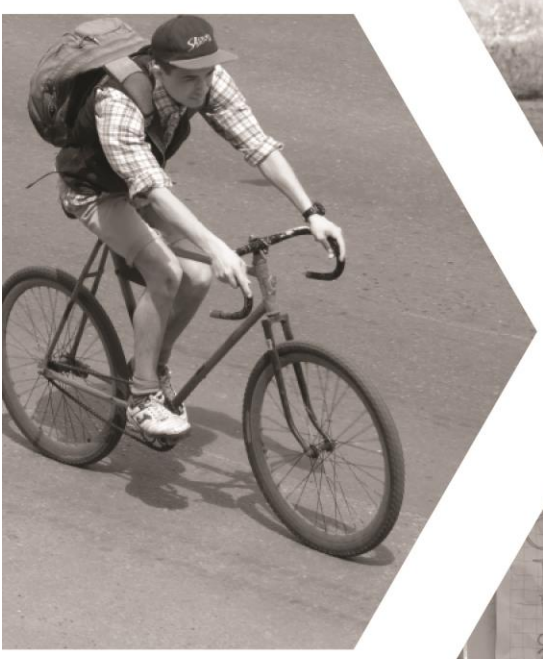

Sustainable Urban Mobility Plan Poltava

Sustainable urban mobility plan for Poltava (draft)

March 2019

The document was prepared within the framework of the Project «Integrated urban development in Ukraine»

Commissioning party:

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ПОЛТАВА 2030
ІНТЕГРОВАНИЙ РОЗВИТОК МІСТА
МОЯ ПОЛТАВА – МОЄ МАЙБУТНЄ

Resume

The sustainable urban mobility plan of Poltava city was developed on the initiative of the German government company "Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH" in cooperation with the Poltava City Council and the MO "City Development Institute". The planning process is in line with the EU Sustainable Urban Mobility Planning Guidelines and implemented in accordance with the principles of participatory planning and with the involvement of international and local experts (Chapter 1).

In the course of professional discussions, six priorities for the development of mobility in Poltava city have been defined (Chapter 2):

- Improving the attractiveness of public transport;
- Improvement of parking space;
- Creating an intelligent transport system;
- Development of pedestrian space and improving accessibility;
- Development of cycling;
- Increasing road safety.

Diagnostics of urban mobility (Chapter 3) showed that, in comparison with European cities, a large share of trips is carried out by public transport (55%) and walking (30.5%). The public transport system is developed with a high level of coverage in populated areas, and the trolleybus network is ramified and actively used. However, there is a need to improve the quality of the infrastructure and the effectiveness of the system management and the financing of transport. A network of cycling and traffic safety management requires further development.

As a result of the working group discussions, 21 goals of mobility were articulated for each priority (Chapter 4). In order to assess the options for achieving the goals, four options for the development of the Poltava city have been proposed, depending on the level of organisational capacity and financial resources for the implementation of changes (Chapter 5).

A number of measures, based on the analysis of the existing situation and objectives have been developed to form the implementation plan. All activities are divided into groups: infrastructure, management and organisation, monitoring and data collection, capacity building, promotion and information.

The key measures of the Poltava Mobility Plan are: the reorganisation of the transport management system, reorganisation of the public transport network, using large buses and trolleybuses, development of dedicated lines for public transport, building a safe infrastructure for cyclists and engineering buildings for the safety of pedestrian movement, collection and systematisation of data, development of a strategy for parking management, etc.

Chapter 6 provides an explanation of the measures and analyses the possibility of their implementation in accordance with different subsequently modelled scenarios, which allowed to receive quantitative or qualitative assessment of the impact of the measures and were summarised in scenarios' summary (Chapter 7).

In order to assess the implementation progress against the set objectives, a monitoring system was proposed (Chapter 9), recommendations for the collection and data analysis were developed, and baseline indicators for 2018 were identified.

Table of Content

Introduction

What is a Sustainable Urban Mobility Plan (SUMP)?

A sustainable urban mobility plan is a strategic document that must meet the mobility needs of people and businesses in cities and their surroundings to achieve a better quality of life. It is based on existing planning practices and principles of integration, participation and evaluation[1].

A Sustainable Urban Mobility Plan is a new form of strategic transport planning, proposed officially by the European Commission in 2009. "The main task of SUMP is to improve the accessibility of urban areas and ensure high-quality and stable mobility and transportation to, through and within the city's territory"[2].

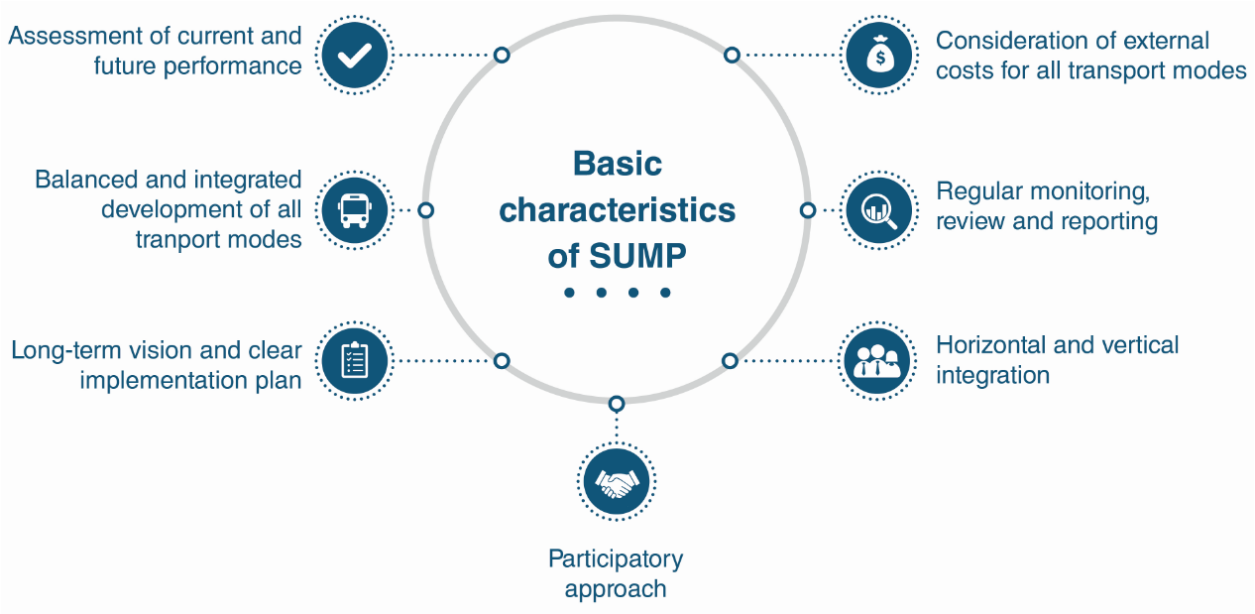


Figure 1. Main features of SUMP

In contrast to the classic transport planning, the SUMP concentrates not on the organisation of the movement and the provision of infrastructure for certain types of transport, but on planning the movement of people in the city. Sustainable Mobility means providing the opportunity to move from point A to point B at a reasonable time and at an affordable price, using the most effective and sustainable forms of travel for the sake of securing the public interest. This means that any person, regardless of his/her physical or material abilities, should be able to move through the city comfortably, and therefore, planning should take into account individual characteristics, as well as general needs and interests.

The SUMP allows developing a long term strategy for the development of the city's mobility and linking the current status with long-term objectives for Poltava. While evaluating the scenarios, the SUMP helps to identify and fill the gaps in the mobility structure of the city.

Table 1. Difference between SUMP and traditional transport planning

Traditional Transport Planning	Sustainable Urban Mobility Planning
Focus on traffic	Focus on people
Primary objectives: Traffic flow	Primary objectives: Accessibility and quality of life, as well as

Traditional Transport Planning	Sustainable Urban Mobility Planning
capacity and speed	sustainability, economic viability, social equity, health and environmental quality
Modal-focused	Balanced development of all relevant transport modes and shift towards cleaner and more sustainable transport modes
Infrastructure focus	Integrated set of actions to achieve cost-effective solutions
Sectorial planning document	Sectorial planning document that is consistent and complementary to related policy areas (such as land use and spatial planning; social services; health; enforcement and policing; etc.)
Short- and medium-term delivery plan	Short- and medium-term delivery plan embedded in a long-term vision and strategy
Related to an administrative area	Related to a functioning area based on travel-to-work patterns
Domain of traffic engineers	Interdisciplinary planning teams
Planning by experts	Planning with the involvement of stakeholders using a transparent and participatory approach
Limited impact assessment	Regular monitoring and evaluation of impacts to inform a structured learning and improvement process

Source: Guidelines – developing and implementing a sustainable urban mobility plan

Why does Poltava need a SUMP?

Sustainable Urban Mobility Plan is a new way of planning urban mobility that aims to create an urban transport system by addressing – as a minimum – the following objectives:

- Ensure all citizens are offered transport options that enable access to key destinations and services;
- Improve safety and security;
- Reduce air and noise pollution, greenhouse gas emissions and energy consumption;
- Improve the efficiency and cost-effectiveness of the transportation of persons and goods;
- Contribute to enhancing the attractiveness and quality of the urban environment and urban design for the benefits of citizens, the economy and society as a whole. [1]

Vision "Poltava-2030" and sustainable mobility

The integrated development plan defined the following vision for the city development until 2030[3]:

"Poltava 2030 is a green, cosy and hospitable city on the banks of the Vorskla River with a significant economic future. An eco-standard of Ukraine is with unique lands, fresh air and clean water.

Poltava is on its way to become a powerful regional centre, integrated into the national and global economy. A diversified ecologically oriented city economy, which uses modern scientific knowledge, creative ideas and innovations, will provide residents with high

quality of life as well as withwide opportunities to work, to develop, to get sound education and realize their own business potential on the labour market.

By 2030 Poltava will be recognised as a platform for the preservation of the Ukrainian cultural heritage and the development of contemporary art and as an attractive tourist destination with a wide range of offers for all tastes: from gastronomic enthusiasm to comprehensive health improvement for the whole family, from business meetings to meaningful leisure experience.

Poltava is a city of healthy lifestyles, friendly to young people, who value and support the elderly. It is a tolerant and safe city with a strong socially responsible community. A city in which you want to give birth to children and which is worthy to meet old age»

The elaboration and implementation of the Sustainable Urban Mobility Plan fully correlates with the city's vision and will substantially strengthen its implementation in the following aspects:

- **ECOLOGICAL COMPATIBILITY OF POLTAVA** - SUMP is always aimed at strengthening the role of less-polluting transportation solutions (walking, cycling and public transport);
- **STRENGTHENING THE CITY'S ECONOMY** - the plan is intended to increase the efficiency of the movement of people and goods within the city, reduce the average time and improve the accessibility of residential areas. Improving the paths efficiency usually translates into lower costs for delivery as well as into increased productive working hours;
- **INCREASING THE TOURISM ATTRACTIVENESS** - the opportunity to travel comfortably creates an additional space attractiveness not only for tourists, but also for the city residents. It is important that tourists will typically use public transport and walking as main travel modes. These two modes of getting around are key points of SUMP;
- **HEALTHY LIFESTYLE -** active mobility (walking and cycling) is recognised by the World Health Organisation[4] as a method of preventing non-infectious diseases, which include cardiovascular diseases, diseases of the musculoskeletal system, etc. Walking and cycling are key points of SUMP;
- **A CITY THAT VALUES AND SUPPORTS THE ELDERLY** - the mobility plan is designed to create an inclusive transport system for the city, in which getting around should be accessible to people with limited mobility and the elderly. By creating comfortable conditions for low-mobility groups, the city will automatically create comfortable travel conditions for the entire population.

Chapter 1 Development process of the SUMP in Poltava

The SUMP for Poltava has been developed according to the best practices adapted to the local context. The overall process has followed the European guidelines on SUMP development and included a well-established participatory process. The SUMP development team has consisted of main stakeholders for mobility, local GIZ office and professional transport consultants. The complete list of participants is presented in Annex B. The overall SUMP planning process in Poltava included 6 stages.

Sustainable mobility planning foresees active involvement of experts and local residents. Joint work of external consultants and individuals who understand the local context, enables the development of the efficient long-term strategy covering all phases of urban planning – from a general plan to more specific plans.

At the initial stage a triple organisation structure to ensure the involvement of necessary experts or representatives of local communities with the most relevant experience and direct interest in a particular section of the plan (figure 2).

STEERING COMMITTEE. This is a key project implementation group that consisted of key city decision makers, representative of GIZ and international consultants. The Steering committee makes strategic decisions and monitors the SUMP development process.

TASK FORCE. Representatives of the relevant city departments, academics, local experts, police and representatives of industry-specific public associations. The task force is the main working format for the development of the SUMP. The group is flexible and can accommodate its structures to the needs of developing a particular section of the plan. The task of the group is to develop the plan basis, which should be based on the understanding of local needs, opportunities and vision for the future.

MOBILITY FORUM is the widest group of participants. Its role is to facilitate participation of the city's residents and professional associations.. The Forum meets at organised events (such as “Maisternya mista”). At these occasions every Poltava resident can make his or her own contribution to the development of the plan, comment on it and specify the concept submissions of the task force.

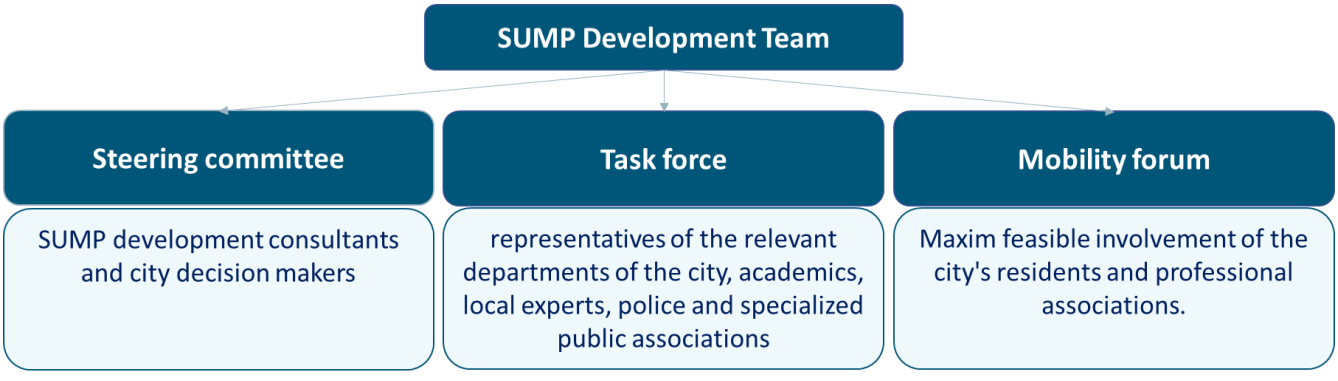


Figure 2. SUMP development team

SUMP development in Poltava consisted of 6 stages:

STAGE 1 Determining the priorities of urban mobility

First of all, the priorities of urban mobility development were identified during discussions with key stakeholders. Priorities serve as a guideline for further processes and are the main focus areas, according to which improvements in the mobility of Poltava are intended. Priorities are presented in Chapter 3.

STAGE 2 Diagnosis of the current state

According to the identified priorities, a diagnosis of the current state has been performed, including a SWOT analysis of the system. At this stage, the road network, the public transport network, corridors and directions of the largest passenger traffic and the state of infrastructure were analysed in detail. For the first time, a mobility study has been conducted and the travelling behaviour of the city's inhabitants were analysed. The results of the diagnosis are presented in Chapter 4.

STAGE 3 Goals setting and key performance indicators

At the third stage, each of the priorities was assigned a number of SMART goals, the achievement which is the main task of the plan. For each priority, three to six goals were identified. The achievement of set goals is the main precondition for the success of SUMP. In order to monitor the progress of their implementation, a set of key performance indicators (KPIs) has been developed, i.e. at least one KPI for each goal, and a system to monitor them. The goals of the sustainable mobility plan are presented in Chapter 3, SUMP Monitoring System in Chapter 8. Goals and KPIs were developed during workshops integrating different stakeholders important for the mobility in Poltava.

STAGE 4 Complete list of measures

At the fourth stage, a comprehensive list of measures has been developed, including various projects in the field of urban mobility.

The complete list of measures was developed based on the set goas, city diagnosis s, expert discussions during working group meetings and analysis of city policies. The list of city documents analysed for this stage is presented in Annex C. As a result a comprehensive database of mobility projects has been developed and combined into implementation scenarios. Description of the measures is presented in Chapter 6 followed by the list of particular projects aimed to contribute to the achievement of the goals of the city.

STAGE 5 Implementation Scenarios

The scenarios were developed in line with the Integrated Urban Plan for Poltava. Scenarios for the city development account for both, natural demographic changes and city development strategies according to the Integrated Urban Development Plan. The scenarios assume four options of conditions that may occur and will affect the implementation of the above mentioned measures. Each scenario contains a combination of the projects developed at the previous stage. Depending on the scenario, each project is evaluated regarding its priority for realisation and time of implementation (5, 10 or 15 years). The scenarios were tested for qualitative and quantitative impacts. For the quantitative analysis of the scenarios, the traffic model and analytical models were used.

STAGE 6 Implementation plan

The implementation plan is a list of measures to be implemented under each scenario within a short-term period (5 years). Based on tested scenarios, the implementation plan provides particular activities that are complex and interrelated but manageable under the city budget. Each measure is related to the goals of the SUMP and contains information on compliance with city programmes, type of measure (infrastructure, management and organisation, monitoring and data collection, capacity building, awareness and information).

Participation within the urban mobility planning in Poltava

The development of the SUMP Poltava is a component of the Integrated Urban Development Project in Ukraine. The key aspect of the development of Sustainable Urban Mobility Plans is the involvement of a broad spectrum of stakeholders, ranging from the supreme city leaders, which form the strategic vision of urban mobility, to residents of specific city areas, who are best informed of the shortcomings and benefits of mobility in their own home areas.

The most frequent form of participation in the process of developing a mobility plan were thematic workshops, interdisciplinary working groups and individual interviews with experts. Poltava experts, city planners, police, representatives of civil society organisations and senior management of the city gathered together to determine the priorities of sustainable urban mobility, setting targets and defining indicators for achieving these goals. The list of participants and the topics of the meetings can be found in more detail in Annex B.

Figure 3. Participatory planning in Poltava

The key platform to attracting stakeholders and residents of Poltava to the development of SUMP was the office of the Poltava Development Institute and the GIZ office in Poltava as a place for meetings and holding discussions.

Online communication and feedback collection took place across multiply channels: 1) the website of the "Integrated development of the city of Poltava" project www.2030.poltava.ua became the platform for inviting to discuss and inform about the outcomes of discussions; 2) the website of the Poltava Development Institute www.rada-poltava.gov.ua/people/irm/ informs residents about the outcomes of SUMP discussions; 3) the Facebook page of the Poltava Development Institute www.facebook.com/IRMPoltava/ regularly provided the latest news on the development process and the decisions taken by the interdisciplinary groups; 4) within the framework of the project, an e-mail address has been created to which anyone could send additional offers on the strengthening of SUMP in Poltava sump.poltava@gmail.com.

Chapter 2 Priorities of Sustainable Urban Mobility Plan ofPoltava

The SUMP is a plan for enhancing the city mobility with a 15-year planning horizon, the purpose of which is the development of non-motorised and motorised modes of transportation to enrich the city, improve the quality of life of residents and simplify the movement of people and goods. It was important to fully consider the views of various stakeholders from the very first steps of its development - the definition of broad priorities for the plan.

The priorities of the SUMP Poltava were identified after four individual interviews with key stakeholders in the city and two meetings of the steering committee, which included representatives of the city council departments, deputies and representatives of the city's public organisations. During the meetings, the most important vectors of the city's mobility development were identified, which resulted in six priorities.

The priorities of SUMP Poltava should be focused on following areas of urban mobility improvement:

Improving the attractiveness of public transport

Public transport of Poltava should become a more attractive transport mode, which is increasingly chosen by residents for getting around.

Improvement of parking space

Poltava's parking system should become clear and transparent to users (clearly defined places and prices for parking), create comfortable conditions for car storage, help to organise city space and start to generate money for the city budget. The schemes include a parking space for people with disabilities.

Creating an intelligent transport system

The city should begin the systematic collection and analysis of mobility data, and based on these data introduce innovative automated traffic control systems, and make decisions on different engineering interventions.

Development of cycling

Cycling in Poltava should become a more attractive transportation option, which will be chosen by residents for getting around. The basis for increasing the attractiveness of using a bicycle is having a network of comfortable and safe bike lanes.

Development of pedestrian space and improving accessibility

Walking in Poltava should be an attractive option for getting around. The basis for increasing the attractiveness of walking should be the creation of a comfortable, safe and inclusive pedestrian infrastructure.

Increasing road safety

Getting around Poltava should not result in death or injury of any traffic participant. The city must reduce actual mortality and injury rates and influence the perceptions of urban mobility as safe.

The priorities of the SUMP are in line with the areas of development and the objectives of the Integrated Urban Development Concept of Poltava. Particularly, in the area of "Improvement of mobility", which sets out the basic principles for improving mobility* and identifies many of the actions taken into account in this document. Also, these goals correspond to the most important areas of the concept†:

A.3 Modernisation of infrastructure

W.1 Creating a city centre

D.4 Improvement of mobility

D.5 Improvement of the ecological situation

* Integrated Urban Development Concept of Poltava, p. 220

† Integrated Urban Development Concept of Poltava, p. 79

Chapter 3 Diagnosis of the City of Poltava

General City Diagnosis

Poltava is a city of regional importance with the population of 287 thousand inhabitants[5]. The existing territory of the city is 10640[6] hectares. The city is divided into three administrative districts: Kiev, Shevchenko and Podilskyi.

The demographic situation in the city can be called unfavourable. It is characterised by low fertility and high mortality. Every year, the population of the city decreases, the rate of natural population growth is "-5.16", while the national figure "-4.4").

The share of the adult population of working age is about 70% of the city population. The share of registered persons with disabilities in Poltava is 10% of the total population of the city.

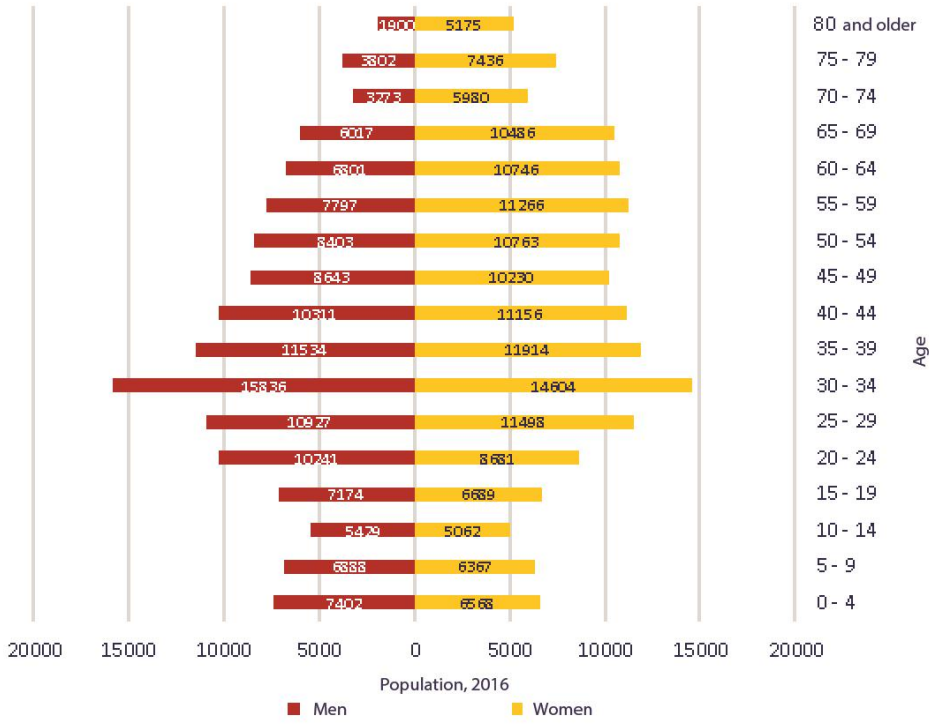


Figure 1. Demographic pyramid of Poltava region, 2016

Despite the decrease in the population of the city, the level of motorisation is expected to grow. As of 2015, the level of motorisation was 152[7] cars/ 1000 inhabitants, until 2031 it is assumed that the level of motorisation will be 330 cars/ 1000 residents, which will increase the load on the street and road network of the city.

The General plan predicts an increase in the city's territory by 27.2% (2821 ha) from the existing territory, which will determine the need to revise the route network of the city to ensure transport accessibility of the attached territories.

Spatial organization of the city

The spatial distribution of the population in the city of Poltava is uneven, as well as the distribution of workplaces. Although the average population density is high, it is very different between separate microdistricts. The most inhabited are Almaznyi, Levada, Sady-1, Sady-2, Ogivivka and central parts of the city (Figure 5). The northern part of the city is scarcely populated. In Poltava predominates apartment building and is 78%, while farmsteads - 22%.

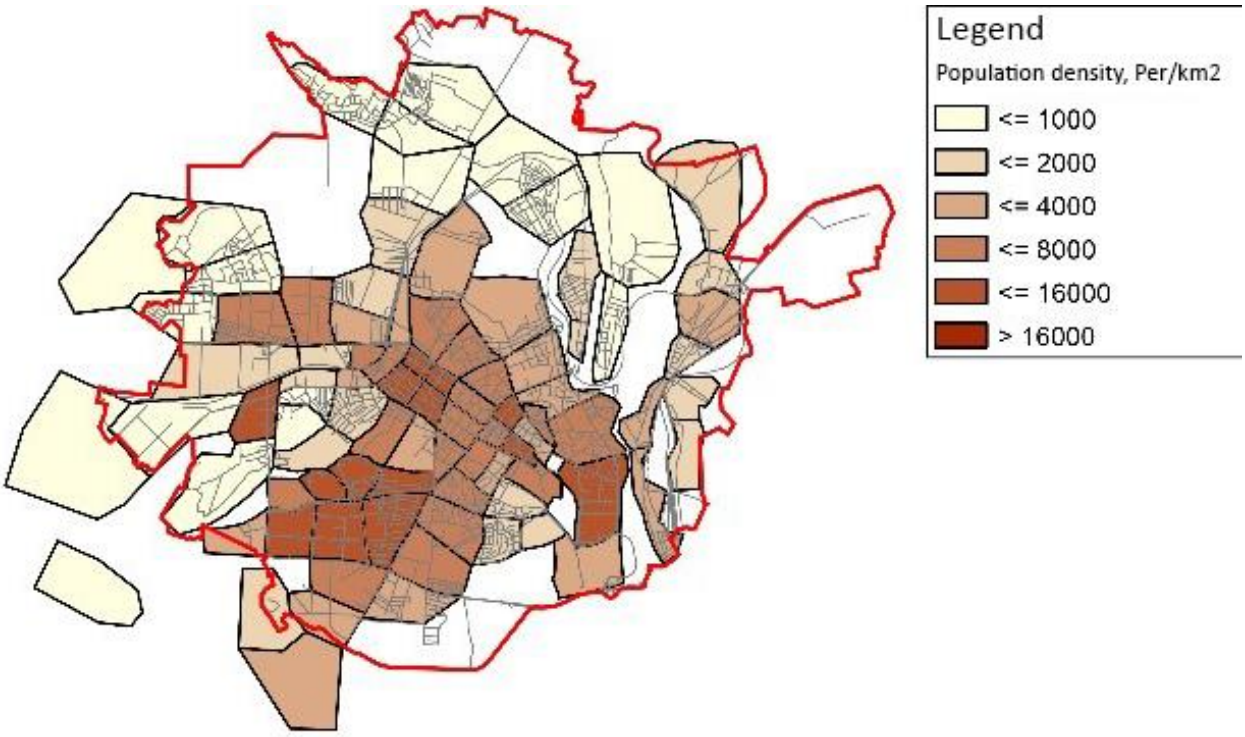


Figure 5. Population density in transport areas

The central urban area is well-developed and structured in the form of a city. Some central / subcentral zones can be seen in other districts of Poltava, especially in the case of local centres in peripheral districts (Figure 6).

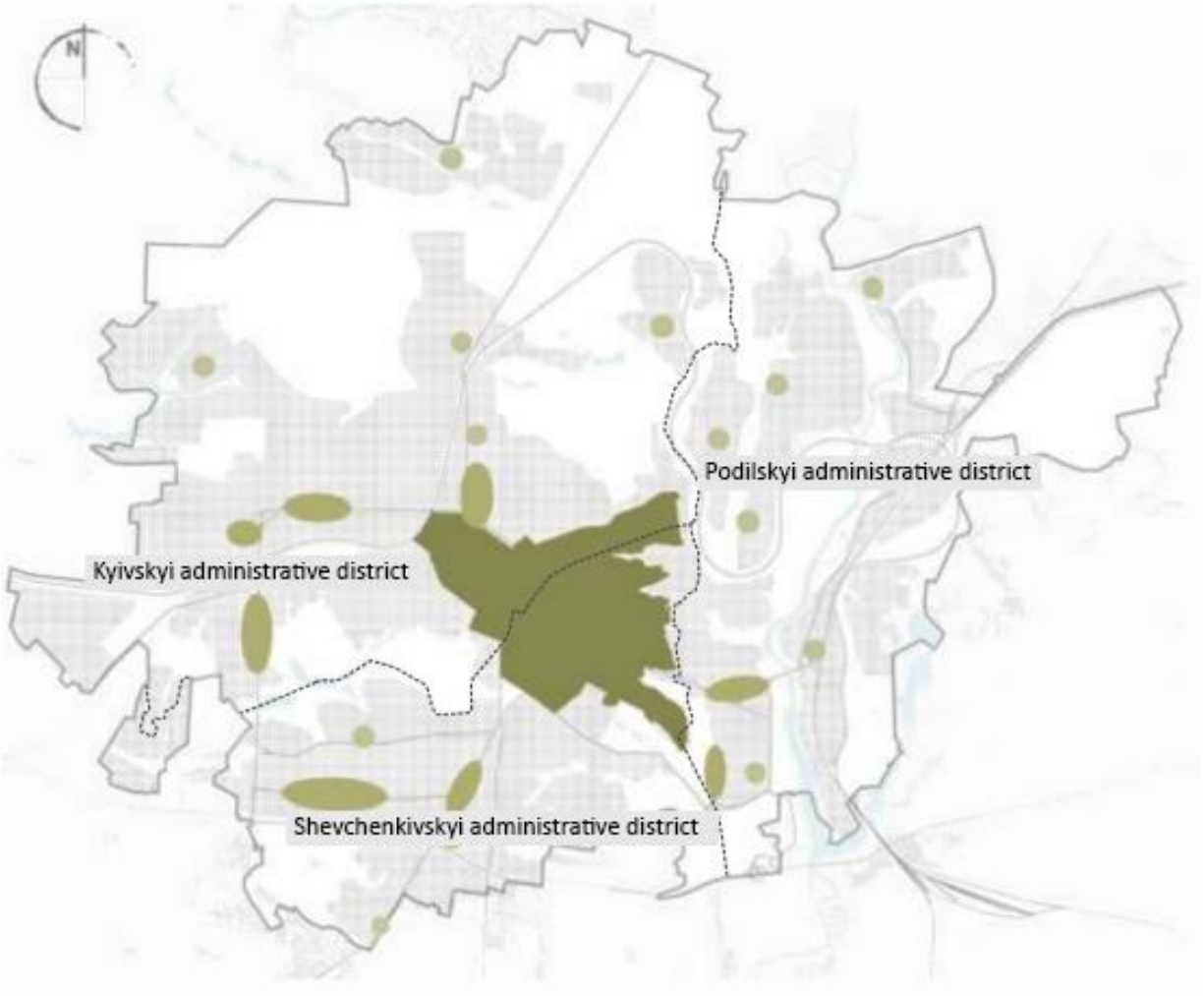


Figure 6. Primary centre and sub-centres of Poltava

Workplaces are mainly concentrated in the central part of the city, in the area of the southern station and in the southern part of the city (Figure 7). The location of the workplaces forms labour movements, which are characterised by long-term stay at the destination and occur at certain time periods of the day (morning and evening peak load).

The spatial distribution of points of attraction according to the number of visitors is similar to the distribution of workplaces. These places (for example, shopping and entertainment centres, markets, restaurants, etc.) are characterised by short-term stays and distributed throughout the day (Figure 8). The northern part of the city is characterised by low population density and a low concentration of points of attraction.

These indicators are important in analysing the mobility of inhabitants and the formation of a public transport system. Working trips make a significant share of traffic in the city and most of all affect the loading of street and road networks in the morning peak period in the direction of home - work, and in the evening - on the contrary.

