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SYNTHETIC REPORT

Vlada Kantona Sarajevo – UTPS – Urban Mobility | April 2025

Insights and paradigm change for transport planning in Sarajevo

Urban Transformation Project Sarajevo (UTPS) Work Stream 2 (WS2)

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Preamble

The Urban Transformation Project Sarajevo (UTPS) is a research and consulting project supported by the Swiss State Secretariat for Economic Affairs (SECO) with the first phase running from 2021 to 2025. It was launched by the SECO in collaboration with the Consulting Consortium composed of Urbaplan, Helvetas, Enova and Transitec, as well as the Swiss Federal Institute of Technology in Zurich (ETHZ), its spin-off Swiss AI, and the University of Sarajevo (UNSA) to support the modernisation of the urban planning system in Sarajevo Canton, and more specifically the elaboration of the Cantonal Urban Plan 2016-2036.
The present document is elaborated by the UTPS Consortium as part of the workstream 2 “urban moblity”. The activities within workstream 2 aim to challenge the multimodal network planning in order to put Sarajevo in the tracks for sustainable mobility.

Contents

1. Introduction

History and heritage

Sarajevo has a complex history shaped by its strategic location as an important trade center in the Ottoman Empire and many diverse cultural influences. During the Austro-Hungarian era the city and its transportation system was modernized, and Sarajevo became one of the first European cities to have an electric tram network. The Bosnian War in the 1990s severely damaged infrastructures and is still palpable in the city today.

The traffic infrastructure plan adopted in 1965 consists of a primary street network with the highway bypassing the city in the south and the north, as well as 4 longitudinal and 14 transversal roads. Within the plan a railway-ring around Hum, a route through Lukavica and a route to the east were intended to be built. In later revised plans of 1986, 1990 and 2006 a tunnel to bypass the city center was integrated and the southern highway bypass disappeared from the plan. The road network used as a base concept consists of the projects of the different traffic infrastructure plans, notably:

- two major projects for the supra-cantonal network:
  - the south highway
  - the tunnel « Gradski autoput »
- for the metropolitan accessibility:
  - two main roads on both sides of the central avenue;
  - transversal VI and I to connect with the future south highway.

Previous traffic infrastructure plans of Sarajevo put forward road network capacity rather than a global vision integrating all modes of transportation including public transport, cycling and walking.

New and modern goals on mobility

The Sustainable Urban Mobility Plan (SUMP) is an integrated planning concept that targets to solve transport related problems in a way to contribute to the European climate and energy goals set by the EU. The objective of the SUMP is to reduce Greenhouse gas (GHG) emissions by 40% in 2030 compared to 1990.

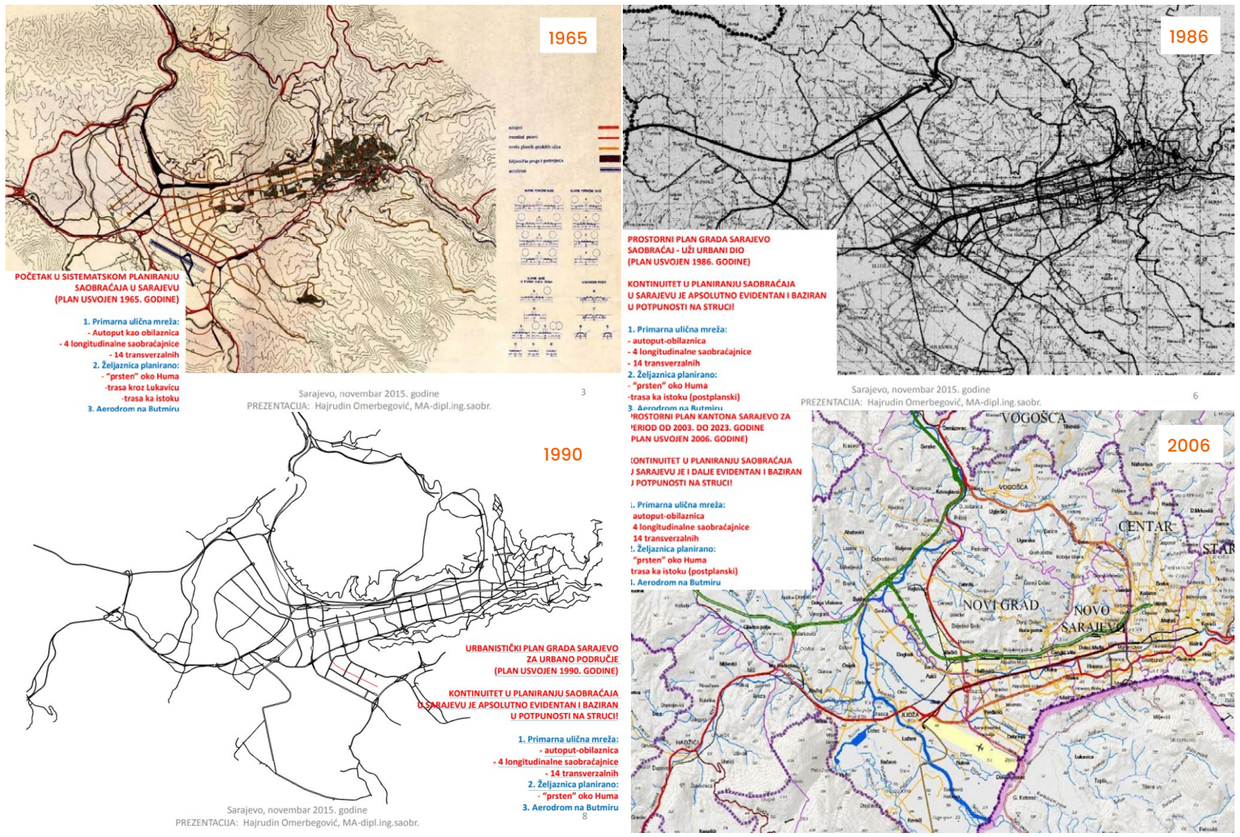
The following indicators are defined in the SUMP to help monitor the strategy:

- keep traffic emissions below 500'000 tons by 2025
- +20% of green spaces along roads for non-motorized trafic
- +200% of non-motorized transport trips by 2025
- 7'600 m2 of space freed from motorized traffic
- +10% km travelled by urban public transport.

In their new objectives, the EU aims to reduce the GHG emissions by 55% until 2030 compared to the level of 1990. Sarajevo applied to be and was selected to become one of the European-Union (EU)-funded climate-neutral and smart cities by 2030.

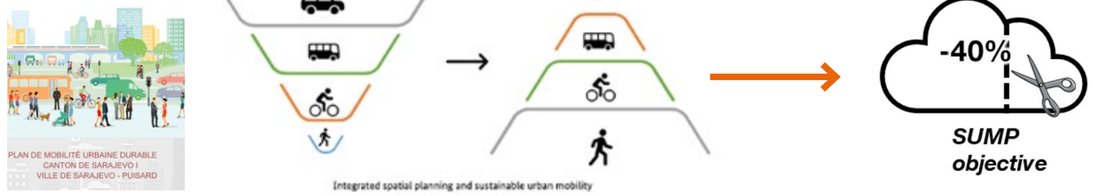
FROM THIS...

OVERVIEW OF THE FOUR PREVIOUS URBAN PLANS FOR SARAJEVO



TO THAT...

SUMP



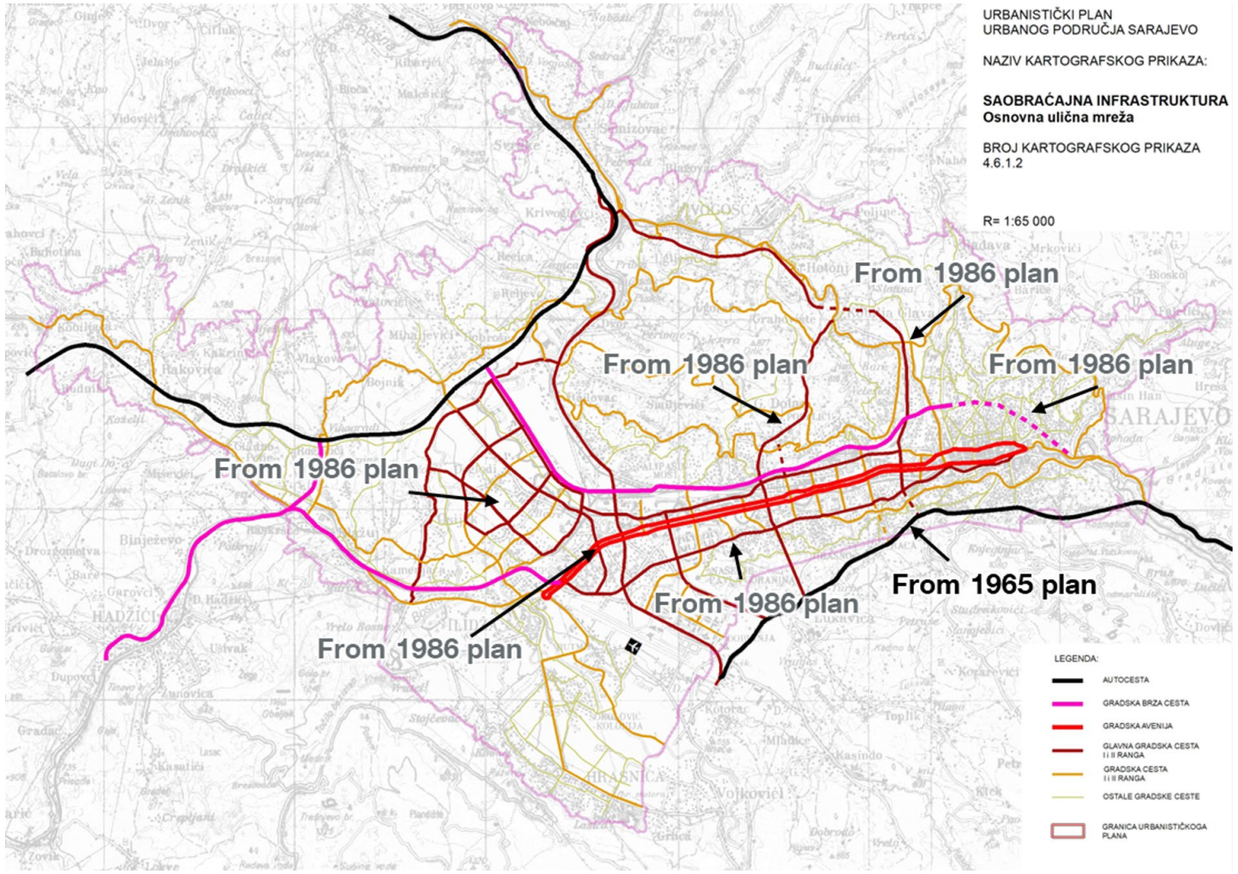
Away from an approach of planning that focuses solely on developing infrastructure without considering the broader developement of the city. Let's create cities for people rather than for machines.

EU GOALS

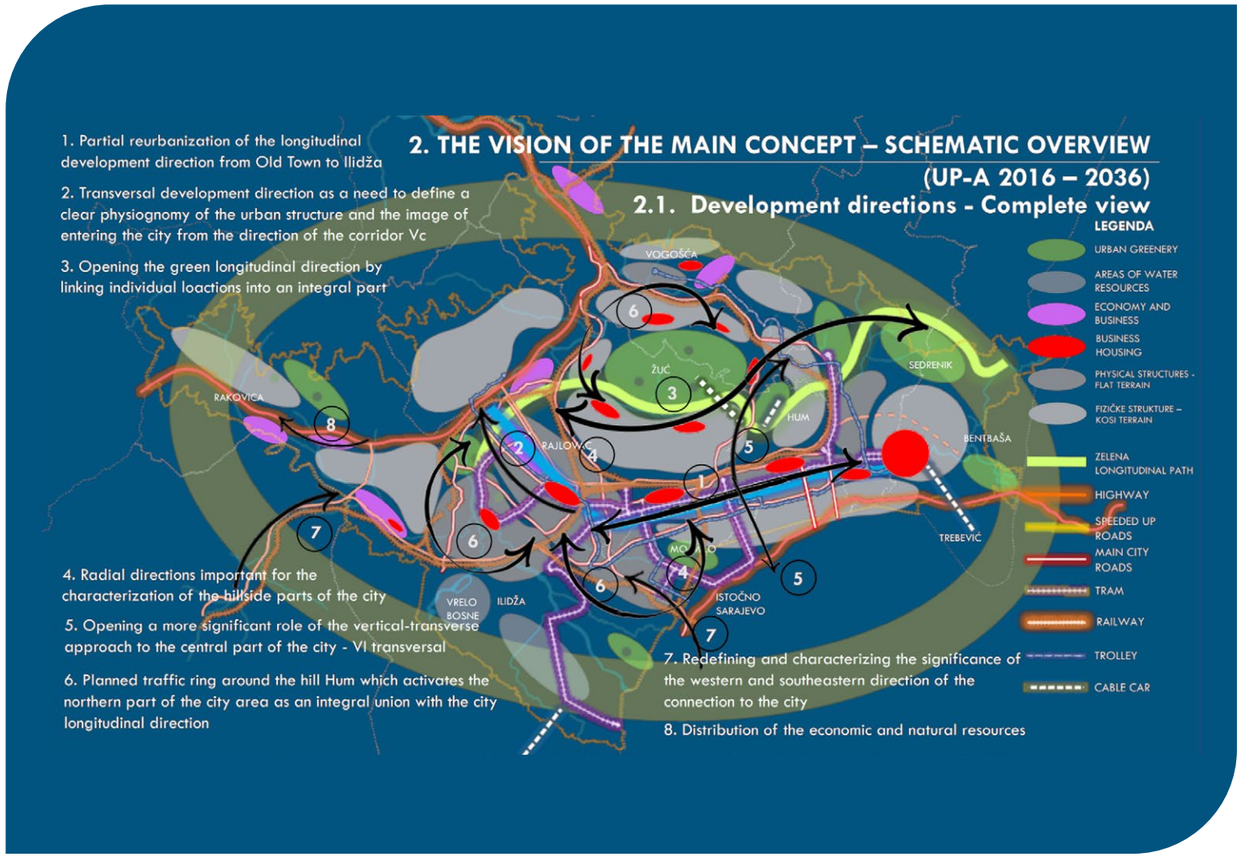
Climate City Contracts [...] set out their plans to achieve climate neutrality by 2030. The contracts are a clear and highly visible political commitment, [...]. Mission Cities will start their journey [...] applying innovative governance and a systemic approach [...] to achieve long-term solutions for common city problems.

