the common understanding of drivers.

Developing a UVAR scheme must be based on a participatory development process.

Getting stakeholders **involved**

Going from building blocks to a UVAR package

Developing a UVAR scheme should be based on a participatory development process. It should start with creating a recommendation for a scheme that is formulated following a range of proposed options.

It is crucial that the scheme and its UVAR building blocks are affordable and appropriate, tailored to the area and its mobility challenges- for example, 'self-enforcement' using traffic signs only or installing a camera control system. The recommendation requires agreements between political players and the public. The latter requires consultation and communication along the entire process to ensure agreement on policy implications and negotiate effects on individual communities. The steps to shape a new UVAR scheme from existing options needs to involve political decision-makers regularly from the start to ensure consultations with the public and for final approval.

A possible process includes these steps:

1. Design the initial framework for the scheme
2. Discuss and approve amongst elected representatives
3. Create details of the building blocks to use in the scheme
4. Initial consultations with stakeholders on an informal level
5. Refine the details of the scheme
6. Discuss and approve with elected representatives on the refined scheme
7. Second consultation on a formal level
8. Formulate recommendations for the final scheme
9. Elected representatives approve the final scheme
10. Implementation commences

Potential for replication

- Closing streets to traffic within towns and cities is not new – use good examples which demonstrate effective design and delivery, this helps to persuade people.
- Allow flexibility in your proposed scheme – political uncertainty and changes in circumstances are very likely in a big project, and you must adapt accordingly.
- Think how you might vary your tools to achieve your aims– look at your building blocks.
- Talk to stakeholders about access to premises from the start– there are usually solutions if approached early in the design.
- Compliment street closure with greening creates a genial and community-minded environment.
- Remind people that walking and cycling are faster in short journeys – this may require some creative campaigning.

Padova

Description of the city

- The Municipality of Padova is 92.8 square kilometres, with a resident population of approximately 210,000 inhabitants. Its Mobility Department is responsible for sustainable mobility planning, integrated mobility systems, access regulations, mitigation of traffic-related impacts on the environment, and the creation of positive awareness of sustainable transportation methods.

- Padova has adopted a Sustainable Urban Mobility Plan (SUMP) that also embraces the 18 surrounding municipalities; which belongs to the Local Agenda 21, a participatory process aimed to reach community consensus to elaborate a long-term action plan (SECAP) towards environmental, social and economic sustainability.

A box to drop off questionnaires on the superblock in the Guizza district, in Padova ("SuperGuizza").
Credits: Comune di Padova

Early on, Padova included political representatives and its SUMP coordinators to align its ReVeAL measures with the local context.

Aligning ReVeAL with **local strategies**

What did they do?

Within ReVeAL, Padova ran two pilots in two different parts of the city.

For the first action, the municipality created a new regulation of vehicle access into the historic centre, to foster the entrance of clean vehicles (electric, natural gas and LPG vehicles). In addition to that, a new and powerful system of electronic gates was implemented along the boundary of the Low Traffic Zone (LTZ).

For the second action, the municipality applied the 'superblock model' in a suburban part of the city alongside the existing tramway line no.1. To reach a concrete reduction of car traffic, in particular of transit traffic, Padova implemented infrastructural and/or traffic regulation measures like school streets and removing on-street parking spaces. This new traffic organisation concept increased space and safety for pedestrians and cyclists in the superblock and in particular around the school district.

The key success factor at the start was to incorporate UVAR measures into the existing political framework created by the Mayor's decree on LTZs. This helped to connect the new UVAR measures to urban planning and more specifically to the management of the existing Sustainable Urban Mobility Plan in Padova. Essential elements right at the start were meetings with political representatives and the Padova SUMP coordinators to

Pupils of the Ricci Curbastro Institute taking part of in a public event in the SuperGuizza superblock in 2021.
Credits: Comune di Padova

> Both city-level and district-level politicians did online and in-person meetings with stakeholders and inhabitants of the LEZ."

effectively align the initial project plans for the LEZ and the superblock with the local context.

Moreover, the urban mobility planning culture moved from a set of different standalone planning tasks to an environmentally driven comprehensive planning approach to the city's transport policies. Workshops with municipal departments covering policy fields like the environment, public works, and trade as well as the local police and Padova University's department of civil, environmental and architectural engineering proved to be crucial.