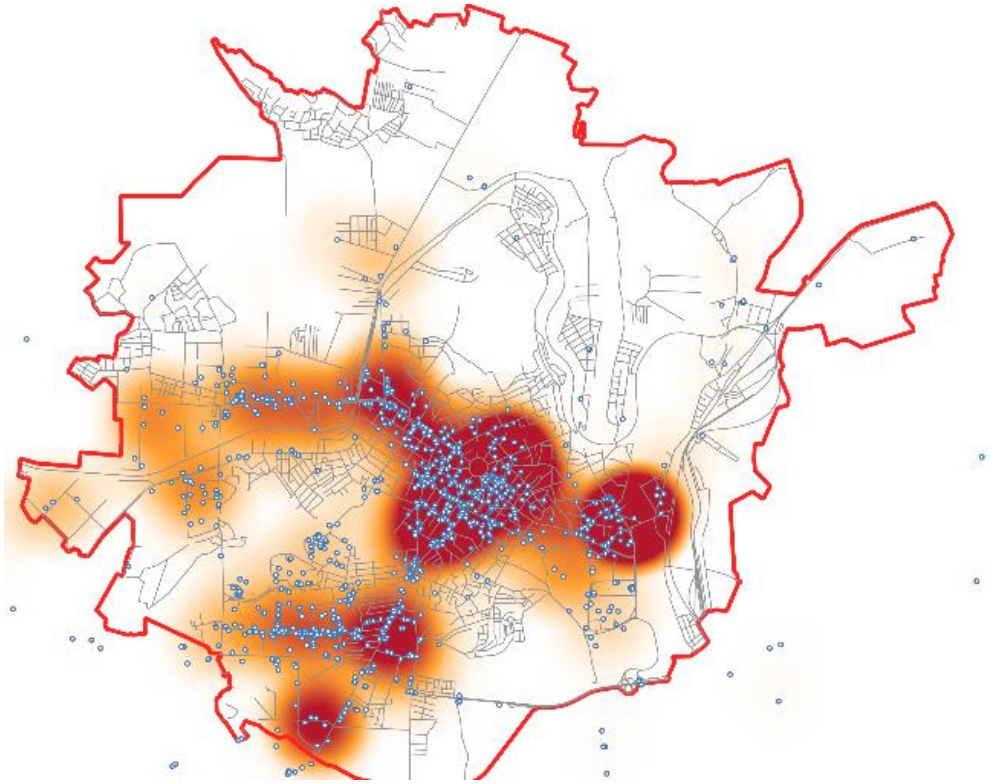


Figure 7. Heatmap of workplaces

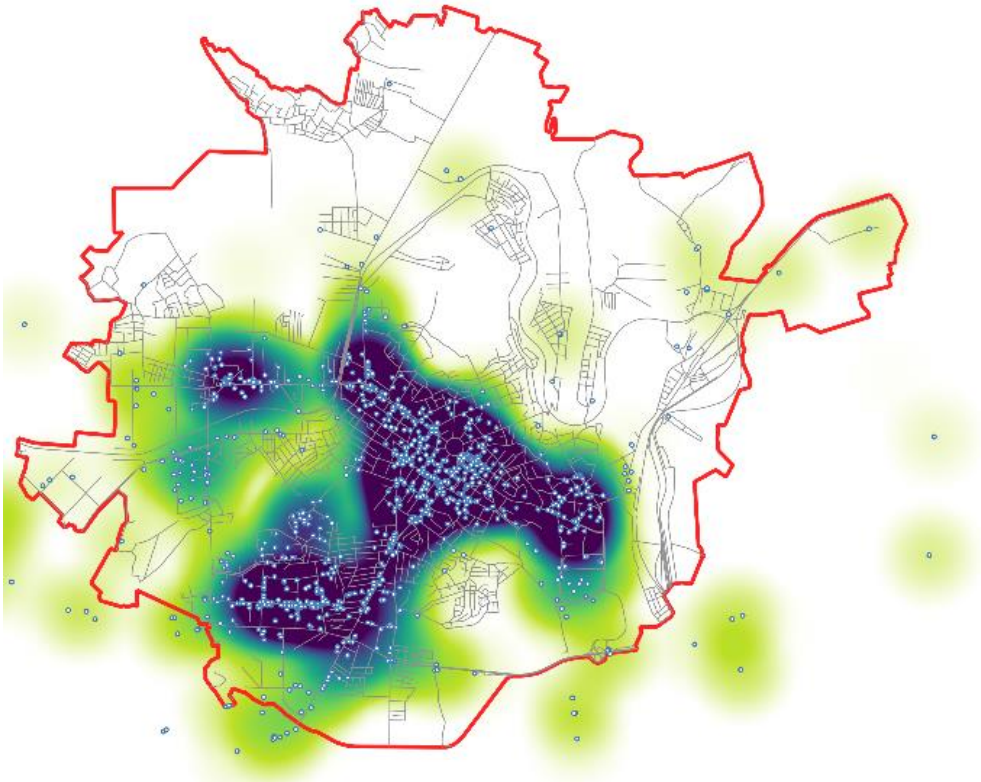


Figure 8. Heatmap of number of visitors

According to the Concept of the Integrated Development, Poltava has a fuzzy centre and three sub-centres (in each administrative district). Such a hierarchy of spatial distribution affects mobility. Within the adjoining territory of one sub-centre, it is first and foremost to pay attention to the possibility of walking and cycling, and between the districts - by public transport.

One of the indicators of the work of the street-road network is the volume to capacity ratio. It is calculated as the ratio of the volume of movement in a certain section to its capacity and characterises the conditions of movement of this section. In the central part of the city, the load level B prevails, the movement proceeds in separate columns and packets of cars. While on the periphery on most sections the movement is free, sometimes there are separate groups of cars. The biggest complications in the movement according to the transport model are on the Shevchenka str. (near the Central Market), on the Sobornosti str. (crossroads with Vatutina str.) and on the Teatralna str. on the approach to Corpusnyi Sad.

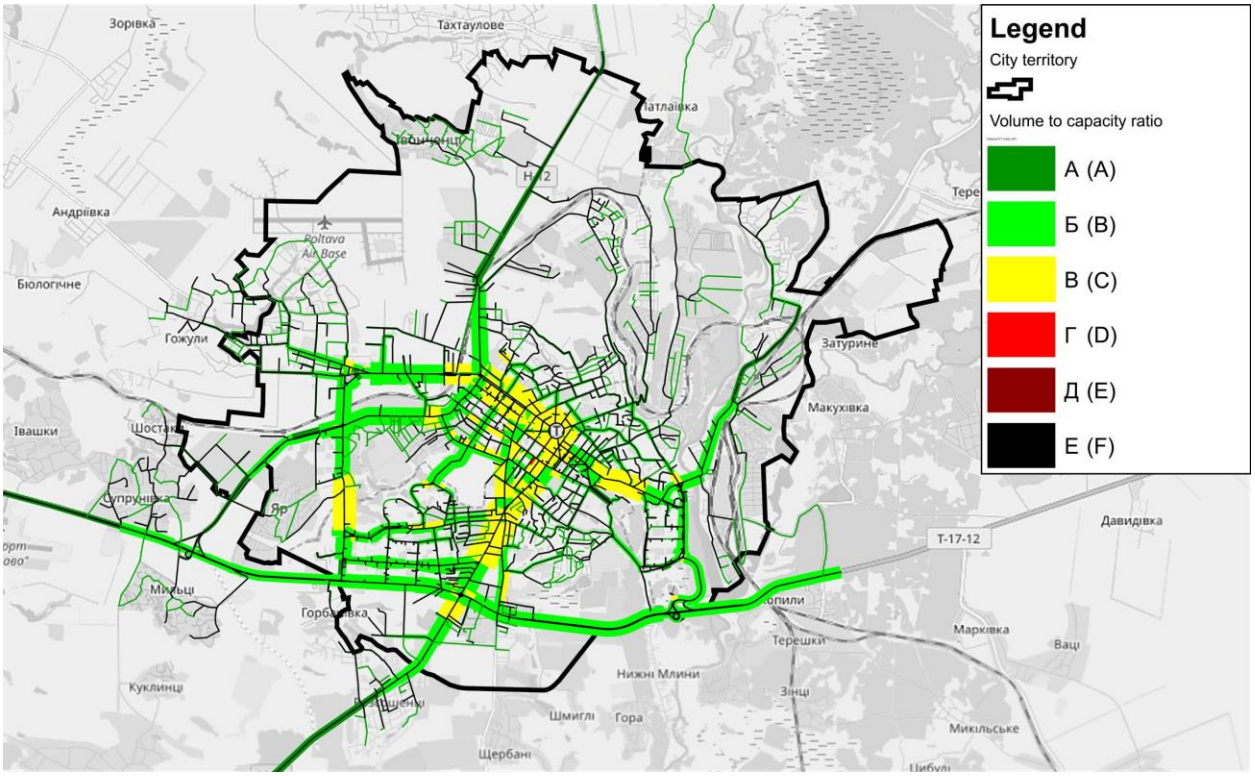


Figure 9. Average daily volume to capacity ratio of the road-street network*

Mobility of Poltava

Mobility survey in Poltava was carried out in May 2018 and provided a detailed picture of Poltava citizens' transport behaviour.

Modal split by trips

The modal split was analysed for all trips by inhabitants within the city (Figure 10). The distribution of modal split between non-motorised (walking and cycling) and motorised trips (car and public transport) is 32.3% and 67.6 %, respectively.

Public transport is the most often-used mode of transport in Poltava, the share of public transport is 55.2 %, walking is the second often-used mode with a share of 30.5 % of all trips. The share of car users is relatively small.

* Distribution according to Ukrainian normatives

The percentage of male car users is more than twice as much as share of female users.

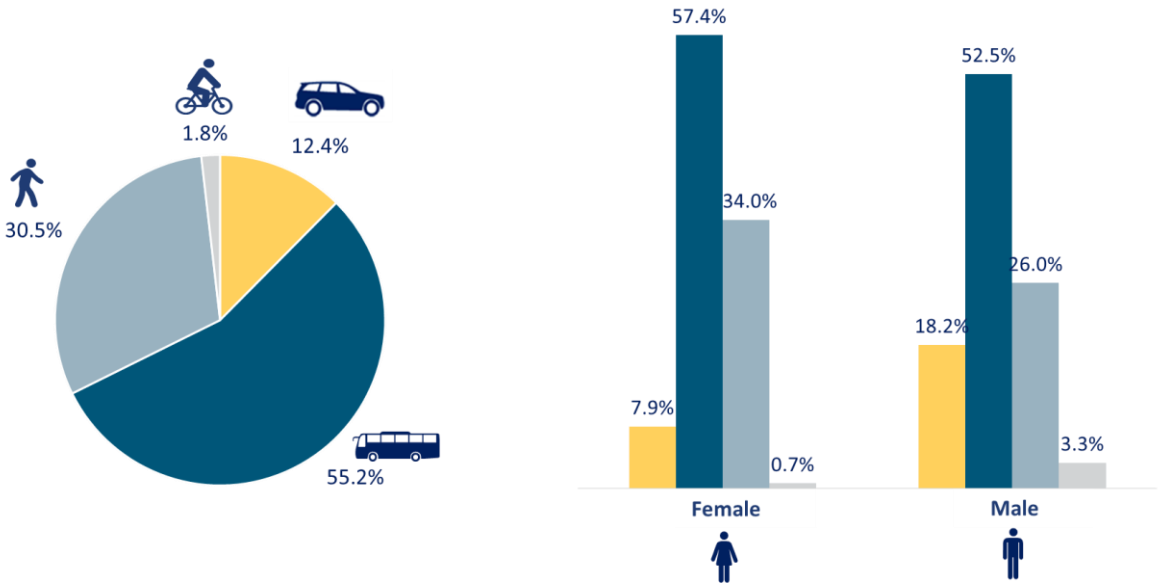
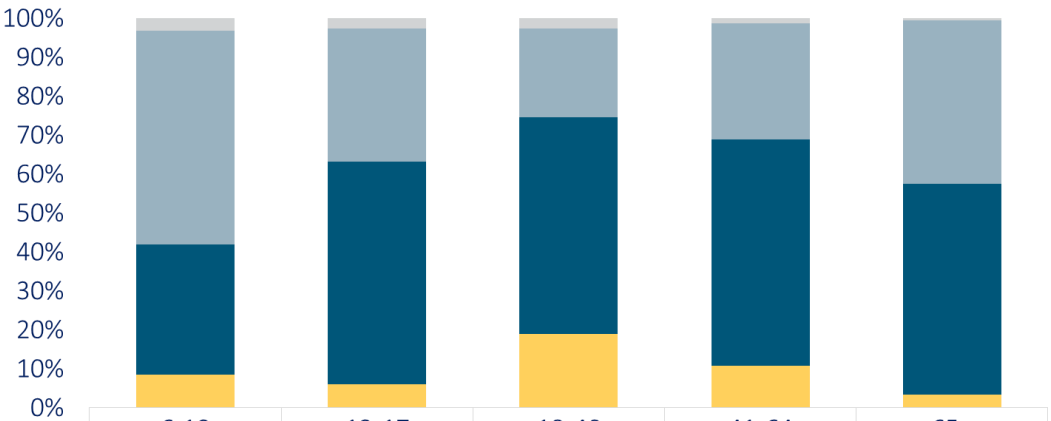


Figure 10. Modal split

The Figure 11 below shows that walking is the main mode for children up to 12 years and it is public transport for people from 13 years and older. The share of walking and cycling is the highest for children up to 12 years, public transport – for people from age 41 to 64 and the share of car users is the highest for adults from age 18 to 40.



	6-12	13-17	18-40	41-64	65+
Bicycle	3.2%	2.6%	2.5%	1.3%	0.5%
Walking	54.8%	34.2%	22.9%	29.8%	42.0%
Public transport	33.3%	57.0%	55.6%	58.1%	54.1%
Car	8.6%	6.1%	18.9%	10.8%	3.4%

Figure 11. Mode choice by age group

An average number of trips is 2.1 per person per day (Figure 12). In comparison to comparable German cities, the number of trips per day in Poltava is lower but similar to comparable Polish cities, for example Gdansk.

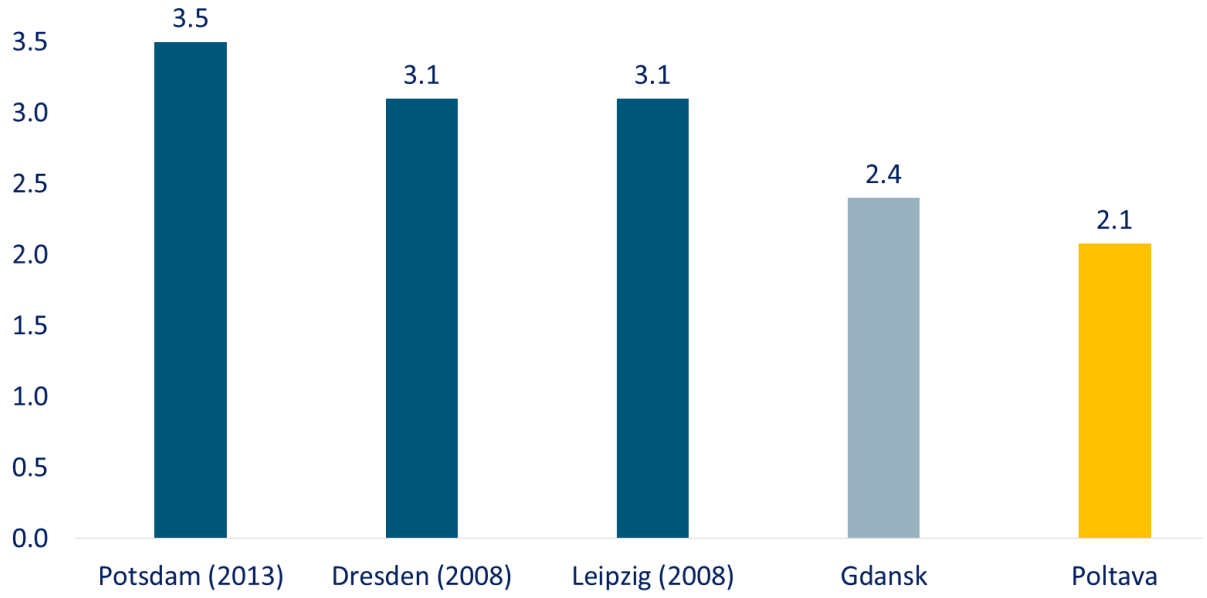
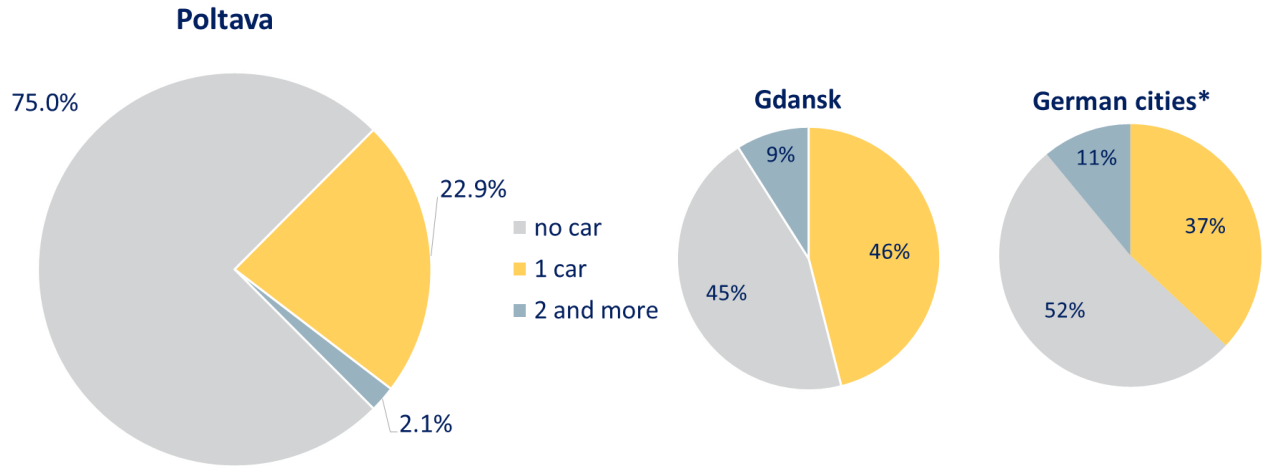


Figure 12. Average number of trips per day

Individual motorisation

75 % of all households do not own a car. This is a much higher portion than in Gdansk and the featured German cities (Figure 13). 22.9% of the households own one car which is also less in comparison with the featured cities in Poland and Germany.

According to the survey, the level of motorisation is 101 cars/1000 inhabitants. Among the individual car users, male ones drive car more frequent than female ones (Figure 14).



*German cities are represented by the SrV-Städtepegel -a pool of East German cities of a size from approx. 80.000 -500.000 inhabitants from flat and hilly regions. The data is from 2008.

Figure 13. Car ownership by household

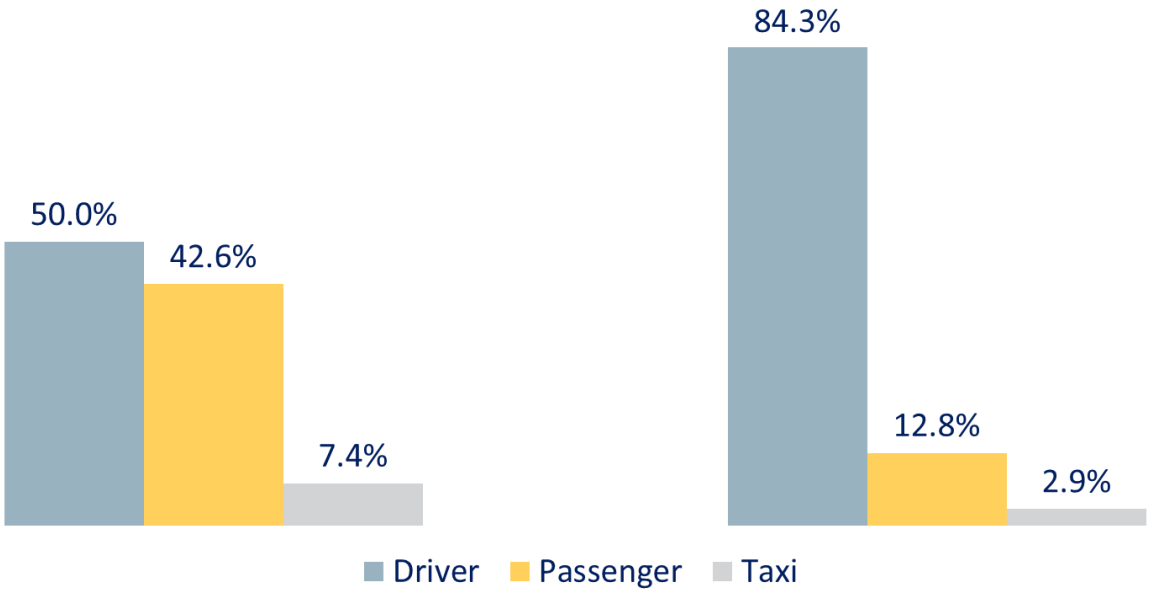
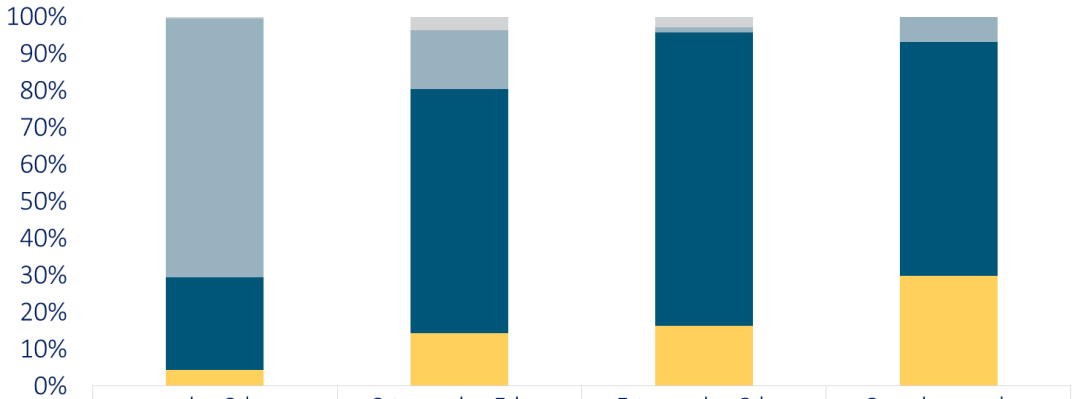


Figure 14. Types of individual car users

Modal split by trip length

The graph below shows the modal split of inhabitants in Poltava in four trip length classes (Figure 15). The share of car users increases with increasing trip length while the share of walking simultaneously decreases. Public transport is the most often used mode for trips with a distance of two and more kilometres.

In general, trips below 5 km are usually considered very suitable for cycling, but the share of cycling is rather low in Poltava and 65.9 % and 14.4% of trips from 2 and under 5 km are done relatively by public transport and car.



	under 2 km	2 to under 5 km	5 to under 8 km	8 and more km
Bicycle	0.5%	3.7%	2.9%	0.0%
Walking	70.0%	15.9%	1.4%	6.8%
Public transport	25.1%	65.9%	79.3%	63.2%
Car	4.3%	14.4%	16.3%	29.9%

Figure 15. Modal split by trip length

Modal split by purpose of trip

The graph below shows the modal split by purpose of trip. For work and education trips, public transport is the most often-used mode of transportation.

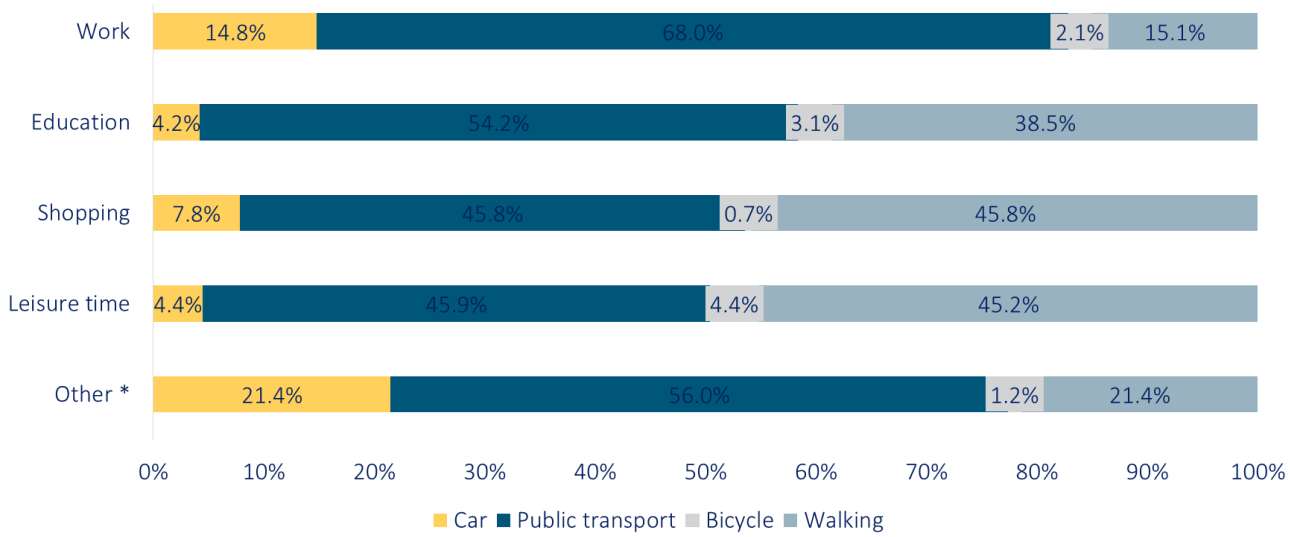


Figure 16. Modal split by purpose of trip

Trips to shopping are commonly made by public transport or walking with equal share. Leisure time trips are done by public transport, followed by walking. Considering all purposes, the share of cycling is the highest for leisure time trips, but it is only 4.4 % of all leisure time trips.

Figure 17 presents the comparison of purpose of trips in Poltava with German cities and the Polish city. Almost half of the trips have home as a destination, it covers 47 % of all trips of Poltava citizens. The share of trips for work is the same like in Gdansk and more that in German cities. The share of shopping trips is also the same like in Gdansk, but less for German cities. The share of trips for education and leisure time activities is less in comparison with the featured other cities.

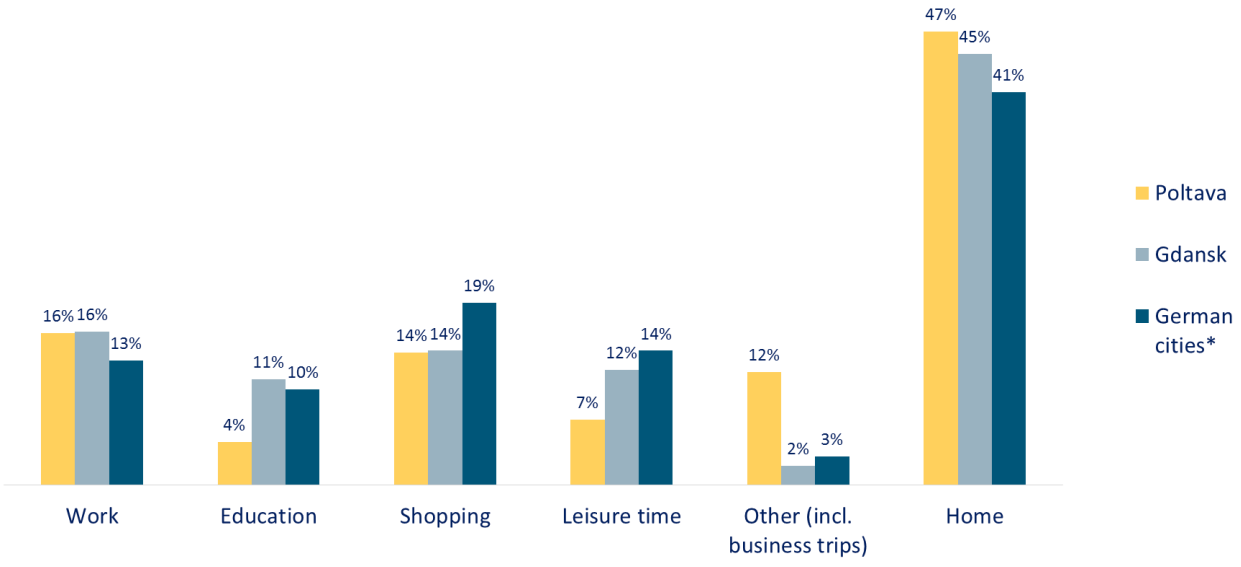


Figure 17. Purpose of trips in comparison to European cities

Quality of public transport services

Strengths

The work of public transport is focused on meeting the needs of users and is characterised by the density and size of the route network. There are 10 trolleybus and 65 bus routes in the city[8].

The final stops of 10 of 65 bus routes (about 15%) are located outside the territorial border of the city (in the villages of Rozsoshentsi, Hobanivka, Yar), which makes the route network of the city accessible to the population of the nearest settlements. 87.9 % of local residents live in the access area of 500 m to public transport[9].

The length of the route network of urban electric transport is - 73 km, while the route network of urban vehicles is 250 km[3] (Figure 18). The network of public transport stops has 407 stopping points, that indicates its development.

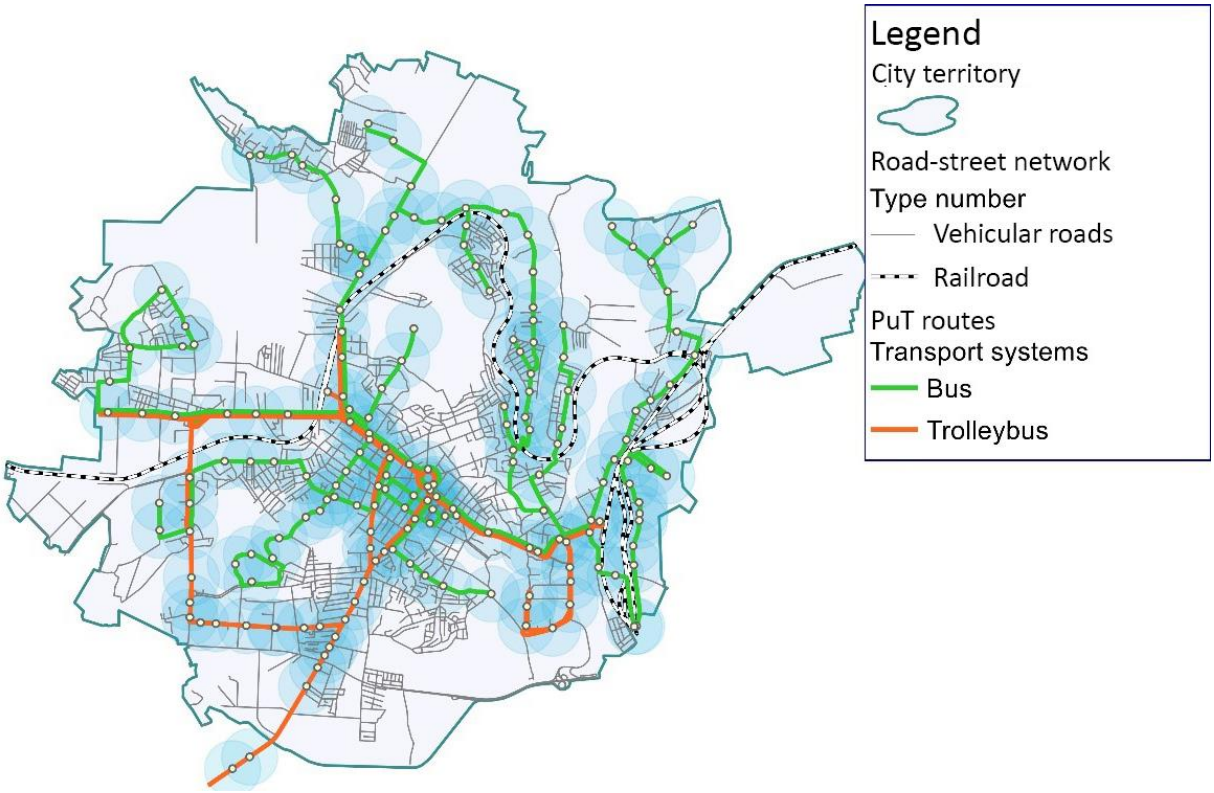


Figure 18. Public transport network

As for the results of the mobility survey conducted in May 2018, female passengers are more likely to use electric public transport compared to male passengers (Figure 19).

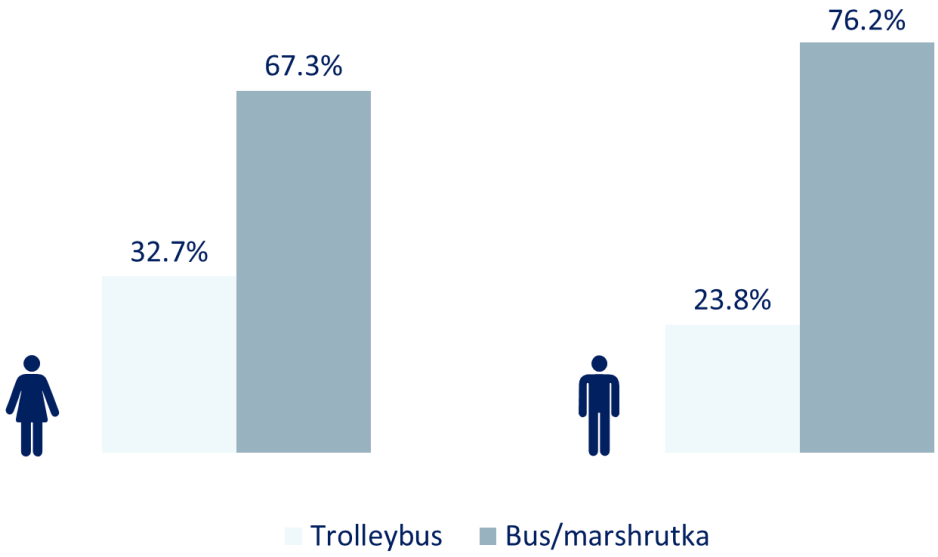


Figure 19. Modal split by public transport mode

Bus carriers are engaged in updating the rolling stock, which contributes to the safety, quality of passenger transport and the formation of a positive image of public transport in the population. 68% of the rolling stock of the bus fleet is not older than 10 years.

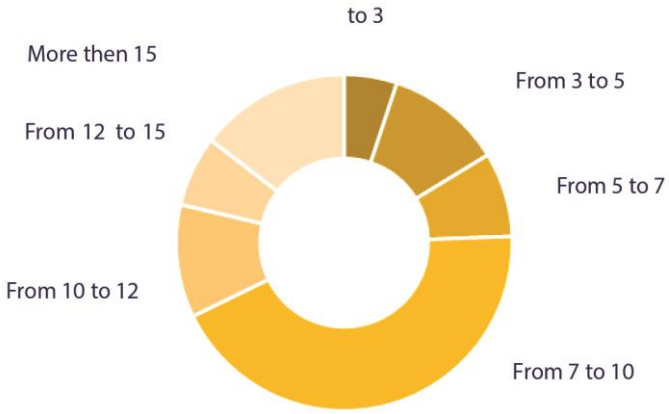


Figure 20. Average age of rolling stock of bus operators

The city contracted a private company, carrying out dispatching work for public transport and transmitting data to the Department of Housing and Communal Services. From 10/10/2018 the contract for the functions of organisation and management of the movement of buses on city bus routes with LLC "Track Service Control" has been terminated. In order to monitor the implementation by operators of transport legislation and contractual terms from 2019, it is planned to resume the work of the municipal enterprise "Central dispatching service of city passenger transportations" of the Poltava City Council.

In 2018, preparations began for the introduction of an automated fare collection system.

Weaknesses

In the city, there is a large number of duplicate routes, which eventually leads to congestion of the transport network and adversely affects the:

- Passenger comfort
- Speed of traffic flow
- Road safety
- Environment

To estimate the level of duplication of public transport routes, the route factor is used, which shows the average number of routes that pass through one section of the network. The estimated value of the "route index" for Poltava is 6.04, and exceeds the normative value more than 2 times. The largest number of public transport routes passes through Sobornosti str. - 37 routes.

In order to improve the quality of transport services to the population in the city, there is a need to increase the number of buses of large class. Today 49% of the bus fleet are buses of a small class. Special attention should be given to the renewal of the rolling stock of electric vehicles, as the current age of 70 % of the rolling stock of the trolleybus fleet exceeds 15 years[10].