Urban plan for the urban area of Sarajevo from 1986, towards 2036

- The Canton of Sarajevo is obliged to respect the traffic network planned in the Urban plan in force, which dates to 1986. In this 2024 Urban plan, Sarajevo committed to the development of transversal axes, the activation of park-forests, the development of traffic networks and a more detailed structuring of spatial use. These inherits, which have so far been in the background, ought to be put forward and effort is to be made to elaborate and prioritize the development of structuring axes of the Sarajevo mobility network. For this, the vision of the development directions of the Urban Plan 2016-2036 was formulated by the the Sarajevo Canton Institute of Development and Planning (IPDCS).
- Yet, the Institute for Planning of Development of the Canton of Sarajevo (IPDCS) has asserted a vision with strong guidelines such as the reurbanisation of the longitudinal from old town to Ilidza, the development of a green longitudinal along the river, the relation with the northern part of the city thanks to the traffic ring and the activation of several city centers in order to counteract the actual monocentric dynamic.



ROAD NETWORK INFRASTRUCTURE DEVELOPMENT PRESENTED IN 2024 URBAN PLAN



VISION FROM SARAJEVO CANTON

Urban Transformation Project Sarajevo (UTPS) – Workstream 2 – Urban mobility planning

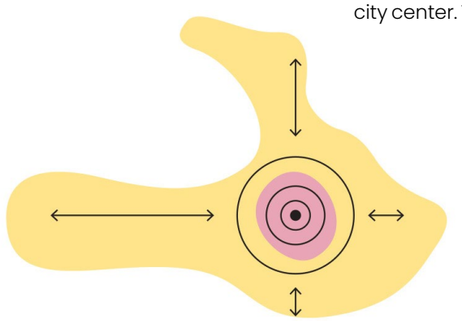
In order to accompany the Canton of Sarajevo and in particular the IPDCS in the process of updating its Urban Plan, the workstream 2 of the UTPS aims to provide an outside perspective and to challenge the 2024 Urban plan. Being elaborated with clear mobility objectives in the context of reaching sustainable objectives, potential inconsistencies or weaknesses not allowing the plan to be aligned with these objectives are identified and other visions and concepts of mobility planning proposed in order to challenge the ones being developed.

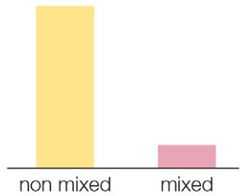
2. Current situation

A challenging monocentric structure of land use

The land use is characterized by mainly monofunctional areas (segregation of residential and activity areas) and public services concentrated nearby and within the city center, quite far away from most residential areas. Other activities zones are located in peripheral areas away from the densified residential areas.

This current monocentric allocation of urban land use and development generate long trips and concentrates them on a few axes during the peak hours. Commuting trips must necessarily join the central longitudinal roads to reach the main city center. Traffic congestion is the direct and daily consequence.

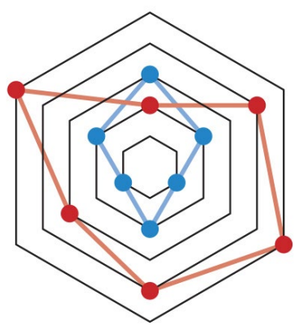


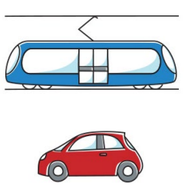


Lack of competitivity of public transport system

Sarajevo possesses an important public transport offer with a dense urban public transport network with seven tram and over 40 bus lines serving the metropolitan trips and a promising but underused rail network for long distances to Konjic-Ploce and Doboj-Samac.

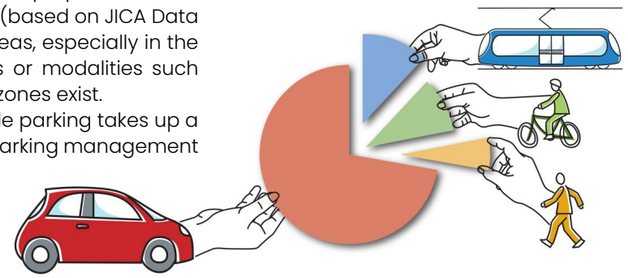
Yet, the services have important weaknesses that make them less attractive than they could be. The public transport network is concentrated on the center. All tram lines run along a single route, the Boulevard of Meše Selimovića and around 30 of the 40 bus lines serve the city center. The attractiveness is further limited by a low level of service concerning frequency, punctuality, travel time, lack of passenger information, capacity and comfort both of the vehicles and the public transport stops and walking accessibility of the stops.





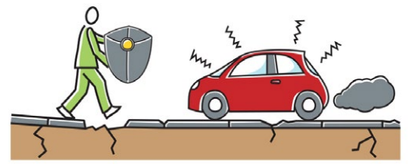
Predominating presence of the car in public space

The public space in Sarajevo is extensively oriented towards individual motorized traffic. The current proportion of car journeys has been estimated to 80% (based on JICA Data Collection surveys, 2020). In some areas, especially in the urban center, circulation restrictions or modalities such as one-way streets and moderated zones exist.
Moreover, individual motorized vehicle parking takes up a significant amount of public space. Parking management has been identified to be insufficient.



A discontinuous and heterogeneous quality of the pedestrian network

The existing pedestrian infrastructure is mostly oriented towards touristic and leisure areas where some pedestrian zones and well-dimensioned walkways exist. Outside of these zones, walking is dangerous and not enjoyable. The main reasons are the lack of appropriatly developed infrastructure such as wide walkways, quality of public space (green areas, benches, ecc.) and safe crossing infrastructures and the exposure to car traffic nuisances (noise and air pollution).



A rare use of cycling despite a promising flat plain

Sarajevo lies in a 10 km long, mostly flat plain and is surrounded by hills and mountains. Although the city center as well as most residential and activity areas are located in this flat area, cycling is not widespread. The main reason why the potential of cycling as a mean of transport is not being exploited was identified to be the discontinuous cycling network.
The existing infrastructure is mostly oriented towards leisure and tourism. Due to the lack of infrastructure on commuting routes and on intersections and crossings, cycling is not a safe and attractive alternative to the individual motorized transport.

Promising levers

- Most of the generated traffic stays within the Canton and does not depend on externalities, the Canton has an important lever of action for the major part of traffic.
- Some main roads with important width, resulting in opportunities for reconversion.

Walking

pedestrian area / footway

sidewalk

Cycling

cycleway

Public transport

train

bus

Motorized individual transport

main road

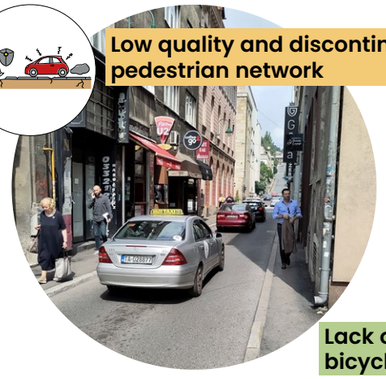
Urban development

mixed use

residential use

industrial use

Low quality and discontinuous pedestrian network

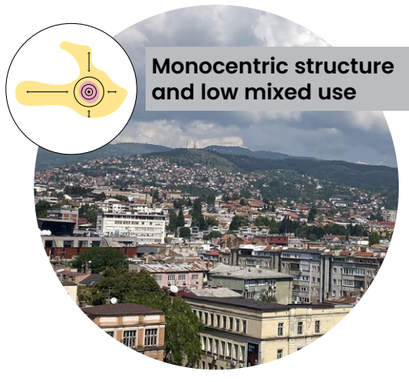


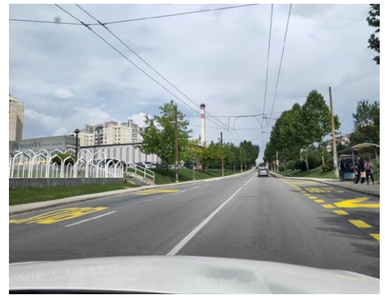
Lack of safe and coninuous bicycle network

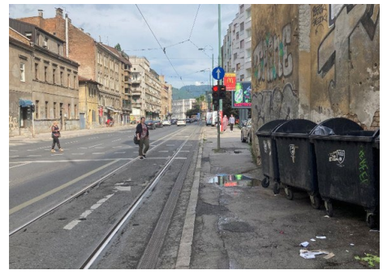
Lack of competitivity of public transport

Unequal space share between the modes of transport

Monocentric structure and low mixed use







3. A need for a paradigm shift

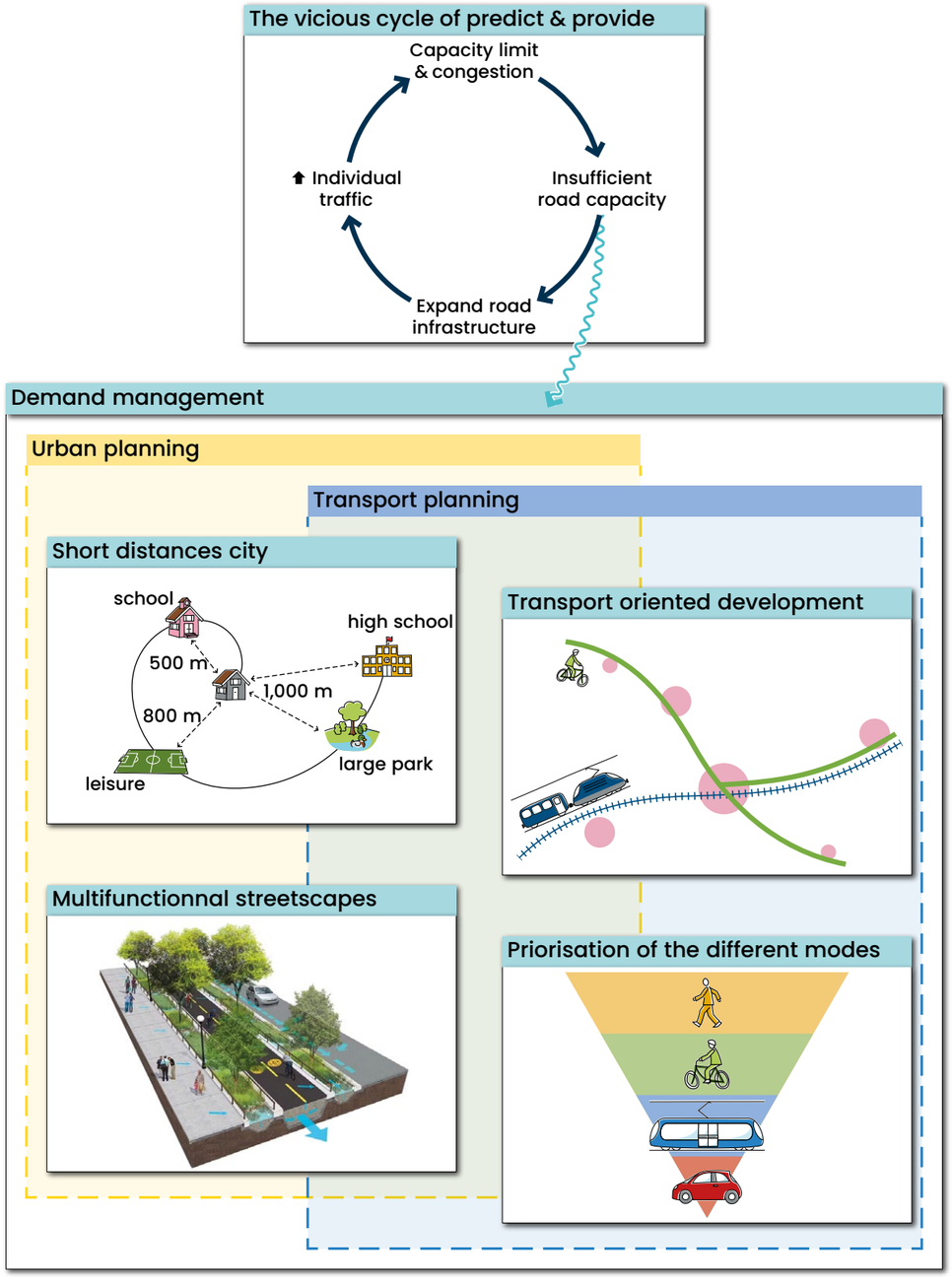
No longer meet demand but manage it: getting out of the vicious cycle

In order to cut the vicious cycle of predict and provide, which consists in expanding the road network to respond to traffic congestion, it is necessary to manage and channel demand of transport in the direction that meets the set objectives.

To achieve this, action must be taken in both urban and transport planning:

- The short distance city consists of an urban planning concept in which most daily necessities and services, such as work, shopping, education, healthcare and leisure can easiliy be reached by a 15-minute walk, bike ride or public transit ride from any point in the city.
- Transit-oriented development is a type of urban development that maximizes the amount of residential, business and leisure space within walking distances or around public transport hubs. It promotes a symbiotic relationship between a dense, compact urban form and the public transport network.
- The way in which public space is allocated to the different modes and other related needs has significant influence on the attractiveness of alternatives to the private car. Decisions and ruling must be made by considering a wide range of criteria.
- Prioritisation of modes of transport to plan the different transport networks defining a clear priority to the most efficient, safe and sustainable modes depending on the urban space available and in such a way to make intersections more attractive for these modes.

The implementation of these principles in the Urban Plan makes it possible to reduce the length of journeys, use public space more efficiently, improve its quality and promote road safety. The overall effect will be to rebalance the modal share in favour of alternatives to the car and consequently reduce greenhouse gas emissions.