It was helpful to connect UVAR measures to environmental protection for public acceptance since the population is well aligned with the city's climate protection policy established 20 years ago. Understanding the specific needs or concerns of retail and residents improved the projects by fine-tuning plans accordingly.

Local politicians took a key role in the integration of UVARs and the shift to environmentally sustainable planning: they acted as mediators between potentially conflicting stakeholder groups and as campaigners for UVAR measures in media and participation process elements such as conferences. Both, city-level and district-level politicians worked through online and in-person meetings with stakeholders and inhabitants of the LEZ.

The integration of other governance levels was helpful. The interregional authority 'Bacino Padano' supported the municipality with advice on legal options for how and when to implement air quality-related measures.

The use of complementary measures supported UVAR planning and implementation since they tied the new measures to well-known ones and consequently eased work for the municipal staff. Public space interventions like the implementation of school streets or rededicating former on-street parking spaces to other uses worked well as tools to demonstrate the contribution of UVARs to more liveable and healthier cities.

Lessons learnt

- Be open to new ways of planning and experimenting with new measures, even those that seem not feasible for the local conditions at the first glance.
- Dedicate staff to study the feasibility of the measures before their implementation.
- Connect with other cities and experts to learn how to overcome your capacity and knowledge gaps, such as evaluation elements and methodologies.
- Don't expect one-size fits all solutions when implementing UVARs. Assess the wide field of possible activities and adapt the fitting ones to your local context.
- Invest in the communication of the new UVAR measures to stakeholders, residents and the general public. Take your time in creating a clear communication strategy and give people time to develop their understanding of the measures.
- Avoid conservative and static planning approaches.

Public space interventions, like creating school streets or using former on-street parking spaces for other uses, are useful to demonstrate the contributions of UVARS.

Witnessing **positive change**

Going from building blocks to a UVAR package

The building block approach has been present in Padova for 15 years thanks to its engagement in environmentally friendly mobility measures. The most recent and prominent ones added in the scope of ReVeAL are the first LEZ and the super-block 'SuperGuizza'.

The transition to a UVAR package is based on the lessons learnt from ReVeAL and aims to install respective measures in the historical centre as well as a roll-out of superblocks in different areas of the city.

Implementation of the superblocks in Padova.
Source: Comune di Padova



Potential for replication

- Do a detailed feasibility study before planning in detail. The study needs to investigate technical elements, economic scopes and impacts as well as the potential effects of UVAR measures in your specific context.
- Position the UVAR measures in your main urban strategies and make them an integral element of your SUMP.
- Exploit accepted strategic approaches like an environmental development policy to advocate the UVAR measures.
- Use a push-and-pull approach complementing the supply of sustainable mobility means with UVAR measures to strengthen the effect of a modal shift.

Vitoria - Gasteiz

Description of the city

- Vitoria-Gasteiz is a multicultural city in northern Spain. The municipality – which comprises 63 surrounding villages – is the largest in the Basque Country, with a total area of 276,81 square kilometres and a population of 253,093. In 2012, Vitoria-Gasteiz became the first Spanish municipality to be awarded the title of European Green Capital, and it has been recognised by the UN with the Global Green City Award (in 2019). It is among the 100 European cities that will take part in the European Union Climate-neutral and Smart Cities mission and participates in the Climate Change Adaptation Mission.

- The Environmental Studies Centre (CEA) is an autonomous entity owned by the Vitoria-Gasteiz City Council: its mission is to foster the city's sustainable development, as Vitoria-Gasteiz aims to implement the superblock model at the city level through UVARs and traffic calming measures.

A cyclist commuting in Vitoria-Gasteiz, using segregated bicycle lanes side by side with the tram tracks.
Credits: Centro de Estudios Ambientales, Vitoria-Gasteiz

Two superblocks have been created that give priority to pedestrians over private cars.

Better public spaces, **slower** traffic

What did they do?

Vitoria-Gasteiz's SUMP establishes a network of main roads along which all motorised vehicles, either public (bus, tram and taxis) or private can circulate. The aim is to disincentivise the traffic in the rest of the network by separating the main roads from the ones just covered by local traffic in a 'superblock' model. Superblocks merge the topics of mobility and public space: they are spatial units that define a core network of mobility options at the edge of urban cells and cut out any motorised traffic except for residents, services and emergency vehicles from entering the cells to stress active mobility and liveable public space for people inside the superblocks. As of today – and especially with the new adaptation of the "Plan for Sustainable Mobility and Public Space 2021-2025", the ambition of Vitoria-Gasteiz is to advance in new superblocks with public works and pedestrianisation of streets and to extend the superblock scheme to the rest of the city centre using lane reduction, parking removal, street directions changes and contraflow bicycle ways. The creation of a LEZ with new access control systems, monitored by video camera surveillance with number plate recognition will be implemented, thanks to the knowledge gained during the ReVeAL project.