Only about 10% of the bus fleet and 100% of the trolleybus fleet are equipped with GPS sensors[9]. For the effective functioning of the system of dispatching and monitoring of the system of passenger transport in the city, there is a need to further equip the rolling stock of public transport.

According to the Department of Social Development of Poltava 10% of the population of city are persons with disabilities and 30% of the population of the city has the right to enjoy benefits[11]. The city implements the municipal programme “Turbota” ("Care"), which performs a socially important function for the transportation of privileged categories of the population. It creates an additional financial burden on public transport of municipal ownership. Under the programme "Turbota", the city undertakes free transportation of the following categories of residents: parents of large families, single mothers and single parents, school aged children of single mothers, social workers, medical workers, school aged children of from specialised educational institutions, family members of the deceased veterans of the war, family members of soldiers- internationalists killed in Afghanistan, one of the parents (guardians) of children with disabilities of subgroup "A" and persons with disabilities from childhood group i of subgroup "A"; postmen.

Concerning the high level of disability of the city population, it can be stated that the existing level of equipment of vehicles is insufficient to effectively meet the needs of the population with disabilities. According to the register of public passenger transport routes, only 24% of buses are equipped with a sound information system about the name of the bus stops, and 7% of buses are equipped with ramps[9].

It is also worth noting the complex system of organisation and management of urban passenger transport: the order of transport services is carried out by the Department of Transport and Communications, and monitoring by the Department of Housing and Communal Services. It unimaginably feedback from the local authorities in case of violation of the conditions of the contract for the public service transport providers.

Pedestrian space and barrier-free space

Pedestrian infrastructure is the basis of the mobility system in cities. How comfortable the pedestrian infrastructure will be depends on how much a person wants to use it. The problem of pedestrian infrastructure is typically rooted in specific technical shortcomings (no low curbs, poor quality of coating, and the problems of wastewater), as well as a certain sense of danger on poorly organised pedestrian crossings and poorly lit footpaths in the dark.

Strengths

In Poltava, there is a permanent pedestrian zone - a part of the street Sobornosti, from the Korpusnyi Sad to the drama theatre named after Gogol, with a length of 310 m.

A powerful resource to stimulate pedestrian movements is a large number of green areas and recreational facilities. In Poltava, there are 20 parks, 28 public gardens and 12 boulevards. On December 22, 2017, the decision of the Poltava City Council approved the "Programme of development of parks, squares and boulevards of Poltava for 2018-2020".

Figure 21. Pedestrian zone on Sobornosti str., Poltava. Photo: Olexandr Yurovskii

Within the framework of the programme, reconstruction and renovation of 28 recreational facilities are planned. In general, the implementation of the programme from the city budget should make about 160 million UAH for three years available. The implementation of the programme will create in the city centres of social and cultural development of the population in the natural environment, which will act as a functional-mobile, recreational and educational systems and meet the socially significant interests and needs of different groups of the population. Responsible for the implementation of the programme is appointed Management of housing and communal services of the city Executive Committee.

Weaknesses

The streets of Poltava are in many cases not balancing the needs of the different users (private cars, public transport, pedestrians, cyclists, small businesses, restaurants and residents of the street). This is manifested in the fact that the street space takes into account the needs of only a few types of users, ignoring the needs of others, e.g. the needs of pedestrians. The universal rule of the way out of such

situations is the city's decision on the optimal use of all available space to meet the needs of each group of users; in the case of insufficient space it is worth offering compromise solutions.

The most critical challenge in the improvement of the performance of the pedestrian traffic in Poltava is to improve the technical condition of the pedestrian infrastructure. It is the ability to move in a qualitatively ordered network of pedestrian paths, which would create a huge growth area for this type of mobility.

Stepovoho Frontu str.

Sobornosti str.

Figure 2. Examples of non-quality pedestrian infrastructure, Poltava

An acute problem of the city is to ensure the barrier-free pedestrian space for people with limited mobility since 10% of Poltava's population consists of people with disabilities. Accessibility is also an important element of comfort for people with limited mobility: people with temporary disorders of the musculoskeletal system, elderly people, pregnant women, fathers and mothers with prams, preschool children. Pedestrians had to overcome numerous obstacles in its path: curbs, stairs, coverings of low quality, and the like.

In addition, an important problem of the pedestrian space of the city of Poltava is the placement of temporary structures within it. The existence of this problem is confirmed by the fixed number of permits issued for the installation of temporary structures. Thus, in 2014, 488 permits were issued for a period of 5 years, in 2015 – 115 permits for a period of 5 years, in 2016 – 50 and 95 permits for a period of 5 years and 1 year, respectively. The uncontrolled placement of temporary structures on pedestrian paths, sidewalks and alleys creates obstacles to the free movement of pedestrians, which is the reason for reducing the safety of public space.

An important issue is the lack of urban navigation. Once in an unfamiliar area of the city, the pedestrian must learn the location of the desired object or route only with the help of verbal contact with passers-by, or using mobile devices with Internet access.

Figure 3. Small arquitectural form on crossing of streets Stritenska and Nebesnoi Sotni, Poltava

Parking system

Management of the parking space of the city can be attributed to the areas with great development potential for Poltava. The city has still a lot of work to do to deploy a parking management system, but the experience of other settlements shows that this work results in a significant improvement in the quality of life and improves traffic safety.

Strengths

On October 26, 2011, the Poltava City Council considered the project "Approval of the tariff for services for the maintenance of sites for paid parking of vehicles in the city Poltava", the proposed tariff for paid parking services is set at 2.5 UAH for an hour of Parking. In continuation of the above-mentioned project, the decision of the Poltava City Council from September 18, 2012 approved the “Regulation on parking vehicles in the city Poltava”.

On July 10, 2015, the List of special land plots allocated for the organisation and implementation of activities to ensure that the parking of vehicles was approved. It identified 13 sites in the area of the old market and the railway station Poltava South for the organisation of paid parking. Responsible for the organisation and conduct of activities to ensure the parking of vehicles is the utility company "Poltava-service".

To address the issue of unauthorised parking, the city authorities and the population are taking appropriate measures, namely, providing traffic signs to prohibit parking, install vehicle barriers and antipersonnel columns, placing concrete barriers at the entrance to residential areas etc. the Introduction of the above mentioned measures contributes to the restriction of unauthorised parking within certain areas. However, at the level of the entire city, it does not resolve the issue systemically.

Weaknesses

The lack of a control systems, parking control and a single scheme for the city parking space leads to the problem of mass spontaneous street parking. Drivers wilfully leave the car on the roadway in places, where it is prohibited or on the pedestrian infrastructure. Unauthorised parking is also widespread in the areas of dwelling houses on adjoining territories.

Figure 24. Examples of efforts against chaotic parking

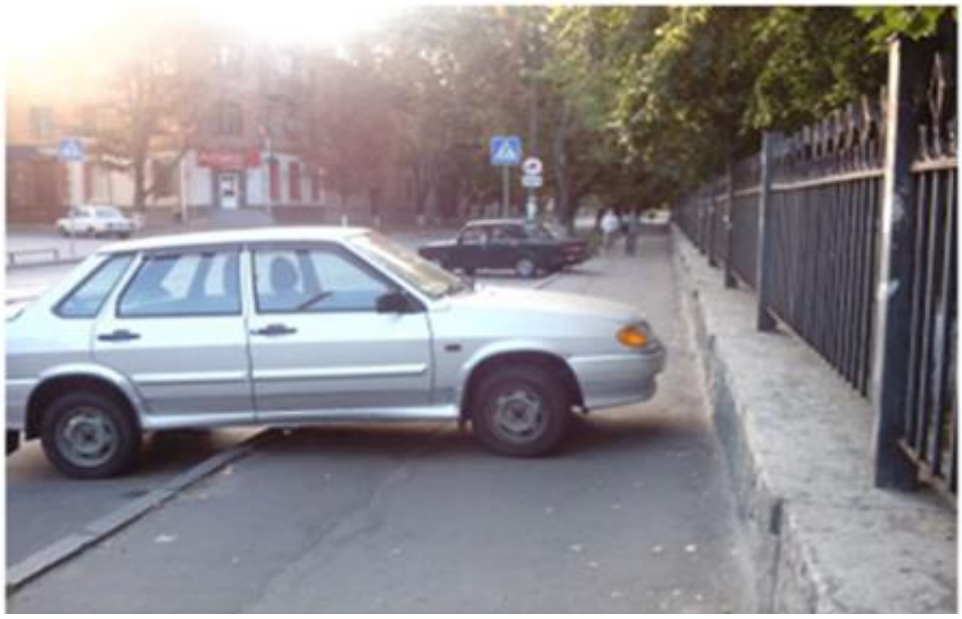


Figure 4. Chaotic parking on Shevchenka str., Poltava

Bicycle transport

Cycling could become a part of daily activity in Poltava. Small distances (under 5 km), plain relief at the majority of city territory as well as wide streets create a great potential for the development of cycling as a mode of transport in the city. As for now, cycling infrastructure is underdeveloped in the city.

Strengths

Poltava has mostly a flat territory. The maximum level of the relief plains within the city of Poltava is fixed at +159,2 m above sea level in the centre of the Field of the battle of Poltava, and the minimum is +78 m in the area of Vorskla under the bridge of the highway Kyiv-Kharkiv[12]. Because of the analysis of the relief features of the city, it can be argued that in Poltava there are favourable geographical conditions for the development of bicycle infrastructure. Poltava is quite compact with a city area of 103.5 square km; flat terrain for most parts of the city and wide street profiles create a huge potential for the development of this transport mode in the city.

Developed in 2015 and approved by the decision of the Poltava City Council on March 29, 2016 "Concept of development of Bicycle infrastructure for the City of Poltava". The concept provides ideas for the introduction of main (28.77 km), secondary (53.1 km), recreational (28.7 km) and suburban routes (22.5 km) with a total length of 133.07 km. As of the beginning of 2018, the city has a bicycle lane on the Yakivchanska street near the Arboretum with a length of 1.200 meters. In addition, in 2017, as part of the overhaul of sidewalks on the streets of Kurchatov and Marshal Biriuzov, Bicycle paths, combined with sidewalks, have been created.

The town has active community organisations that advocate the emergence of cycling infrastructure and promote cycling: "CityLab" (http://www.citylab.org.ua) and "Belopoltsi" (http://www.velopoltava.org/). Organisations are exploring the dynamics of growth in the number of cyclists in the city, conducting twice-yearly counts of Bicycle traffic at key intersections of Poltava. Thus, according to the study of the "CityLab", which has been conducted in spring and autumn 2015/2016, the average number of cyclists who are crossing the key intersections of the city for 1 hour in the spring-autumn period is about 50

people/intersection. The largest Bicycle traffic is observed at the intersection of Yevropeiska street and Raisy Kyrychenko street, which has an average hourly crossing of 104 cyclists[13].

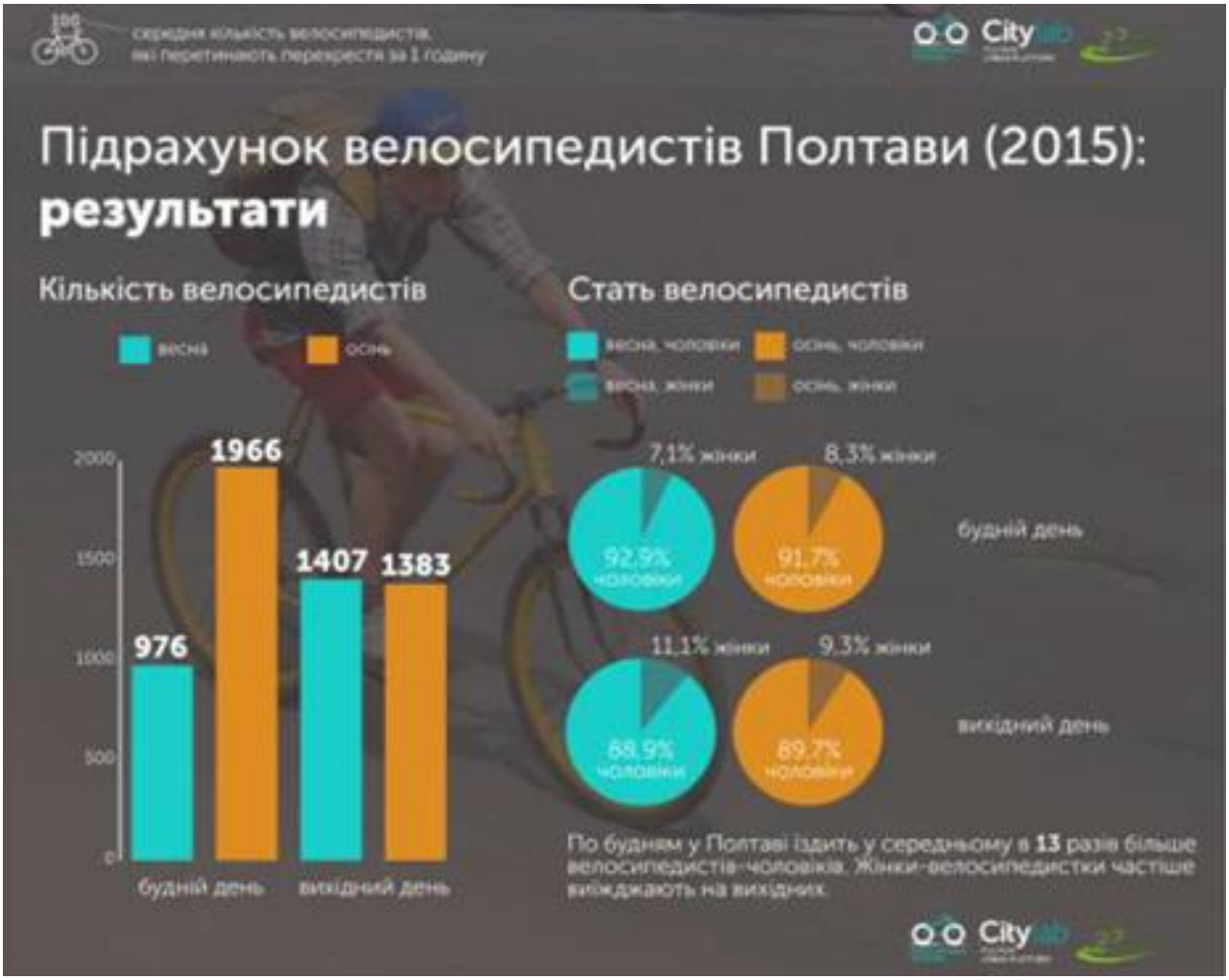


Figure 26. Calculation of Poltava cyclists (2015): results

The survey of cyclists' movement was also conducted in 2017 within the framework of the project "Integrated urban development in Ukraine", using the application Modalyzer[14]. The most intensive movement of bicycle transport is recorded on the Kahamlyka street, Shevchenko street, Sobornosti street, Swedska street, Marshala Biriuzova street, Nebesnoi sotni street, Yevropeiska street, Balakina street, Panianka street and Anatoly Kukoby street.

In 2016, the public organisation "CityLab" submitted the project to install bicycle racks in the city and five self-service stations for bicycles to the "Participation Budget ". The project was supported by residents of Poltava and implemented in 2018: 33 cycling racks have been installed near social infrastructure institutions (museums, hospitals, musical and sports schools, etc.) as well as 1 street technical service station for bicycles on the Theater Square.

Weaknesses

The city's cycling infrastructure is in its nascent stage. That is, despite the 2016 approval of the concept to develop cycling infrastructure, the implementation of the plan for the proposed activities has not yet started.

A study on the composition of the bicycle flow shows that among all active users of bikes in Poltava, only 9% are women[13]. This gender distribution of users indicates the perception of the bike as a transport associated with a high level of danger.

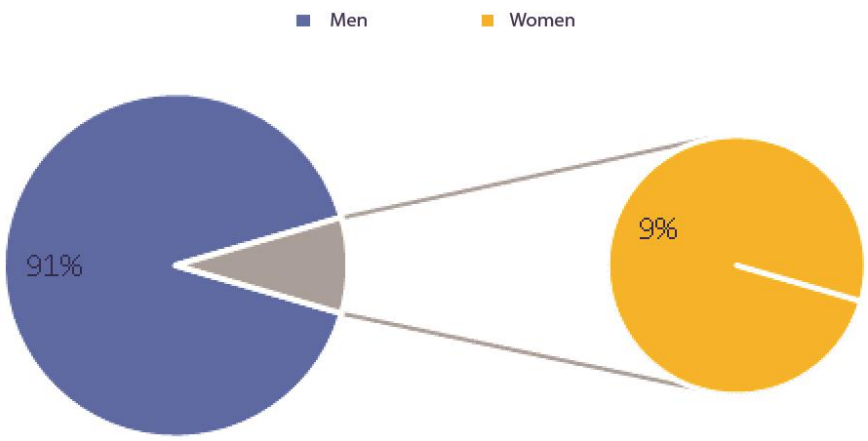


Figure 27. Distribution of the number of users of bicycle by the sex

The survey of local residents, which was conducted as part of the mobility survey of the city population in 2017, found that 4.1% of the surveyed population carry out cycling trips from time to time, 31% do not use a bicycle and 64.9% rarely use a bicycle[15].

The main reason for the unattractiveness of cycling for potential users in Poltava is the lack of quality and properly equipped Bicycle infrastructure in the city.

Road safety

The issue of road safety should always be under control in the transport management vertical of the city. It is important to establish a system for monitoring the state of security, use the collected data to specific activities at points of increased probability of accidents and to monitor how the measures taken have solved the safety problems.

Strengths

The main criterion for assessing the level of safety of citizens is the number of road accidents (RTA) and injuries received during movement around the city. From 2012 to 2015 there has been a positive trend of reducing the total number of accidents in the city of Poltava. Thus, in 2012, the total number of road accidents in the city was 1631 units, while in 2015 this figure was 1017[15]. Unambiguous reason for the decrease in the number of accidents in the city is difficult to establish, because of the reformation of the law enforcement system which was taking place in this period, including the departments that were involved in the collection of statistical information about accidents in the city.

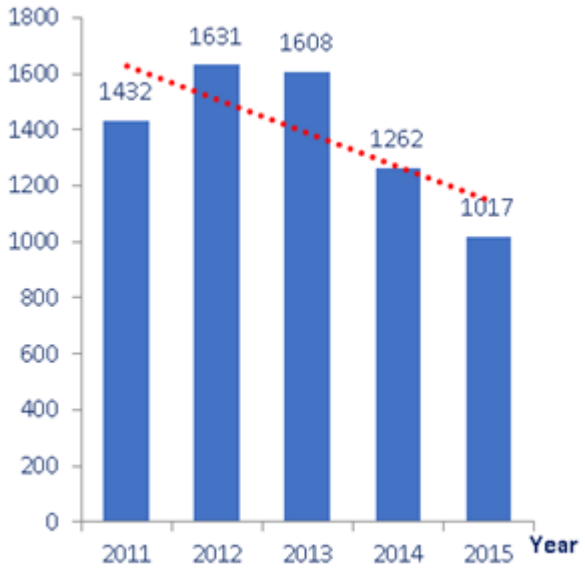


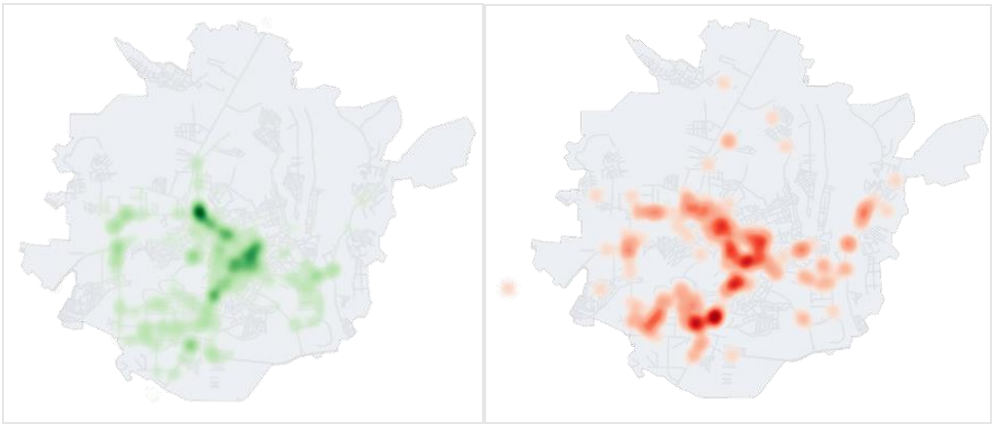
Figure 28. Quantity of road accidents in Poltava

In 2016, due to the liquidation of relevant structures in the ranks of the police, the statistics of road accidents were almost not collected. On September 18, 2017, the Department of Traffic Safety was established and put into operation of the Patrol Police Department. Employees of the department on began to establish data collection about accidents their own. Now, the process of creating a reliable database on the state of traffic safety in the city is in formation.

Representatives of the patrol police conduct educational work on road safety among different segments of the population. Among others, they conduct activities in educational institutions, telling students about the rules of the road as well as about personal safety and responsibility, they conduct explanatory conversations with drivers of vehicles and attract the public to participate in projects to improve road safety.

Weaknesses

Since 2016, after the beginning of the police reform, there has been no systematic data collection in the field of road safety, which complicates the process of analysing the causes of road accidents and thus slows the process.



a. Without victims **b. With victims**

Figure 29. Places of concentration of road accidents

The most common type of accidents involving persons in the city of Poltava are accidents involving pedestrians, while the most common causes of accidents leading to death and injury of people are:

- exceeding safe speed
- violation of manoeuvring rules
- violation of the rules of passage of intersections.

Local residents have filed 3 petitions with respect to road safety during 2016-2017, which stresses the importance of this issue. At Myru Street, traffic signalisation with a button for pedestrians has been installed in 2018. The remaining petitions are still under consideration[16].

Based on the analysis of the map of places of concentration of traffic accidents with the victims, the locations found in the petitions, and places that do not meet the standards of pedestrian accessibility and barrier-free space (for example, underground pedestrian crossings), a general map of problem points in Poltava has been created (Figure 30).

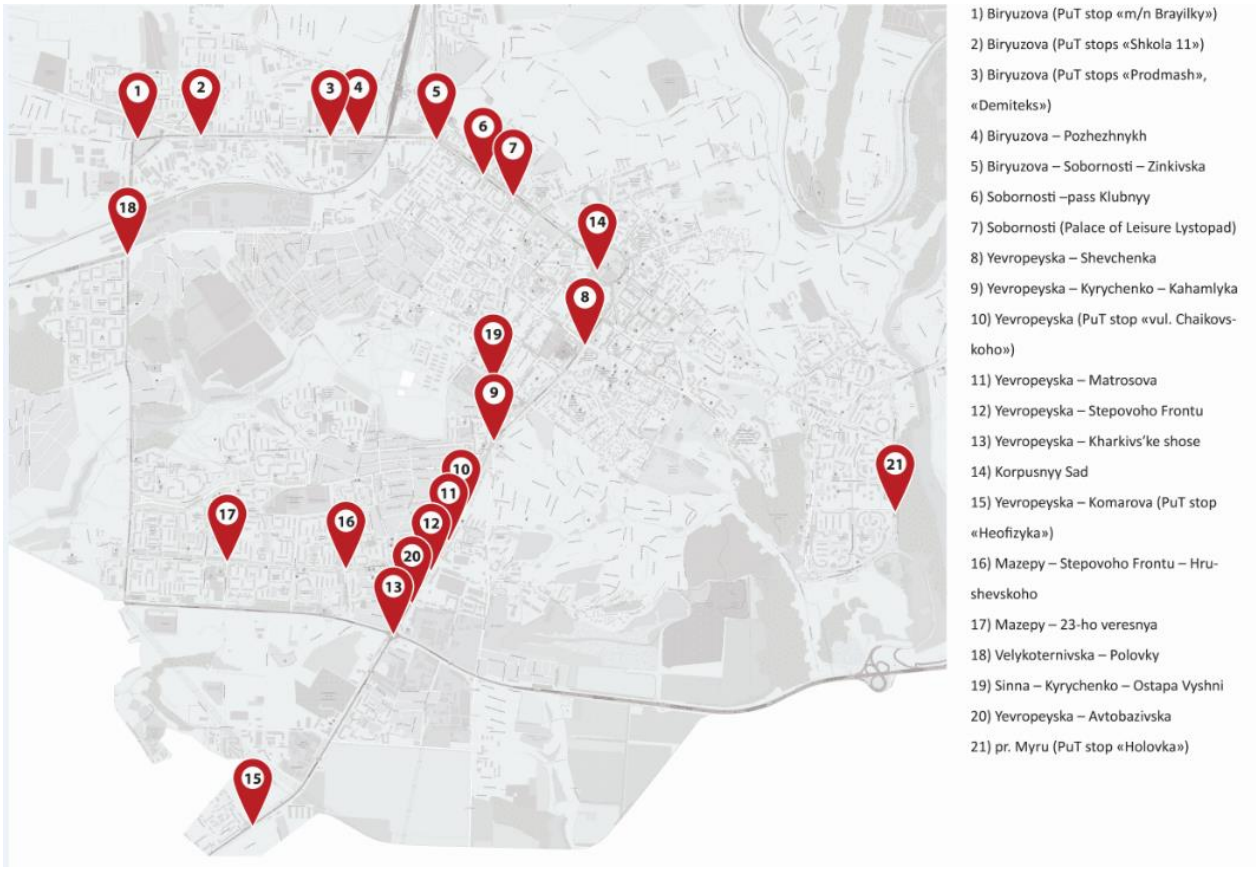


Figure 30. Problematic places in Poltava

Data collection, analysis and management

Intelligent transport systems (ITS) are a wide range of new IT and telecommunication technologies that are used in the field of urban mobility. They offer new methods to address various mobility issues, such as improving traffic safety, reducing traffic jams and reducing emissions to the environment.

Strengths

In April 2016, Poltava joined the all-Ukrainian Association of local governments "Association of Cities of Ukraine". All member cities of the Association take part in the project to automate the system of municipal statistics and fill its database of information about their city by categories:

- economic development
  - population
  - transport
  - social protection
  - health
  - education, culture, art
  - city budget
  - solid domestic waste
  - accomplishments.

The system makes it possible to quickly find the necessary data, analyse them, use them in management decision-making, and to carry out a comparative analysis of its activities with the activities of local governments in other cities of Ukraine.

In order to improve the level of security, ensure effective and coordinated work of local authorities and law enforcement agencies, improve the responsiveness to emergency and dangerous situations in the city in 2017, the construction of the "Safe City" system began in Poltava. By the end of 2018, the city plans to install 317 surveillance cameras, of which 140 are cameras with facial recognition, 62 are cameras with recognition of state license plates, and 115 cameras are designed for inspection of territories.

The programme of social and economic development of Poltava 2018 among the priorities indicated "The introduction of an automated system of accounting of fare". On January 31, 2018, public discussions were held on the introduction of such a system[17].

Before 10/10/2018 there was a private enterprise operating that monitored the operation of public transport. Its functions included:

- check the conformity of the number and brands of vehicles operating on the route, approved by the contract of carriage
- control over observance of traffic schedules vehicles
- recording of violations of transport discipline by drivers (smoking at the wheel, use of mobile communications, etc.)
- implementation of visual control over the technical condition of vehicles.

The results of the analysis of the collected information on public transport services are provided to the local authorities for making appropriate decisions to improve transport services. The existence of such a database creates a framework for further improvement of the efficiency of public transport management and allows us to consider the possibility of its integration with advanced intelligent transport systems of the city.

According to the decision of the Poltava City Council of December 22, 2017, the "Programme of Development of a Geoinformation System of Urban Cadastre of Poltava" has been approved and is supposed to be implemented by the Department of Urban Planning and Architecture of Poltava. The

main objectives of the programme are to update the software of the urban cadastre, the formation of a database and the address register of objects of the urban cadastre system.

Weaknesses

The formation of a unified data system, which includes a variety of information resources about the situation that occurs in various areas of the city and the further use of this information for effective urban management, requires a regulatory framework. This concerns not only Poltava, but also the country on the whole. These are examples of video recording of violations of public order, road safety, rules of transportation of passengers (goods), etc., and the use of such material in the legal procedures against violators.

One of the problematic issues of the scope of the intelligent city management is also technical support. This is reflected in the absence of a navigation map of the city, a single electronic cartographic basis for the correct collection and display of relevant information on the situation in the city. An important issue towards the development of such tools is training for specialists to perform such tasks, as well as the establishment of a separate responsible organisation that could take on these obligations. Intelligent city management systems specialists should be able to solve a wide range of dynamic tasks, for example, to optimise the distribution of traffic flows on the network and operational management of road transport routes. To be able to choose the strategy for traffic management taking into account the requirements of environmental indicators, traffic safety and the actual state of the road network.

Existing participatory processes

The development of the participatory process in Poltava is largely associated with the start of the project of integrated urban development in Ukraine. The Party Programme is one of the main tools of this project and it instils in the city a culture of collecting feedback from residents by the city authorities. Below will be shown the practices of the party, which were observed in Poltava before the start of the project.

Self-organisation of local residents

Before the trend of public involvement in decision-making began to gain momentum in Poltava, the city already had precedents of self-organisation of people and the creation of the common good by the forces of the citizens. The most striking example of such activity is the events that took place in 2014 around the building of the Cadet Corps.

A group of students of the faculty of architecture of Poltava National Technical University decided to clean the territory of the Cadet Corps, which had been empty for more than 20 years. During the three organised clean-up processes 30 to 60 people had been involved. . Activists were able to agree on the involvement of municipal equipment.

After a successful clean-up, it was decided to hold the art festival "Cadetarium". Artists, musicians, dancers and performers filled the space of the building with their own works. In the 5 hours of the festival, the building was visited by 1500 people.

A month and a half took "Cadetarium 2.0", which attracted 5,000 visitors and placed in the walls the cadet brass band. The consequences of activity on "Cadet" was the formation of the urban platform "CityLab", the experimental film Studio "Polywood" and the Poltava Art Territory festival. For its part, the city paid attention to the buildings and planned activities for its preservation.

Participatory process initiated by the city

The participatory process initiated by the city government is to inform the residents of the city about certain changes by means of online consultations[18] and presentations of ready-made projects of changes in the city[19]. The information about the planned hearings is made through the placement of ads on the website of the City Council. Such processes are a formal requirement of the Ukrainian legislation.

Participation budget

With the advent of the municipal organisation "Institute of development of the city" the participatory process in Poltava quickened noticeably. A huge achievement of the Institute was the implementation of the project "Participation Budget"[20], when the community of the city choose how to allocate part of the budget.

The budget of Poltava's participation in 2016 amounted to 1.5 million UAH. To participate 58 projects had been submitted bythe residents of Poltava. In 2017, the project budget was increased to 5 million UAH.

Participatory process, which is implemented by GIZ within the project Integrated Urban Development in Ukraine

The project is Integrated urban development in Ukraine, which is implemented by the German Society for International Cooperation (GIZ) practices the widest possible involvement of specialised professionals and residents of the city in the future planning process for the following formats:

- Thematic workshops and interdisciplinary working groups[21] - events, at which representatives of the city, experts, specialised public organisations jointly develop a vision on certain topics. Working groups have a permanent composition and meet at regular intervals, unlike workshops, which are one-time activities
- Workshop of the city[22] – festival of lectures, master classes and workshops designed to interest the residents of Poltava to the themes of urban development in order to collect their suggestions for improvement of the urban environment. In Poltava, two workshops of the city were held to discuss various aspects of the integrated development of Poltava and gathered the views and suggestions of Poltava citizens on the future of the city in 2030;
- The public forum for integrated development of the city[23] is an event, which invited active residents of the city, as well as the heads of condominiums, public organisations, professional associations, representatives of business and other associations to discuss the most painful issues of development of Poltava and diagnosis of the current situation in various sectors of urban development.

SWOT Analysis

STRENGTHS

- Urban electric transport occupies a strong position in the public transport system of the city
- Public transport network has a high level of coverage and covers the surrounding settlements
- Compact structure and mainly flat terrain of the city are the basic prerequisites for the development of pedestrian and bicycle traffic
- Wide street profiles have a high potential for more efficient space allocation between all its users (including pedestrians, cyclists, small businesses, local residents)
- The city has an approved strategic document for the development of bicycle infrastructure
- High level of landscaping, including near roads (wide alleys, boulevards, parks, squares). Poltava is a green city (12.47 m^2 / inhabitant)
- The presence of a pedestrian zone on the Sobornosti street
- Very high level of pedestrians in modal split (30.5%)
- High air quality in the city

WEAKNESSES

- Lack of a centralised system for statistics collection and monitoring of processes related to mobility and road safety
- Transport system management functions lie on different subjects between which there is no coordination
- Re-coordinating management system public transport and poor quality control of the carriers from the city
- Payment system operators encourage the use of small buses as they are the most profitable to operate for them
- Inefficient network of public transport routes with significant duplication of routes
- Passenger transportation in the city evolved in the context of the free market and lack of regulation
- Street infrastructure priority is given to the movement of private vehicles, neglecting other users of the streets, i.e. the Organisation of Traffic Infrastructure gives priority to the movement of private vehicles: pedestrian traffic restrictions, barrier fences, lack of dedicated lanes for public transport
- Pedestrian infrastructure is in poor condition, not in compliance with accessibility requirements. Cycling infrastructure is virtually non-existent.
- The city does not have transfer systems between different modes of transport
- Municipal transport is underfinanced and carries an additional financial burden in the form of transportation of privileged categories of the population
- Paid Parking system is not considered as a tool for managing the demand for other types of movement, except for private cars

- The city has difficulties in attracting competent contractors for the design and construction of street infrastructure

OPPORTUNITIES

- Transfer of passenger transport to liquefied gas could improve the environmental situation in the city
- The development of bicycle infrastructure and the improvement of pedestrian could significantly reduce the level of use of private cars and public transport, due to the compactness of the city
- New development areas could generate minimum load on the road network by private cars, provided they provide for
- mixed functions of buildings, high-quality pedestrian and bicycle infrastructure and a comfortable connection to the public transport network of the city
- Strong public associations of representatives of various low-mobility groups who are ready to help the city to improve the conditions of mobility
- Department of road safety in the structure of the patrol police could become the core of the control system of traffic safety in the city
- International financial institutions are ready to lend to infrastructure projects in the field of transport in Ukrainian cities
- Speed limits in cities reduced to 50 kmph, which contributes to the improvement of road safety
- The law about parking, which took effect from September 2018, gives the local authorities powers to regulate parking
- Updating of state building codes in the field of construction, repair and reconstruction of streets will allow to design safer streets and to use street space more efficiently

THREATS

- Financial or budgetary constraints can be a barrier to introducing mobility policies
- Shortcomings in the national legislation do not allow cities to control the compliance with speed limits, reconstructed to eliminate damaged sections of the streets
- Negative population growth may lead to a reduction of the self-sufficiency of public transport
- Further growth of the level of motorisation of the population without the city's offer of alternative options of movement may lead to a deterioration of the road situation

Chapter 4 Goals for Sustainable Urban Mobility Development in the City of Poltava

Each of the Sustainable Urban Mobility Plan priorities of the city of Poltava is specified in a number of goals aimed at improving its current situation.