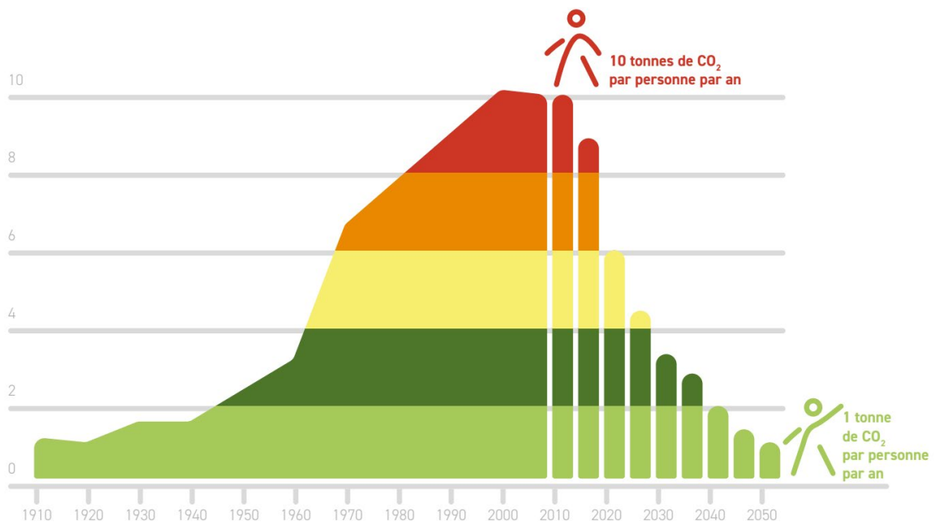
4. Examples of European Cities in transition

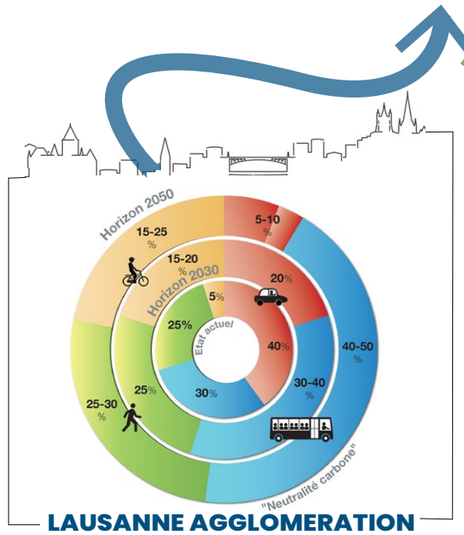
From Ljubljanas pedestrian-friendly streets to Lausanne's efficient public transport, cities around the world are redefining mobility—it's Sarajevo's turn now! Sarajevo stands at a crossroads, with global examples lighting the way to a future of sustainable and inclusive mobility. Here are a few from various cities around Europe, from Geneva (CH), to Lausanne (CH), Ljubljana (SI), Bologna (IT), and Budapest (HU).

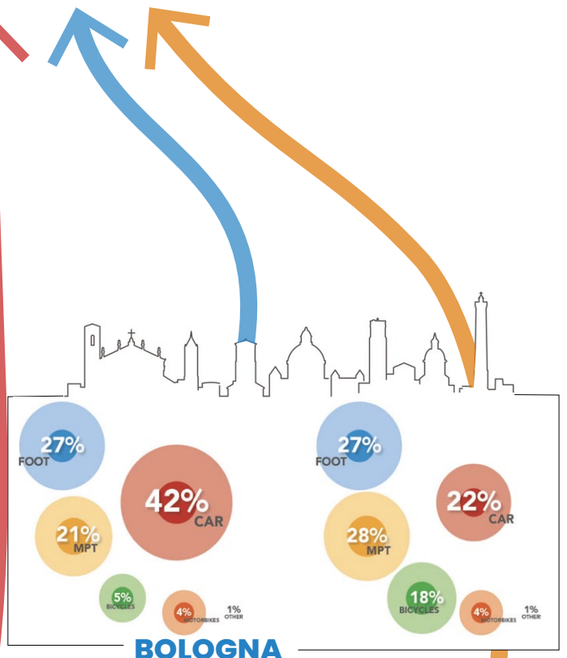
Geneva's journey towards carbon neutrality has begun. The objectives concerning emissions of CO2 equivalents have set a reduction from 10 t/year per person to 1 t/year per person by 2050. Therefore, it was established that a division by 5 of the number of car trips was necessary. In other terms, a reduction of car traffic by 80% is to be aimed at.

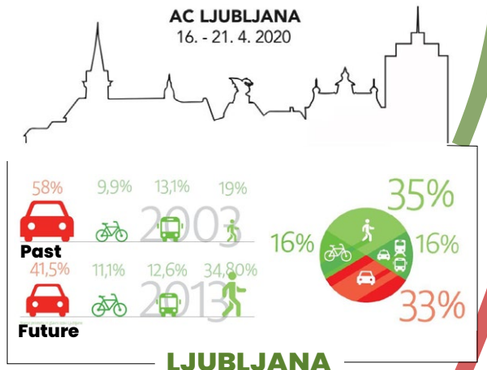
Ljubljana, **Lausanne** and **Bologna** accelerate their shift towards greener mobility by settings clear and ambitious goals of modal shift and changing drastically their road infrastructures.

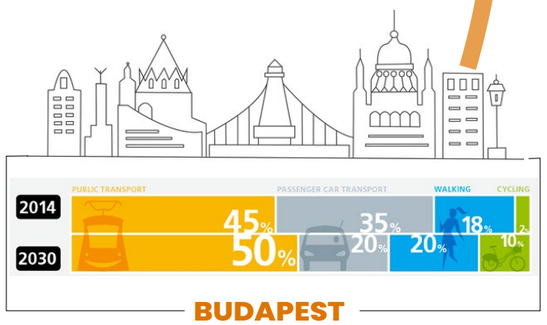
«REACHING CARBON NEUTRALITY BY 2050», GRAND GENÈVE EN TRANSITION, 2023









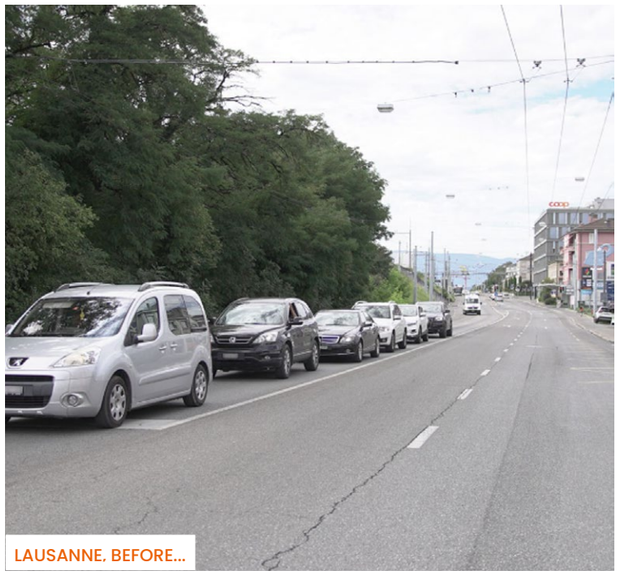


LJUBLJANA. BEFORE...

...AND NOW

BOLOGNA. BEFORE...

...AND NOW



LAUSANNE. BEFORE...

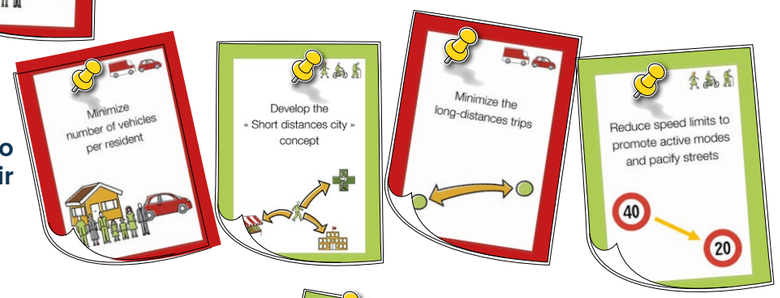
...AND NOW

5. Participative workshop

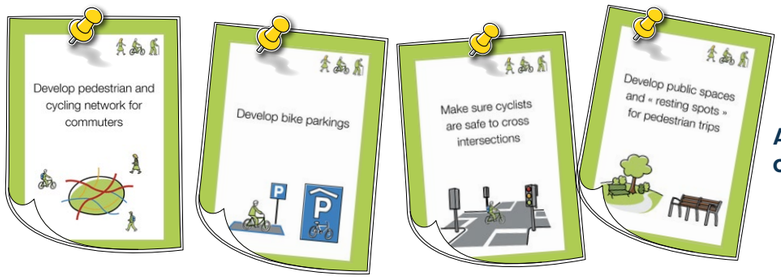
During the mission, a workshop was held in Sarajevo on December 6th 2022, with around 15 different people and different organizations related to urban planning (Kanton Sarajevo, Zavod Planiranja, Grad Sarajevo, Saobraćajni Fakultet, Hidrogradnja Fakultet). The aim was to gather the main challenges about mobility and transport and to select the most important objectives for Sarajevo in order to reach carbon neutral mobility. The participants chose 14 main objectives out of 50 that were suggested and brought to the fore 4 main thematics:

- the urge for a pleasant place to live with clean air;
- the focus on the development of non-motorized mobility;
- the demand of traffic management improvement;
- the need of complementarity between modes, especially public and private transport.

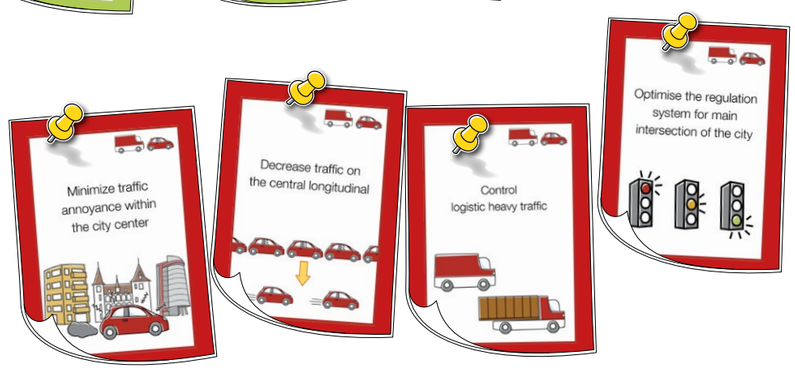
Develop complementarity between private and public modes



A pleasant place to live with clean air



An intensive development of non-motorized mobility



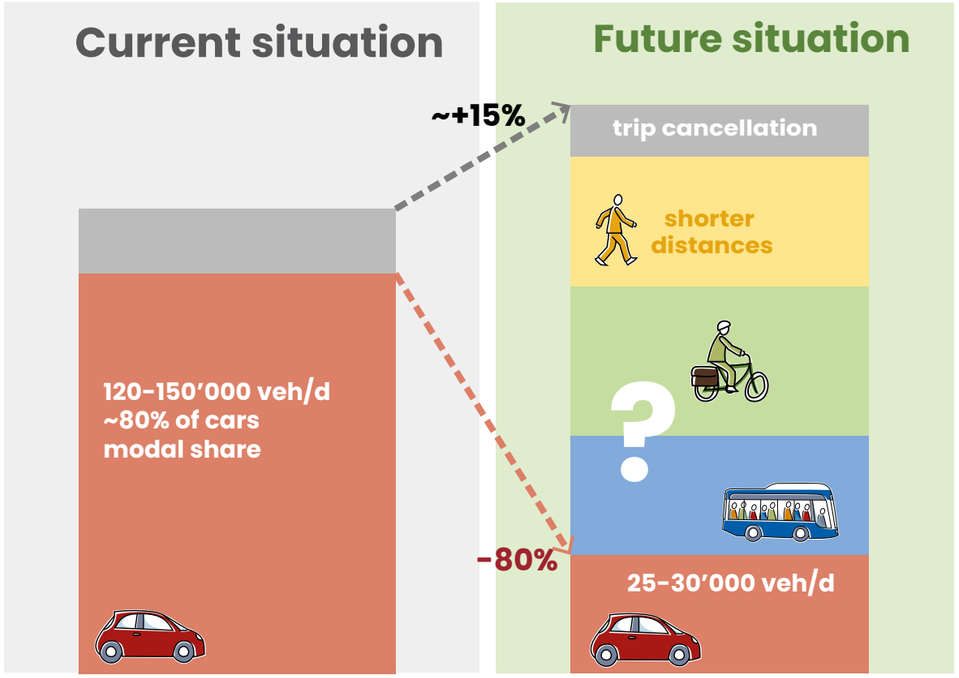
Take on traffic and parking management

6. Recommended objectives and measures for Sarajevo

The modal share target is essential and structuring. Compared to the current situation where nearly 80% of trips are made by car on the main roads, the target of dividing this volume by at least 5 can be defined to achieve the objectives concerning air quality and quality of life. It is necessary to therefore narrow down the vision in terms of objectives for the alternatives with the share of trips that:

- can be eliminated (lifestyle, teleworking, e-commerce, etc.);
- can be done in the new urban centers, close to where people live and therefore on foot;
- can be done by bicycle thanks to the favorable topography and the relatively short distances between urban centers and where people live;
- transferred to cycling with an attractive and dense cycling network with high-quality infrastrucutre;
- transferred to public transport with efficient, structuring tram lines, but also due to a reliable and comfortable bus network.

PERSPECTIVES FOR MODAL SHARE EVOLUTION WITHIN THE CANTON OF SARAJEVO



Two keywords must be entered in the planning. By reducing distances, trips are **avoided**, and overall transport demand is reduced. This is made possible by the achievement of a very high quality of pedestrian networks, in particular by the comfort compared to other modes (networks free from the nuisances of traffic) and the carefully worked mesh of primary, secondary and tertiary pedestrian networks.

Through the development of the public transport and cycling network, a **shift** from individual motorized transport to other modes is achieved. By enhancing the use of the most efficient mode for the respective trip length and purpose, the modal shift potential is affirmed.