Two superblocks have been created that give priority to pedestrians over private cars. A crucial element of the superblocks is the creation of public plazas and recreational spaces, which were established on what was previously on-street parking spaces.

Residents of Vitoria-Gasteiz waiting for the electric bus.
Credits: Quintas

> "The measures taken are in line with the principles for superblocks as noted in the SUMP."

It was crucial to cooperate with the surrounding neighbourhood associations since the removal of parking spaces often prompts public protest. For this, clear information and several personal meetings gained opinions and suggestions. The city could mitigate possible protests in addition by providing parking options in other streets partially covering up for the cut of parking in the super-block areas.

The measures taken are in line with the principles for superblocks as noted in the SUMP. Supporting elements that go beyond the scope of superblocks such as escalators and lifts in areas with steep slopes additionally improved accessibility and functionality of the urban sustainable mobility scheme and public space.

The installation of a camera access control system in one of the superblocks allowed to improve the effectiveness of entry control.

The support from other governance levels was critical, specifically the financial contribution from the Spanish Government during the COVID-19 crisis.

Experiences with low-traffic areas such as the superblocks paved the road to install a new zone mixing the principles of an LTZ and an LEZ during the second half of 2022.

Active mobility and public transport in Vitoria-Gasteiz.
Credits: CEA

Lessons learnt

- Work closely and right from the start with the directly affected stakeholders such as neighbourhood associations.
- Make use of cost-effective measures such as road closures instead of cost-intensive street refurbishment investments to apply superblocks to a larger area.
- Be open to solutions that other cities used to improve your UVARs such as the use of traffic camera enforcement with licence plate recognition.
- Use evaluation capturing the situation before and after the interventions to prove their success story to decision-makers, stakeholders, and the public.

Vitoria-Gasteiz applied an integrated and comprehensive approach to its mobility challenges through UVARs.

A **holistic** mobility strategy

Going from building blocks to a UVAR package

The work at the building block level has been characterised by taking an integrated approach applying a wide set of measures and a push and pull strategy. This mix of measures proved a success in the superblocks.

The experiences gained here are used to form the transition from the building block approach to an area-based one by installing a new low-traffic and emission zone in 2022. This zone goes well beyond pure access control and complements this with actions such as a micro-logistic hub, new pedestrian areas, new bicycle parking and tracks, Park & Ride services and the extension of regulated parking and its digital management.

Potential for replication

- Combine urban mobility and public space use in one integrated approach to maximise the effect on the liveability of the city.
- Apply a push and pull approach, an integrated mix of measures, that delivers gains to stakeholders and people instead of concentrating on restrictive measures only. Vitoria-Gasteiz delivered a new public transport network, high-capacity public transport corridors, and improved walking and cycling infrastructure alongside its measures connected to parking policies and access to superblocks.
- Make use of intensive communication and awareness raising on the objectives of the measures as well as when and how the measures are introduced. The Mobility and Public Space Citizen Pact of Vitoria-Gasteiz is an example that justified car traffic restrictions by highlighting the general interest over individual ones.
- Create strong participatory approaches to planning and deliver a mix of measures including UVARs to get better accepted and better working results.
- Use a mix of funding sources including local, state and EU funds as well as alternatives like participatory budgets to finance your measures.

ReVeAL

"A key success factor in implementing their UVARs was the establishment of multidisciplinary and multi-level governance partnerships."

Jerusalem

"Developing a UVAR scheme must be based on a participatory development process."

City of London

"Testing any measure before starting permanent implementation is highly recommended."

Bielefeld

"The exchange with peer cities in the frame of the ReVeAL project allowed to gather external views on the work for a Zero Emission Zone."

Helmond

"Vitoria-Gasteiz applied an integrated and comprehensive approach to its mobility challenges through UVARs."

Vitoria - Gasteiz

"Public space interventions, like creating school streets or using former on-street parking spaces for other uses, are useful to demonstrate the contributions of UVARS. "

Padova