PRIORITY 1.
Improving the attractiveness of public transport

Goal 1.1 Improving the quality of public transport services

The provision of high-quality public transport services is essential to increase the quality of life and to enhance urban development. Creating a customer-oriented and efficient public transport system with provision of high-quality public transport services is a key element in public transport development.

From the customer perspective, it is important to provide punctuality and reliability of public transport vehicles, shorten intervals between the services and travel time, eliminate overcrowdedness of public transport vehicles, etc. Meeting the needs of customers will increase the use of public transport and improve the level of satisfaction with public transport services.

The quality of public transport services provision is covered by many factors. The City of Poltava is going to achieve the EU Standard of Public Passenger Transport and create effective and high-quality public transport system with defined criteria as follow:

- Public transport services are ***available*** for all citizens at every time and city districts.
- Public transport is ***accessible*** for all people, including people with reduced mobility.
- The public transport system provides real-time ***information*** on the vehicles operation within the system allowing efficient planning and execution of journeys.
- The public transport system stands for ***time*** aspects to provide competitive travel time as well as waiting time to accomplish a trip.
- The ***comfort*** of the public transport service is such as to satisfy the needs of public transport users.
- Using of public transport is ***safe*** in with respect to the sense of personal protection of users.
- The public transport system minimises the ***environmental Impact*** from the service provision.

Provision of high-quality public transport services in Poltava is a top goal of improving the attractiveness of the public transport system in general and increasing the number of public transport users.

Goal 1.2 Introduction of efficient public transport management system

Efficient transport management system is required to ensure high quality of operation and financial sustainability. The efficiency of public transport is considered in two realms:

- efficiency in providing services, meaning how well the system meet the goals of its operation and needs of its customers,
- efficiency in company's operating margins, meaning how well the transport company maintains its financial sustainability and cost recovery.

In order to achieve the operating efficiency, a transport network has to be planned as a demand-oriented system with prioritisation of vehicle fleet accordingly. It means that most sustainable, most efficient and least flexible transport, such as trolleybuses, have to be allocated first, followed by high-capacity buses and if required supported by least efficient medium-capacity transport. This will allow to better address demand (service efficiency) and generate higher income relatively to cost (financial efficiency).

Efficient public transport management means that all modes and means of transport are planned as one system, which is monitored and coordinated by the municipal administration or its representatives. The unified transport management system in Poltava does not mean monopolisation of the transport market, but rather establishing public transport alliances on a city or regional level that ensures a unified high standard transport services, while individual operators may still keep their independent status.

Goal 1.3 Improving conditions for people with limited mobility

Accessibility of public transport services is essential to provide people with limited mobility a barrier-free, access safe and comfortable use of the public transport system. People with limited mobility should be able to participate in everyday activities using the public transport environment as other public transport users do.

The city of Poltava strives to achieve priority action of the European Disability Strategy 2010-2020 to make goods and services accessible to people with disabilities and promote the market of assistive devices and is going to provide accessible public transport for the people with limited mobility by the following:

- ***low-floor vehicles*** are operating on every public transport line;
- ***barrier-free access*** to public transport stops: barrier-free dropped kerbs, footways and wheelchair routes;
- ***barrier-free public transport stops***;

- existing integrated terminals that allow ***barrier-free transfer*** between modes and routes.

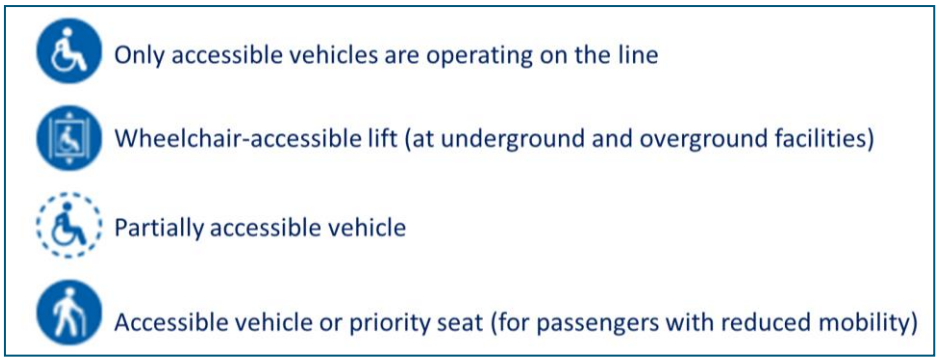


Figure 31. Pictograms that are installed on accessible lines for people with reduced mobility

The development of a quality barrier-free public transport system in Poltava will give an opportunity to establish mobility and an accessible urban environment as well as public transport for all the citizens, including people with limited mobility.

Goal 1.4 Development of multimodal and integrated public transport

Improvement of the quality of public transport service provision is fundamental to the improvement of public transport customers' satisfaction. For the customer, the prospective development of multimodality and integration of the public transport system increases the service quality provision, thus, creating a more attractive system.

Multimodal public transport is a comprehensive system that covers different public transport modes. It aims at improving flexibility and accessibility and create easy connections between public transport modes. The integration of public transport implies harmonised timetables and networks, a unified ticketing system for all modes of public transport, as well as integrated fares. It benefits customers, operators and city administration. It allows to decrease travel time from origin to destination, to minimise the transfer time and to increase the quality of public transport service provision.

The integration of different transport modes requires the relevant infrastructure. The integration of the public transport system, as well as the creation of barrier-free transfer stations between transport modes foresees the installation and implementation of relevant services and facilities, e.g. benches and shelters at public transport stops; capacities to carry bikes in public transport vehicles; cycling parking and storage facilities at public transport stops, availability of shared bike services and an

What do "intermodality" and "multimodality" mean?

"Multimodality" means the use of different means of transport for different journeys, for instance on different days of the week.

"Intermodality" means the use of different means of transport for one journey. A classic form of intermodality involves cycling to the railway station, changing to the train and then to the bus.

information and navigation system.

The City of Poltava is on the way to develop an integrated and multimodal public transport system to provide an easier and more comfortable public transport environment and service for its citizens.

Goal 1.5 Prioritising public transport in traffic

Currently, public transport is the main mode of mobility in Poltava. More than a half of the trips are conducted by public transport, while only 15% of trips are made by cars.

The public transport priority manifested in separated lanes and priority crossing on intersections leads to a reduction of the overall travel time. And this index has advantages for both – users and operators. Public transport users can benefit from improved travel times while public transport operators can use the infrastructure in a more efficient way. Improved commercial speed allows to reduce the round trip time and utilises less vehicle for keeping the same headways or decrease headways using the same number of vehicles.

Prioritising public transport in traffic improves quality and efficiency of public transport operation. Poltava is striving for better reliable transport and will achieve it through all kind of measures.

PRIORITY 2. Improvement of parking space

Goal 2.1 Unload roads and sidewalks in the city centre from parking

Parking management is a powerful tool to influence transport and one of the most effective ways to reduce traffic and create more efficient and attractive urban conditions. Appropriate parking management balances the supply and demand.

Public space is limited and special attention is focused on the development of an adequate on-street parking management system as well as setting up parking zones to unload roadways and sidewalks in the city centre from cars.

Goal 2.2 Provision of a sufficient number of parking spaces of adjoining areas in residential areas

Parking in residential areas is an important issue to provide the supply and create a pleasant, free and safe environment. People are willing to be able to park their cars as close to the building as possible. However, unorganised parking results in compromised safety and unfriendliness of the environment. According to the concept of integrated development, the City of Poltava will improve the quality of housing and residential areas. Providing balanced parking management in

residential areas is a crucial part of it. With this goal, the City of Poltava strives to achieve improvement of urban environment quality and safety without compromising need for parking, including commercial vehicles and providing sufficient parking space for people with disabilities.

Goal 2.3 Parking management near public and commercial institutions

Parking is one of the most critical obstacles to the development of a liveable city. The lack of space for parking in an urban area reduces the accessibility of people.

Public space is always overloaded near public and commercial institutions and near city's points of interests. Visitors or workers usually park their cars at the entrance to public and commercial buildings. The City of Poltava sets a goal to improve the accessibility to public and commercial buildings by finding an efficient solutions (e.g. providing more paid off-street parking, while reducing free on-street parking that is an obstacle to liveability) for the sustainable use of public space.

Goal 2.4 Relieving the central part of the city from large-sized vehicles

Freight logistics is an essential part of city life because, in the end of the day, goods have to reach their customers. However, the city area and especially its central part, is not a place for oversized vehicles. Oversized and overweight vehicles destroy the pavement and cause much more danger to vulnerable road users. Relieving the central part of the city from large freight is a reasonable goal that can be achieved by freight logistics management strategies without a significant loss in its functionality.

PRIORITY 3.
Collection and analysis of data about the city and creation of an intelligent transport system

Goal 3.1 Decision-making is based on data

The well-structured and regular collection of urban data from multiple sources and its aggregation and correlation analysis to obtain information for making decisions and strategic planning is the core element of sustainable urban development of cities.

The City of Poltava sets a goal to create a unified information system for data collection to be integrated into a multi-dimensional database and an efficient tool to monitor urban situations. This includes regular data collection and monitoring

of all urban sectors including public transport, road safety and traffic management, etc.

The existence of a unified data collection system in Poltava creates the opportunity to quickly find and analyse necessary data, to make well-grounded management decisions as well as to carry out comparable analysis. It facilitates electronic data exchange between relevant public authorities so that all city council departments have an access to existing and accurate city data, e.g. road and traffic data.

The unified data collection system in the city of Poltava will allow to harmonise urban data as well as to evaluate the service quality, to analyse the urban life, to monitor behavioural patterns and urban infrastructure.

Goal 3.2 Implementation of the electronic payment system for transport services

Electronic payment is a first step towards an intelligent transport system. The implementation of electronic payment systems is has a number of advantages, such as financial transparency, accessibility, efficiency, ease of use, time savings.. Electronic payment systems aim to reduce inefficiencies of the traditional systems thus better achieving customer satisfaction. It is useful for paperless transactions, the reduction of transactions costs and convenient for the customers.

Poltava is going to implement the following features of electronic payment systems for transport services:

- Parking payment system
- Bicycle-sharing
- E-ticketing system for public transport

Due to the implementation of an e-payment system for transport services, Poltava will create a digital urban environment that will allow to monitor urban services and operations and contribute to the development of intelligent transport systems.

Goal 3.3 Provision of information to road users

According to Directive 2010/40/EU, Intelligent Transport Systems (ITS) are advanced applications embodying intelligence with the aim to provide innovative services relating to different modes of transport and traffic management and to enable various users to be better informed and make safer as well as more coordinated and ‘smarter’ use of transport networks. By implementing intelligent transport system services in public transport services, such as a traffic information system, parking scheme, and city service monitoring system, Poltava will align its operations with European standards.

Goal 3.4 Infrastructure renovation in accordance with the latest technologies

Infrastructure renovation technologies create a new efficient urban environment. It intends to meet customers' needs and increase the quality of life. Smart urban infrastructure solutions are a key to provide high quality urban life. Renovating urban infrastructure according to the latest technologies will boost efficiency and reduce costs of transport system operations in Poltava.

The City of Poltava is going to upgrade urban infrastructure in line with new technologies as well as creating easy monitoring and management for the urban environment.

PRIORITY 4. Development of cycling

Goal 4.1 Promotion of cycling among citizens and tourists

Due to its multiple positive effects, cycling has become an important solution for many problems of modern cities. Cycling decreases the risk of getting diabetes, cancer and heart diseases because it is a great cardio exercise. The bicycle is very efficient in terms of use of public space - it needs much less space to move and park so it does not create congestions. In addition it causes less damage to pavements. The bicycle is a pollution-free mode of transport and is also featured as "green" or eco-friendly which fully corresponds to Poltava's brand as a green city. Last but not least, the bicycle is a socially fair transport, it is quite affordable and it makes people happier, improves capacity of thinking, reduces level of anxiety and creates a good mood.

Increasing share of cycling trips and enlarging the number of active cyclists is a reasonable goal for the city.

Goal 4.2 Creating a management mechanism for the development of cycling

Building a cycling city is a long process that has to be supported by sufficient administrative capacities. The City of Poltava will establish a full time position and develop an efficient management structure for the development of cycling in order to achieve all the goals it sets with respect to the promotion of cycling.

Goal 4.3 Creating the ability to cycle through the city quickly and safely

People are much more likely to choose cycling if they find conditions for cycling which are safe and convenient, which allow a quick movement, the use of high

quality infrastructure and if there is bike-parking available. Poltava will strive to provide the required conditions to cyclist for a quick and safe movement through the city.

PRIORITY 5.
Development of pedestrian spaces and accessibility

Goal 5.1 Increase of attractiveness of walking mode in the city

Walkability is one of the most important target sectors in creating sustainable mobility, it is a vital component of urban life and is important for urban development as well as for the economy, social life and environment.

Walking becomes more attractive when high quality pedestrian infrastructure is well-planned and provided. The City of Poltava defined a high quality pedestrian network with the following characteristics:

- The pedestrian network is ***connected*** and provides good access to key city destinations
- The pedestrian network is rather ***comfortable*** in terms of sidewalks width, surface, lands
- The streets can be crossed ***safely*** by all mobility groups
- The walking infrastructure provides proper ***street lighting***
- Sidewalks are ***protected*** and provide shade and weather protection
- Pedestrian infrastructure is ***attractive*** in terms of available seating and rest areas

The City of Poltava stands by development of an attractive walking environment and to encourage walking as a mode of transport in the city.

Goal 5.2 Development of safety and comfortable facilities for pedestrians

Enhancing the urban infrastructure and making it safe and comfortable will create an attractive and pleasant environment for all, men and women, children and elderly, and will encourage people to walk in Poltava. One of the goals of the City of Poltava is the creation of safe and comfortable walking infrastructure. Walking infrastructure is safe if it is protected from crime and thefts, free of obstructions and well-lightened. The urban environment is universally accessible and available for all citizens, including people with limited mobility. It is built and maintained to get people to the desired places in a way that makes walking pleasant.

The development of well-designed, safe and comfortable urban infrastructure is a goal that is going to be achieved by Sustainable Urban Mobility Planning in Poltava.

Goal 5.3 Creation of a municipal management system of walking facilities

A municipal management system responsible for walking facilities is the developed department and/or defined position in the City Council responsible for the development and maintenance of the walking infrastructure and promotion of walking as a mode of transport. The City of Poltava is going to create and implement a walking management system that will foresee:

- Advancement of the development and maintenance of the walking infrastructure and assistance in walking promotion
- Development of walking strategy as well as reviewing current policies and promoting best practices
- Development of annual maintenance programmes
- Carrying out regular walking facilities inspections
- Promotion improvements of local walking infrastructure and encourage the use of existing infrastructure
- Regular communication with local authorities, stakeholders and the public
- Support of a walking infrastructure monitoring system

The City of Poltava sets a goal to create an effective municipal management system responsible for walking infrastructure to maintain and develop quality pedestrian infrastructure and public space in the city.

PRIORITY 6. Increasing road safety

Goal 6.1 Creation of safe urban environment

“If everybody from 8 years old to 80 years old feels great, this is a fair, comfortable and safe city”[24]. In order to provide the best possible conditions for its residents, Poltava strives to create a safe urban environment. By safe urban environment we understand that it is safe in terms of road safety, meaning that no lives are lost in traffic accidents and everyone who could be saved is saved. It means that urban fabric is developed in a way that it encourages people for safe and positive behaviour. Public transport is of high standard and free from harassment and violence, every women or child feels safe and can travel without danger.

With this goal, Poltava wants to reach a transport system that allows people to fulfil their mobility need without any danger to their health0020and property.

Goal 6.2 Improvement of traffic culture

The improvement of road safety can be achieved through the combination of hard and soft measures, however, the improvement of road users' culture is an important element. City of Poltava sets a goal to achieve respect and care among the road users through the combination of promotional and enforcement measures.

Chapter 5 Overview of Scenarios

A scenario is a description of the likely development of a situation that may occur in a given future. They support multi-variant diagnosis and policy making that is prepared for different directions of changes in the environment. Since the 1980s, they have been used in developing the transport policy of highly developed countries, although enterprises have used them before - the first comprehensive scenarios created for the strategic management of Shell were developed in the first half of the 1970s. Scenario methods are used more and more often due to the difficulties in the long-term forecasting.

Scenario methods acknowledge that it is impossible to predict the future with certainty. Instead of projecting current trends into the future in a linear manner and then expecting that this is the only way the situation can develop, they allow planners to prepare for different possible future pathways. The main advantage is that if less likely scenarios become reality, for example due to unexpected political or technological changes, planners do not stand unprepared, but have already thought about suitable reactions and measures. Thinking in scenarios necessarily includes judgements about future trends, which are open to various interpretations, which is why the assumptions of scenarios always have to be made transparent.

In order to identify the most important possible futures of the city of Poltava the method based on level of limitations was used for the scenario development. Implementation of the policy will require further organisational, institutional, financial resources as well as public support, which are preconditions for the successful application of measures. A matrix based on availability of financial resources and level of organisational capacities and acceptance of change was applied, which have been assessed as the two most important factors limiting policy making for sustainable transport.

Figure 32. Matrix of scenario definition

Organisational capacities and acceptance is about how much implementation capacities of the institutions and stakeholders should be involved, how the decision-making process is complicated and needs political will or additional administrative resources to realise measures for sustainable transport.

Availability of financial resources is taken as level of financial assignation to the transport sector. For example, the current expenditures on transport from the Development Budget of Poltava are taken as a starting point and are assumed as the low level. In case the city will optimise the management system and fiscal policy, the incomes and savings will rise, as well as activate the cooperation with donors, international financial institutions. Through the applications for grants and state programmes of development, additional financial inflows will increase and the level of investments in the transport sector will be significant.

With the help of the matrix above and limitations, four different scenarios have been developed:

Scenario 1 – Business as usual

ASSUMPTIONS: The assumption is that due to unstable and inconsistent management of the sector, there will be no significant investments available and also continually low organisational capacities and acceptance for change.

POLICY RECOMMENDATIONS: In this case, the city would have to concentrate on a "maintain and operate" strategy, which means that the main focus would be to maintain the system and not to allow threats to weaken it. New measures would mostly need to be limited to those that are cheap and do not require strong political backing.

Scenario 2 – High resources / low capacities

ASSUMPTIONS: This scenario assumes that, thanks to an active and successful investment strategy, there are financial resources available for the development of the sector in a form of combination of loans and private investments as well as national and international support. However, the scenario assumes no change in the planning strategy and low political and administrative capacities allocated into the development of the transport and mobility sector because of low organisational capacities and acceptance for change.

POLICY RECOMMENDATIONS: The important focus of that scenario is to prevent harmful development of the city due to lack of coordination of hard measures of implementation. Good and effective planning is needed to ensure that only projects are implemented that contribute to Poltava's priorities. There are opportunities for beneficial costly measures such as to modernise the public transport system.

Scenario 3 – Low resources / high political and public support (plus organisational capacities)

ASSUMPTIONS: This scenario assumes that the city has low access to financial resources to be allocated to transport infrastructure but high political support for the reformation of the mobility sector.

POLICY RECOMMENDATIONS: The implementation of hard measures, such as rebuilding infrastructure, will be similarly limited as in the business as usual scenario, but there are good opportunities for cost-effective soft measures. The main focus should be on the management and organisation of the mobility sector, the promotion of sustainable transport behaviour and awareness campaign among the

population and stakeholders, the conduction of surveys for data collection and its analysis to monitor of the system and capacity building to improve the skills of the authority representatives and the service personnel of the transport sector.

Scenario 4 – High resources / high capacities

ASSUMPTIONS: This is the most optimistic scenario, which assumes that the city will have access to the financial resources as well as enough political and public support to implement the strategies. It offers the best opportunities for a breakthrough.

POLICY RECOMMENDATIONS: In this scenario, Poltava should focus on taking the maximum advantage of the available opportunities by both enhancing the strength of the system and overcoming weaknesses. Hard and soft measures should be integrated into effective packages. It is recommended to first concentrate on improving the offers of environmentally friendly transport modes (pull measures), such as by building missing biking and walking infrastructure and modernising the public transport system. Once those are in place, push measures should also be implemented to promote a modal shift, such as development of parking zones with higher parking fees as well as the reductions of car lanes and speed limits.

Chapter 6 Measures

This chapter contains information on measures that should be undertaken by Poltava in order to achieve the goals set in previous sections. The chapter is organised according to priority area, where each set of measures specifies which goals it will contribute to and explains specific measures with respect to their construction and main effects. In the end of each priority, a detailed table with actions (projects) to be implemented within the priority is presented and rated according to the scenarios explained in the previous chapter. Each action is identified by a measure type. There are five types of measures:

Infrastructure

Providing effective and inclusive infrastructure as well as provision of safe access to it is crucial for ensuring city resilience in the long-term perspective. Infrastructure measures are a comprehensive list of actions that need to be implemented to improve the city's infrastructure, which includes building new, reconstructing or upgrading existing infrastructure to support and improve the accessibility to urban facilities and services. This category of measures is the most cost-effective.

Management and organisation

An effective management, organisation and functioning system of local self-government bodies helps to ensure the achievement of relevant priorities and goals; development, implementation and promotion of concepts, standards, programmes and plans as well as to achieve the desired results in general. Management and organisation measures aim to meet the overall need in development relevant management systems and to develop strategic documents to support a high-quality urban environment and mobility.

Monitoring and data collection

The lack of quality data and a data collection system limits conducting quality analysis of the urban situation. Regular monitoring is one of the valuable ways to identify problems that allow to monitor the trends and identify pressing problems. During the urban mobility planning it is important to set up a monitoring system to collect data on a continuing basis to maintain the overall system and enable long-term performance measurement and assessment. This category includes the development of monitoring systems, carrying out regular surveys, database development, etc.

Capacity building

When starting sustainable urban mobility planning, it is recommended to improve awareness and knowledge of sustainable mobility among politicians, planners, and others stakeholders involved in the urban mobility planning process by capacity building activities. Lack of strategic planning practice as well as low level of competence of staff in the relevant city administration units is a problem of a number of cities today.

Promotion and awareness

Promotion and awareness is intended to increase citizens' awareness about the urban opportunities, such as the use of urban infrastructure, development of sustainable modes of transport and other issues related to sustainable urban mobility. Promotion and awareness focuses on carrying out activities to influence citizens' behaviour and raise their awareness.

Public transport

Public transport makes up for 55% of all trips in Poltava[26]. The planning of a high quality and comfortable public transport system is an important and emerging goal. According to the Ukrainian law "On Automobile Transport", the city administration is responsible for the passenger movement management.

Measures in the field of Public transport are aimed at the creation of high quality and integrated systems of passenger service. These measures mainly contribute to the achievement of the following goals:

1.1 Improving the quality of public transport services

1.2 The introduction of an effective management system for public transport

1.3 Improving conditions for people with limited mobility

1.4 Development of multimodality and integration of public transport

1.5 Prioritisation of public transport movement in traffic

3.2 The introduction of e-payment of transport services

3.3 Providing information to road users

In order to achieve the goals of priority, it is required to implement a comprehensive concept for the development of public transport.

The key concept of public transport

The key concept of public transport of Poltava is to create an efficient transport network that minimises expenses for its operation and maximises service quality. It is also important that the public transport network of Poltava supports other priorities of the city's mobility, especially walking and safety. The fundamental principle is that urban public transport is an integral system where all routes, stops, and vehicles operate on a high quality level to serve the passenger. Below are presented long as well as short term measures in order to achieve a unified system of passenger service.

As priority measures in the field of public transport should be reviewed the requirements for the quality of transportation, regulated by the terms of the contract, reviewed the organisation of the route network and introduced a system of electronic payment of travel fees. In the medium term - the creation of a unified centralised public transport management system, the prioritisation of public transport in the overall flow and the introduction of a monitoring system for public transport. In the long perspective, need to be achieved a synergy not a competition between urban and suburban transport, and the concept of free transfer between public transport needs to be realized.

Optimisation of the route network

Route network optimisation is a prerequisite for achieving efficient system operations. The main tasks of optimising the route network are:

- reduce duplication on urban public transport routes,
- unload the network from a large number of small capacity vehicles,
- reduce travel time for passengers

Key principles for the re-organisation of the route network:

- focus on demand,
- optimisation of transport system operational cost,

- building a network from most efficient vehicles first.

The main ways of unloading the centre is the organization of work on the Sobornosti street of buses of only large capacity and reducing the number of routes, the final point of which is the city centre. Key tasks for rationalization of the route network:

1. concentrating efforts on radial directions by reducing the number of routes and increasing the carrying capacity of remaining routes;
2. use of large-capacity vehicles (100 pass.) on the Sobornosti str., in other parts of the road network is allowed work of vehicles of less capacity;

3. cancellation of a number of routes operating exclusively in the central part of the city;

4. cancellation of a number of routes that duplicate trolleybus routes.

A detailed modification plan is presented in Annex C. Optimisation of the route network should be gradual and coordinated with other processes necessary for the implementation of the concept, such as the introduction of an electronic payment system, improvement of the availability of stop points, the organization of dedicated lanes and the transfer of suburban stations.

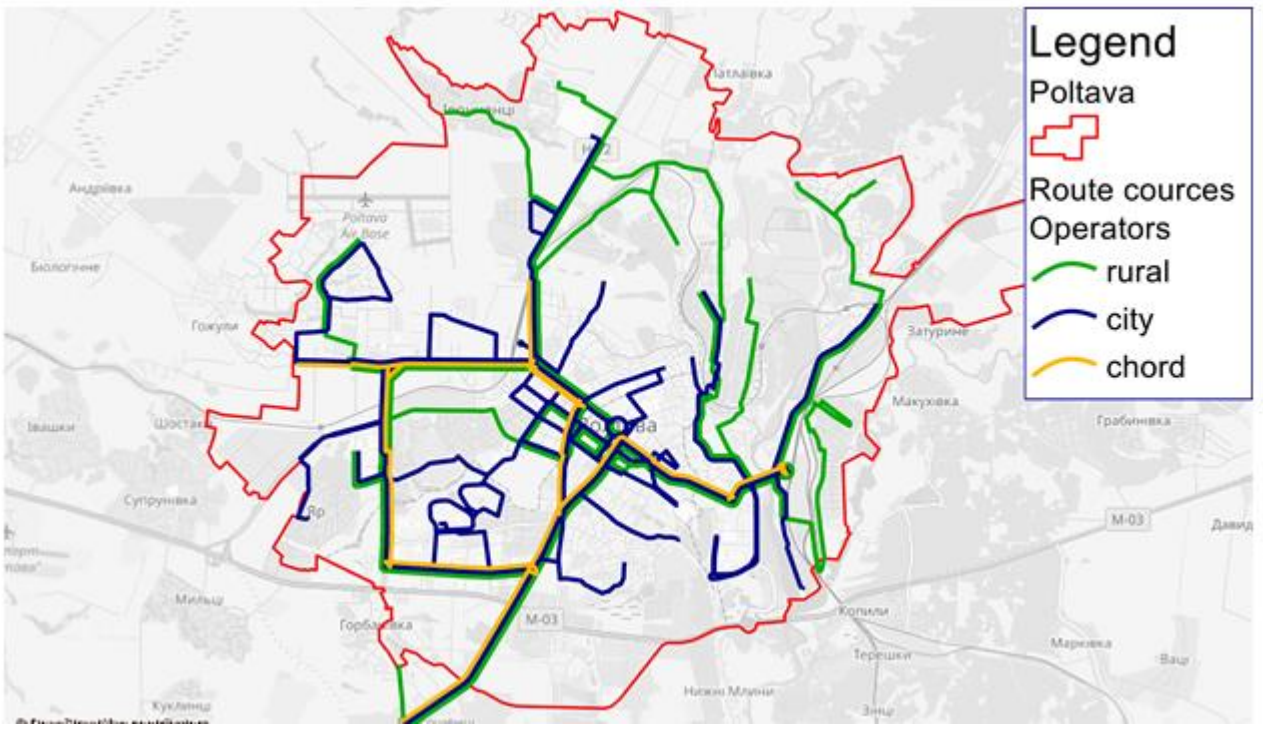


Figure 33. Three levels of new route system

In order to develop environmentally friendly transport systems, it is necessary to implement a policy of increasing electric transport and the introduction of additional trolleybus routes in the conditions of the existing trolleybus network. Characteristics of the proposed routes are given in Annex C.

The number of vehicles needed to service the transport system in Poltava after introducing the optimization of the route network is presented in Table 2.

Table 2 - The number of rolling stock required to service the transport system

Vehicle	Existing network	Adjusted network	Adjusted network with priority for electric transport
Small capacity	162	6	6
Medium Capacity	81	102	97
Large capacity	15	75	60
Trolleybus	55	64	90
Totally	313	247	253

Requirements for transportation quality

The city administration orders transport services and tenders for the passenger transport services. The quality of public transport is regulated by the terms of the competition and is fixed in the contract on the organisation of transportation. Below are the minimum requirements for the quality of carriage to be included in the contract for the organisation of transportation when re-contracting the route for service and in accordance with a decision which will be made to extend or terminate the service of the route by a specific carrier.

Table 3 - Minimum requirements for the quality of transportation

	Quality criteria	Requirements
1.	Availability	The number of vehicles, mode of movement, frequency of carriage - in accordance with the passport of the route
2.	Accessibility	Adapt public transport fleet for use of people with disabilities - 100% of rolling stock
3.	Information	GPS monitoring system for the transmission of GPS monitoring data to executive authorities
4.	Time	Headway and schedule according to the passport of the route. Adhere to the schedule in the range of 5 minutes (arriving to the bus stop up to 1 minute early, or up to 4 minutes delayed).
5.	Customer Care	Equipping vehicles with means of visual and audio assistance; The presence inside the vehicle of contact information about the driver, the carrier and the executive body to which one can send a complaint about the quality of service.
6.	Comfort	Requirements for the minimum passenger capacity of the vehicle: in the medium term on the general urban routes - vehicles of medium and high passenger capacity, in the long-term - of high passenger capacity. Obligatory installation and use of the cashless payment system ("electronic ticket")
7.	Security	When updating the rolling stock, ensure the installation of video surveillance cameras in the bus interior.
8.	Environmental Impact	Requirements for emissions of pollutants by public transport: for buses in the medium term use of vehicles of at least Euro-4 standard, in the long run, the use of TK on an electric motor or biofuels.

Unified centralised public transport management system in the city

In order to coordinate and implement the concept of high quality transport, it is necessary to create an appropriate institutional structure. This structure can be implemented as a single municipality subordinated to all processes or as a public-private partnership. The functions of the transport company-administrator will include functions of managing the system of electronic payments, accumulation and redistribution of income, dispatching and monitoring of transport, analysing and optimising the operation of the transport system, forming the conditions of the competition for transportation and providing the body of the executive committee with information for the conclusion / termination of contracts.

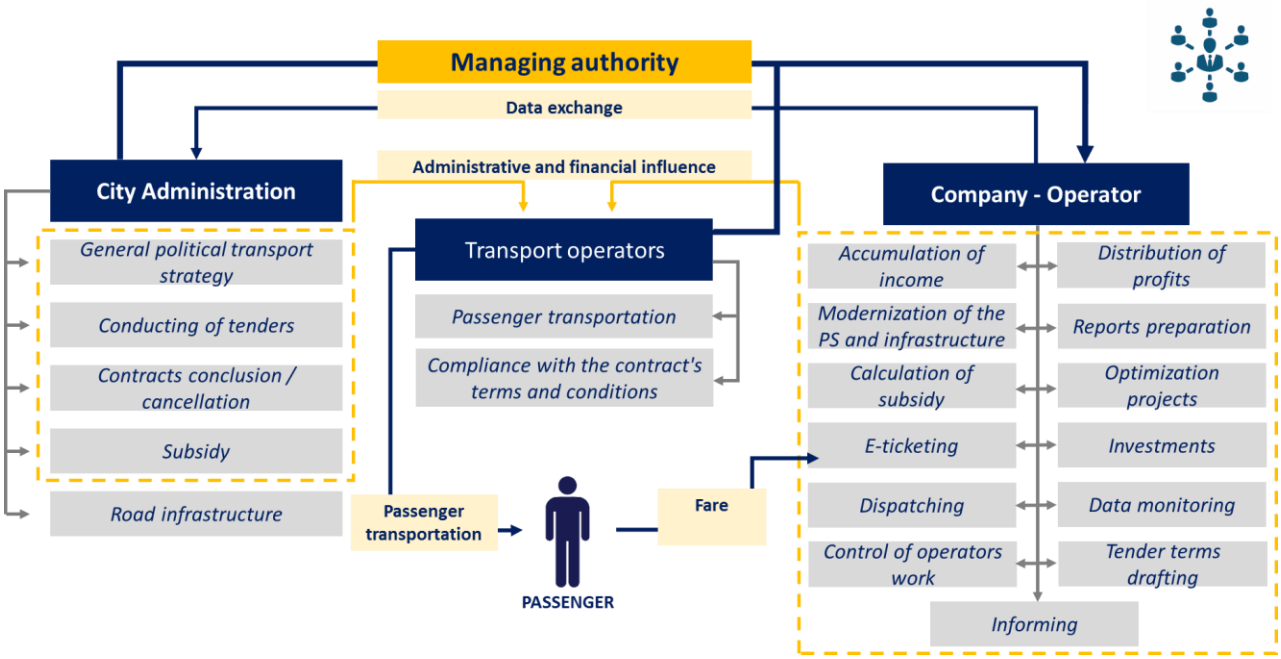


Figure 34. Structure of unified public transport management

Tariff policy and payment system

High-quality public transport is often unprofitable and subsidised from the city budget, but tariff policies should ensure a certain level of sustainability of the transport system. The social function of transport should be achieved through providing access to transport, and not through providing free rides that generate additional demand, increase financial pressure to the city budget and thus decrease the quality of service. In a simplified form, the profitability of a public transport route can be represented as the dependence of revenue from the route to total costs.

$$\text{profitability of the route} = \frac{\text{volume of transportation} \cdot \text{tariff}}{\text{fixed costs} + \text{variable costs} + \text{capital investments}}$$

However, the lack of reliable information on the number of passengers carried (including the subsidized categories) does not allow to form a reasonable tariff. As a result, public transport should either be actively subsidized from the city or its quality will continue to deteriorate. In order to introduce passengers' accounting and improve the monitoring system, an electronic payment system must be introduced.