Avoid trips within the districts by strengthening their central functionalities and attractivity

The urban structure has a big impact on the mobility flows. By steering the distribution of population and activity, mobility can be transformed. Instead of concentrating the flows towards one single center, many trips become obsolete when focusing on the development of mixed area and multiple centers. With daily necessities being within walking distance, for trips to bring the children to school, to go to work or to go shopping, a car is no longer essential.

By using urban management as a tool to manage demand instead of staying within the cycle of predicting demand and providing constantly additional capacity, motorized trips can be reduced, quality of life increased and the potential of walking as a mode of transport exploited.

To make walking a mode of transport of its own:

- a continuous pedestrian network with classification of its use (commercial areas, leisure and greenery, commuters, ...) must be planned,
- "urban cuttings" must be minimized, as such can discourage pedestrians,
- pedestrian zones and moderated speed traffic zones (30 km/h, 20 km/h) ought to be created, and
- one is to be vigilant about making the streets attractive, comfortable and safe by creating vibrant spaces which respect the needs of all population groups.

Shift trips between districts to public transport and cycling

The current high use of the car does not align with the goals to improve the quality of life in Sarajevo and to transition towards more sustainable mobility. To reduce the car use and increase the use of cycling and public transport, the offer of these efficient modes of transport for the distances between districts must be enhanced and their competitivity to the motorized individual transport ensured.

To achieve a shift from the car to cycling, an attractive cycling network must be created for every user. It must guarantee continuous accessibility of the whole urban area within an adequate grid. Its use and importance are to be transcribed in the network hierarchy, and the infrastructures to be dimensioned respectively. By providing adequate parking spots close to the main destinations, the competitiveness of cycling is optimized.

To make public transport attractive and competitive to the motorized individual transport, urban planning in accordance with the development and improvement of the transport network are to be prioritized. An easy access to stations by foot or bike supports the shift from car use to public transport.

Objectives

By effective demand management, concrete multimodal planning can be developped with :

Reduce trip distances and prioritize walking within the neighborhoods

Make cycling attractive and accessible for trips in the urban agglomeration

Provide reliable and accessible public service within and outside the canton

Adapt car accessibility and regulate the impact of individual motorized

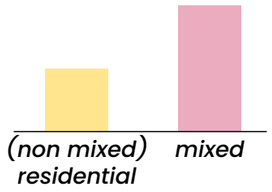
Related measures

Urban planning

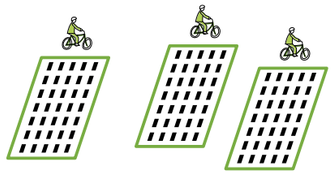
Transport planning

Short distances city

Provide daily necessities and services



Generous supply of bicycle parking spaces in buildings and public spaces



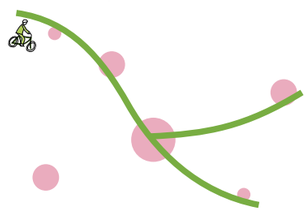
Provide reliable and accessible public service within and outside the canton

Regulated and controlled parking contruction and management

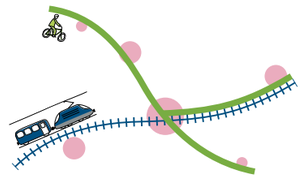
Transport oriented development

Multipolar city

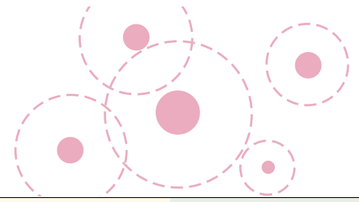
Multimodal transport hubs accessible by bike



Multipolar city connected with high capacity public transport services

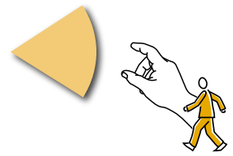


Developing a park-and-ride strategy consistent with public transport network



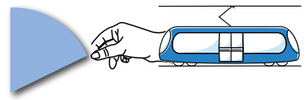
Multifunctionnal streetscapes

A significant share of public space dedicated to walking and greenery



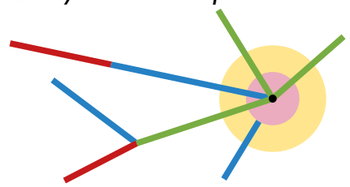
A significant share of public space dedicated to cycling

Reserved lanes for public transport on key axes



Efficient space use

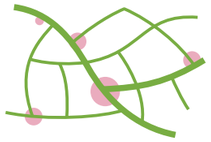
Adapting car use of public space to the hierarchy of the transportat netork



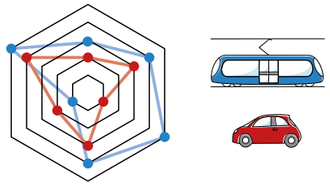
Ruling in space allocation

A dense and attractive pedestrian network with safe crossings

A direct, dense and attractive cycling network with wide and safe infrastructures separated from cars along primary roads



Public transport priorization at intersections



Coherent adaptation of road capacity to enhance the potential of other modes

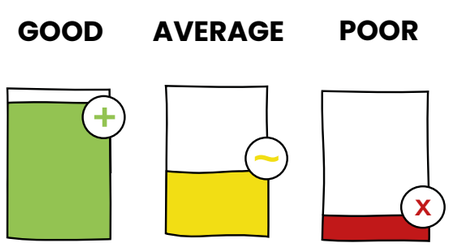
7. Critical Analysis of the 2024 Urban plan for Sarajevo

To critically assess the actual plan for Sarajevo, the relevant materials provided during the mission in summer 2022 are evaluated against the defined objectives. The aim is to identify the elements aligned with the pursued approach of sustainable development as well as potential inconsistencies. This analysis will serve as a basis for alternative mobility network plans and designs in the future that are more consistent with the objectives of integrated sustainable development.

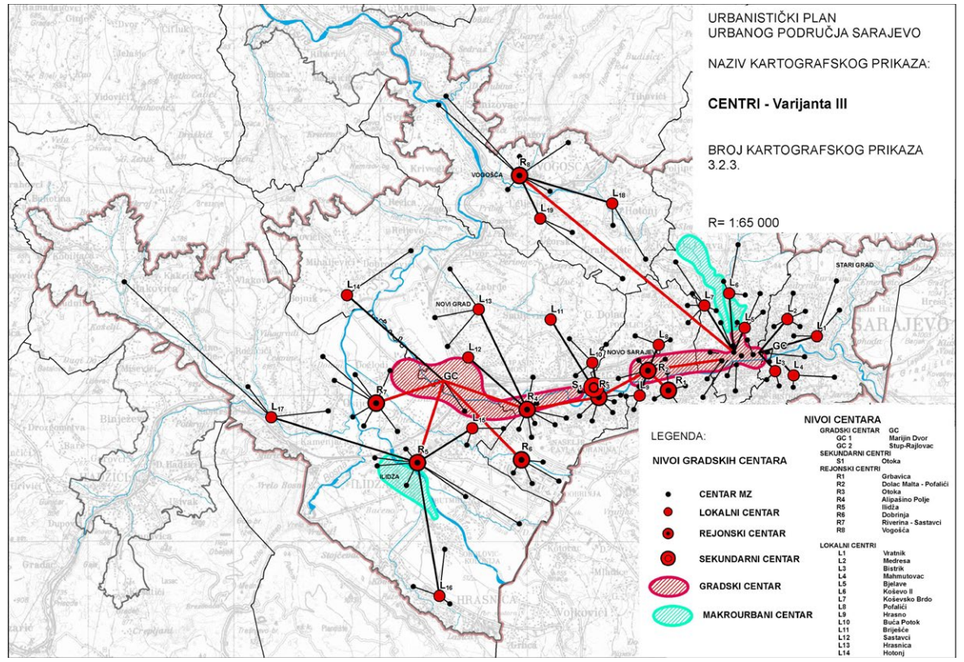
Two major developments are highlighted:

- The ambition to create a polycentric dynamic by reinforcing activity towards Ilidza to deconcentrate flows towards the current old center while maintaining travel in the plain and close to the current transport networks.
- The development of multimodal transport networks with:
  - the strengthening of the main road network by a ring to the north, 3 longitudinal and 4 to 5 transversal to criss-cross the territory;
  - the particular treatment of the current avenue of the longitudinal axis;
  - the development of the tramway towards the southern and western poles as well as the rail network with the ring to the north;
  - the consideration of a trolley-bus line along the southern longitudinal axis;
  - the development of the cycable network in line with the hills and forest all around the urban area.

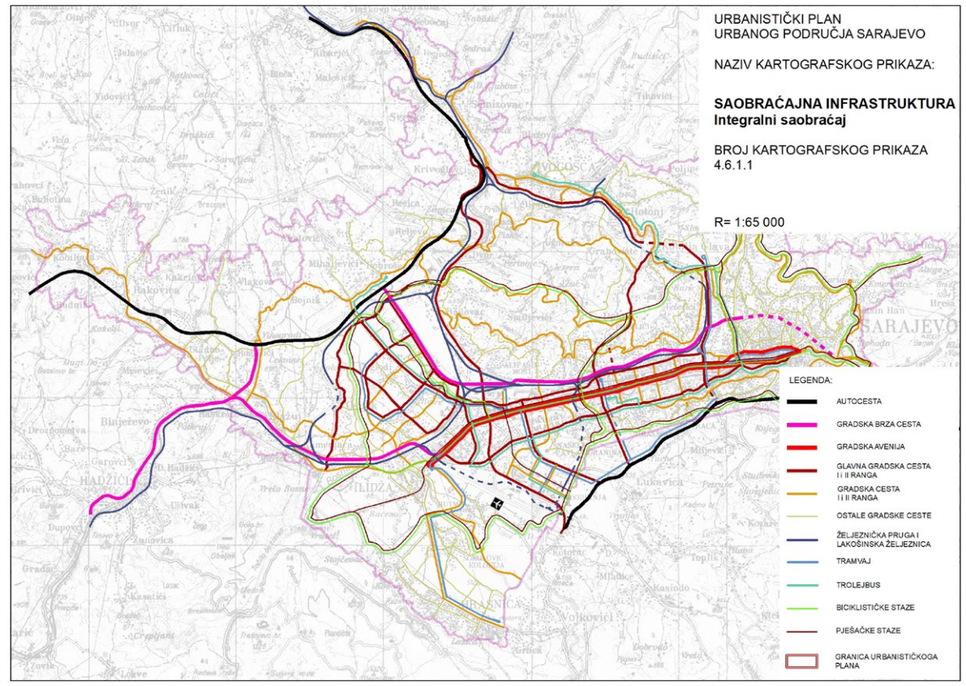
ANALYSIS OF THE CONSISTENCY WITH SET OBJECTIVES



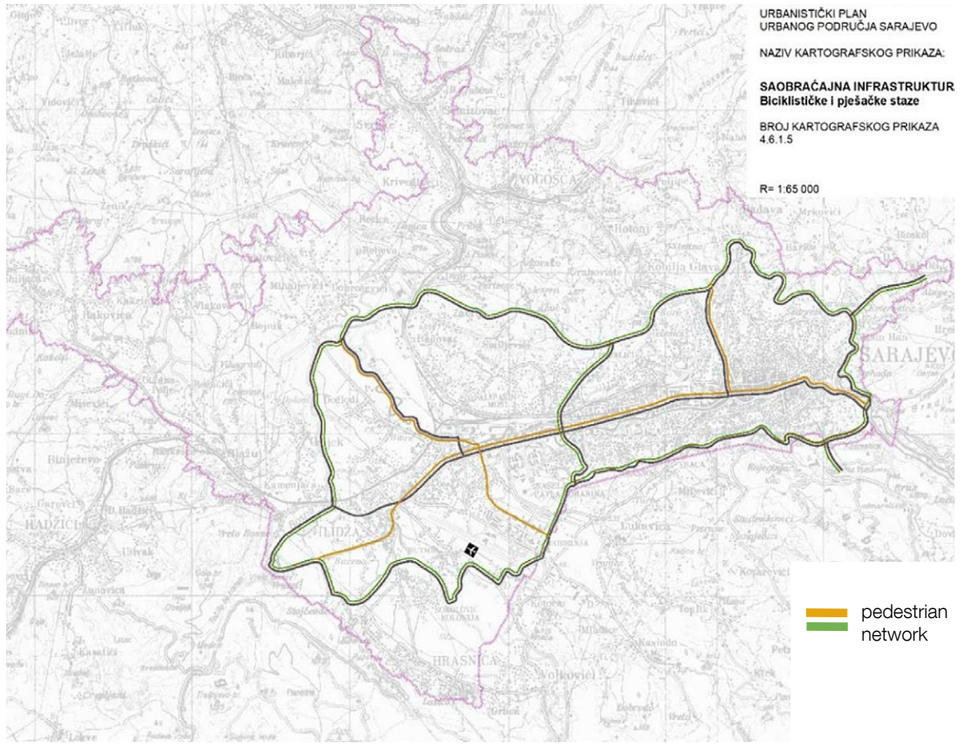
ORGANISATION OF URBAN CENTER - VARIANT 3 (EXERPT FROM 2024 URBAN PLAN)



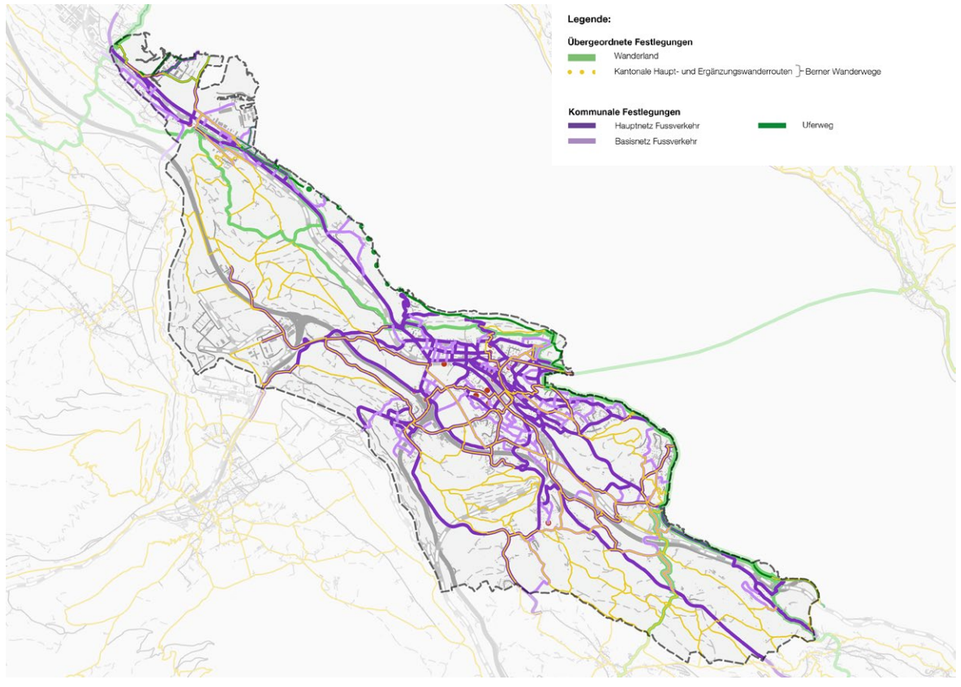
MULTIMODAL TRANSPORT NETWORK (EXCERPT FROM 2024 URBAN PLAN)



SARAJEVO 2024 PEDESTRIAN NETWORK



SPIEZ (CH) PEDESTRIAN NETWORK



Reducing trip distances and prioritize walking within the neighborhoods

SHARE OF ACTIVITY AND RESIDENTIAL AREAS WITHIN PRIMARY AND SECONDARY CITY CENTERS

In the 2024 Urban plan, the dense areas located within the plain are generally designed with residential, tertiary activities as well as everyday activities and services. Nonetheless, the less dense residential areas seem to suffer from a lack of these kind of activities: the inhabitants of the hills, the peripherical areas such as Hrasnica or the neighborhood of Velesici, Bjelave or Kobilja Glava are still very much dependent of the main centers for work and everyday life options.