System benefits:

- Monitoring of passenger traffic

- Legalisation of financial flows
- The mechanism of fair compensation and benefits

Primary Tasks of the System (Stage 1):

- Implementation on municipal transport
- Introducing a differentiated payment
- Compensation for the passage of preferential categories on the card

Medium-Term Tasks of the System (Stage 2):

- Implementation on routes of all forms of ownership

Long-term tasks (Stage 3):

- Free transfer between vehicles

Public transport priority in traffic flow

The priority of public transport can be provided on the network sections through the organization of dedicated lanes, or on the nodes through the means of adaptive traffic control at regulated intersections.

According to DBN B.2.3-5: 2018, separates lanes should be arranged on main streets and roads in the presence of three or more lanes in one direction or two in one direction in conditions of reconstruction in streets where historical and / or existing construction is. These lines should be marked by road marks and, if necessary, constructively (delineators).

The prioritisation of public transport in traffic flow can increase the operating speed of public transport, which leads to:

- Reduced passenger travel time
- Reducing vehicle revolving time and, as a result, improving operational efficiency (fewer vehicles and drivers to provide the same level of service).

Figure 35. Example of dedicated bus lane

Based on the results of modelling of public transport traffic and analysis of road conditions, the introduction of a network of separates lanes has been proposed.

The separate lanes for public transport are expedient and possible to arrange in both directions on Marshal Biryuzova str., Kovpaka str., Zinkivska str., I. Mazepy str., Yevropeiska str. and Sobornosti str. (Figure 36). On Nebesnoyi Sotni str. from Yevropeska str. to Konstytutsiyi str.) it is possible to introduce a priority movement of the route vehicles in both directions only by changing the scheme of the traffic organization on the indicated, as well as adjoining streets. That is, on Nebesnoyi Sotni str. movement of public transport will be in both directions, and private - only in the direction from Korpusnyi sad. Meanwhile, private transport in the direction of Yevropeiska str. will pass through Gagarina str., Pushkina str. and 1100-richchia Poltavy. In Yevropeska street (in the direction to Korpusnyi sad, at the intersection with Shevchenka Str.) the public transport lane must go into a stop with the appropriate markings and signs.

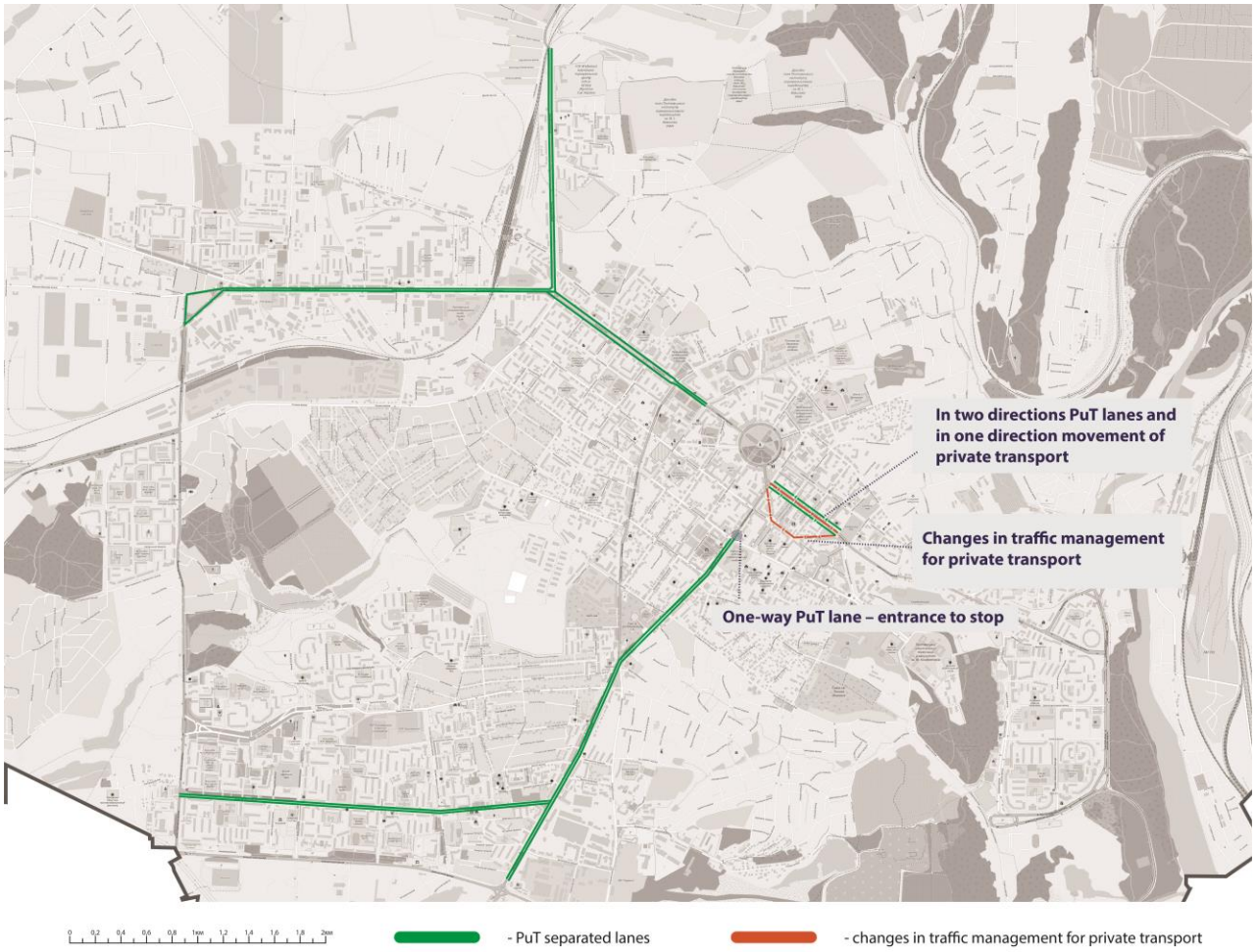


Figure 36. Layout of dedicated lanes for public transport

Maintenance and updating of public transport infrastructure and rolling stock

In order to achieve high-quality results, it is imperative to maintain the existing infrastructure. The strong side of the city is an extensive trolleybus network. Measures to support the quality functioning of trolleybus transport are included in all scenarios of economic development.

Key support and infrastructure updates are:

- Increased passenger comfort (air conditioning, number of seats and their quality)
- Improving the availability of rolling stock for people with reduced mobility (vehicle design, equipment for sound communication);
- Ensuring safety of travel (technical service, maintenance),
- Energy efficiency (voltage redistribution system, recuperation).

Figure 37. New Bogdan-T70117 on Heroiv Nebesnoi Sotni street in Poltava; Photo by Yuriy Davidenko

Improved accessibility of public transport

Accessibility has a direct impact on travel time and on the general quality of transport service. In general, accessible public transport is a prerequisite for a high quality of urban life, making other “urban products” (education, culture, labour market, etc.) available in time and space. The supply of public transport services reaches an optimum between full accessibility and costs of provision of services. Demographic changes (growing share of elderly people) and spatial development of the city create new challenges to the transport services in the case of accessibility.

Introduction of new types of public transport

The transport is considered public if every resident or city visitor can have access to it. Typical forms of public transport are buses, trolleybuses, taxis, trams and metro. Such types of public transports as car sharing, ride sharing (i.e. Uber), bike sharing or municipal taxis are new to Ukraine. The introduction of such forms of transport will improve mobility and diversity in travel, as well as improve the level of customer service.

In order to increase the business attractiveness of Poltava and implement the strategy of the expo-centre, Poltava should introduce modern mobility options. With the economic development of Poltava as a regional centre, the attractiveness of individual transport will increase.

In case of active development of tourist attraction of Poltava alternative forms of public transport will become increasingly popular.

Figure 38. A row of green LimeBikes is seen parked by the Imperial Beach, San Diego, USA (2017) Photo: Andrew Bowen

Capacity building in public transport management

Personnel development are the soft measures of transport system improvement. These are inexpensive but necessary measures that should be conducted regularly and included into the city budget.

Monitoring and audit

The achievement of a quality management system is only possible if the appropriate monitoring system is used. To implement a monitoring system includes both infrastructure projects (e.g. installation of equipment) as well as management and administrative tasks (e.g. introduction of official duties, reporting).

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
PT1	Conduct regular training in the field of management, development of Public transport and the collection and analysis of traffic data to members of the relevant local authorities[25]	Capacity development	1.1, 1.2	1-3*	1-3	1-3	1-3
PT2	Changes to the conditions of the competition for the transportation of passengers on city bus routes[2627]	Management & organization	1.1, 1.2	1	1	1	1
PT3	The creation of a single centralised management system of public transport in the city[3 26 27]	Management & organization	1.1, 1.2			1	1
PT4	Development and approval of the concept of integration of public transport and Poltava agglomeration[25 26 27 28]	Management & organization	1.1, 1.2, 1.3, 1.4, 3.2			3	2-3
PT5	The introduction of an automated accounting system for fare payment (AASFP) in urban passenger transport of Poltava [26 27]	Management & organization	1.1, 1.2, 3.2	1	1	1	1
PT6	The introduction of single ticket for all public transport [3 26 27]	Management & organization	1.1, 1.2, 1.4, 3.2			2	2
PT7	Route optimisation of urban passenger transport [26 27]	Management & organization	1.1, 1.2, 1.3, 1.4			1	1
PT8	Development and implementation of new schemes of road traffic organisation from proration for public transport[27]	Management & organization	1.1, 1.5, 3.4			2	2
PT9	The construction of a new bus station in the direction Poltava-Kremenchuk[3 6]	Infrastructure	1.1, 1.2, 1.4, 2.1		2-3	2-3	2
PT10	The elimination of the suburban bus station at the central market[3 6 28]	Infrastructure	1.1, 1.2		1	2	1
PT11	Construction of the trolleybus line in the districts "57" and "artsklady"[3]	Infrastructure	1.1, 1.2, 1.4, 2.2	3	2-3	3	2-3
PT12	Construction of transport-transfer nodes at commuter transport stops and their integration with the system of urban transport[25]	Infrastructure	1.1, 1.2, 1.4, 2.5			2-3	2

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
PT13	Arranging of toilets for staff (drivers, conductors) on the routes[25]	Infrastructure	1.1, 1.2, 1.4, 2.6			2-3*	2
PT14	Purchase of low-floor trolley buses[29]	Infrastructure	1,1	1-3	1-3	1-3	1-3
PT15	The overhaul and current repair of rolling stock of trolleybus Park[29]	Infrastructure	1,1	1-3	1-3	1-3	1-3
PT16	Technical re-equipment of contact, cable network and traction substations[29]	Infrastructure	1,1	1-3	1-3	1-3	1-3
PT17	The construction of the trolleybus line to micro district "Ognivka", “Sady-2”, “Dendropark”[29]	Infrastructure	1,1	2-3	1-2	2-3	1-2
PT18	Construction of new traction substations [29]	Infrastructure	1,1		2		2
PT19	The transfer of public transport (communal and private ownership) to liquefied natural gas[30]	Management & organization	1,1			1	
PT20	Purchase of low-floor buses for city routes [27 31]	Infrastructure	1.1, 1,3		2	3	2
PT21	Conducting the audit of state of stopping points in Poltava [3 27]	Monitoring & data collection	1.1, 1.3			1	1
PT22	The repair and reconstruction of roadside stations in accordance with the norms and standards and tailored to the needs of people with limited mobility[3 27]	Infrastructure	1.1, 1.3			1-3	1-2
PT23	Creation of a unified public transport dispatch system[3 27 28]	Monitoring & data collection	1.1,1.2, 3.1, 3.3			1	1
PT24	Monitoring compliance with the terms of the tenders for the transportation of passengers [27]	Monitoring & data collection	1.1, 1.2			1-3	1-3
PT25	A study on the mobility of the population[25]	Monitoring & data collection	1.1, 1.2			1-3	1-3

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
PT26	The study of the level of satisfaction of the population by public transport[25]	Monitoring & data collection	1.1, 1.2			1-3*	1-3
PT27	The introduction of public bike rental (Bike sharing)[27]	Infrastructure	1.4, 4.1		2		2
PT28	The introduction of a system of public car rental (car sharing)[27]	Infrastructure	1,4			3	3
PT29	The construction of the line of the funicular from the Cathedral square to St. Anatoly Kukoba (Proletarska) [6]	Infrastructure	1.1, 1.3, 1.4				3
PT30	Additional equipment of rolling stock of public transport by means of satellite tracking[27]	Infrastructure	1.1, 1.2, 3.4			1	1
PT31	Installation of information boards with timetables of transport at stops[27]	Promotion & awareness	1.1, 3.4		1-2		1-2
PT32	Developing and promotion of a mobile app for displaying up-to-date traffic information, with screen reader functions for visually impaired people[3 27]	Promotion & awareness	1.1, 3.3	1		1	1
PT33	Integration of new districts / zones new development in the public transport network on the level of planning for these areas[25]	Infrastructure	1.1, 1.2, 1.3			1-3	1-3
PT34	Integration of 57 and artsklady districts in the public transport network on the level of building[25]	Infrastructure	1.1, 1.2, 1.4				1-2
PT35	Establishment of urban policy "Developer contributions"[27]	Management & organization	1.1, 1.2, 1.3, 1.4, 3.2			1	1
PT36	Changing the organisation of traffic on the ring road around Corpusnyi Sad[27]	Management & organization	1.1, 1.2, 1.3, 1.4				1

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

Parking management

Parking management refers to different policies and programmes that lead to more efficient use of parking resources. Moreover, parking management can be an effective tool for local authorities to reduce road traffic and related emissions in overloaded areas by encouraging people to use other means than driving alone.

Parking policies were highlighted in the Concept of Integrated Development of Poltava City in Objective 6.1 with the help of such projects and measures:

• Payable parking area in the historic city centre

• Offstreet parking for temporary car storage

• Construction of parking lots for permanent car storage

• Concept of control and management of parking spaces for individual transport.

Measures in parking management are aimed at creating a better organised public space for all and managing the parking demand. These measures mainly contribute to the achievement of the following goals:

2.1 Relieving the traffic area and sidewalks in the city centre from parking

2.2 Provision of a sufficient number of parking spaces in adjoining areas in residential areas

2.3 Organisation of parking lots near public and commercial institutions

2.4 Relieving the central part of the city from large-sized vehicles

4.3 Creating the ability to cycle through the city quickly and safely

5.3 Creation of a municipal management system of walking facilities

Parking management is a powerful tool to influence transport and one of the most effective ways to reduce traffic and create more efficient and attractive urban conditions. Appropriate parking management balances the supply and demand.

Parking management policy and standards

According to the legal act “About some changes to legal acts of Ukraine regarding reforms on vehicles parking” of 21/12/2017 city municipalities now are able to take over the control function of parking and actually establish a municipal organisation that will control parking and is allowed to fine or evacuate vehicles of those who parked illegally. This opportunity to better manage space area comes with responsibility and requires a well-developed concept for parking management.

The parking management concept should be developed and approved by the city council and include obligatorily:

- the city policy regarding parking (Parking will be used as a tool to curb the use of private cars in the city)
- parking zoning
- delivery vehicles and trucks movement and loading / unloading policy
- tariff policies
- the location and capacity of parking areas on street and off-street parking

- the organisational and institutional structure of the parking management system
- the structure of the distribution of funds from fees for Parking
- an implementation plan

Special attention should be paid to delivery vehicle movements. The target programme of heavy vehicle movement should contemplate a specific area for parking, loading and unloading. The choice of the area should be a function of the following factors:

- Type of load
- Land use and its occupation
- Geometric designs of roads
- Flow of freight vehicles

Effective management system establishment

The introduction of the system of paid parking in the city requires the development of institutional parking management structure. The changes in parking management require to create a municipal company that will operate the parking space and ticketing infrastructure, collect fees, enforce fines for violating parking rules, conduct monitoring and analysis of historic data and develop recommendations for the city council on the parking management policy.

Parking pricing

The parking management system includes a parking fee collection scheme. It usually is focused on the central area of the city where demand for parking space is high (mixture of different functions: residential, business, retail, leisure & tourism). The parking fee scheme could generate additional revenue which should be spent on measures to improve sustainable mobility offers in the city (walking, cycling, and public transport).

Goals of pricing:

- Demand management

An optimised parking system prevents cars from the extensive use of public space. It increases the value and attractiveness of urban public space, making it more safe and comfortable. Parking fees could also decrease the demand for cars and switch some passengers to use alternative forms of transport.

- Getting profits

Revenue generation cannot be the main premise for the introduction of parking fees. Parking funds should be allocated to finance improvements in urban mobility such as public transport, cycling or the walking infrastructure.

In order to lower the negative political effect of the implementation of parking, it is important that parking pricing includes significant improvement in quality; high prices are only charged at the busiest places and the visible improvement of the area in general is also ensured.

Figure 39. Multi-space parking meters which accept credit cards and coins, San Francisco, USA Photo: Brant Ward, The Chronicle

Organisation of parking space is limited, and special attention in the city is focused on the development of an adequate on-street parking management system as well as setting up parking zones to unload city centres roadways and sidewalks from cars. Effective on-street parking management can be beneficial for the urban environment.

- Parking management improves liability. The most obvious benefit is the reduction in obstructive and chaotic parking. Better parking management for cars greatly ease traffic congestions.
- Conflict over parking can be greatly reduced.
- On-street parking management makes the whole parking system work better.
- On-street parking management can indeed be improved.

Parking near residential buildings

The city has to provide the residents with enough parking places in residential districts to park their cars close to their houses. Well-organised residential parking is a core stone for the development of viable residential areas since it requires a lot of space to provide enough parking slots but on the other hand residents should have dedicated places to park their cars in residential areas close to their buildings.

Long-term parking near buildings as well as at adjoining areas create an obstacle for accessible residential environment as well as safe hazard and it is recommended to organise off-street parking facilities (underground and ground-level parking) for residents that can be both indoors and outdoors.

According to the State Sanitary Rules of Planning Development and Human Settlements approved by the Order No. 173 of the Ministry of Health of Ukraine dated on June 19, 1996, it is allowed to construct underground and semi-underground parking space in the pediment and substructure of residential buildings for cars owned by the residents of that building with the provision of noise protection and emission protection according to hygiene standards. Entrance and exit to underground parking and vehicular access should be located not closer than 15 m from the window of residential units.

Parking spaces for private cars must be designed in accordance with the functional designation of the territory. In residential areas, it is important to provide enough space for long-term parking. It is 100% of the number of cars owned by residents of a certain area. And also not less than 10% of this amount for guest parking lots.

The required minimum number of places for long-term parking in accordance with the state building regulations for the city of Poltava is almost 32 thousand parking spaces. Distribution of parking spaces in transport areas is presented in Annex D.

According to the forecast for 2031 motorization level - 330 cars / 1000 inhabitants, the minimum number of parking spaces is 104.4 thousands lots. However, the implementation of the plan for sustainable mobility should lead to a reduction in the projected level of motorization, because the development of parking spaces in accordance with the current forecast is inappropriate.

Parking for visitors of residential areas

Visitors are eligible for guest parking unless it is not forbidden by territory use and the size of adjoining territory allows to arrange it. There are organised locations available to provide quest parking service close to main city institutions and authorities. Development of quest parking zones improves the comfort of visitors as well as improves general environment and reputation of the institute with available guest parking slots.

If urban neighbouring territories cannot provide enough parking space, parking is permitted on this territory for a limited period of time.

Parking near public and commercial facilities

Short-term parking should be placed near the points of attraction of citizens. In places of historical development, such parking should be exclusively underground. In other conditions - separate terrestrial, underground or explore in the basement spaces of buildings. To assess the required quantity of parking space for short-term use, it is necessary to conduct an audit of gravity sites in accordance with Table. 10.7 of DBN B.2.2-12 - 2018.

Parking can be organized both on specially equipped territories and on the street-road network in accordance with the conditions described in 5.5.2 of DBN B.2.3.5 - 2018.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
P1	Development of the concept of parking space and tariff policy in Poltava[27]	Management & organization	2.1, 2.2, 2.3, 2.4, 6.1			1*	1
P2	Creation of municipal service for the control of Parking[3] [27]	Management & organization	2.1, 2.2, 2.3, 2.4, 6.1			1	1
P3	Concept of the movement, unloading and parking of freight transport within Poltava[25]	Management & organization	2.1, 2.3, 2.4			1	1
P4	Arrangement of paid parking areas[3] [32]	Management & organization	2.1, 2.4, 4.3, 5.3			1	1
P5	Arrangement of parking zones by payment terminals and video surveillance[3] [32]	Management & organization	2.1, 2.4, 4.3, 5.4			1-3	1-3
P6	Arrangement of out-of-street parking zones[3] [32]	Management & organization	2.1, 2.4, 4.3, 5.5			1-3	1-3
P7	Gradual arrangement of places for recharging electric cars in parking zones in the planned amount of 5% of the total number of parking spaces[3] [32]	Management & organization	2.1, 2.4, 4.3, 5.6			2-3	2-3
P8	Development and implementation of navigation and information about the availability of parking places[27]	Promotion & awareness	2.1, 2.4, 3.3, 6.1			1	1
P9	Construction of a system for temporary storage of vehicles within adjacent areas[3] [27]	Infrastructure	2.2, 5.3	1	1	1	1
P10	Construction of a system for permanent car storage [3] [27]	Infrastructure	2.1, 2.4, 6.1	2-3	2-3	2-3	2-3
P11	Arrangement of parking places for long-term storage of bicycles near transport-junction hubs[3] [32]	Infrastructure	2.1, 2.4, 6.2			1-2	1-2
P12	Construction of park-and-ride car parkingss outside the city centre with the possibility of quick and comfortable transfers to public transport to continue the trip to the centre[25]	Infrastructure	1.4, 2.1, 2.4	3	2	3	2

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
P13	Development of cargo terminals and the transport and logistics centre on the periphery of the city[3] [25]	Infrastructure	2.3, 2.4, 6.1		3*		3
P14	Improvement of the skills of city planners and transport engineers in planning and parking space organization [25]	Capacity development	3.1, 6.2			1-3	1-3
P15	Improvement of the skills of city planners and transport engineers in planning freight transport in urban areas [25]	Capacity development	3.1, 6.2			1-3	1-3
P16	Introduction of a system of monitoring the use of parking spaces[25]	Monitoring & data collection	3.1, 6.2			1-3	1-3
P17	Encouraging public and commercial institutions to organise a parking space for the temporary storage of private cars[25]	Management & organization	2.3, 6.1			1	1
P18	Encouraging public and commercial institutions to organise a parking space for the temporary storage of bicycles[25]	Management & organization	2.3, 4.3, 6.1			1	1
P19	Taking into account the movement of freight transport in planning the development of new territories and development of a detailed plan of the territory[25]	Infrastructure	2.3, 2.4			1	1

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

Intelligent transport system

Measures in intelligent transport system are aimed at the development of a system that allows for data driven transport planning and efficient use of modern technologies. These measures mainly contribute to the achievement of the following goals:

3.1 Decision-making is based on data

3.2 Implementation of the electronic payment system for transport services

3.3 Provision of information to road users

3.4 Infrastructure renovation in accordance with the latest technologies

6.1 Creation of safe urban environment

1.2 Introduction of an efficient public transport management system

1.5 Prioritising public transport in traffic

An Intelligent Transport System (ITS) is a complex of interconnected automated systems designed for effective control and management of the city's transport infrastructure in order to improve the quality of management decisions made on the basis of software and hardware.

Data collection and analysis

The introduction of the implementation of a video surveillance system throughout the city, which provides a system of a "Safe City", will create an information resource about relevant situations. This information can be used for further decision making in the transport sector, namely traffic management, managing public transport for response in case of accidents etc.

Integration of the system "Safe City" with the uniform system of collection, processing and analysis of sustainable development of the city will allow different public service bodies (e.g. police, emergency services, transport planning department, etc.) to improve their operations and coordinate their actions.

Transport modelling

In order to improve decision making, macroscopic and microscopic transport models are used.

Transport modelling is a mathematical representation of the functioning of a transport system. It is used not only to show different indicators of the current state of transport networks but also to predict changes if there are improvements made.

A **macroscopic transport modelling** shows general transport behaviour in a zone (city, region). It takes into account vehicle distribution, traffic flows and their density considering intersections, traffic lights, number of lanes etc. For example, a macroscopic model can show how a new built neighbourhood will effect general trip distribution in the city.

Microscopic transport modelling concentrates on every individual vehicle and its behaviour in relation to others. For example, it can describe movements through one or a few intersections, or the outcome of changing traffic light duration on queuing etc.

In general, transport modelling estimates positive and negative effects from some changes before they are made on roads and streets.

Multimodal information system

Multimodal information systems are the services that provide the user with information about all the available transport options (car, public transport, bike sharing, railway, etc.) and allows to plan the trip with all possible combinations. The user may access information at home before planning a trip, from his or her cell phone while traveling or directly from the system – at the transit stop or inside the transport vehicle. These services significantly improve the quality of transport services and satisfaction of the passenger. High quality information systems help people to stay informed and to minimise their annoyance if on delays etc. The development of a simple mobility app for different types of services can be a cheap option for Poltava to improve its information system. Establishing boards at the public transit stops could address visitors and elderly people who are less keen on use of technology.

SIRIO - Entrance Control System to the centre of Bologna (Italy):

In order to reduce the parking load and contamination of the centre of Bologna, a differentiated system of arrival to the city centre was introduced.

Drivers who want their own private cars to get into the zone have to get a permission.

Permit for arrival are given to residents of the area, taxis, people with disabilities, hybrid vehicles and electric cars. Temporary permissions are available to hotel guests.

The system is electronic and excludes the human factor

Traffic management

The introduction of the ITS system helps to collect better information, conduct monitoring of the transport system and improve its performance. ITS support regular traffic management solutions and can be divided into:

- Adaptive traffic control;
- Green waves;
- Priority movement for public transport;
- Real time information for passengers;
- Parking management;
- Paid areas
- Emission reduction zones
- Traveller information system

The data collection sources for ITS are GPS trackers, mobile operators, road sensors, systems of automatic identification of license plates, Surveillance cameras (CCTV) and emission monitors.

ITS may contribute to improving traffic through novel solutions addressing safety and efficiency.

Smart ticketing

A smart ticketing system is a system that electronically stores the travel ticket and allows passengers to pay for transport services. Integrated ticketing allow a passenger to use all available types of transport (including public transport, railways, bike sharing, car sharing, etc.). An integrated ticket is not necessarily a single ticket for all types of transport, it is one virtual wallet with several tickets. The introduction of

electronic ticketing will allow to better monitor passenger flow and cash flow of transport operations. The introduction of integrated ticketing will improve attractiveness of the public transport system and will allow to implement the optimisation strategies described in the section on public transport priority. In order to efficiently implement the ticketing system, a smart fare system should be implemented, including a differentiated price by user category, permanent tickets, regional tickets, etc. The cost of a single ticket fare should be higher in comparison to a single trip paid for a permanent ticket.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
ITS1	Development of the concept "ITS Poltava" [3] [27] [28]	Management & organization	3.1, 3.2, 3.3, 3.4			1*	1
ITS2	Establishment of a responsible authority for the organisation and management of the unified data system[27]	Management & organization	3.1, 3,4			1	1
ITS3	Creation of a unified information system of collecting, processing and analysing the sustainable development of the city[3] [27] [28]	Monitoring & data collection	3.1, 3.2, 3.3			1	1
ITS4	Development and update of the transport model of the city[27]	Monitoring & data collection	1.2, 3.1			1	1
ITS5	Implementation of the system "Safe City" [33]	Infrastructure	3.1, 3.2, 3.4, 6.1	1-3	1	1-3	1
ITS6	Development of the concept for the implementation of the automated system of traffic management in the City of Poltava[3] [27]	Infrastructure	1.2, 1.5, 2.4, 3.3, 3.4, 6.1			2	2
ITS7	Integration of the system "Safe City" with a uniform system of collection, processing and analysing the sustainable development of the city [27]	Infrastructure	3.1, 6.1			2	2
ITS8	Development of an interactive map of the city and the surrounding areas [3]	Promotion & awareness	3.1, 3.3			2	2
ITS9	Improvement of the skills of city planners and transport engineers in the field of transport planning and ITS[25]	Capacity development	3.1, 6.2			1-3	1-3

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

Cycling

Measures in the field of cycling are aimed at the creation of comfortable and safe conditions for existing and potential cyclists in order to boost the share of cycling as a mode of transport. These measures mainly contribute to the achievement of the following goals:

4.1 Promotion of cycling among citizens and tourists

4.2 Creating a management mechanism for the development of cycling

4.3 Creating the possibility to cycle through the city quickly and safely

1.4 Development of multimodal and integrated public transport

Key principles of concept for cycling infrastructure development in Poltava are:

- Safety of all the users
- Comfort of movement
- Accessibility of cycling infrastructure
- Continuousness and complexity of cycling management
- The gradual introduction of bicycle infrastructure in all areas of the city with recreational areas and tourist facilities

The sustainable urban mobility plan of Poltava stresses the strengths of the existing cycling strategy and defines the shortages to be targeted in order to improve the cycling sector in Poltava.

Urban cycling policy and standards

In order to achieve the goals set under the cycling priority of the SUMP, it is required to provide a clear and efficient mechanism for the development of cycling. One of the important parts of that is the existence of the policy and standards for the development of cycling.

Regarding the policy documents, there are two levels of policy documents required on the national level:

- Strategic – Aconcept on cycling infrastructure development
- Tactical– A city target programme on cycling infrastructure development

The strategic policy document defines priorities, principles and key goals for development of cycling in the city. In turn, the tactical policy document takes the strategic plan and divides it into specific activities, short term actions and plans to achieve the planned objectives. The second is missing in Poltava.

In order to achieve the goals of the cycling strategy it is required to develop an implementation plan for the cycling concept and integrate the requirements for proper cycling infrastructure maintenaince into the Site Improvement Standards of Poltava («правил благоустрою територій»).

Obligatory National Standards for the Development of bicycle infrastructure:

- *SBN V.2.3-5:20XX «Streets and roads of settlements»*
- *SBN B.2.2-12:2018 «Planning and building of territories»*

Standards and guidelines of recommendatory nature:

- *NSoU (National Standards of Ukraine) "Planning and designing cycling infrastructure" (in the process of development)*

Segregated cycling facilities

The prioritisation of cycling facilities is realised according to the highest positive benefits.

There are two common types of segregated cyclist facilities: cycle tracks and cycle lanes which have different advantages and disadvantages and care should be taken to ensure they are provided in the appropriate circumstances. A cycle track is a high-quality, dedicated infrastructure for cyclists intended to separate cyclists physically from motorised traffic, either by a gap (distance) and/or by being raised to a higher level (height). A cycle lane is a legally reserved riding space for cyclists on the road, which is located close to the carriageway and separated by markings or kerbstones.

Cycling infrastructure can be classified by:

- type of infrastructure (cycle track or cycle lane);
- purpose (commuting, recreational);
- functional use (highway, local).

The development of cycling infrastructure should take place in accordance with the recommended scheme of placing the cycling infrastructure of the concept by connecting corridors maximising the effect of its implementation. The impact of cycling infrastructure development is estimated as the number of potential cyclists using the infrastructure and represented by potential cycling traffic volumes. After analysing the perspective traffic volumes of the Poltava Street and road network, a conditional coefficient of attractiveness is determined for each proposed cycling route, which is a function of the number of potential users. Taking into account the received data, consultations with the population and analysis of interactions with other modes of transport the order of priority arrangement of these routes have been established.

Table 4 - Priority of the arrangement of cycling routes

Route according to the concept	Route	Attraction rate	Priority
1.1	Almaznyi - Center (European str., from S. Front str. to Nebesnoi Sotni str.)	20,5	2
1.2	Almaznyi – Center (Mazepy str)	10,5	6
2	Zyhina Monument – Bila Altanka (Sobornosti str. – Korpusnyi sad – Sobornosti str (near Altanka))	14	1*
3	Sady – Center (Petliury str., from Kolektyvna str. To Sobornosti str.)	8	8
4	Institute of Communications – Zyhina Monument (Zinkivska str.)	5	9
5.1	Polovky/Brailky – Center (Brailky (Marshala Biriuzova str. – Zyhina Monument)	12,5	4
5.2	Polovky/Brailky – Center (Bus Station – Velykoternivska str. – Polovka str. – Halturina str.)	10	7

* As a result of the discussion on the priority of infrastructure development for public and cycling transport, the highest priority is given to Route 2

Route according to the concept	Route	Attraction rate	Priority
6	Podil – Center (Southern Bus Station – Korpusnyi sad)	13	3
7	Sinna str.	12	5

Bicycle parking and storage

Short-term parking

For **short-term parking**, the proximity to the destination and speed of use are more important. Main principles to be met by short-term parking are these: providing two points of contact between the bike and the rack; the ability to lock the frame and one of the wheels; compatibility with standard locks (including u-shaped ones); secure attachment on site; convenient access and functionality; supplementing the environment).

Long-term parking

Long-term parking is considered when you leave the bicycle for longer than 4-6 hours. It is relevant for people who have come by bike to work or study, as well as storage at night near the places of residence. Long-term storage can be provided as follows: an individual locker for a bicycle; special closing room; enclosed space with a gate and cover (desirable); equipped space, which is supervised by the guard; equipped space with video surveillance (next one must still be a guard to respond to possible theft); lobby or other accessible room in a building with a secure entrance (key, code, etc.) and video surveillance; lobby or other part of building, where visitors and staff can directly supervise the left bike.

Parking in residential areas

Such parking is relevant in the absence of space for storing a bicycle directly in the apartments. For the convenient arrangement of **parking lots in residential areas**, the following solutions are used: common storage space for bicycles, available in basements of buildings or adjacent areas, should be located within a radius of 150 m from the place of residence and be accessible only for users; street bike garages - these are small boxes for several bikes, can be located on one of the adjacent car parks.

Bicycle parking racks should be safe, vandal-proof, well-lit in the dark, easy to use and accessible. More detailed standards for the installation of bikes are described in the Bicycle Concept.

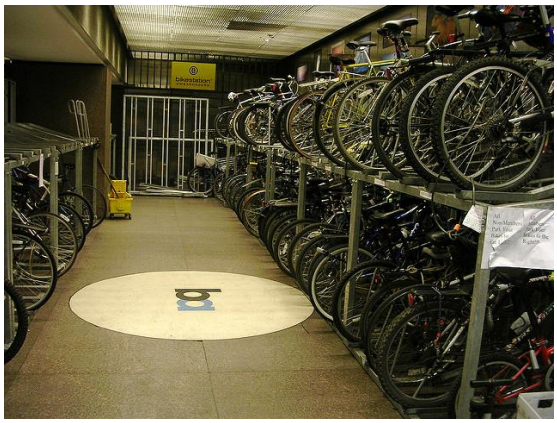


Figure 40. Examples of bicycle parking facilities: San Francisco and West Midlands, England, 2006

Integration of cycling with public transport - multimodality

Integration at vehicle

The most common type of multimodal interaction is the integration of cycling into the public transport system. In Ukraine, it is allowed to carry a bicycle in an electric transport (tram, trolley bus) (clause 5.7 "Rules of use of tram and trolleybus in the cities of Ukraine"). However, it is often uncomfortable. A popular solution in North America is the equipment of buses with special fasteners at the front. It is also possible to place bicycles directly inside the bus. For this purpose, comfortable racks are installed. Suburban directions can be equipped with special wagons of electric trains.

Figure 41. Bike fastening in front of the bus, Vancouver (Canada), 2015 Photo: Stephen Rees

Racks inside the bus for bicycle transportation, Vancouver (Washington, USA), 2017 Photo: Steve Morgan

Transportation of bicycles in a special carriage on the train line Lviv - Mukacheve, 2016 Photo: Yurii Ter

Figure 42. Arrangement of bicycles in public transport

Integration at PuT stops

Cyclists who ride to public transport stops have to be provided with comfortable and safe bike storage options to continue their journey. In addition, it is desirable to use it for free. It is possible to apply a combined ticket - payment for parking.

At suburban transport stations there is also a need to arrange comfortable parking spaces, preferably covered. It is important to provide good protection, because, usually, bicycles will stay there for a long time.

To comfortable enter public transport with a bicycle, raised platforms at the stops should be designed, that is, the height of the platform corresponds to the height of the floor of the vehicle.

Figure 43. Entering a carriage for cyclists, Copenhagen, 2016 Photo: Francis Joseph Dean/Deanpictures

Bike sharing system

A bike sharing system can be a good alternative for traveling short distances in the city network. It helps to decrease pressure on the road network and public transport and can be an attractive way for visitors to reach destinations from the city gates such as railway stations and bus station.

For example, the distance from Poltava-Kyiv railway station to Korpusnyi Sad can be covered in less than 15 minutes, from Poltava-South railway station in less than 20 minutes and from Central bus station in less than 30 minutes.

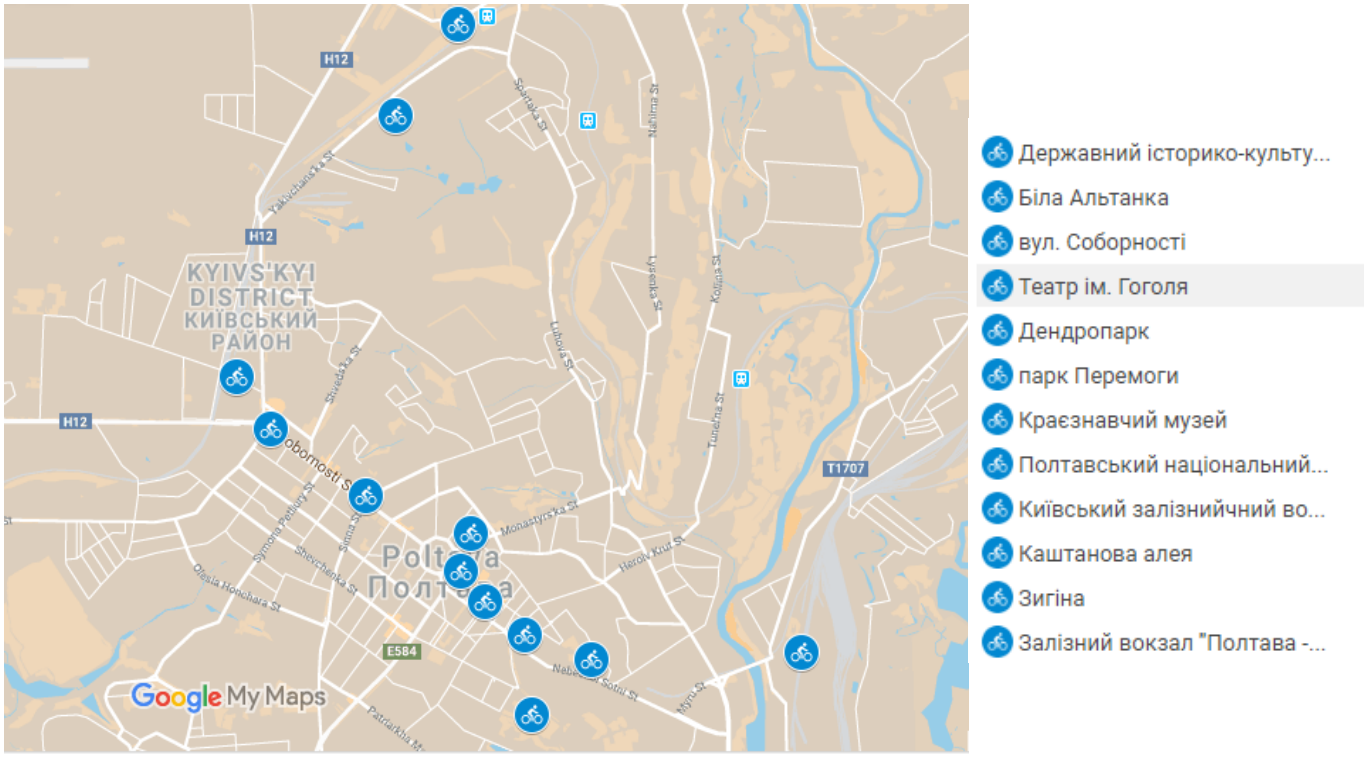


Figure 44. Proposed locations of bike-sharing system stations

Without regard for business model according to the best practices the bike sharing system has to fit to the following planning requirements:

- Minimum system coverage area: 10 sq.km
- Station density: 10–16 stations per sq.km
- Bikes/resident: 10–30 bikes for every 1,000 residents (within coverage area)
- Docks per bike ratio: 2–2.5 docking spaces for every bike

When beginning to plan a system, identifying a coverage area (the physical area that the bike share system will cover) and saturating it with the appropriate number of stations are the most critical factors in creating a successful system with high ridership. The coverage area must be large enough to contain a significant set of users' origins and destinations. If it is too small to connect meaningfully to other places, the system will have a lower chance of success because its convenience will be compromised.

Dense, mixed-use areas with a high trip-generation capacity (generally city centres) are likely to see the most demand for bike-share, as they will be both the origin and destination points of many trips and are usually the best places to start. When defining the coverage area, the city will have to balance demand with costs.

Optional locations for bike-sharing stations are presented on the map, the particular locations will be identified together with an investor based on technical requirements of the system.

Monitoring and audit

The monitoring of cycling progress includes a number of tools described in detail in Chapter 10 Monitoring and Evaluation and includes mobility surveys, bicycle counts, and audits of cycling infrastructure and can be conducted in cooperation with local NGOs and universities.

Capacity building

It is necessary to improve the skills of city planners and engineers in transport technologies with respect to organisation and planning of cycling.

Promotional activities

Promotional activities or campaigns are considered as so called “soft measures”. They seem to be very effective if they are combined with “hard measures” like improvements in the infrastructure. So the opening ceremony of a new built cycling track can be embedded into a promotional campaign of “How does the city encourage people to cycle more often”. This campaign can be supported by promotional activities like an information centre on Sobornosti Street, a “Bike-to-work-initiative” with famous city representatives who are riding there or stories about cycling on the local TV.

Among those activities that are already being carried out in Poltava and those that can be introduced are the European mobility week, Bike-to-work, Veloday, cycling tours, conducting cycling classes in schools and universities and many other.

Establishment of an effective management system

In order to ensure the implementation of the strategy, the organisational changes have to happen. Among those is the establishment of a full time position for cycling management within the city administration. The functions of the coordinator include:

- Ensuring the implementation of the concept for cycling infrastructure development and the City Target Programme for Cycling Development;
- Data collection, analysis, and monitoring related to the cycling development priority from the Sustainable Urban Mobility Plan;
- Participation in specialised committees of city council representatives (city planning, transport, city development, budgeting, etc.)
- Promotion of cycling and coordination or management of promo events.

	Measures	Category	Complience with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
C1	The development of the City target program of development of Cycling infrastructure[27 28 32]	Infrastructure	4.1, 4.2, 4.3	1*	1	1	1
C2	The creation and approval at the municipal level the responsible for the development of Cycling transport terms of reference [27 32]	Management & organization	4.2			1	1
C3	Inclusion of principles on maintenance of cycling infrastructure to the rules of improvement of territories of Poltava[25]	Management & organization	4.1, 4.2, 4.3			1	1
C4	The development of a monitoring system and auditing Cycling infrastructure in the city[25]	Monitoring & data collection	4.2, 4.3			1-3	1-3
C5	A survey of cyclists in the city[25]	Monitoring & data collection	4.2, 4.3			1-3	1-3
C6	The construction of the main bike trail "Almaznyi-Korpusnyi sad"[27 28 32]	Infrastructure	1.4, 4.1, 4.3	1	1	1	1
C7	The construction of main and tourist Cycling route "Zyhina-Bila altanka"[27 28 32]	Infrastructure	1.4, 4.1, 4.3	1	1	1	1
C8	The construction of the main Bicycle route "Ohnivka-str. Sobornosti" [25 28 32]	Infrastructure	1.4, 4.1, 4.3	2	1	2	1
C9	The construction of main and tourist Cycling route "Pole Poltavskoi bytvy -Arboretum-Zyhina"[27 28 32]	Infrastructure	1.4, 4.1, 4.3	2	2	2	2
C10	The construction of the main Bicycle route "Pivdennyi vokzal-Korpusnyi sad"[25 28 32]	Infrastructure	1.4, 4.1, 4.3	1	1	1	1
C11	The construction of the main Bicycle route "Bus station-Polovky-Brailky-Zyhina"[27 28 32]	Infrastructure	1.4, 4.1, 4.3	3	2	3	2
C12	Improvement of the road network of stations for charging electric bikes[25]	Infrastructure	4.3	3	2	3	2
C13	Improvement of the road network of stations for repair and maintenance of bicycles[25]	Infrastructure	4.3	1	1	1	1

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

	Measures	Category	Complience with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
C14	Development and design safe crossings for cyclists at crossroads[25]	Infrastructure	4.3, 5.3, 6.1, 6.2	1-3*	1-3	1-3	1-3
C15	Construction of a recreational route along the river Vorskla[25 27 32]	Infrastructure	4.1, 4,3		1		1
C16	Construction of a recreational route in the Arboretum[25 27 32]	Infrastructure	4.1, 4,3		2		2
C17	Construction of a recreational route along Pushkarivska balka[25 27 32]	Infrastructure	4.1, 4,3		3		3
C18	Improvement of the skills of city planners and engineers with respect to transport technologies as well as organisation and planning of cycling[25]	Capacity development	4,2	1	1	1	1
C19	Ensuring safe and smooth movement of cyclists in the planning of construction and repairs of streets and roads included in the scheme of placing of objects of cycling infrastructure development concept for Cycling infrastructure of Poltava[25]	Management & organization	4,3			1	1
C20	Integration of new districts / zones and new buildings into the network of Cycling infrastructure of Poltava on the level of planning for these areas[25]	Infrastructure	4.1, 4.3			1-3	1-3
C21	Integration of 57-district and "artsklady" district to the network of cycling infrastructure of Poltava on the level of building[25]	Infrastructure	4.1, 4.4				1
C22	Organisation of contra-flow movement at one sided roads[25]	Infrastructure	4,3			1	1
C23	Integration of bicycle transport and public transport[27 32]	Infrastructure	1.4, 4.1, 4.3	2	2	2	2
C24	Development of cycling routes that connect the city with suburban areas according to the concept of development of cycling infrastructure in Poltava [27 32]	Infrastructure	4.1, 4.3			2-3	2-3

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

	Measures	Category	Complience with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
C25	European mobility week[25]	Promotion & awareness	4,1	1-3*	1-3	1-3	1-3
C26	Initiate Bike-to-work activities [25]	Promotion & awareness	4,1	1-3	1-3	1-3	1-3
C27	Initiate a cycling day[25]	Promotion & awareness	4,1	1-3	1-3	1-3	1-3
C28	Development and implementation of the tourist bicycle tours[3 28 32]	Promotion & awareness	4,1	1-3	1-3	1-3	1-3
C29	Popularise the use of electric bikes[25]	Promotion & awareness	4,1			2-3	2-3
C30	Holding of lessons of bike riding in educational institutions[25]	Promotion & awareness	4,1	1-3	1-3	1-3	1-3

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

Walking and barrier-free environment

Walking is an integral part of daily mobility and 30.5 % of all trips in Poltava are made by walking. Walking infrastructure is a vital element of urban life, it is both socially and economically important for the pedestrians and the city itself.

Measures in the field of walking are aimed at providing an attractive, comfortable and barrier-free pedestrian environment available for all citizens and tourists. These measures mainly contribute to the achievement of the following goals:

5.1 Increase of attractiveness of the walking mode in the city

5.2 Development of safe and comfortable facilities for pedestrians

5.3 Creation of municipal management system of walking facilities

1.3 Improving conditions for people with limited mobility

3.3 Provision of information to road users

3.4 Infrastructure renovation in accordance with the latest technologies

4.3 Creating the ability to cycle through the city quickly and safely

6.1 Creation of safe urban environment

6.2 Improvement of traffic culture

The city of Poltava has a considerable tourist potential and very good perspectives to develop and become a well-known tourist centre in the region with high-quality pedestrian infrastructure.

In order to achieve the goals towards the prioritisation of walking, it is required to develop, and implement a walking policy in the city, as well as to create an efficient walking management system and develop high-quality pedestrian infrastructure.

Quality standards for walking infrastructure

A developed and approved urban design programme is the prerequisite for the development of an attractive and barrier-free walking environment in the city of Poltava with high-quality pedestrian infrastructure. Below are the main urban design requirements for the walking infrastructure:

- Accessible for all users, including people with limited abilities
- Comfortable, i.e. minimise physical discomfort from walking (such as crowding, poor weather conditions, darkness)
- Connected, i.e. provide possibility to walk from and to different trip origins and destinations
- Safe, i.e. develop the sense of security in pedestrians by protecting them from crime and traffic
- Convenient in use and easy to understand
- Appealing to all users

In order to develop and implement the Urban Design Programme it is vital to establish a municipal management system responsible for the walking infrastructure in the city that will develop annual programmes on maintaining and developing walking infrastructure, carrying out regular inspections and so on.

Reorganisation of transport mode priorities

One of the key concepts of sustainable mobility is reversing the pyramid of transport modes. Walking and cycling has to become the most comfortable and safe transport mode, while motorised transport is given less priority. Organising car-free zones, combining walking streets with transport hubs are efficient ways to do so.

Currently one of the most conflicted areas in Poltava is the city centre. Reorganisation of transport priorities in the zone between Korpusnyi Sad and Krytyi market will significantly improve the attractiveness of Poltava. In the long term perspective, it is desirable to reorganise the circle around Korpusnyi Sad into a car-free zones with allowed public transport on it. Simultaneously transferring the transport hub from the market will allow to organise a better quality of space and implement a public space concept proposed in the Integrated Urban Development Concept of Poltava.

Such kind of solutions should be tested with a micro simulation model.

Figure 45. Example of the integration of a walking street with a public transport hub, Alexanderplatz, Berlin, Germany

Car-free zones

The existing pedestrian zone in the city centre of Poltava is limited to a length of 310 m. On the one hand it provides car-free public space and opportunities to spend time there but on the other hand it does not create a desirable pedestrian image of the city since it is limited to its length. In order to develop a pedestrian-friendly and barrier-free walking environment in the city of Poltava there should be a focus on the creation of more car-free zones in the city centre. A car-free city centre should be created in order to

- provide better accessibility and mobility for pedestrians;
- decrease the traffic in the city centre;
- allow for larger safer streets for everyone to interact;
- encourage people to walk;
- improve attractiveness of public spaces as well as of the city in general;
- increase the satisfaction from pedestrian infrastructure;
- decrease air pollution and noise.

A car free zone is a city area designed for pedestrians only; traffic is forbidden there. The development of car-free zones enhances the public realm of the city and creates a more pleasant and attractive environment in the city.

According to the Integrated Urban Development Concept of Poltava, the city sets a goal to become a regional centre, and it is important to improve the attractiveness of the city, and continue the development of a pedestrianised city centre.

Below are requirements for the development of car-free zones:

- Prohibited traffic flow
- Arranged and designed with high quality, safe and accessible pedestrian infrastructure
- Provide direct and convenient connections
- No car parking available
- Among the benefits for the development of such pedestrian zones in the city of Poltava are
  - Environmental and health benefits – ensure less harmful emissions and reduce noise
  - Social benefits – encourage communication and interaction between people
  - Economic benefits – encourage the development of local businesses, attract more people including tourists

In order to test some solutions and provide a smooth transition from car-oriented planning to good-for-all planning, it is proposed to create temporary car-free zones on weekends, public holidays and during some festivals as well as organising public street festivals. Such temporary transformations will make urban environment more attractive for people and will allow the city administration to observe people's behaviour and test how their behaviour can be changed in order to make future decisions on the creation comfortable walking and barrier-free environment.

Development, maintenance and upgrading of walking infrastructure

One of the pillars of comfortable urban mobility and barrier-free environment is a high-quality pedestrian infrastructure that should be maintained, developed or upgraded on a regular basis. In order to ensure proper conditions for pedestrian infrastructure that meet their demands, it is necessary to regularly update the pedestrian infrastructure. Among the basic hard measures for the provision of quality walking infrastructure in the city of Poltava are:

- Road maintenance and rebuilding
- Reconstruction, repair and rebuilding of sidewalks, crossing and roadsides available for all users including people with disabilities all over the city
- Reconstruction and repair of sidewalks in residential areas
- Development of quality walking infrastructure in new residential areas and districts connected with the existing one
- Reconstruction/repair of crossings

The maintenance of 1 km of walking infrastructure is 50 times cheaper than the maintenance of 1 km of the car road network. But high quality sidewalks influence the comfort of all residents.

Figure 46. Workshop of green corridors development, Maisternya mista, Poltava, 21.09.2018

Walking routes

In order to strengthen and develop the potential of the city of Poltava to create a walkable environment for citizens and strengthen it to become a tourist region centre, it is necessary to develop walking routes

for slow urban mobility among the city, e.g. there is a need to create a walking route between Sobornosti Street and Peremohy Park that could be one of the most pleasant promenade and touristic routes in the city, thus strengthening the attractiveness of the city centre.

Below are the basic requirements for developing walking routes in the city of Poltava:

- Provision of routes with proper infrastructure prioritising the pedestrian movement to traffic
- Provision of a safe, comfortable, accessible (barrier-free), clear and well-maintained path arranged with quality street furniture
- Provision of a connection between key city locations and other walking routes

Pedestrian crossings

Safe and comfortable pedestrian crossings provide a walkable environment and are essential to walkability. Pedestrian crossing design and the location influence the behaviour of the people and in order to make people feel confident and safe wherever they cross the street, pedestrian crossings should be of high-quality design.

Below, there are minimum quality requirements that apply to the development of safe and comfortable pedestrian crossings available for all users:

- Provide street crossings every 150 - 300 m according to State building standards STD B.2.3.5:2018, since a person is more likely to cross the street directly if there are no available crossings within 3-5 minutes of walking which is rather unsafe and unprotected
- Arranging crossings on all intersections and at all legs of it as well as where it is desirable for people to cross the street (near the points of interests, close to PT stops, etc.)
- Pedestrian crossings should always be marked, regardless of paving material
- Provide over ground crossings with signalisation on streets with a speed limit of 50 kmph and uncontrolled over ground crossings on streets with a limit of 30 kmph
- Provide a crossing distance as short as possible by installing additional facilities to decrease the risk of accidents
- Provide island sites on multiple lane roads in one direction according to State Building Standards STD B.2.3.5:2018 to create two-stage safe crossings for pedestrians
- Arrange good visibility on crossings waiting areas in order that pedestrians can see the oncoming traffic and increase the visibility for drivers
- Provide day and night lighting of crossings, sidewalks and waiting areas
- Provide pedestrian crossings at grade in the city except the places with limited-access highways and natural sites
- Provide pedestrian crossings on one level with sidewalks where it is necessary to have a safe crossing area and it is nor forbidden by the type of road

Within the framework of creating safe, clearly designed and easily visible pedestrian crossings, it is important not only to develop new quality crossing infrastructure, but also to improve the existing infrastructure to meet the basic requirements mentioned above.

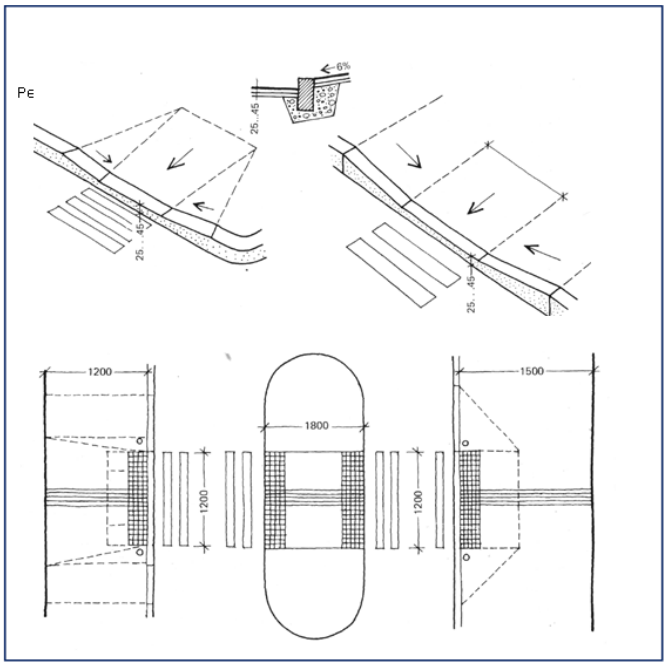


Figure 47. Pedestrian crossing requirements

In order to create a walkable and barrier-free urban environment, it is required to rearrange underground walkways to over ground crossings that will allow to create an accessible environment for all pedestrians including people with limited mobility.

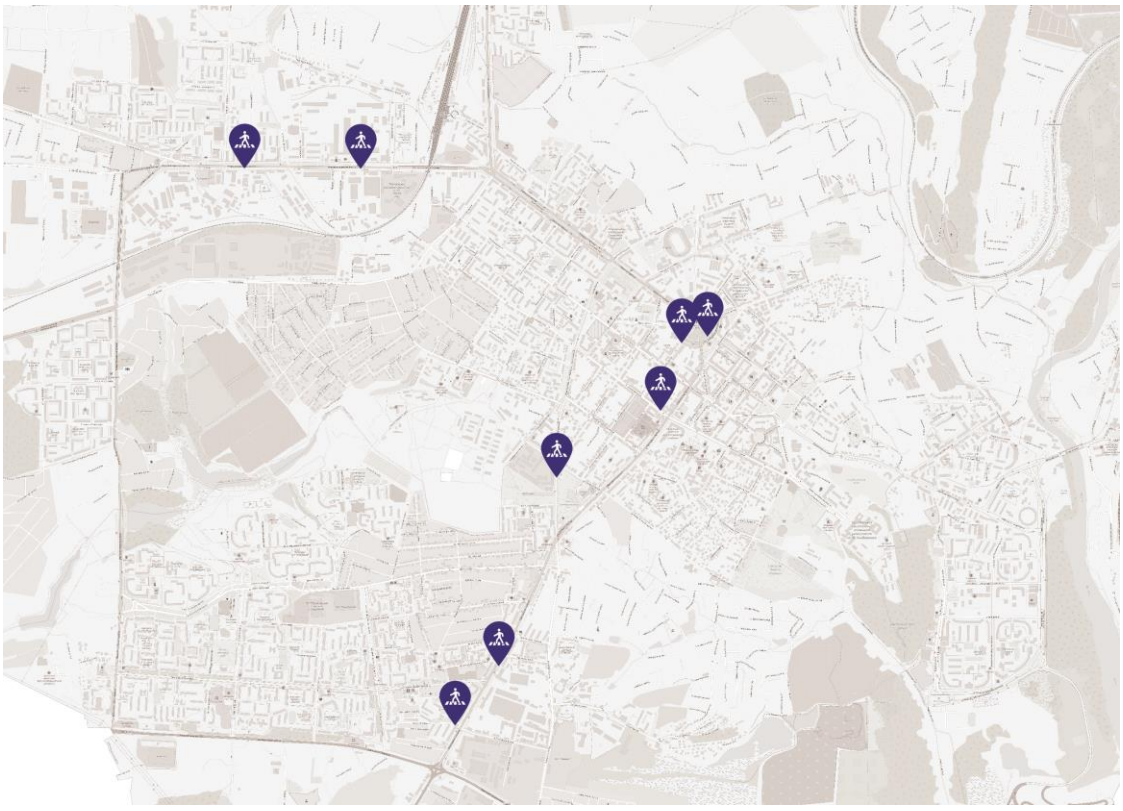


Figure 48. The location of underground walkways in Poltava

Green and recreational zones

Development of green and recreational zones and reconstruction of existing one will make the City of Poltava a more attractive place to live, work and visit. The City of Poltava has great recreational potential since the city is a rather green city with a high number of green territories, parks, squares, etc. In order to use the existing potential and create an attractive green city it is necessary to developing new and maintain the existing green and recreational zones that will benefit the city in the following:

- Creation of an attractive recreation opportunity to walk and spent time
- Provision of urban amenities
- Improving the street landscapes
- Creating stable neighbourhoods
- Improving air quality
- Economic growth which stimulates the recreation and tourism industries

City navigation system

A city navigation system is a useful tool to explore the city both for citizens and tourists. Development of a city navigation system provides walking and sightseeing alternatives and opportunities for pedestrians in urban environment, thus increasing the attractiveness of the whole city and strengthening the position as a tourist city. The system will offer pedestrians and tourist specific landmarks providing possible directions.

In order to strengthen the tourist potential of Poltava, it is necessary to determine the most attractive tourist objects of the city to be a base for urban navigation system that will contain street direction signs on recreational places, important city locations, landmarks, public catering places, organisations, etc.

Promotional events

Measures on promoting are soft measures that are effective while implementing together with hard measures. Promoting walking is a top priority while creating a walking and barrier-free environment. The main reasons for promoting walking is to improve citizens' health and the city environment as well as development walking as a mode of transport that is sustainable one in general.

Promotional activities can be organized and devoted to some international events, e.g. organization car-free day during European Mobility week or organization some information campaign by local communities, holding activities to involve workers to walk more (e.g. walking challenge), etc.

Capacity building in the field of walking and barrier-free environment

Capacity building measures are soft measures that do not require large investments and budget, but are necessary to improve and increase the level of knowledge in planning and organisation of barrier-free urban environment. Capacity building measures shall aim at raising awareness among city planners and self-governmental authorities with the ultimate goal of improving the planning practices in the city. Such measures should be carried out on a regular basis in order to reach the desirable goal.

Monitoring and audit

The effectiveness of carried out measures cannot be assessed without systematic monitoring. Efficient planning and development of walkable infrastructure defines the progress on the development of a liveable walkable and barrier-free environment. Regular monitoring and auditing will prevent from undesirable infrastructure deconstruction and allow to compare with target and collect data on infrastructure that is needed to be reconstructed, repaired or developed.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
W1	Development and implementation of Programme for Street Design [3] [27]	Management & organization	1.3, 5.1, 5.2, 5.3			1*	1
W2	Updating the rules of landscaping for the maintenance of sidewalks and other pedestrian infrastructure[27]	Management & organization	5.1, 5.3			1	1
W3	Creation of an unhindered land route between Korpusniy Sad and the pedestrian part of Sobornosti Street [27]	Management & organization	5,1			1	1
W4	The creation and approval at the municipal level the responsible for the development of pedestrian infrastructure terms of reference [27]	Management & organization	5,1			1	1
W5	Repair and reconstruction of pedestrian infrastructure of the central part of Poltava[3] [6] [27]	Infrastructure	5.2, 5.3	1-3	1-3	1-3	1-3
W6	Expanding of the pedestrian zone of Sobornosti Street[3] [6] [27]	Infrastructure	5.2, 5.3	1		1	1
W7	Establishment of sitting facilities in public spaces[25] [27]	Infrastructure	5.2, 5.3, 6.2	1-2	1-2	1-2	1-2
W8	Establishment public toilets in public spaces[25] [27]	Infrastructure	5.2, 5.3, 6.3	2-3	2-3	2-3	2-3
W9	Overhaul of outdoor lighting network with replacement of lamps with LEDs [26] [27]	Infrastructure	4.3, 5.3, 6.1	1-2	1-2	1-2	1-2
W10	Development of pedestrian corridor between Sobornosti Street and Peremohy Park[3] [6] [27]	Infrastructure	5.2, 5.3			2	2
W11	Repair and reconstruction of pedestrian infrastructure in residential areas of the city[25]	Infrastructure	5.2, 5.3		2-3	2-3	2-3
W12	Development and implementation of city navigation (for pedestrians, cyclists, tourists)[27]	Promotion & awareness	3,3, 5,2, 5,3			2-3	2-3
W13	Construction of walking routes for tourists[27]	Promotion & awareness	5.2, 5.3	3		3	2
W14	Development of recreational zones near the Vorskla river[3] [6] [26]	Infrastructure	5.2, 5.3	2	1	2	1
W15	Reconstruction and repairing of small parks ("squares") [34]	Infrastructure	5.2, 5.3	1-3	1-3	1-3	1-3

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
W16	Reconstruction and repairing of boulevards[34]	Infrastructure	5.2, 5.3	1-3*	1-3	1-3	1-3
W17	Reconstruction and repairing of parks[34]	Infrastructure	5.2, 5.3		1-3	1-3	1-3
W18	Development of recreational zones near the Kolomak river[3 6 26]	Infrastructure	5.2, 5.3		1	2	1
W19	Introduction of traffic calming measures at pedestrian crossings[27]	Infrastructure	5.3, 6.1			1-2	1-2
W20	Introduction of "smart" pedestrian crossings[25]	Infrastructure	3.4, 5.1, 5.2, 5.3, 6.1			3	3
W21	Reconstruction / repair of sidewalks, roads, land, overground, underground passages taking into account needs of low-mobility categories of population[27]	Infrastructure	5.2, 5.3	1-3	1-3	1-3	1-3
W22	Prohibition or restriction of traffic on the major roads of the city, and giving priority to pedestrians and cyclists on weekends and holidays[25]	Infrastructure	6,1	1	1	1	1
W23	Development of high quality pedestrian passes in new city districts / on development territories and integrating them with existing city pedestrian passes network[3 27]	Infrastructure	5.2, 5.3,			1	1
W24	Restrictions on the movement of individual transport along the ring of Soborna Street (Korpususy Sad) from Zlatomisto to Kadetskiy Corpus from the side of the Poltava City Council and giving priority to pedestrians and cyclists on weekends and holidays[25]	Infrastructure	5.2, 5.3,			2	2
W25	Monitoring and auditing of pedestrian infrastructure[25]	Monitoring & data collection	5.1, 5.2, 5.3, 6.1			1-3	1-3
W26	Capacity building of self-governing authorities (workshops / trainings) in the field of walking and development of a barrier-free environment[25]	Capacity development	5,1	1-3	1-3	1-3	1-3
W27	Development of pedestrian routes and construction of a suspension bridge on Vorskla near Pryrichnyi Park[25]	Infrastructure	5.2, 5.3				2

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

Road safety

Measures in the field of Road safety are aimed at providing a comprehensive approach to road safety management that will reduce the number of road accidents. These measures mainly contribute to the achievement of the following goals:

6.1 Creation of a safe urban environment

6.2 Improvement of traffic culture

2.4 Relieving central parts of the city from large-sized vehicles

4.3 Creating the possibility to cycle through the city quickly and safely

5.2 Development of safety facilities for pedestrians

When it comes to the development of road safety improvement measures, the so called rule of “four E’s” is applied: engineering, enforcement, economy and education. Presented below are the combinations of measures required to improve road safety in Poltava.

Road safety policy and standards

Vision Zero concepts needs to define zero fatalities in traffic accidents as the highest priority of Poltava in the field of road safety. The concept has to contain:

- A plan to decrease the share of fatalities in comparison to "zero measurement"
- Definition of ways to collect and analyse data numbers on dead and injured people;
- Definition of a procedure for road safety audits for street space;
- Definition of financial mechanisms of funding infrastructural interventions in places where most people are killed;
- Definition of mechanisms of funding of education for civil servants in the field of road safety

The purpose is to provide residents with the opportunity to safely, comfortably and quickly move around the city. To do this, it is necessary to develop a programme that will provide comprehensive services for the streets and roads of the city:

- Road surface quality;
- Illumination of streets, pavements, roads, crossings;
- Adaptation of crossings and pedestrian crossings (ground and underground) to the needs of reduced mobility groups;
- Safety of crosswalks (contrasting illumination, arrangement of safety islands, arrangement of means of forced reduction of speed);
- Equipment for crossings, pedestrian crossings and railway crossings with signs, markings, traffic lights, forced-deceleration devices;
- Public transport stops maintenance;
- Accidents monitoring.

Road safety of the new infrastructure

During the construction of new roads and providing transport access to areas that are created must be ensured safety for all road users: pedestrians, cyclists, users of automobile and public transport. The concept of integrated development of Poltava city provides for the creation of a new residential buldings - microdistrict 57 and Artsklady. When organising access to this territory, it is necessary to arrange a road of urban significance (Figure 49), which corresponds to the principles of sustainable mobility. A sketchy street project is in the process of development. Options for arranging the street profile are shown in Figure 50.