MULTIPLE CITY CENTERS OF MAIN IMPORTANCE

By pursuing the development of a second center in the area of Stup-Ilidza, Sarajevo aims to reduce the pressure on the existing historical center. This is expedient because the concentration of the flow towards a single center in a monocentric development is not efficient and the existing center has limited potential for densification.
The proposed location of the second city center however is questionable. It is directly located on important road infrastructure, and it is a sensible area for floading. The main interest from the proposal is to reduce the pressure on the actual city center by splitting the mobility demand between two centers. Yet, this separation occurs in a dense and active part of the canton (Cengic Vila), which makes it difficult to implement on the territory. Additionally, considering the urban dynamics, longitudinal flows will inevitably occur.

SIGNIFICANT PUBLIC SURFACE SHARE TOWARDS PEDESTRIAN ZONES

The main city centers offer some streets reserved to pedestrians in the main touristic and commercial areas, especially along water bodies. The Urban plan mentioned the possibility to create new pedestrian zones in residential areas around the local squares. Yet, the pedestrian zones should not be dedicated only for leasure but must also be designed on actual streets close to activities and public spaces outside of residential areas and highlight their compatibility with other methods. It would be important to map these pedestrian zones at the metropolitan scale in order to assess their relative importance.

DENSE AND QUALITATIVE PEDESTRIAN NETWORK

Even though a chapter on pedestrian traffic exists in the Urban plan, the value of the most important mode of transport (almost 50% of all trips!) is not clearly presented:

- the map representing the pedestrian network as presented in the Urban plan is defined towards leasure on a regional level (forests, central longitudinal). The network could be designed in a much denser way. For urban territory, the city of Geneva for instance plans a grid of 250 meters for the structuring main pedestrian network. Similarly Spiez distinguishes between leasure and main pedestrian routes whereas the later are especially dense in the urban area;
- it's not about identifying actual pedestrian corridors and adapt the infrastructure consequently but to create dense and qualitative infrastructure in order to promote walking trips that don't exist today.

The ambition presented in the urban document must be translated into precise and quantitative indicators in order to monitor and actually implement these objectives.

Providing attractive bike accessibility within the urban agglomeration

MULTIMODAL TRANSPORT HUBS ARE ACCESSIBLE BY BIKE

The actual plan highlights the importance of the integration of cycling and public transport as these modes complement each other in terms of efficiency depending on trip length. Yet, it would have been interesting to map the cycling network along with these transport hubs in order to make sure they are all well accessible and to provide secure bicycle parking spots in the hubs.

Thereto, in the bicyle network plan of the Lausanne agglomerationen, the most important train stations are illustrated and their connection to the cycling network prioritized.

A DIRECT, DENSE AND ATTRACTIVE CYCLING NETWORK WITH WIDE AND SAFE INFRASTRUCTURES, SEPARATED FROM CARS ALONG PRIMARY ROADS

The cycling network of the actual plan does not connect all polarities. All centers and residential areas must be considered in the bicycle network to improve the bike accessibility of the whole Canton.

The planned cycling network is not dense enough to be efficient: a primary network should be designed with a grid spacing of about 0.5 km and a secondary network with 300 m. Therefore, the bike accessibility as shown in the map, lacks continuity and attractiveness in order to improve the cycling modal share.
The planned infrastructure of separated bike paths is not continuous and overlaps with the primary car access. Also it lacks a hierarchy that defines a primary, a secondary and a leisure network.

The Lausanne agglomeration, an area of comparable size, provides a much denser and a hierarchized cycling network.

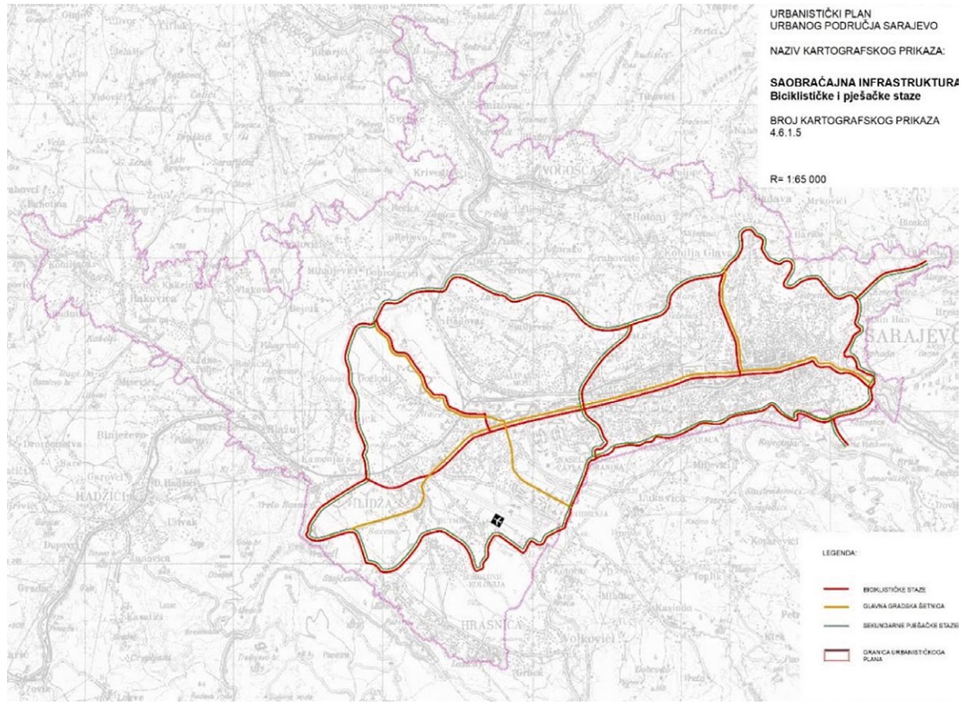
GENEROUS SUPPLY OF BICYCLE PARKING SPACES IN BUILDINGS AND PUBLIC SPACES

The Urban Plan is the perfect opportunity to regulate the quantity and quality of bicycle parking in new buildings and neighborhoods.
Adding the rules regulating the number and type of bicycle parking spot of the Urban Plan is a powerfull tool to promote bicycle ownership.
The Urban Plan must also integrate the planning of the main bike stations in order to offer a secure place to park a bike, and bicycle parking standards into street redevelopment projects, compliant with multimodal networks.
The actual plan does not forsee or include any space for bicycle parking.

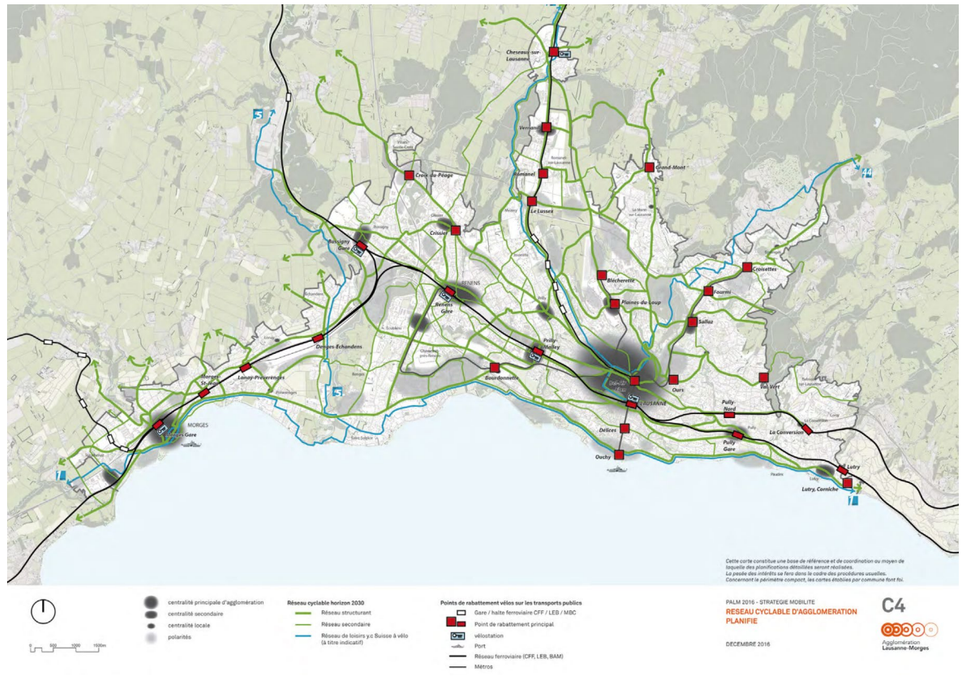
A SIGNIFICANT SHARE OF PUBLIC SPACE IS DEDICATED TO CYCLING

The plan suggest bicycle paths of 1.50 m dimension per direction. From experience, these widths are not enough to provide a capacitary infrastructures for daily cycling trips. The planning documents now recommend a minimum of 2.00 m for a cycling path along important traffic roads and up to 2.50 m for a high standard quality infrastructure especially for the main cycling network.

SARAJEVO 2024 BICYCLE AND PEDESTRIAN NETWORK



BICYCLE NETWORK PLAN FOR LAUSANNE AGGLOMERATION



Providing reliable and accessible public service within and outside the Canton

URBAN DEVELOPMENT ALONG PUBLIC TRANSPORT AXES

The forecasted urban development, for residential and activity areas, is mainly concentrated around existing or forecasted public transport lines. The most sensitive areas are the ones located in the hills since they present difficulties of access for large buses because of its sinuous and steep road network. The urban development is therefore more concentrated in the plain areas.

HIGH CAPACITY AND QUALITATIVELY ATTRACTIVE SERVICE

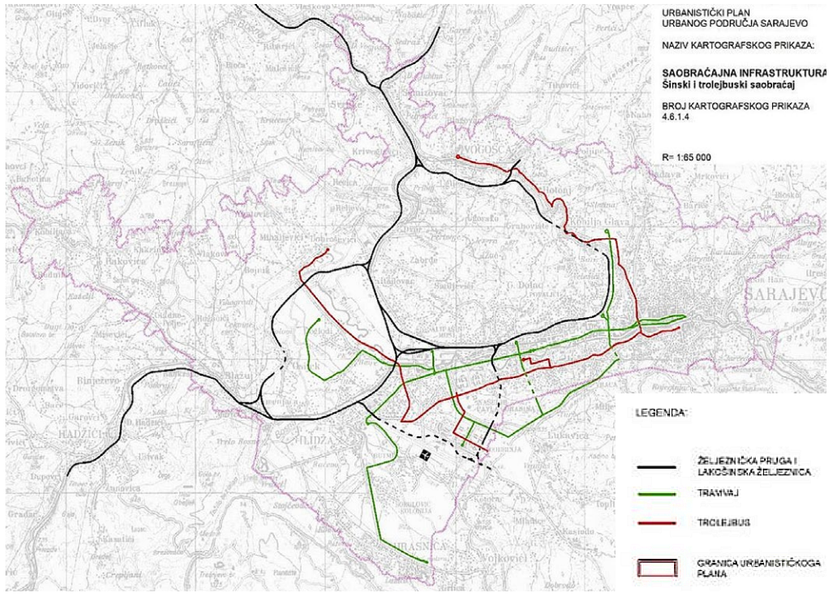
The actual and forecasted public transport network (as well as the local bus network, not represented in the Urban plan) is relatively well designed and covers several polarities of the territory. Trams and trolleybuses are deployed on several major routes in order to provide interesting cadences.

The plan is actually quite ambitious especially with the railway ring in the northern part or the tramline in the southern part crossing the entity border. Yet, such development are very complex and their realisation not certain. The plan could be enhanced by prioritising these measures in order to make sure some measures are feasible in the target timeframe of the planning. Plus, the handling of hubs can be further emphasised with specific measures on the handling of offers and services of all modes (connection times between lines, pedestrian routes within the stations, bike accessibilty and parking, park-and-rail for cars….).