Figure 49. Scheme of the location of a perspective Lazurna street

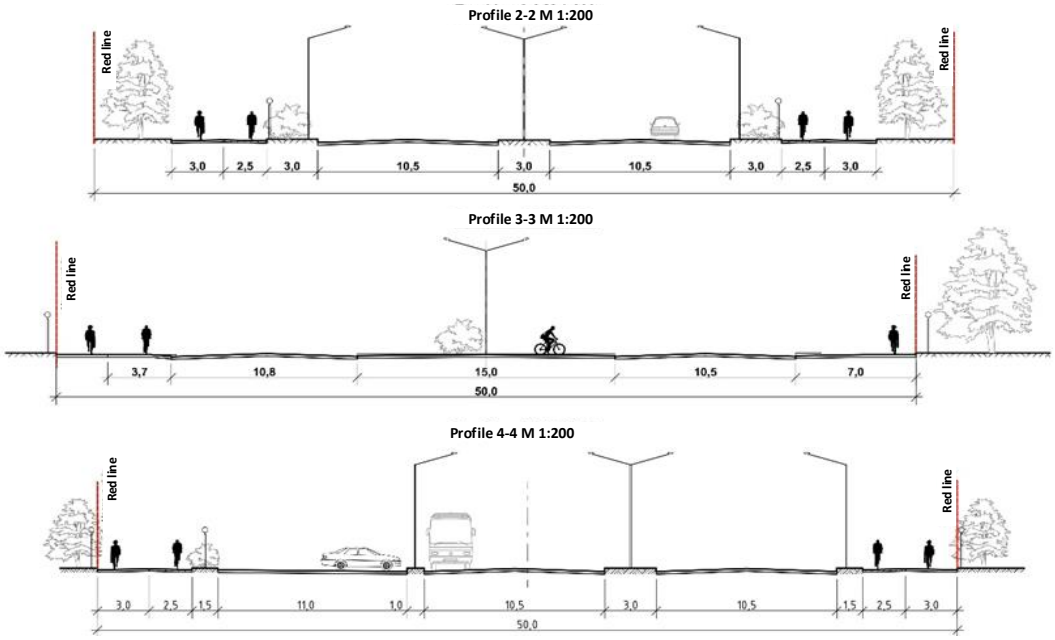


Figure 50. Options for setting street profiles

Traffic calming measures

One of the main causes of road accidents is the speeding of motor vehicles. Lowering speed of traffic not only decrease the severity of the accidents but also provides drivers with more time to react and prevent potential accidents.

Research shows that if a car hits a pedestrian or a cyclists at a speed of 30 kph, there will be a 90% chance for the person to survive, if the speed is 50 kph the changes of survival will be around 50%. While accidents at speed 60kph and over allows only for 15% of survival. According to Ukrainian traffic rules, the maximum speed in the city is 50 kph- However, there is an absence of proper control and the street design allows for significantly higher speed.

There are a number of efficient traffic calming measures to be implemented in the city, such as

Changing one-way streets to two-way

To increase road capacity, one-way streets were designed, but it has also resulted in higher speeds. Now to provide better safety, these streets are redesigned into two-way streets. This measure also helps to reduce mileage of vehicles and provides more comfortable conditions for cyclists.

Figure 51. East Wells Street in downtown Milwaukee was converted from a one-way street to a two-way street. Photo: Flickr – Dave Reid (2011)

Widening sidewalks/narrowing streets and traffic lanes

In fact, much more people walk more than drive a car. And even drivers and passengers should still use the sidewalk. That is why widening sidewalks make pedestrians' movements more comfortable, calms traffic and can even revitalise economical life of the street. And since most traffic lanes are planned for a speed much higher than is allowed there, narrowing streets make drivers move more slowly without any additional restrictions.

Roundabout

A roundabout is a type of circular intersection. They increase safety because they force the driver to lower speed, and also exclude manoeuvre of intersection of traffic flows, replacing them for merge and separation.

Raised medians and safety islands

A raised median is a barrier in the middle of the street or road that divides traffic flows of different directions. And traffic islands show areas on the road where vehicles should not be. They increase pedestrian safety by reducing distances of crossings, give people the possibility to concentrate on one direction of traffic and not at two at the same time.

Figure 52. Raised landscaped median. Source: Designing for Pedestrian Safety

Figure 53. Midblock median island. Port Townsend, Washington, USA Photo: Richard Drdul

Tight corner curbs

A corner curb radius is formed by two sidewalks on perpendicular streets that come together at a corner. Making this radius tighter shortens the distances of pedestrian crossings, reduce traffic speed while turning and increases pedestrian visibility to divers.

Raised crosswalk

A raised crosswalk is a roadway lifted to the level of pedestrians in places of pedestrian crossings. This is also a traffic calming measure, it reduces vehicle speed but also provides convenient movement of pedestrians.

Figure 54. Raised crosswalk with “sharks' teeth” and median refuge, Bilbao, Spain (2015) Photo: Eric Fischer

Speed hump

These are the most popular elements of speed calming and are used for 30 kph zones. A speed hump is a vertical obstacle on the road. They are established to enforce drivers to reduce speed when approaching pedestrian crossings or intersections.

The construction of infrastructure to improve road safety should take place in the city, as needed, including a list of problem areas (Figure 30) and, first of all (first stage), include:

Area 14: Korpusnyi Sad

Area 5: The crossroads of Biryuzova str. - Sobornosti- Zinkivska;

Area 8: The crossroads of Yevropeiska str.-Shevchenko str.;

Area 13: The crossroads of Yevropeiska - Kharkivske highway;

Area 17: The crossroads of Mazepa street – 23-go Veresnia;

Area 10: Yevropeiska str. (near the stop of Tchaikovskogo str.).

Road Safety Audit

Research shows that there are three contributing factors to road crashes:

- human factors (involved in about 95% of crashes)
- road and road environment factors (involved in about 28% of crashes)
- vehicle factors (involved in around 8% of crashes)

However, urban environment can be altered to minimise the human factor and to direct road users into safer behaviour.

A road safety audit is a formal procedures to check safety aspects of the roads before it is build or redesigned. There are five main audit stages:

1. Feasibility study audit
2. Preliminary design audit
3. Detailed design audit
4. Pre-opening audit
5. Monitoring of the road in use

In order to ensure the high standard for safety at all of those stages it is important to assign a person in the administration system to be responsible for the management of the auditing process. For this, a number of separate checklists for the road audit has to be developed and a clear monitoring system with scope and timeline has to be defined.

Management and monitoring

The monitoring of the progress of road safety may only be ensured if the functional responsibilities are assigned for particular person in the city administration. At the same time the special safety committee has to be developed involving people from police, “Avtodor”, road design and reconstruction, communal services department, education department, communication department, etc.

A safety coordinator should be assigned to:

- The coordination of the implementation of the "Vision Zero” concept"
- The coordination of the deployment of the system of automatic photo-video control of violations of traffic rules;
- The coordination of the work of departments of the city with the local police
- The coordination of data collection, monitoring and analysis of traffic safety in the city
- The determination of the priority of engineering activities (reorganisation of crossroads, arrangement of safe crosswalks with safety isles, organisation of traffic calming measures) for the most effective reduction of mortality and injury.
- Coordination of the work of the commission for conducting "technical investigations" of fatal accidents
- Coordination of traffic safety audit of Poltava

Safety awareness programme

Many accidents can be prevented if the road users were better aware of simple safety rules. People should be reminded of the consequence of their reckless or simply unwary behaviour.

Parents should teach common traffic rules to their children and should also encourage their safe behaviour. Particular attention should be brought at schools for safety education in cooperation with police and NGOs. Educating children has a long term sustainable effect-For educating the adults different tools should be used, such as social cause advertisement, safety information boards in public buildings, city-wide campaigns and competitions. Special attention should be focused on informing drivers on safe driving, a ban on the use of mobile phones while driving and others.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
S1	Development of "Vision of zero mortality on the streets of Poltava"[25]	Management & organization	6.1, 6.2, 6.3			1*	1
S2	Establishment of a municipal authority responsible for the road safety coordination in Poltava	Management & organization	6,1			1	1
S3	Development and implementation of a programme for repairing, maintenance and monitoring of the street infrastructure[3 6 28]	Management & organization	6,1	1		1	1
S4	Development and implementation of a programme for road safety increase[3 27]	Management & organization	6,1	1	1	1	1
S5	Organisation of exits from the adjoining territories to the main streets in one level with the sidewalk[25]	Infrastructure	6,1	1-3	1-3	1-3	1-3
S6	Construction of safe and inclusive ground pedestrian crossings[27]	Infrastructure	5.3, 6.1	1-3	1-3	1-3	1-3
S7	Construction of a one-level overpass at the intersection of Myru and B. Khmelnitskoho streets[3 6]	Infrastructure	6,1		2		2
S8	Construction of a one-level overpass at the intersection of Sobornosti Street, M. Biryuzova, Zinkivska on the railways crossings[3 6]	Infrastructure	6,1				2
S9	Construction of a one-level overpass at the intersection of Raisa Kirichenko and Yevropeys'koyi[3 6]	Infrastructure	6,1				2
S10	Construction of a one-level overpass at the intersection of Yevropeys'koyi and European and Nebesnoyi Sotni[3 6]	Infrastructure	6,1		2-3		2-3
S11	Implementation of the reconstruction project of the M-03 / E40 Kyiv-Kharkiv road in the city of Poltava[3 6]	Infrastructure	6,1				2
S12	Realisation of pilot infrastructure projects in order to increase traffic safety in the city[3 27]	Infrastructure	4.3, 5.3, 6.1, 6.2			2	2

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
S13	Introduction of 30 kph zones [25]	Infrastructure	6,1	2*	2	2	2
S14	Construction of a bypass road[3] [6]	Infrastructure	2.4, 6.1				2
S15	Development of street and road passports in Poltava[27]	Monitoring & data collection	1.5,2.1, 2.3			1	1
S16	Road traffic safety audit for school routes[25]	Promotion & awareness	6,1			1	1
S17	Construction and elimination of high danger areas on school routes[25]	Infrastructure	7,1			1	1
S18	Revision of the existing hierarchy of streets and roads[6] [27]	Infrastructure	2.4, 6.1		1	1	1
S19	Implementation of inclusive planning practices for increased security infrastructure[27]	Promotion & awareness	6,1			2	2
S20	Inclusion of an independent "road safety audit" component to the projects of streets repairing and reconstruction[25]	Management & organization	6,1		1-3	1-3	1-3
S21	Conduct a "Road safety audit" for the streets and roads of Poltava[25]	Monitoring & data collection	4.3, 5.3, 6.1			1	1
S22	Development of a city road safety monitoring and data collection system (Bases of mortality and injury in accidents in the city)[25]	Monitoring & data collection	6.1, 6.2,			1-3	1-3
S23	Creation of a special technical commission for the investigation of fatal accidents[25]	Monitoring & data collection	6.1, 6.2			1	1
S24	Installation of equipment for an automatic video recording system for traffic violations [25]	Infrastructure	3.4, 6.1		1	1	1
S25	Activities in the field of road safety promotion by the police[27]	Promotion & awareness	6.1, 6.2			1-3	1-3
S26	Promo campaign for safety speed limits in the city[25]	Promotion & awareness	6.1, 6.2			1-3	1-3

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

	Measures	Category	Compliance with Goals	Scenario 1	Scenario 2	Scenario 3	Scenario 4
S27	Conduction of traffic safety lessons in educational institutions [27]	Promotion & awareness	6,2	1-3*	1-3	1-3	1-3
S28	Participation of the city in events such as 'Days of Road Safety' and others[27]	Promotion & awareness	6.1, 6.2	1-3	1-3	1-3	1-3
S29	Capacity building of self-governing authorities (workshops / trainings) in the field of road safety[27]	Capacity development	6.1, 6.2	1-3	1-3	1-3	1-3
S30	Development and implementation of emergency-reaction-to-accidents programme [25]	Management & organization	6.1, 6.3			2	2
S31	Organization of safe land transitions and crossings, arrangement of a crossroads while designing new territories, in particular on the Lazurna str. (microdistrict artskladi, 57)	Infrastructure	6.1, 5.3, 4.3	2-3	1-2	2-3	1

* Number of Phase: 1 – 1-5 year of implementation (2018-2023), 2 – 6-10 year of implementation (2024-2028), 3 – 11-15 year of implementation (2029-2033); 1-2 or 1-3 means the measure should be implemented gradually each phase.

Chapter 7 Summary Of Scenarios

Scenario 1 – Maintain and Operate

Assumption

This is a baseline scenario that assumes that no significant changes in funding and organisational structure will happen in near future. The City has no substantial investments available and also continually low organisational capacities and acceptance for changes.

Composition

- the public transport infrastructure is maintained to sustain and if possible improve operating conditions;
- an automated fare collection system for public transport is introduced;
- bicycle routes of first priority are built and safety of intersection crossings are improved;
- repair stations and parking racks for bicycles are installed along the major cycling routes.
- City target programmes for repairing, maintenance and monitoring of street and cycling infrastructure, road safety are developed;
- the pedestrian infrastructure is maintained and renovated to provide barrier-free movement and comfort, the car free zone is expanded, walking routes taking into account needs of low-mobility categories of population are created;
- the road safety will be increased by safe and inclusive pedestrian crosswalks and safety awareness programmes;
- city-wide events are organised to increase awareness of sustainable urban mobility;
- capacity development activities are organised for transport specialists, city representatives and transport authorities.

Rough cost of implementation first phase of the scenario (2018-2023):

250.6 mil. UAH

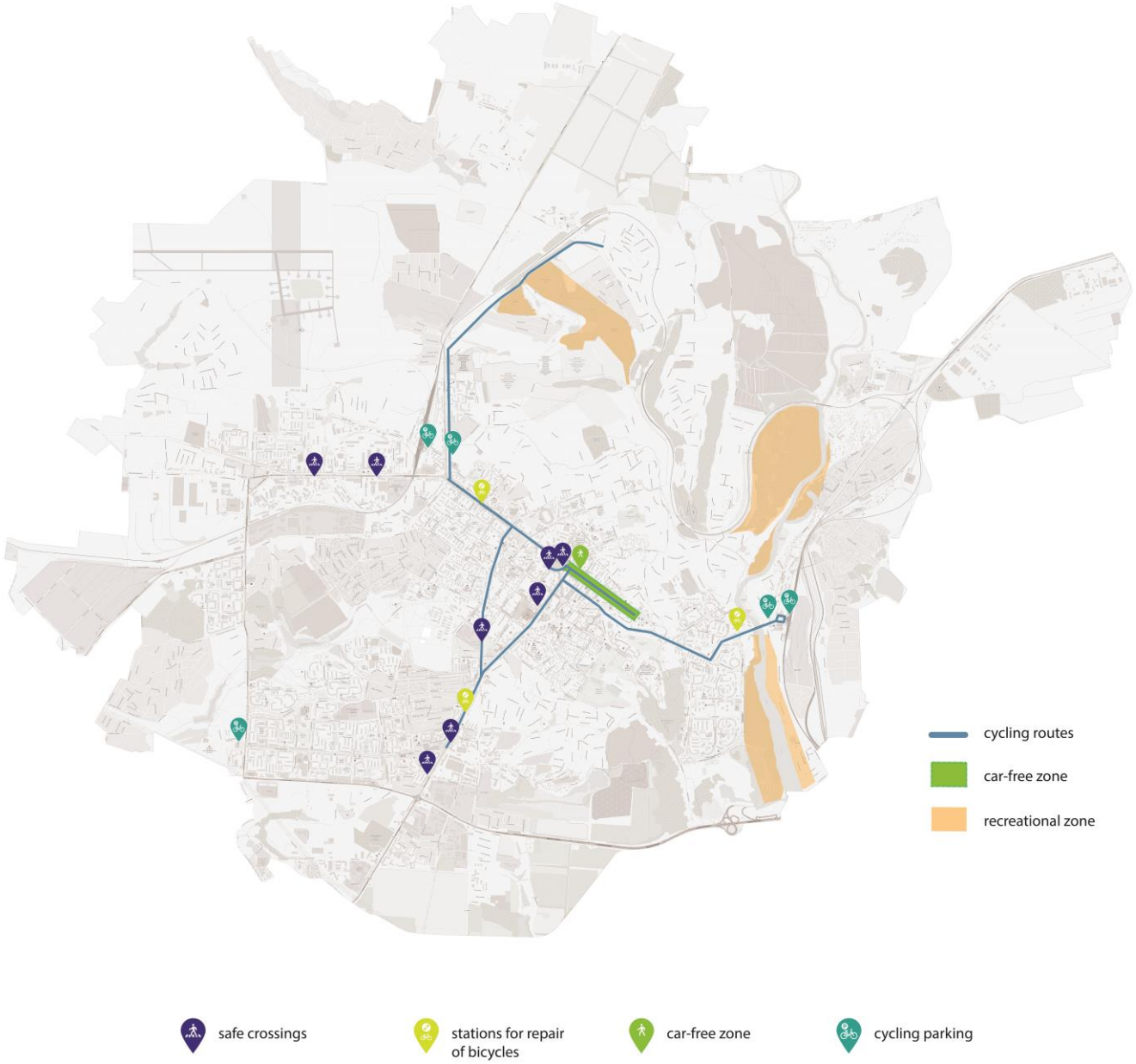
Quantitative Impact:

Parameter	Value
Average travel time, min	30min. 19s.
Average waiting time, min	5min. 37s.
Average distance, km	5,91
Average speed, kph	11,7
Average speed of public transport, kph	24,74
Average number of transfers	6,7%
Total number of passengers	278 000
Vehicle-kilometres	65 824
Passenger-kilometres	1 356 304
Passenger hours	54 829h.

Qualitative impact:

- Improved mobility of pedestrians and cyclists;
- Increased safety on the roads;
- Refined conditions for people with limited mobility;
- Increased reliability of public transport;
- Enhanced viability of the public transport;

- More attractive public spaces;
- Higher awareness of sustainable urban mobility.



Map of the Poltava city: Scenario 1 – Maintain and Operate

Scenario 2 – Continue and Expand

Assumption

The City will implement an active investment strategy and will have access to sufficient financial resources available for the development of the sector. No significant changes are expected in organisational or institutional structure.

Composition

- The public transport infrastructure is continually maintained, the trolleybus fleet is updated and the municipal bus fleet is enlarged with low floor vehicles. Operating conditions of public transport are improved by infrastructure development; an automated fare collection system is introduced;
- The trolleybus network is maintained and a new line is constructed;
- The suburban bus station is relocated from city centre to the city outskirts;
- Bicycle routes are built, repair stations and parking racks for bicycles are installed along the major cycling routes.
- The pedestrian infrastructure is maintained and renovated to provide barrier-free movement and comfort, walking routes and recreational zones taking into account the needs of the low-mobility categories of population are created;
- A cargo terminal and logistic centre on the periphery of the city is created;
- Automatic video recording is installed and a road safety audit is introduced, the road safety will be increased by safe and inclusive pedestrian crosswalks and safety awareness programmes;
- City-wide events are organised to increase awareness of sustainable urban mobility;
- Capacity development activities are organised for transport specialists, city representatives, and transport authorities.

Rough cost of implementation first phase of the scenario (2018-2023):

427.7 mil. UAH

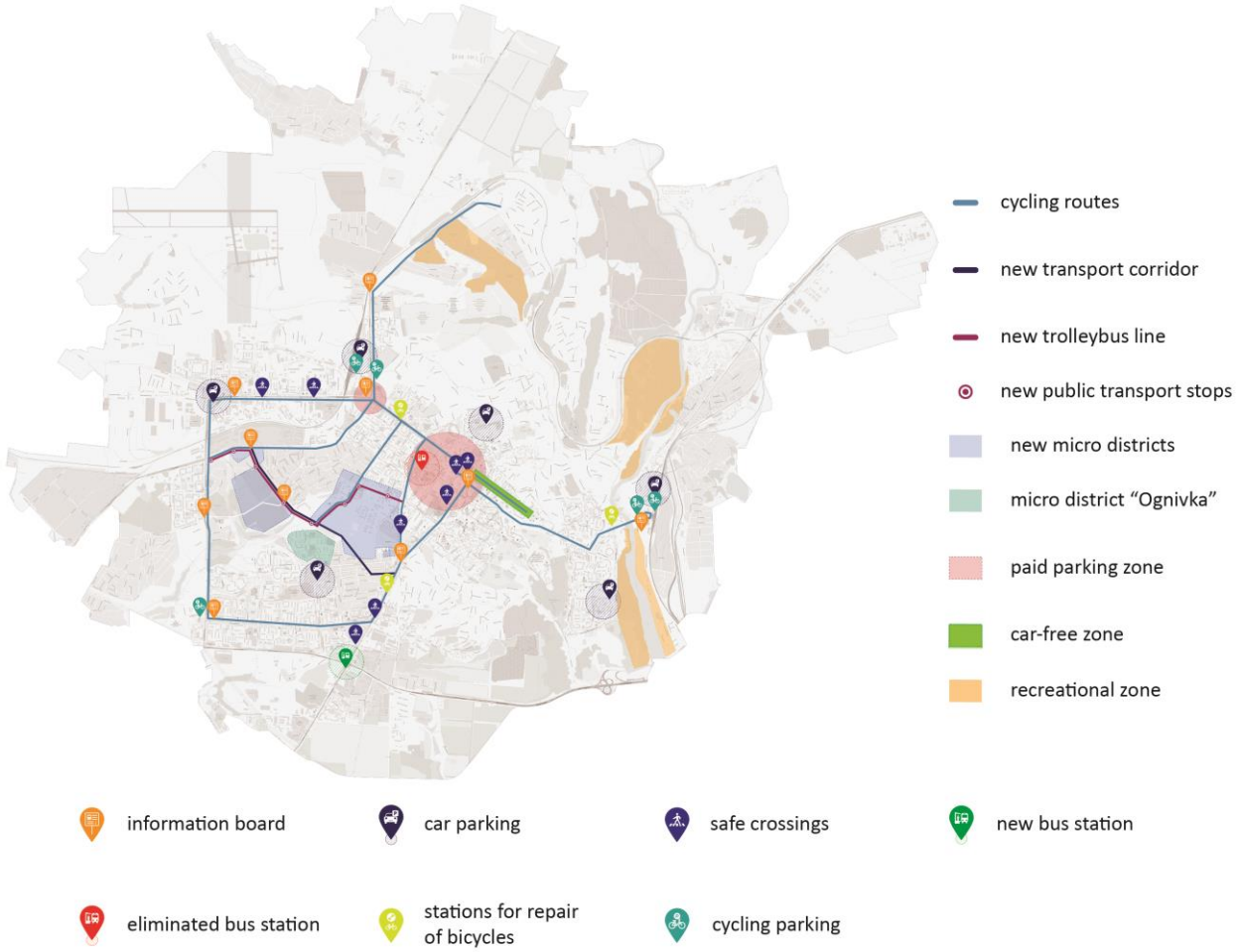
Quantitative Impact:

Parameter	Value
Average travel time, min	29min 27s
Average waiting time, min	5min 31s
Average distance, km	5.73
Average speed, km / h	11.67
Average speed of public transport, km/h	24.72
Average number of transfers	7%
Total number of passengers	268 000
Vehicle-kilometres	65 770
Passenger-kilometres	125 9748
Passenger hours	50 958h 47min

Qualitative impact:

- Improved mobility of pedestrians and cyclists;
- Increased safety on the roads;
- Refined conditions for people with limited mobility;
- Increased reliability of public transport;
- Enhanced viability of the public transport;
- Decreased number of large-sized vehicles in the city centre;
- More attractive public spaces;
- Improved image of the city;

- More comfortable touristic sites and recreational zones;
- Higher awareness of sustainable urban mobility



Map of the Poltava city: Scenario 2 – Continue and Expand

Scenario 3 – Reorganize and Prepare

Assumption

This scenario assumes that no significant changes in funding will happen but that the organisational structure will improve in the near future. The city has low access to financial resources to be allocated on sustainable urban mobility measures but high political and public support and organisational capacities for the reformation of the sector.

Composition

- A unified centralised public transport management system is introduced and the reorganisation of the route network has been started; studies of population mobility and satisfaction of transport services are conducted on a regular basis;
- A single ticket and automated fare collection system is introduced; the suburban bus station is relocated from the city centre;
- The authority of organisation and management of the unified data system is established, a unified information system for collecting, processing and analysing of the sustainable development of the city is created; the transport model is being developed
- Main and touristic bicycle routes with repair stations and parking racks are built and the safety of intersection crossings are improved; innovative low cost solutions for walking and cycling safety are being tested in the city;
- Respective positions for mobility management (cycling, walking and safety) infrastructure are introduced;
- the pedestrian infrastructure is maintained and renovated to provide barrier-free movement and comfort, car-free zones in city centre are expanded; walking routes and recreational zones taking into account the needs of the low-mobility categories of the population are created;
- The rules of landscaping and maintenance of pedestrian infrastructure are updated;
- The municipal service for control of parking and monitoring the system is established, paid parking areas, parking-free and out-of-street parking zones are arranged; parking places for long-term storage of bicycles near transport hubs are created;
- Concepts for zero mortality on the streets are introduced; 30 kph speed zones in residential areas and safety awareness programmes;
- City target programmes for repairing, maintenance and monitoring of street and cycling infrastructure, road safety and safe city, developer contribution, ITS Poltava, Parking spaces are developed;
- City-wide events are organised to increase awareness of sustainable urban mobility;
- Capacity development activities are organised for transport specialists, city representatives and transport authorities.

Rough cost of implementation first phase of the scenario (2018-2023):

272.3 mln UAH

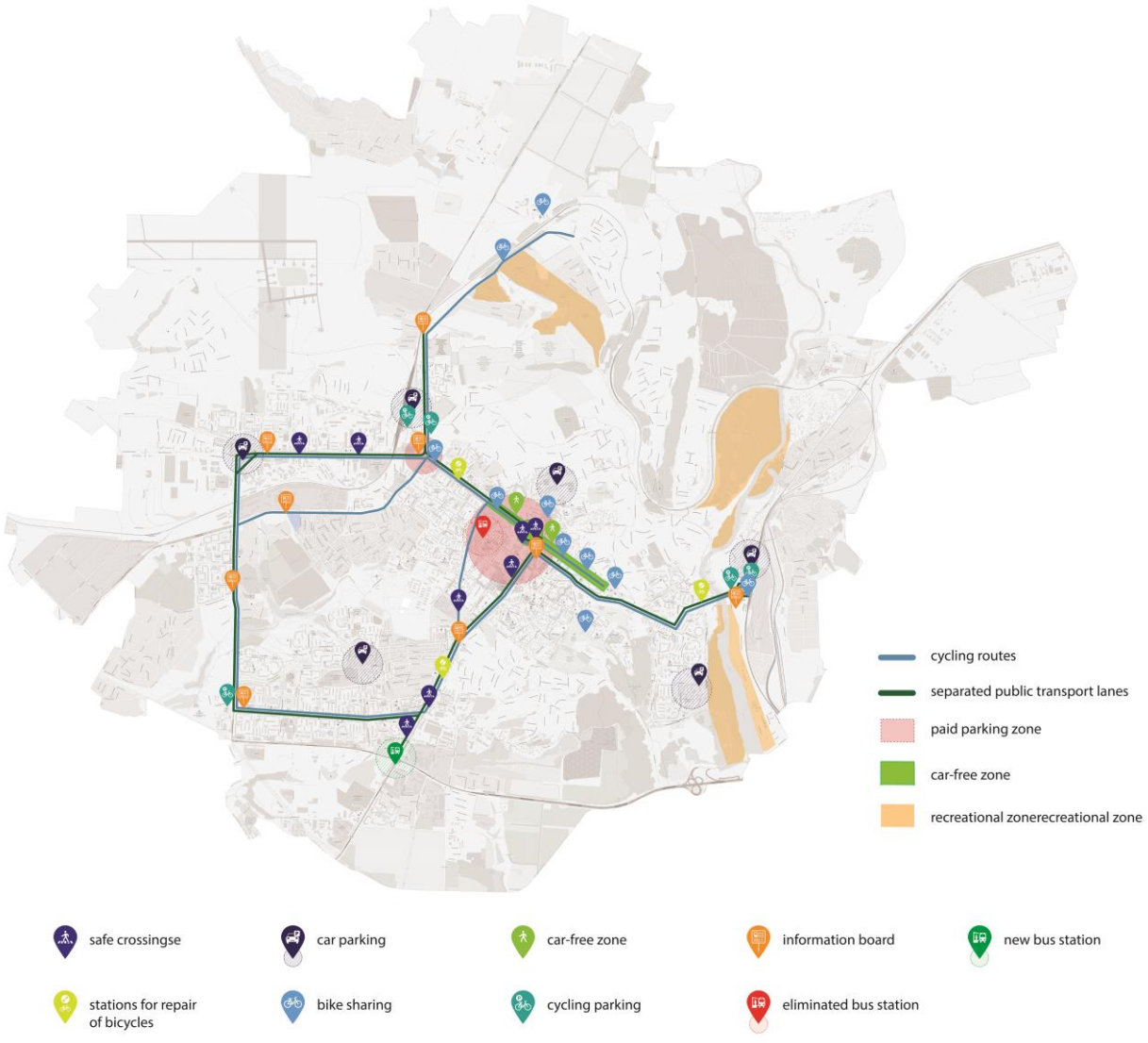
Quantitative Impact:

Parameter	Value
Average travel time, min	31min. 47s
Average waiting time, min	6min. 51s
Average distance, km	5.89km
Average speed, km / h	11,12km/h
Average speed of public transport, km/h	24.55 km/h
Average number of transfers	6,50%

Parameter	Value
Total number of passengers	278 914
Vehicle-kilometres	46850 km
Passenger-kilometres	1 351 075 km
Passenger hours	55 029h 10min.

Qualitative impact:

- Improved mobility of pedestrians, cyclists and people with limited mobility;
- Increased safety on the roads and in the city;
- Increased reliability and viability of public transport and better integration with other modes;
- Centralised decision-making in urban mobility that is based on reliable data;
- Improved quality of parking spaces and decreased traffic in the city;
- More comfortable and attractive public spaces and recreational zones;
- Improved image of the city;
- Higher awareness of sustainable urban mobility.



Map of the Poltava city: Scenario 3 – Reorganise and Prepare

Scenario 4 – Transformation

Assumption

This is the most optimistic scenario. It offers the best opportunities for breakthroughs. The city has access to mobilise the financial resources as well as sufficient organisational capacities and public support to implement the strategies for innovation.

Composition

- A unified centralised public transport management system is introduced
- The Mobility concept for the organisation of traffic on the ring road around Corpusnyi Sad has changed by giving the priority to pedestrians, cyclists and public transport;
- 57 and Artsklady districts are integrated in the public transport network via the trolleybus network and cycling and walking infrastructure is included into the district outline;
- A transport model is developed; studies of population mobility and satisfaction of transport services are conducted on regular basis; a unified information system of collecting, processing and analysing of the sustainable development of the city is created;
- Main and touristic bicycle routes with repair stations and parking racks are built and safety of intersection crossings are improved;
- Responsible for management, development and monitoring of cycling and pedestrian infrastructure are introduced;
- Innovative solutions for cycling and walking safety are introduced; the pedestrian infrastructure is maintained, renovated and expanded; the cycling infrastructure is included in the planning of construction and repairs of new districts / zones, streets and roads; the rules of landscaping and maintenance of pedestrian infrastructure are updated;
- The municipal service for control of the parking and monitoring system is created; paid parking areas, parking-free and out-of-street parking zones are arranged; parking places for long-term storage of bicycles near transport hubs are created;
- The concept of the movement, unloading and parking of freight transport within Poltava is implemented and managed by a cargo terminal and logistic centre established on the periphery of the city;
- The municipal authority, responsible for road safety coordination in Poltava, is established;
- City target programmes for repairing, maintenance and monitoring of street and cycling infrastructure, road safety, developer contribution, ITS Poltava, parking spaces,
- Concepts for zero mortality on the streets are developed; 30 kph speed zones are introduced; inclusive pedestrian and cycling crossroads, built new bypass roads and reconstructed school routes and main intersections with automatic video recording; the programme “Safe City” is implemented and integrated;
- Promotion and capacity building are introduced as in previous scenarios;

Rough cost of implementation first phase of the scenario (2018-2023):

449.9 mln UAH

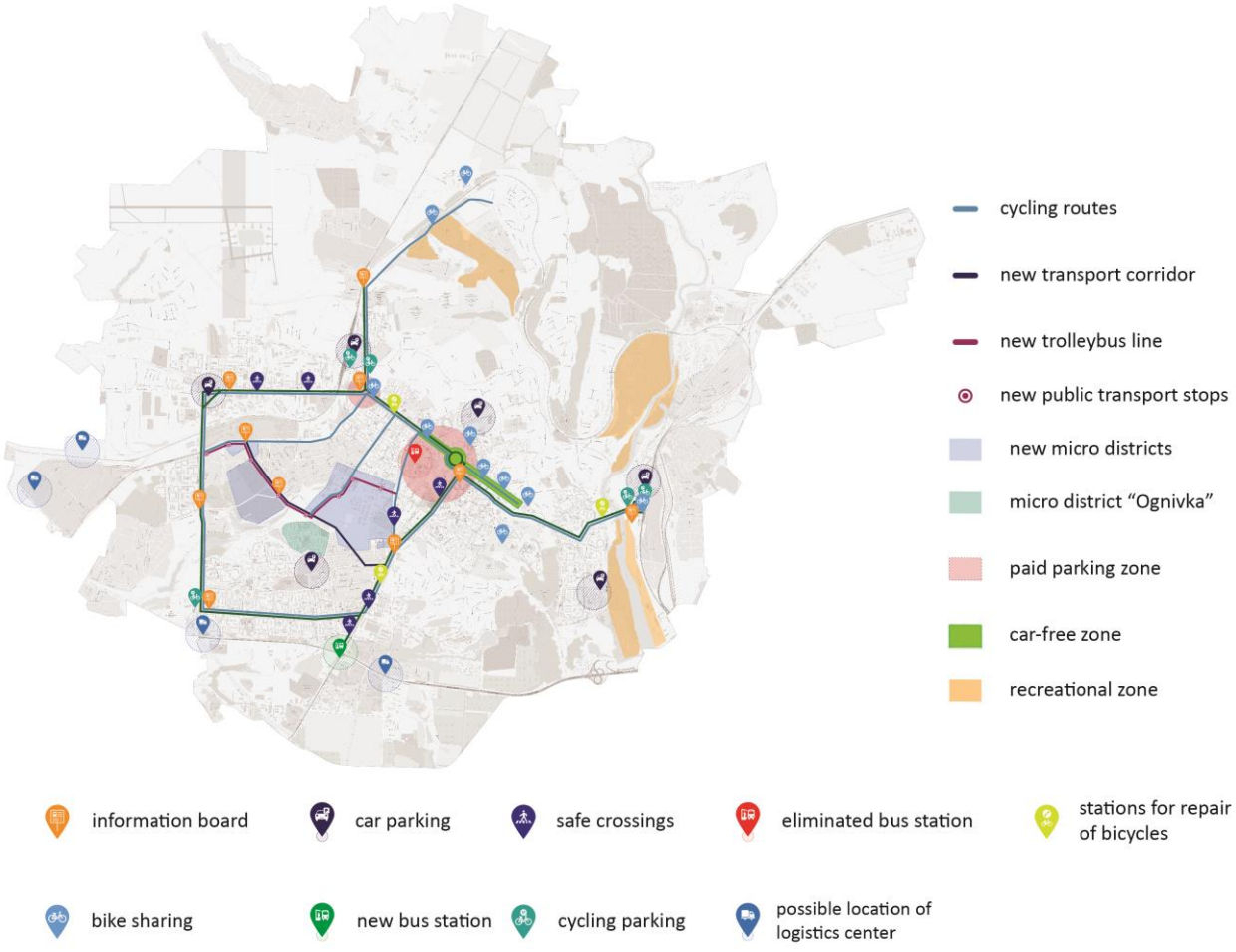
Quantitative Impact:

Parameter	Value
Average travel time, min	31min. 56s
Average waiting time, min	6min. 58s
Average distance, km	5.88km
Average speed, km / h	11,06km/h

Parameter	Value
Average speed of public transport, km/h	24.48 km/h
Average number of transfers	6,90%
Total number of passengers	279 906
Vehicle-kilometres	47148 km
Passenger-kilometres	1 348 681 km
Passenger hours	55 102h 46min.