Public transport currently suffers greatly from the lack of reliability and comfort of its infrastructure. The Canton struggles with the economical scheme and the reliability of the operators of the network that limits its capability to improve the services for customers. The main lacking parameter for the public transport plan regarding management of public spaces, concerns the stops and their related attractiveness. As known, a public transport user is also a pedestrian and has to walk to and from the various stops, it also has to wait and settle. The attractiveness of a public transport network is also very much related to the quality of its stops infrastructure in terms of dimension and comfort especially.

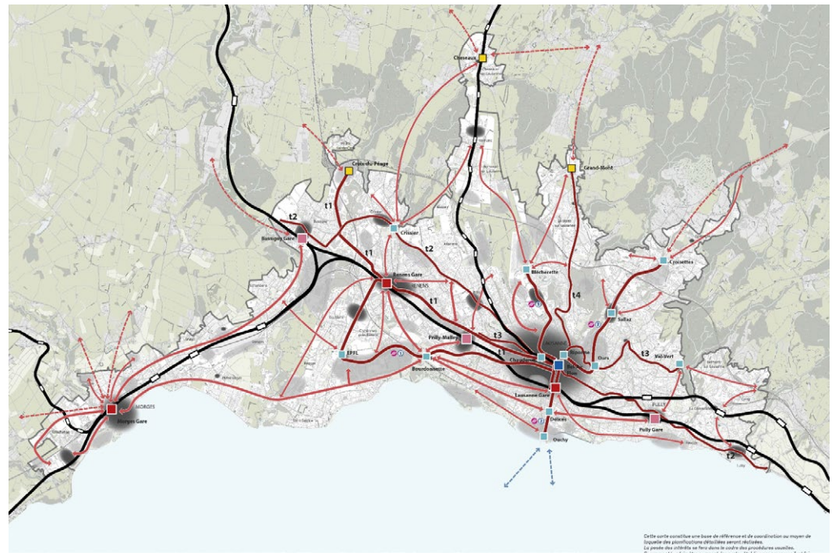
PUBLIC TRANSPORT PRIORITIZATION WITH RESERVED LANES FOR PUBLIC TRANSPORT ON KEY AXES AND TRAFFIC MANAGEMENT AT INTERSECTIONS

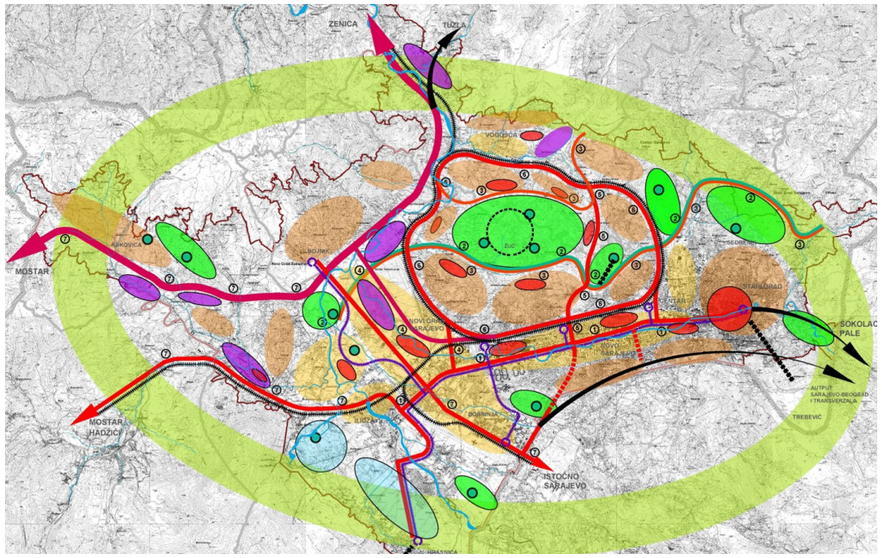
In addition to the lines deployment, the actual traffic conditions have a major impact on the public transport service. The commercial speed of the different lines must be assessed and optimized in order to stabilize the timetable and make the service more attractive. In order to achive these objectives it is fundamental to integrate dedicated bus lanes and coordinate the hierarchy of public transit and car network.

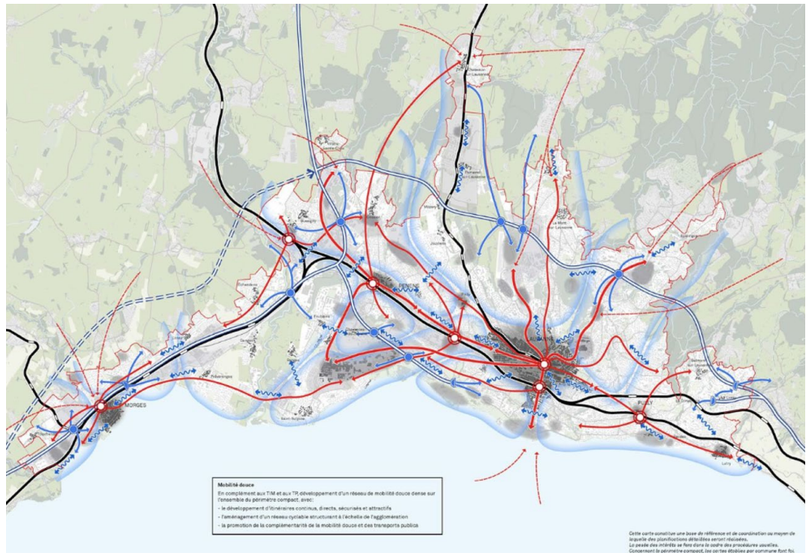


SARAJEVO 2024 PUBLIC TRANSPORT NETWORK

LAUSANNE AGGLOMERATION MAIN PUBLIC TRANSPORT NETWORK
→ 80% of commuters benefit from a public transport service within walking distance





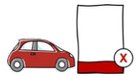


Multimodal concepts

Public transport and private traffic network service quality are closely related and must be comparable in order to evaluate their competitiveness over mid-length distances especially. The actual multimodal concept presented in the Urban plan for Sarajevo clearly spotlights individual traffic whereas the example of Lausanne agglomeration showcases public transport (in red) as the main mean of transport for the urban agglomeration trips.

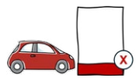
PUBLIC TRANSPORT CONCEPT PLAN: SARAJEVO (LEFT), LAUSANNE (RIGHT)

Adapting car accessibility and regulate its impacts



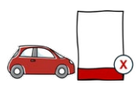
REGULATED AND CONTROLLED PARKING CONSTRUCTION AND MANAGEMENT

An important volume of parking is planned in the Urban plan, eventhough its calcutation is not clearly indicated, around 21'000 new parking slots are identified. No regulation for parking creation is indicated in the Urban plan to limit the car accessibility and make other modes of transport more competitive. Moreover, the central areas such as "Center" and "Novi Grad" are the ones with the most important garage spaces planned. Yet, these parkings are planned to be organized underground in order to reduce the impact of public space. Still, underground parkings do not allow major tree planting and attract a significant volume of traffic in these centers.



MINIMIZE THE IMPACT OF INDIVIDUAL MOTORIZED TRANSPORT IN CITY CENTERS

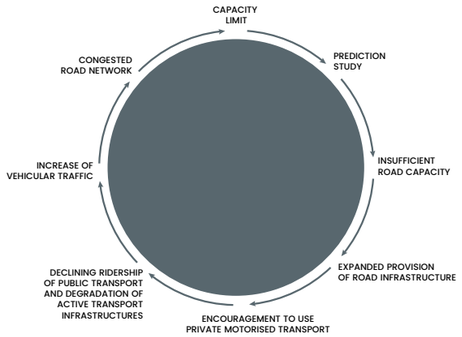
The car accessibility is either enhanced or maintained for all polarities, even the main city center. This target is inconsistent with the objective to pacify city centers and harmonize the modes of transport. In order to achieve a modal shift, the priority must be given to alternative modes of transport to the car in the centralities. The capacity of the main traffic network must be managed around city centers.



COHERENT ADAPTION OF ROAD CAPACITY AND SPEED TO ENHANCE THE POTENTIAL OF OTHER MODES

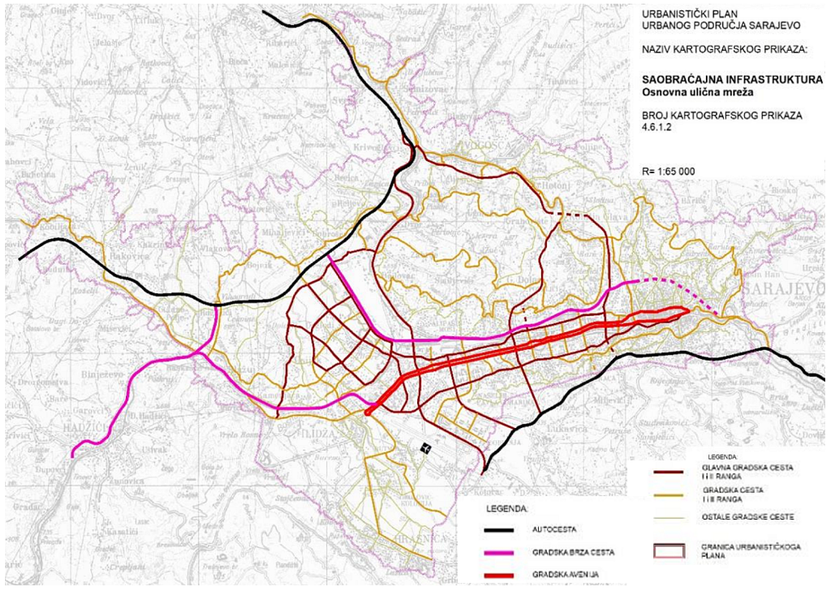
The Urban Plan foresees high investments in road infrastructure to increase the capacity. Two additional longitudinals, a city expressway and a multimodal transit road are planned. In total, Sarajevo would feature four longitudinal connections and a city expressway. Multiple new connections for supraregional traffic are also proposed. With the four planned longitudinal connections, the car remains the most competitive mode and will take up the space and the ressources of the alternative modes. In fact, it is proven that creating more capacity for traffic increases the individual motorized traffic demand. In only a few years, the road network will again suffer from saturation and, if no actions are taken, the vicious cycle of increasing the supply will continue.

THE VICIOUS CYCLE OF PREDICT AND PROVIDE



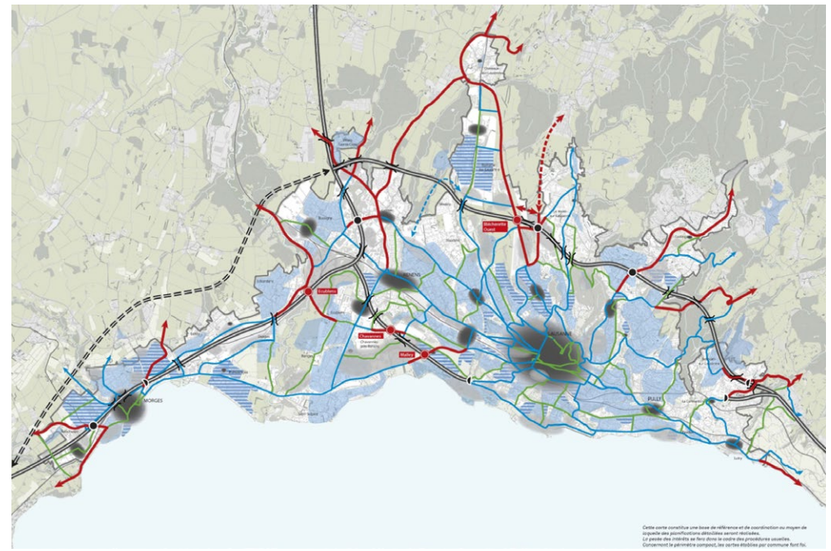
The importance of the motorized individual traffic outweighs the set goals

— The main road network appears oversized compared to the objectives of modal shift.
— The main city polarities are not protected from motorized traffic nuisances.
— The predominance of the car over other modes of transportation impacts their attractiveness.
— The city centers benefits very much from attractive car accessibility which does not pursue the objective to reduce traffic impacts such as air and noise pollution.

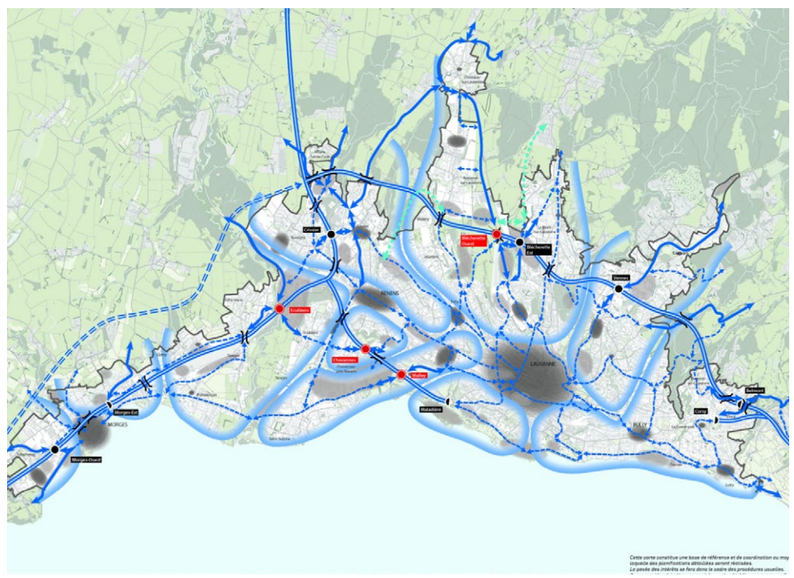


SARAJEVO 2024 INDIVIDUAL MOTORIZED TRANSPORT NETWORK

LAUSANNE INDIVIDUAL MOTORIZED TRANSPORT NETWORK (RIGHT AND BELOW)



The organization of the road network in Lausanne perfectly represents the principle of reducing the size of the road network as one gets closer to the city center. This idea allows the priorization of public space and more efficient and less impacting modes of transport. Motorized individual traffic takes on a superior position in the hierarchy of transport modes only around highway junctions.



Furthermore, the car accessibility in Lausanne is planned to function around one highway junction in order to considerably limit the transit traffic. By doing so, the road network located in between such areas offers the opportunity to reassign the public space to other modes or purposes.

Critical review of the mobility concepts of the 2024 Urban plan

SARAJEVO'S ACTUAL PLAN IS TORN BETWEEN PAST PLANS AND ACTUAL AMBITIONS FOR A HEALTHIER FUTURE. YET, THE TERRITORY CAN RELY ON PRECIOUS ASSETS

- First, the existing dynamics: most of the generated traffic stays within the Canton allowing the administration to have the levers of actions in their hands; the dense areas are situated in the plain, making the territory suitable for cycling; the existing modal share of walking is important, showing the affinity of the citizens for this mode of transport.
- Second, the good basis in the actual plan: the urbanistic plan pays attention to creating mixed areas by providing activities within the residential areas, even the small ones and also challenge the monocentric dynamics by suggesting to balance the trip dynamics on the west side of the Canton; the forecasted public transport network covers the different polarities of the territory well.

THE PLAN MUST GET OUT OF THE TRANSPORT PLANNING VICIOUS CYCLE BY INVERSING THE PRIORITIES OF MULTIMODAL PLAN DESIGN

- First, enforcing high quality service of public transport with a focus on commercial speed of buses, trolleybuses and tramways must be improved even though it impacts car traffic: priority must be given to public transport at intersections, lanes can be reserved for public transport in critical areas. The 2024 Urban plan could distinguish sections where preference is given to public transport over the car network as well as sections, if public space allows it, where a high level of service for both modes is pursued. Requirements for public stops can also be stated.
- Second, the objective for a hierarchical cycling network can be set to covering the whole territory and reaching every polarity, especially residential and activity areas. The size of the different grids for each level of the hierarchy must be carefully established. The objectives of infrastructures in terms of capacity (size), security and comfort can be displayed in order to present the needs for further developments.
- Finally, on another scale, pedestrian network or at least, "macro-vision" must be designed displaying centers where priority must be given to walking related to daily life and not only leasure. Objectives for pedestrian infrastructures shall also be set in terms of width, quality, type, relation with motorized traffic etc.

UNDERTAKING AND ENGAGING WITH LIMITATION OF CAR PREDOMINANCE

- Engaging with the virtuous cycle of demand management by designing roads with the aim of enabling a modal shift and the reduction of trip distances.
- Reviewing the balance of the network which is taking a major role and restricting the attractiveness of other modes.
- Tackling issues of traffic congestion by considering its management with traffic light system (TLS) and traffic schemes in order to prioritize the access for some lanes at intersections and orientate other flows elsewhere.
- Integrating the financial, social and environmental costs of massive new road and parking infrastructures in order to ensure the consistency compared to other solutions of trip planning.

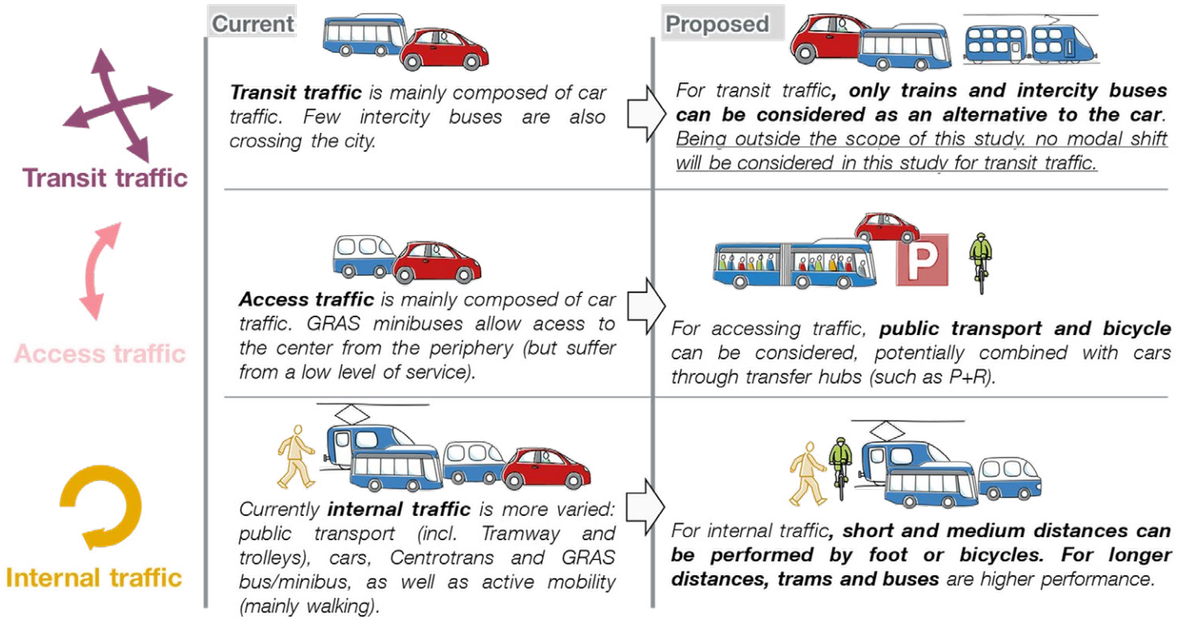
8. Main insights for planning perspectives

The Urban Transformation Project strives to reach the goals that were set and to transform the mobility in Sarajevo. For this, based on the insights from both the diagnosis and the analysis of the actual Urban plan, various topics have emerged. The study has also conducted several proposals of different multimodal network developments with whom the goals can be progressively reached. Some of the main results from that work are presented in the following chapter.

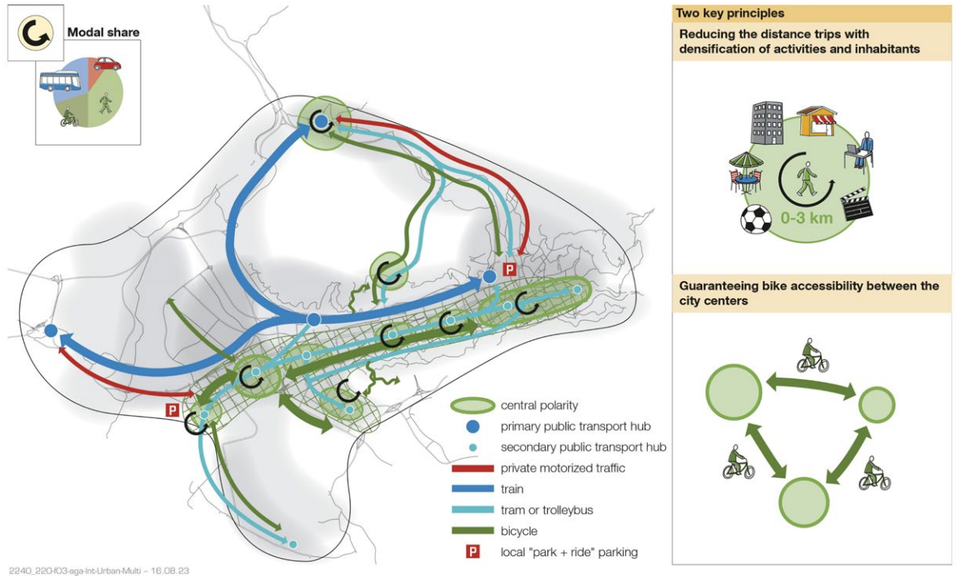
Tackling global accessibility by considering internal and accessing trips on their own

DIFFERENT TYPES OF TRAFFIC REQUIRE DIFFERENT STRATEGIES

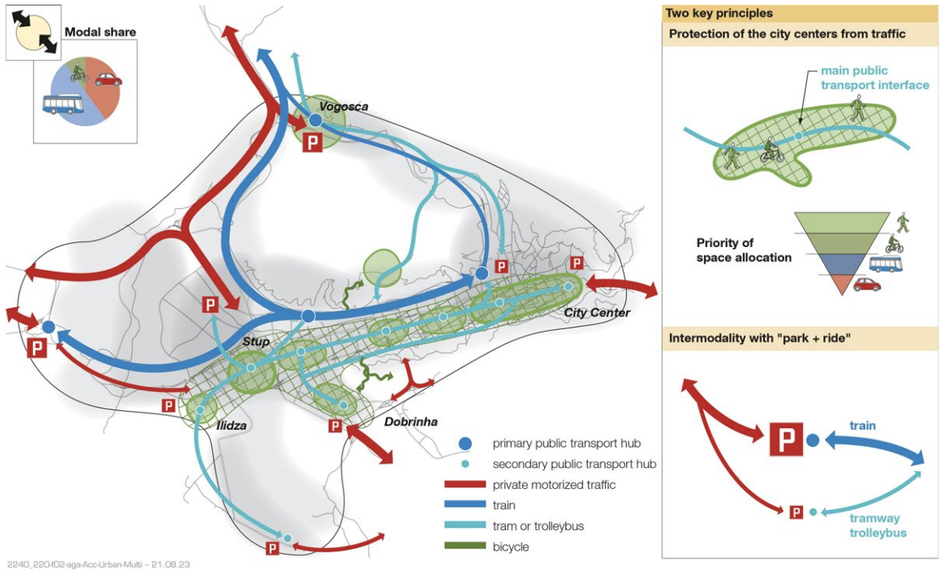
As internal traffic represents the highest potential of modal shift, most of the investments should be allocated to it. Transit traffic represents only 10% of the total trips – therefore not too much resources should be given to infrastructure dedicated to transit traffic.



MULTIMODAL CONCEPT FOR TRAFFIC WITHIN THE CANTON



MULTIMODAL CONCEPT FOR TRAFFIC ACCESSING THE CANTON



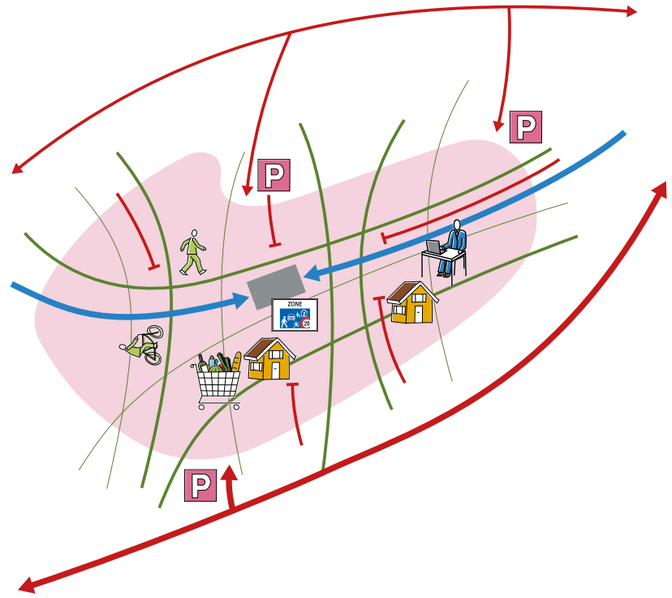
For accessing and internal traffic, a multimodal concept for Sarajevo should imply to:

- Prioritize public transport accessibility and level of service over car traffic
- Provide comfort and security for active modes by reducing their exposition to traffic flows
- Implement high quality of life polarities around public transport hubs, designed according to the short distances paradigm
- Create a dense grid for active mobility

The city centers accessibility needs a multimodal concept to embrace the targeted vision

Sarajevo's city centers gather major social, economic and environmental features that need to be protected and cherished. City centers are especially attractive for pedestrian mobility which are particularly sensitive to pollution and annoyances.
In order to emphasize the goals in these areas, it is suggested to present specific objectives for urbanism and mobility development.

MULTIMODAL CONCEPT FOR CITY CENTER ACCESSIBILITY



Mixity of housing and activities (number of inhabitants equivalent to the number of employment)

Access traffic only: no primary road for transit crossing the terriroty.

Attractive and continuous active mode network

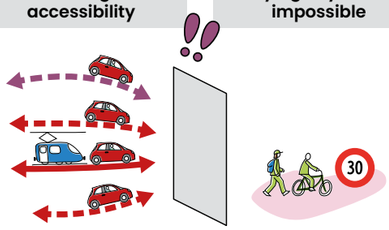
Efficient public transport accessing the polarity

Public spaces protected from traffic annoyances

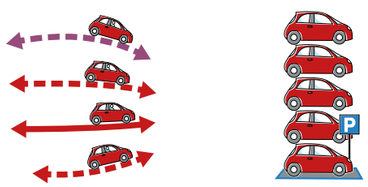
Parking slots in the outskirts of the zone protecting the central area

Inconsistencies from the plan

Increasing car accessibility → **Pacifying city center is impossible**

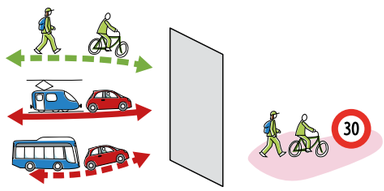


Increasing car accessibility → **Increasing parking needs in the city center**

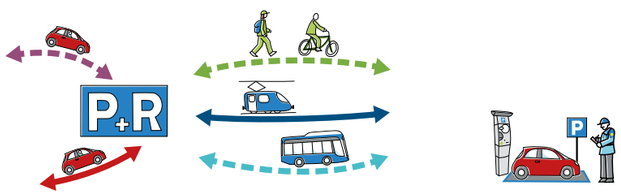


Alternative proposals

Multimodal accessibility → **Leverage to pacify the city center**



Park and ride offer in the periphery → **Multimodal accessibility** → **Parking regulation in the city center**

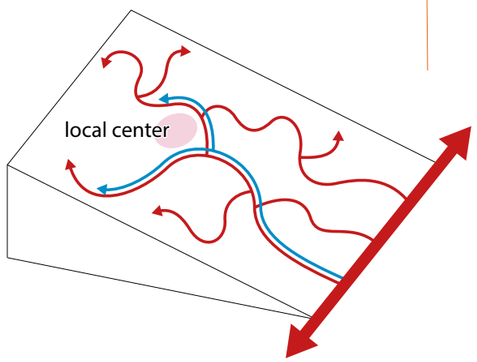


Integrate the hills into the multimodal perspective

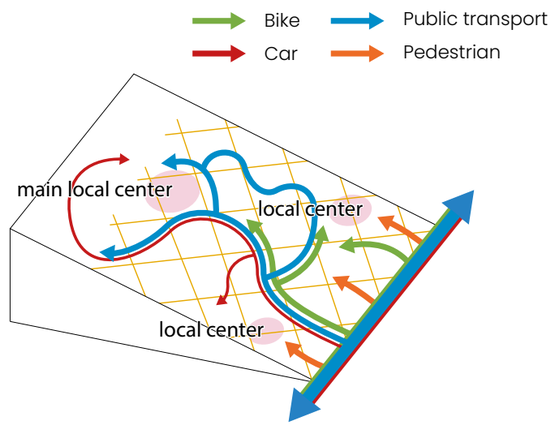
The accessibility of the hills is impacted by a significant topography constraint and several major cuts in the different possibilities for an itinerary, especially due to the car and public transport networks. The pedestrian and bike networks are significantly impacted. A major lack of infrastructure adds to the poor pedestrian and bicycle accessibility which contributes to the significant volume of car traffic in these areas. In order to tackle this, a set of solutions is needed, such as in the following example:

- **development of adapted public transport** with cable cars on major corridors but also urban lifts or funicular railway for shorter distances.
- **support of active mobility towards public transport hubs and secondary city centers** by providing electric bikes and enhancing the pedestrian network grid in order to make it continuous and to avoid detours.

FROM THIS...

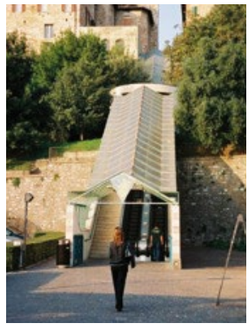


TO THAT...



Perugia, Italy →

The city created an esclator network to connect its historic center to park and rides (P+R) and metro stations



← Paris, France

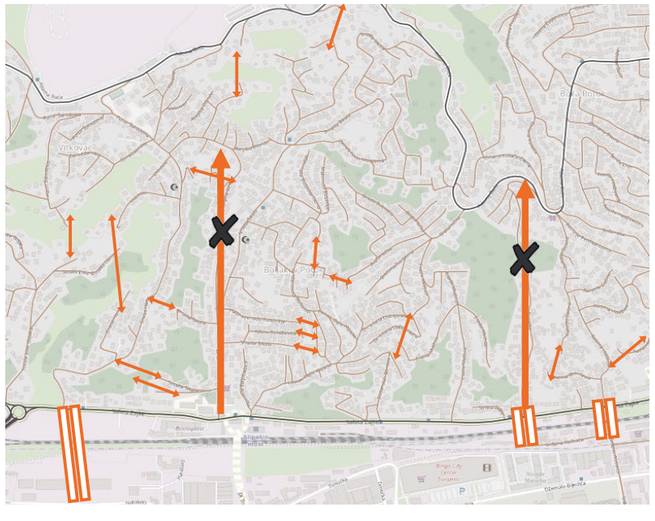
The city has chosen an inclined lift to provide better accessibility of the Montmartre hill, a major tourist spot

Opening of dead-ends to active mobility and create a dense grid for pedestrian and cycling / create shortcuts

Cut tertiary streets in order to control transiting traffic and therefore reduce traffic impacts

Creation of one way bike lanes (on the way up)

Creation of additional pedestrian crossings of the raillway in accordance with pedestrian and cycling itineraries



Transform the central longitudinal: the major asset of the road network

The coarse analysis of the longitudinal network capacity shows a sufficient global capacity for car traffic. The congestion phenomenon, which can be observed, therefore seems to be related to flow management on intersections rather than road capacity as its own. Increasing road capacity as planned results, when considering these current dynamics, in staying in the vicious cycle rather than a step towards the set goals.
From this a clear leeway emerges to reassigne some roadways towards other purposes for mobility but also for greeneries, in order to reach the defined objectives.
The central longitudinal in particular, offers much leeway to improve alternative modes of transports such as buses and bikes. The integration of this avenue into the different urban centralities and neighborhoods such as Otoka, Cengic Vila, Hrasno, Grbavica etc. within the plain area would also have a significant impact in order to mitigate its cutting effect.

- **The "proactive" variant** (A) where one lane of the car network per direction is reassigned to pedestrian and bicycle traffic. The large sidewalks for pedestrians will allow a significant opportunity to improve the ground-floor activity and therefore reduce trip distances and make walking more attractive. The expansion of bicycle ways is suggested to develop this corridor as the spine of the bike network and design it to be able to absorb the different kinds of bike traffic (fast and slow) and allow two bikes to pass one another;
- **The "city parc" variant** (B) suggests to put more focus on greeneries and landscape parts in order to mitigate air pollution, climate change and heat island but also to accompany the attractivity of local centralities.

Concluding, both variants are consistent with the limitation of traffic flow towards the main city centers such as presented above.

In order to provide material for further planning perspectives, two alternative scenarios for this major axis were defined:

PONIATOWSKI AVENUE, PARIS, 2023

MARÉCHAUX AVENUE, PARIS, 2024

Strategic recommandations for road network development

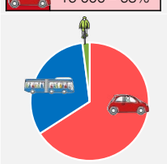
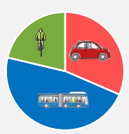
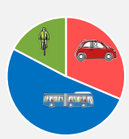
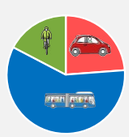
The analysis of three alternative scenarios of network development has allowed to look at the actual urban plan from a different perspective despite its validation status. The alternative options mainly focused on the longitudinal axis (considering that the validation status of the Transversals was more advanced).

This analysis enabled a comparison of the evolution of traffic demand and its modal distribution with the evolution of the network according to the hierarchy of the four defined longitudinal axes. This has demonstrated the importance of the capacity of public transport and also of cycle networks compared to roads dedicated to private cars, which makes it possible to maintain a satisfactory overall volume of passengers transported that is consistent with the new dynamics of demand.

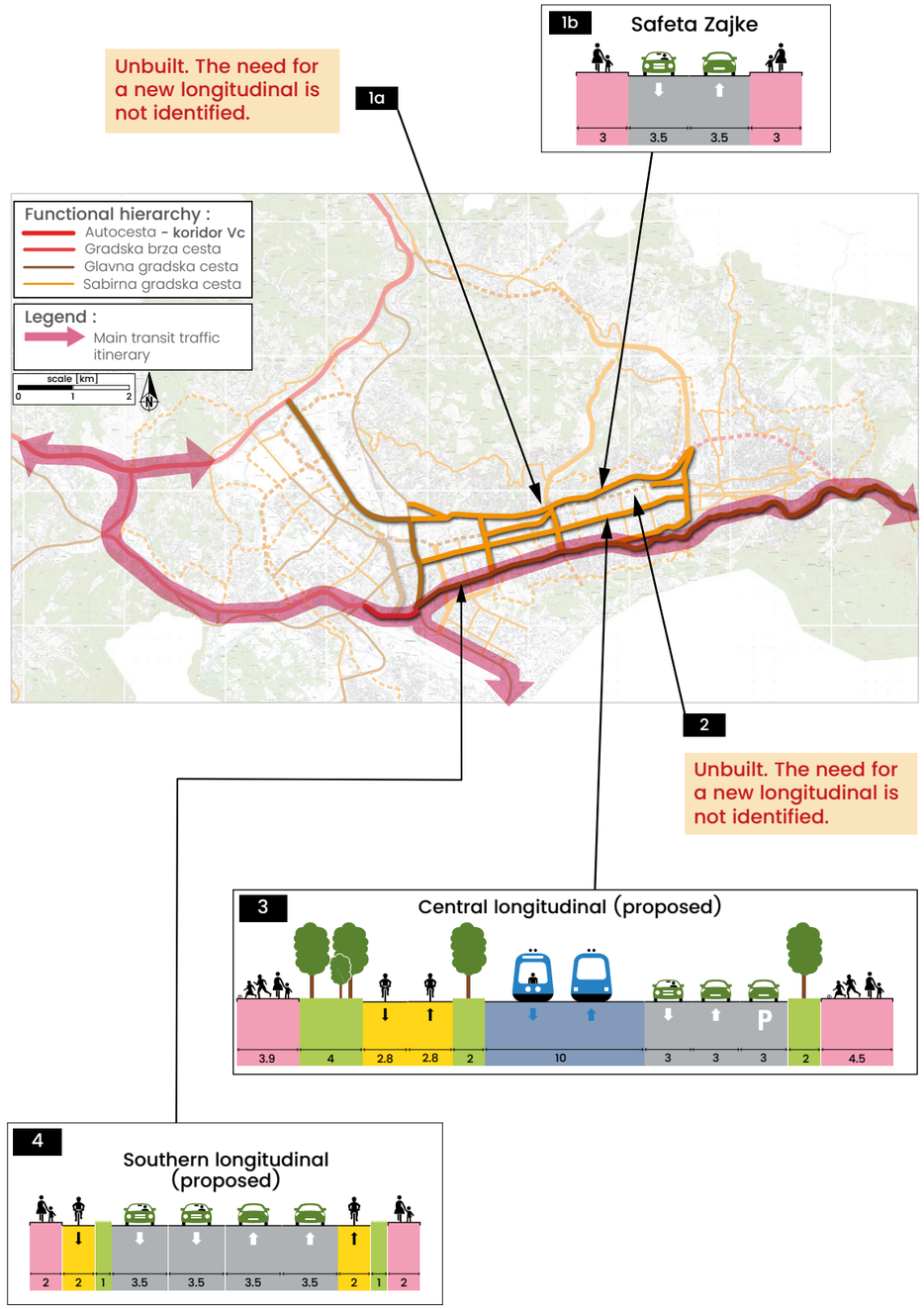
The main outcome of this analysis was to consider the development of a city expressway on the south side of the agglomeration rather than on the north since :

- It allows for a diversion of traffic away from the city center (historic and longitudinal center area).
- The road capacity is sufficient to accomodate the transit traffic flows.
- The global internal traffic flows can be absorbed with the existing longitudinal axis. Yet, the creation of a second way is recommended in order to offer more levers for traffic management and public transport priorization.
- The cutting effet it creates on the southern hill settlements is lesser than the one created in the North by the alternative scenarios 0 and 1.

COMPARISON OF NETWORK DEVELOPMENT SCENARIOS ON THE LONGITUDINALS

	Scenario 0	Scenario 1	Scenario 2	Scenario 3
Multimodal capacity on the network	**19'450** pphpd 400 – 2% 6'550 - 30% 15'000 – 68%	**21'350** pphpd 4'800 – 21% 10'650 - 47% 7'100 – 31%	**15'000** pphpd 2'600 – 17% 7'700 - 51% 4'700 – 31%	**14'700** pphpd 2'550 – 17% 8'650 - 59% 3'500 – 24%
Expected modal mix in the city center				
Coherence with **modal shares' objective**	⊖	⊕	⊕	⊕⊕

PROPOSED DEVELOPMENT OF THE NETWORK (SCENARIO 2)



9. Conclusion and perspective

Sarajevo has a solid basis to organize its mobility. The urban area is organised around a relatively large and dense plain, which allows for a fairly dense transport network. The old center historically attracts a significant proportion of journeys, which places a heavy demand on certain networks at peak traffic times. Some high-quality infrastructures are provided for pedestrians in the centers and along the river, and the public transport network offers extensive coverage of the territory. However, like many cities before it, Sarajevo is seeing an increase in the rate of motorisation of households and suffers from congestion on its main roads at peak times.

In the context of transport planning, legal provisions oblige the Canton to implement a number of important developments, particularly aimed **at increasing the capacity of the road network, with the construction of new segments and the widening of existing axes.**

At the same time, Sarajevo is **turning towards ambitions of modernity and sustainability and is concerned with public health issues related to the air quality**. Since 2016, the Canton has been developing a strong vision that affirms certain assets:

- The **development of a polycentric dynamic urban environment**, in order to break up the concentration of flows, spread the demand for transport and shorten the distances to be travelled. This objective is essential and well defined because it establishes a second major center to the west of the plain while reinforcing a significant density of secondary centers. The topographical advantage and the reduced distances thus represent significant potential for journeys by bicycle and on foot.
- The continued **development of efficient public transport** with high passenger capacity to the main urban centers by tram or even train, as well as a few trolleybus lines.
- The desire to organise and manage parking in the city centres, in particular by **creating centralised car parks** to free up the space occupied by parked cars in the centers.
- Support for **leisure routes for pedestrians and cycles** within the city with the development of networks along the main river and in connection with the hills.

Sarajevo thus intends to strengthen these solid foundations through the development and growth of these transport infrastructures. However, this study aims to challenge the methods and visions of spatial planning to allow the Canton to question itself and possibly adapt some of the planning using modern planning tools so as not to repeat the mistakes and errors of cities that have been there before. The following points are particularly emphasised :

- **Think multimodal instead of monomodal:** at this stage, networks are developed for themselves and then brought together to provide an overall view. Public transport networks, for example, suffer from a lack of attractiveness due to their reliability being constrained by traffic volumes. Prioritising modes with a multimodal vision is necessary to organise and adapt the parts of the network accordingly.

- **Doing more with less:** analyses show that the current networks already allow most of the travel volumes to be absorbed, simply with a different modal breakdown and a share of car travel below 80% compared to the actual situation. The means of transport that consume the least space can move as many or even more people as the most consumerist mode: the car. The existing space is a very important resource and already allows a lot to be done without having to create more: daring to redevelop and transform existing spaces.

- **Transit in the south and local traffic in the north:** for the road network, the developments suggest to strengthen the northern longitudinal. However, the main network should above all meet the needs of transit traffic, which has a better connection to the southern longitudinal. Thus, the northern longitudinal could further complement the multimodal mobility options to supply the north of the agglomeration.

- **The central longitudinal road** has great potential for connecting the two future main centres and the secondary centres with each other providing a much more attractive public transport and bicycle offer. The number of lanes for private cars can be reduced and the intersections organised and regulated in a way to ease traffic and traffic conditions.

TRANSITEC

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Lausanne, April 2025

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APRIL 2025