Qualitative impact:

- Improved mobility of pedestrians, cyclists and people with limited mobility;
- Increased safety on the roads and in the city;
- Increased reliability and viability of public transport and better integration with other modes;
- Centralised decision-making in urban mobility that is based on reliable data;
- Improved quality of parking space, better organisation of freight traffic and decreased traffic in the city;
- More comfortable and attractive public spaces and recreational zones;
- Improved image of Poltava which becomes known as a city with high traffic culture and modern urban environment.
- Higher awareness of sustainable urban mobility
- Decreased number of large-sized vehicles in the city centre



Map of the Poltava city: Scenario 4 – Transformation

Chapter 8 Implementation Plan

This chapter presents the grouping of proposed measures for Poltava‘s sustainable urban mobility development into 4 scenarios. The limitations as time horizon, availability of financial resources and level of organisational capacities have been considered while measures are have been grouped. Some of the measures are included in several phases of the scenarios based on the sequential approach of its implementation.

Scenario 1 – Maintain and Operate

	Actions	Year of implementation			Category	Compliance with Goals
№		2023	2028	2033		
C1	The development of the City target program of development of Cycling infrastructure	■			Infrastructure	4.1, 4.2, 4.3
C6	The construction of the main cycling route "Almaznyi-Korpusnyi sad"	■			Infrastructure	1.4, 4.1, 4.3
C7	The construction of main and tourist cycling route "Zyhina-Bila altanka"	■			Infrastructure	1.4, 4.1, 4.3
C8	The construction of the main Bicycle route "Ohnivka-str. Sobornosti"		■		Infrastructure	1.4, 4.1, 4.3
C9	The construction of main and tourist Cycling route "Pole Poltavskoi bytvy - Arboretum-Zyhina"		■		Infrastructure	1.4, 4.1, 4.3
C10	The construction of the main Bicycle route "Pivdennyi vokzal-Korpusnyi sad"	■			Infrastructure	1.4, 4.1, 4.3
C11	The construction of the main Bicycle route "Bus station-Polovky-Brailky-Zyhina"			■	Infrastructure	1.4, 4.1, 4.3
C13	Improvement of the road network of stations for repair and maintenance of bicycles	■			Infrastructure	4.3
C14	Development and design safe crossings for cyclists at crossroads	■	■	■	Infrastructure	4.3, 5.3, 6.1, 6.2
C18	Improvement of skill of city planners and engineers in transport technologies of organization and planning of cycling	■			Capacity development	4.2

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
C23	The integration of Bicycle transport with public transport		■		Infrastructure	1.4, 4.1, 4.3
C25	The European mobility week	■	■	■	Promotion and awareness	4.1
C26	The holding of activities by Bike to work	■	■	■	Promotion and awareness	4.1
C27	Holding of the Bicycle day	■	■	■	Promotion and awareness	4.1
C28	Development and implementation of the tourist Bicycle tours	■	■	■	Promotion and awareness	4.1
C30	Holding of lessons of bike riding in educational institutions	■	■	■	Promotion and awareness	4.1
P9	The construction of the systems for temporary storage of vehicles within adjacent areas	■			Infrastructure	2.2, 5.3
P10	The construction of a system for permanent car storage		■	■	Infrastructure	2.1, 2.4, 6.1
P12	The construction of Park-and-ride car parkings outside the city centre with the possibility of quick and comfortable transfers to public transport to continue the trip to the centre			■	Infrastructure	1.4, 2.1, 2.4
PT1	Conduct regular training in the field of management, development of Public transport and the collection and analysis of traffic data to members of the relevant local authorities	■	■	■	Capacity development	1.1, 1.2
PT3	The introduction of an automated accounting system for fare payment (AASFP) in urban passenger transport of Poltava	■			Management and organization	1.1, 1.2, 3.2
PT14	Purchase of low-floor trolley buses	■	■	■	Infrastructure	1.1
PT15	The overhaul and current repair of rolling stock of trolleybus Park	■	■	■	Infrastructure	1.1

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
PT16	Technical re-equipment of contact, cable network and traction substations	■	■	■	Infrastructure	1.1
PT17	The construction of the trolleybus line to micro district "Ognivka", “Sady-2”, “Dendropark”		■	■	Infrastructure	1.1
PT32	Developing and promotion of a mobile app for displaying up-to-date traffic information, with screen reader functions for visually impaired people.	■			Promotion and awareness	1.1, 3.3
W5	Repair and reconstruction of pedestrian infrastructure of central part of Poltava	■	■	■	Infrastructure	5.2, 5.3
W6	Expanding of pedestrian zone of Sobornosti street	■			Infrastructure	5.2, 5.3
W7	Sitting facilities introduction in public spaces	■	■		Infrastructure	5.2, 5.3, 6.2
W8	Public toilets establishment in public spaces		■	■	Infrastructure	5.2, 5.3, 6.3
W9	Overhaul of outdoor lighting networks with replacement of lamps with LED lamp on LED	■	■		Infrastructure	4.3, 5.3, 6.1
W13	Construction of walking tourist routes			■	Promotion and awareness	5.2, 5.3
W14	Development of recreational zones near Vorskla river		■		Infrastructure	5.2, 5.3
W15	Reconstruction and repairing of small parks ("squares")	■	■	■	Infrastructure	5.2, 5.3
W16	Reconstruction and repairing of boulevards	■	■	■	Infrastructure	5.2, 5.3
W18	Development of recreational zones near Kolomak river		■		Infrastructure	5.2, 5.3

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
W21	Reconstruction / repair of sidewalks, roads, land, overground, underground passages taking into account needs of low-mobility categories of population	■	■	■	Infrastructure	5.2, 5.3
W22	Prohibition or restriction of traffic on the major roads of the city, and giving priority to pedestrians and cyclists on weekends and holidays	■			Infrastructure	6.1
W26	Capacity building of self-governing authorities representatives (workshops / trainings) in the field of walking and development of barrier-free environment	■	■	■	Capacity development	5.1
S3	Development and implementation of programme for repairing, maintenance and monitoring of street infrastructure	■			Management and organization	6.1
S4	Development and implementation of programme for road safety increase	■			Management and organization	6.1
S5	Organization of exits from the adjoining territories to the main streets in one level with the sidewalk	■	■	■	Infrastructure	6.1
S6	Construction of safe and inclusive ground pedestrian crossings	■	■	■	Infrastructure	5.3, 6.1
S13	30 km/h zones introduction		■		Infrastructure	6.1
S27	Conduction of traffic safety lessons in educational institutions	■	■	■	Promotion and awareness	6.2
S28	Participation of the city in Days of road safety and others	■	■	■	Promotion and awareness	6.1, 6.2
S29	Capacity building of self-governing authorities representatives (workshops / trainings) in the field of road safety	■	■	■	Capacity development	6.1, 6.2
S31	Organization of safe land transitions and crossings, arrangement of a crossroads while designing new territories, in particular on the Lazurna str. (microdistrict artskladi, 57)		■	■	Infrastructure	6.1, 5.3, 4.3

Scenario 2 – Continue and Expand

	Actions	Year of implementation			Category	Complience with Goals
№		2023	2028	2033		
C1	The development of the City target program of development of Cycling infrastructure	■			Infrastructure	4.1, 4.2, 4.3
C6	The construction of the main bike trail "Almaznyi-Korpusnyi sad"	■			Infrastructure	1.4, 4.1, 4.3
C7	The construction of main and tourist Cycling route "Zyhina-Bila altanka"	■			Infrastructure	1.4, 4.1, 4.3
C8	The construction of the main Bicycle route "Ohnivka-str. Sobornosti"	■			Infrastructure	1.4, 4.1, 4.3
C9	The construction of main and tourist Cycling route "Pole Poltavskoi bytvy - Arboretum-Zyhina"		■		Infrastructure	1.4, 4.1, 4.3
C10	The construction of the main Bicycle route "Pivdennyi vokzal-Korpusnyi sad"	■			Infrastructure	1.4, 4.1, 4.3
C11	The construction of the main Bicycle route "Bus station-Polovky-Brailky-Zyhina"		■		Infrastructure	1.4, 4.1, 4.3
C12	Improvement of the road network of stations for charging electric bikes		■		Infrastructure	4.3
C13	Improvement of the road network of stations for repair and maintenance of bicycles	■			Infrastructure	4.3
C14	Development and design safe crossings for cyclists at crossroads	■	■	■	Infrastructure	4.3, 5.3, 6.1, 6.2
C15	The construction of a recreational route along the river Vorskla	■			Infrastructure	4.1, 4.3
C16	The construction of a recreational route in the Arboretum		■		Infrastructure	4.1, 4.3

	Actions	Year of implementation			Category	Complience with Goals
№		2023	2028	2033		
C17	The construction of a recreational route along Pushkarivska balka			■	Infrastructure	4.1, 4.3
C18	Improvement of skill of city planners and engineers in transport technologies of organization and planning of cycling	■			Capacity development	4.2
C23	The integration of Bicycle transport with public transport		■		Infrastructure	1.4, 4.1, 4.3
C25	The European mobility week	■	■	■	Promotion and awareness	4.1
C26	The holding of activities by Bike to work	■	■	■	Promotion and awareness	4.1
C27	Holding of the Bicycle day	■	■	■	Promotion and awareness	4.1
C28	Development and implementation of the tourist Bicycle tours	■	■	■	Promotion and awareness	4.1
C30	Holding of lessons of bike riding in educational institutions	■	■	■	Promotion and awareness	4.1
P9	The construction of the systems for temporary storage of vehicles within adjacent areas	■			Infrastructure	2.2, 5.3
P10	The construction of a system for permanent car storage		■	■	Infrastructure	2.1, 2.4, 6.1
P12	The construction of Park-and-ride car parks outside the city centre with the possibility of quick and comfortable transfers to public transport to continue the trip to the centre		■		Infrastructure	1.4, 2.1, 2.4
P13	The development of cargo terminals and the transport and logistics centre on the periphery of the city			■	Infrastructure	2.3, 2.4, 6.1
PT1	Conduct regular training in the field of management, development of Public transport and the collection and analysis of traffic data to members of the relevant local authorities	■	■	■	Capacity development	1.1, 1.2

№	Actions	Year of implementation			Category	Complience with Goals
		2023	2028	2033		
PT5	The introduction of an automated accounting system for fare payment (AASFP) in urban passenger transport of Poltava	■			Management and organization	1.1, 1.2, 3.2
PT9	The construction of a new bus station in the direction Poltava-Kremenchuk		■	■	Infrastructure	1.1, 1.2, 1.4, 2.1
PT10	The elimination of the commuter bus station at the central market	■			Infrastructure	1.1, 1.2
PT11	Construction of the trolleybus line in the districts "57" and "artsklady"		■	■	Infrastructure	1.1, 1.2, 1.4, 2.2
PT14	Purchase of low-floor trolley buses	■	■	■	Infrastructure	1.1
PT15	The overhaul and current repair of rolling stock of trolleybus Park	■	■	■	Infrastructure	1.1
PT16	Technical re-equipment of contact, cable network and traction substations	■	■	■	Infrastructure	1.1
PT17	The construction of the trolleybus line to micro district "Ognivka", “Sady-2”, “Dendropark”	■	■		Infrastructure	1.1
PT18	Construction of new traction substations		■		Infrastructure	1.1
PT20	Purchase of low-floor buses for city routes		■		Infrastructure	1.1, 1.3
PT27	The introduction of the public bike rental (Bike sharing)		■		Infrastructure	1.4, 4.1
PT31	Installation of information boards with timetables of transport at stops	■	■		Promotion and awareness	1.1, 3.4
W5	Repair and reconstruction of pedestrian infrastructure of central part of Poltava	■	■	■	Infrastructure	5.2, 5.3
W7	Sitting facilities introduction in public spaces	■	■		Infrastructure	5.2, 5.3, 6.2

№	Actions	Year of implementation			Category	Complience with Goals
		2023	2028	2033		
W8	Public toilets establishment in public spaces		■	■	Infrastructure	5.2, 5.3, 6.3
W9	Overhaul of outdoor lighting networks with replacement of lamps with LED lamp on LED	■	■		Infrastructure	4.3, 5.3, 6.1
W11	Repair and reconstruction of pedestrian infrastructure in residential areas of the city		■	■	Infrastructure	5.2, 5.3
W14	Development of recreational zones near Vorskla river	■			Infrastructure	5.2, 5.3
W15	Reconstruction and repairing of small parks ("squares")	■	■	■	Infrastructure	5.2, 5.3
W16	Reconstruction and repairing of boulevards	■	■	■	Infrastructure	5.2, 5.3
W17	Reconstruction and repairing of parks	■	■	■	Infrastructure	5.2, 5.3
W18	Development of recreational zones near Kolomak river	■			Infrastructure	5.2, 5.3
W21	Reconstruction / repair of sidewalks, roads, land, overground, underground passages taking into account needs of low-mobility categories of population	■	■	■	Infrastructure	5.2, 5.3
W22	Prohibition or restriction of traffic on the major roads of the city, and giving priority to pedestrians and cyclists on weekends and holidays	■			Infrastructure	6.1
W26	Capacity building of self-governing authorities representatives (workshops / trainings) in the field of walking and development of barrier-free environment	■	■	■	Capacity development	5.1
S4	Development and implementation of programme for road safety increase	■			Management and organization	6.1
S5	Organization of exits from the adjoining territories to the main streets in one level with the sidewalk	■	■	■	Infrastructure	6.1

	Actions	Year of implementation			Category	Complience with Goals
№		2023	2028	2033		
S6	Construction of safe and inclusive ground pedestrian crosswalks	■	■	■	Infrastructure	5.3, 6.1
S7	Construction of a one-level overpass at the intersection of Myru and B. Khmelnitskoho streets		■		Infrastructure	6.1
S10	Construction of a one-level overpass at the intersection of Yevropeys'koyi and European and Nebesnoyi Sotni streets		■	■	Infrastructure	6.1
S13	30 km/h zones introduction		■		Infrastructure	6.1
S18	Revision of existing hierarchy of streets and roads	■			Infrastructure	2.4, 6.1
S20	Including independent "road safety audit" component to the projects of streets repairing and reconstruction	■	■	■	Management and organization	6.1
S24	Installation of the equipment of the automatic video recording system of traffic violation violations	■			Infrastructure	3.4, 6.1
S27	Conduction of traffic safety lessons in educational institutions	■	■	■	Promotion and awareness	6.2
S28	Participation of the city in Days of road safety and others	■	■	■	Promotion and awareness	6.1, 6.2
S29	Capacity building of self-governing authorities representatives (workshops / trainings) in the field of road safety	■	■	■	Capacity development	6.1, 6.2
S31	Organization of safe land transitions and crossings, arrangement of a crossroads while designing new territories, in particular on the Lazurna str. (microdistrict artskladi, 57)	■	■		Infrastructure	6.1, 5.3, 4.3

Scenario 3 – Reorganize and Prepare

	Actions	Year of implementation			Category	Compliance with Goals
№		2023	2028	2033		
C1	The development of the City target program of development of Cycling infrastructure	■			Infrastructure	4.1, 4.2, 4.3
C2	The creation and approval at the municipal level the responsible for the development of Cycling transport terms of reference	■			Management and organization	4.2
C3	Inclusion of principles on maintenance of cycling infrastructure to the rules of improvement of territories of Poltava	■			Management and organization	4.2
C4	The development of a monitoring system and auditing Cycling infrastructure in the city	■	■	■	Monitoring and data collection	4.2, 4.3
C5	A survey of cyclists in the city	■	■	■	Monitoring and data collection	4.2, 4.3
C6	The construction of the main bike trail "Almaznyi-Korpusnyi sad"	■			Infrastructure	1.4, 4.1, 4.3
C7	The construction of main and tourist Cycling route "Zyhina-Bila altanka"	■			Infrastructure	1.4, 4.1, 4.3
C8	The construction of the main Bicycle route "Ohnivka-str. Sobornosti"		■		Infrastructure	1.4, 4.1, 4.3
C9	The construction of main and tourist Cycling route "Pole Poltavskoi bytvy - Arboretum-Zyhina"		■		Infrastructure	1.4, 4.1, 4.3
C10	The construction of the main Bicycle route "Pivdennyi vokzal-Korpusnyi sad"	■			Infrastructure	1.4, 4.1, 4.3
C11	The construction of the main Bicycle route "Bus station-Polovky-Brailky-Zyhina"			■	Infrastructure	1.4, 4.1, 4.3
C12	Improvement of the road network of stations for charging electric bikes			■	Infrastructure	4.3

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
C13	Improvement of the road network of stations for repair and maintenance of bicycles	■			Infrastructure	4.3
C14	Development and design safe crossings for cyclists at crossroads	■	■	■	Infrastructure	4.3, 5.3, 6.1, 6.2
C18	Improvement of skill of city planners and engineers in transport technologies of organization and planning of cycling	■			Capacity development	4.2
C19	Ensuring safe and smooth movement of cyclists in the planning of construction and repairs of streets and roads included in the scheme of placing of objects of Cycling infrastructure development Concept for Cycling infrastructure of Poltava	■			Management and organization	4.3
C20	Integration of new districts / zones new buildings with a network of Cycling infrastructure of Poltava on the level of planning for these areas	■	■	■	Infrastructure	4.1, 4.3
C22	Organization of contra-flow movement at one sided roads	■			Infrastructure	4.3
C23	The integration of Bicycle transport with public transport		■		Infrastructure	1.4, 4.1, 4.3
C24	The development of cycling routes that connect the city with suburban area according to the concept of development of Cycling infrastructure in Poltava		■	■	Infrastructure	4.1, 4.3
C25	The European mobility week	■	■	■	Promotion and awareness	4.1
C26	The holding of activities by Bike to work	■	■	■	Promotion and awareness	4.1
C27	Holding of the Bicycle day	■	■	■	Promotion and awareness	4.1
C28	Development and implementation of the tourist Bicycle tours	■	■	■	Promotion and awareness	4.1

	Actions	Year of implementation			Category	Compliance with Goals
№		2023	2028	2033		
C29	Popularize the use of electric bikes		■	■	Promotion and awareness	4.1
C30	Holding of lessons of bike riding in educational institutions	■	■	■	Promotion and awareness	4.1
ITS1	Development of the concept "ITS Poltava"	■			Management and organization	3.1, 3.2, 3.3, 3.4
ITS2	The establishment of responsible authority for the organization and management of the unified data system	■			Management and organization	3.1, 3.4
ITS3	The creation of a unified information system of collection, processing and analysis of sustainable development of the city	■			Monitoring and data collection	3.1, 3.2, 3.3
ITS4	Development and updating of transport model of the city	■			Monitoring and data collection	1.2, 3.1
ITS5	The implementation of "Safe city"	■	■	■	Infrastructure	3.1, 3.2, 3.4, 6.1
ITS6	Development of the concept of implementation of the automated system of traffic management in the city of Poltava		■		Infrastructure	1.2, 1.5, 2.4, 3.3, 3.4, 6.1
ITS7	Integration of the system "Safe city" with the Uniform system of collection, processing and analysis of sustainable development of the city		■		Infrastructure	3.1, 6.1
ITS8	Development of an interactive map of the city and the surrounding areas		■		Promotion and awareness	3.1, 3.3
ITS9	Improvement of the skills of city planners and transport engineers in the field of transport planning and ITS	■	■	■	Capacity development	3.1, 6.2
P1	Development of the concept of Parking space and tariff policy in Poltava	■			Management and organization	2.1, 2.2, 2.3, 2.4, 6.1
P2	Creation of municipal service for control of Parking	■			Management and organization	2.1, 2.2, 2.3, 2.4, 6.1

	Actions	Year of implementation			Category	Compliance with Goals
№		2023	2028	2033		
P3	The concept of the movement, unloading and parking of freight transport within Poltava	■			Management and organization	2.1, 2.3, 2.4
P4	Arrangement of paid parking areas	■			Management and organization	2.1, 2.4, 4.3, 5.3
P5	Arrangement of parking zones by payment terminals and video surveillance	■	■	■	Management and organization	2.1, 2.4, 4.3, 5.4
P6	Arrangement of out-of-street parking zones	■	■	■	Management and organization	2.1, 2.4, 4.3, 5.5
P7	Gradual arrangement of places for recharging electric cars in parking zones in the planned amount of 5% of the total number of parking spaces		■	■	Management and organization	2.1, 2.4, 4.3, 5.6
P8	Development and implementation of navigation and information about the availability of parking places	■			Promotion and awareness	2.1, 2.4, 3.3, 6.1
P9	The construction of the systems for temporary storage of vehicles within adjacent areas	■			Infrastructure	2.2, 5.3
P10	The construction of a system for permanent car storage		■	■	Infrastructure	2.1, 2.4, 6.1
P11	Arrangement of parking places for long-term storage of bicycles near transport-junction knots	■	■		Infrastructure	2.1, 2.4, 6.2
P12	The construction of Park-and-ride car parks outside the city centre with the possibility of quick and comfortable transfers to public transport to continue the trip to the centre			■	Infrastructure	1.4, 2.1, 2.4
P14	Improvement of the skills of city planners and transport engineers in planning and Parking space organization	■	■	■	Capacity development	3.1, 6.2
P15	Improvement of the skills of city planners and transport engineers in planning freight transport in urban areas	■	■	■	Capacity development	3.1, 6.2

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
P16	The introduction of a system of monitoring of the use of Parking spaces	■	■	■	Monitoring and data collection	3.1, 6.2
P17	Obligations of public institutions and institutions of Commerce to organize a parking space for the temporary storage of private cars	■			Management and organization	2.3, 6.1
P18	Obligations of public institutions and institutions of Commerce to organize a parking space for the temporary storage of bicycles	■			Management and organization	2.3, 4.3, 6.1
P19	Account for the movement of freight transport in planning the development of new territories and development of a detailed plan of the territory	■			Infrastructure	2.3, 2.4
PT1	Conduct regular training in the field of management, development of Public transport and the collection and analysis of traffic data to members of the relevant local authorities	■	■	■	Capacity development	1.1, 1.2
PT2	Changes to the conditions of the competition for the transportation of passengers on city bus routes	■			Management and organization	1.1, 1.2
PT3	The creation of a single centralised management system of public transport in the city	■			Management and organization	1.1, 1.2
PT4	Development and approval of the concept of integration of public transport and Poltava agglomeration			■	Management and organization	1.1, 1.2, 1.3, 1.4, 3.2
PT5	The introduction of an automated accounting system for fare payment (AASFP) in urban passenger transport of Poltava	■			Management and organization	1.1, 1.2, 3.2
PT6	The introduction of common ticket for all public transport		■		Management and organization	1.1, 1.2, 1.4, 3.2
PT7	Route optimisation of urban passenger transport	■			Management and organization	1.1, 1.2, 1.3, 1.4

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
PT8	Development and implementation of new schemes of road traffic organization from proration for public transport		■		Management and organization	1.1, 1.5, 3.4
PT9	The construction of a new bus station in the direction Poltava-Kremenchuk		■	■	Infrastructure	1.1, 1.2, 1.4, 2.1
PT10	The elimination of the commuter bus station near central market		■		Infrastructure	1.1, 1.2
Pt11	Construction of the trolleybus line in the districts "57" and "Artsklady"			■	Infrastructure	1.1, 1.2, 1.4, 2.2
PT12	Construction of transport-transfer nodes at commuter transport stops and their integration with the system of urban transport		■	■	Infrastructure	1.1, 1.2, 1.4, 2.5
PT13	Arranging of toilets for staff (drivers, conductors) on the routes		■	■	Infrastructure	1.1, 1.2, 1.4, 2.6
PT14	Purchase of low-floor trolley buses	■	■	■	Infrastructure	1.1
PT15	The overhaul and current repair of rolling stock of trolleybus Park	■	■	■	Infrastructure	1.1
PT16	Technical re-equipment of contact, cable network and traction substations	■	■	■	Infrastructure	1.1
PT17	The construction of the trolleybus line to micro district "Ognivka", “Sady-2”, “Dendropark”		■	■	Infrastructure	1.1
PT19	The transfer of public transport (communal and private ownership) to liquefied natural gas	■			Management and organization	1.1
PT20	Purchase of low-floor buses for city routes			■	Infrastructure	1.1, 1.3

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
PT21	Conducting the audit of state of stopping points in Poltava	■			Monitoring and data collection	1.1, 1.3
PT22	The repair and reconstruction of roadside stations in accordance with the norms and standards and tailored to the needs of people with limited mobility	■	■	■	Infrastructure	1.1, 1.3
PT23	Creation of a unified public transport dispatch system	■			Monitoring and data collection	1.1,1.2, 3.1, 3.3
PT24	Monitoring compliance with the terms of the tenders for the transportation of passengers	■	■	■	Monitoring and data collection	1.1, 1.2
PT25	A study on the mobility of the population	■	■	■	Monitoring and data collection	1.1, 1.2
PT26	The study of the level of satisfaction of the population by public transport	■	■	■	Monitoring and data collection	1.1, 1.2
PT28	The introduction of a system of public car rental (car share)			■	Infrastructure	1.4
PT30	Additional equipment of rolling stock of public transport by means of satellite tracking	■			Infrastructure	1.1, 1.2, 3.4
PT32	Developing and promotion of a mobile app to display current information about traffic	■			Promotion and awareness	1.1, 3.3
PT33	Integration of new districts / zones new development in the public transport network on the level of planning for these areas	■	■	■	Infrastructure	1.1, 1.2, 1.3
PT35	Establishment of urban policy "Developer contributions"	■			Management and organization	1.1, 1.2, 1.3
W1	Development and implementation of Program for Street Design	■			Management and organization	1.3, 5.1, 5.2, 5.3
W2	Updating the rules of landscaping for the maintenance of sidewalks and other pedestrian infrastructure	■			Management and organization	5.1, 5.3
W3	Creation of an unhindered land route between the Korpusniy Sad and the pedestrian part of the Sobornosti street	■			Management and organization	5.1

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
W4	The creation and approval at the municipal level the responsible for the development of pedestrian infrastructure terms of reference	■			Management and organization	5.1
W5	Repair and reconstruction of pedestrian infrastructure of central part of Poltava	■	■	■	Infrastructure	5.2, 5.3
W6	Expanding of pedestrian zone of Sobornosti street	■			Infrastructure	5.2, 5.3
W7	Sitting facilities introduction in public spaces	■	■		Infrastructure	5.2, 5.3, 6.2
W8	Public toilets establishment in public spaces		■	■	Infrastructure	5.2, 5.3, 6.3
W9	Overhaul of outdoor lighting networks with replacement of lamps with LED lamp on LED	■	■		Infrastructure	4.3, 5.3, 6.1
W10	Development of pedestrian corridor between Sobornosti str and Peremohy park		■		Infrastructure	5.2, 5.3
W11	Repair and reconstruction of pedestrian infrastructure in residential areas of the city		■	■	Infrastructure	5.2, 5.3
W12	Development and implementation of city navigation (for pedestrians, cyclists, tourists)		■	■	Promotion and awareness	3.3, 5.2, 5.3
W13	Construction of walking tourist routes			■	Promotion and awareness	5.2, 5.3
W14	Development of recreational zones near Vorskla river		■		Infrastructure	5.2, 5.3
W15	Reconstruction and repairing of small parks ("squares")	■	■	■	Infrastructure	5.2, 5.3
W16	Reconstruction and repairing of boulevards	■	■	■	Infrastructure	5.2, 5.3
W17	Reconstruction and repairing of parks	■	■	■	Infrastructure	5.2, 5.3
W18	Development of recreational zones near Kolomak river		■		Infrastructure	5.2, 5.3

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
W19	Introduction of traffic calming measures at pedestrian crossings	■	■		Infrastructure	5.3, 6.1
W20	Introduction of "smart" pedestrian crossings			■	Infrastructure	3.4, 5.1, 5.2, 5.3, 6.1
W21	Reconstruction / repair of sidewalks, roads, land, overground, underground passages taking into account needs of low-mobility categories of population	■	■	■	Infrastructure	5.2, 5.3
W22	Prohibition or restriction of traffic on the major roads of the city, and giving priority to pedestrians and cyclists on weekends and holidays	■			Infrastructure	6.1
W23	Development of high quality pedestrian passes in new city districts / on development territories and integration them with existing city pedestrian passes network	■			Infrastructure	5.2, 5.3,
W24	Restrictions on the movement of individual transport along the ring of Soborna Street (Korpususy Sad) from underground crossing “Zlatomisto” to Kadetskiy corpus from the side of the Poltava city council and giving priority to pedestrians and cyclists on weekends and holidays		■		Infrastructure	5.2, 5.3,
W25	Monitoring and auditing of pedestrian infrastructure	■	■	■	Infrastructure	5.1, 5.2, 5.3, 6.1
W26	Capacity building of self-governing authorities representatives (workshops / trainings) in the field of walking and development of barrier-free environment	■	■	■	Capacity development	5.1
S1	Development of "Vision Zero concept for Poltava"	■			Management and organization	6.1, 6.2, 6.3
S2	Establishment of municipal authority, responsible for road safety coordination in Poltava, creation of a relevant body (for example, the Commission on Road Safety or the Working Group on Road Safety)	■			Management and organization	6.1
S3	Development and implementation of programme for repairing, maintenance and monitoring of street infrastructure	■			Management and organization	6.1
S4	Development and implementation of programme for road safety increase	■			Management and organization	6.1

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
S5	Organization of exits from the adjoining territories to the main streets in one level with the sidewalk	■	■	■	Infrastructure	6.1
S6	Construction of safe and inclusive ground pedestrian crosswalks	■	■	■	Infrastructure	5.3, 6.1
S12	Realization of pilot infrastructure projects in order to increase traffic safety in the city		■		Infrastructure	4.3, 5.3, 6.1, 6.2
S13	30 km/h zones introduction		■		Infrastructure	6.1
S15	Development of street and road passports in Poltava	■			Monitoring and data collection	1.5,2.1, 2.3
S16	Road Traffic Safety Audit School Routes	■			Promotion and awareness	6.1
S17	Construction and elimination of high danger areas on school routes	■			Infrastructure	7.1
S18	Revision of existing hierarchy of streets and roads	■			Infrastructure	2.4, 6.1
S19	Implement inclusive planning practices for increased security infrastructure		■		Promotion and awareness	6.1
S20	Including independent "road safety audit" component to the projects of streets repairing and reconstruction	■	■	■	Management and organization	6.1
S21	Conduct "Road safety audit" for streets and roads of Poltava	■			Monitoring and data collection	4.3, 5.3, 6.1
S22	Development of City Road Safety Monitoring and Data Collection System	■	■	■	Monitoring and data collection	6.1, 6.2
S23	Creation of a special technical commission for investigation of fatal accidents	■			Monitoring and data collection	6.1, 6.2
S24	Installation of the equipment of the automatic video recording system of traffic violation violations	■			Infrastructure	3.4, 6.1
S25	Activities in the field of road safety promotion by police	■	■	■	Promotion and	6.1, 6.2

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
					awareness	
S26	Promo campaign for safety speed limits in the city	■	■	■	Promotion and awareness	6.1, 6.2
S27	Conduction of traffic safety lessons in educational institutions	■	■	■	Promotion and awareness	6.2
S28	Participation of the city in Days of road safety and others	■	■	■	Promotion and awareness	6.1, 6.2
S29	Capacity building of self-governing authorities representatives (workshops / trainings) in the field of road safety	■	■	■	Capacity development	6.1, 6.2
S30	Development and implementation of programme Emergency reaction to accidents		■		Management and organization	6.1, 6.3
S31	Organization of safe land transitions and crossings, arrangement of a crossroads while designing new territories, in particular on the Lazurna str. (microdistrict artskladi, 57)			■	■	6.1, 5.3, 4.3

Scenario 4 – Transformation

	Actions	Year of implementation			Category	Compliance with Goals
№		2023	2028	2033		
C1	The development of the City target program of development of Cycling infrastructure	■			Infrastructure	4.1, 4.2, 4.3
C2	The creation and approval at the municipal level the responsible for the development of Cycling transport terms of reference	■			Management and organization	4.2
C3	Inclusion of principles on maintenance of cycling infrastructure to the rules of improvement of territories of Poltava	■			Management and organization	4.2
C4	The development of a monitoring system and auditing Cycling infrastructure in the city	■	■	■	Monitoring and data collection	4.2, 4.3
C5	A survey of cyclists in the city	■	■	■	Monitoring and data collection	4.2, 4.3
C6	The construction of the main bike trail "Almaznyi-Korpusnyi sad"	■			Infrastructure	1.4, 4.1, 4.3
C7	The construction of main and tourist Cycling route "Zyhina-Bila altanka"	■			Infrastructure	1.4, 4.1, 4.3
C8	The construction of the main Bicycle route "Ohnivka-str. Sobornosti"	■			Infrastructure	1.4, 4.1, 4.3
C9	The construction of main and tourist Cycling route "Pole Poltavskoi bytvy - Arboretum-Zyhina"		■		Infrastructure	1.4, 4.1, 4.3
C10	The construction of the main Bicycle route "Pivdennyi vokzal-Korpusnyi sad"	■			Infrastructure	1.4, 4.1, 4.3
C11	The construction of the main Bicycle route "Bus station-Polovky-Brailky-Zyhina"		■		Infrastructure	1.4, 4.1, 4.3

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
C12	Improvement of the road network of stations for charging electric bikes		■		Infrastructure	4.3
C13	Improvement of the road network of stations for repair and maintenance of bicycles	■			Infrastructure	4.3
C14	Development and design safe crossings for cyclists at crossroads	■	■	■	Infrastructure	4.3, 5.3, 6.1, 6.2
C15	The construction of a recreational route along the river Vorskla	■			Infrastructure	4.1, 4.3
C16	The construction of a recreational route in the Arboretum		■		Infrastructure	4.1, 4.3
C17	The construction of a recreational route along Pushkarivska balka			■	Infrastructure	4.1, 4.3
C18	Improvement of skill of city planners and engineers in transport technologies of organization and planning of cycling	■			Capacity development	4.2
C19	Ensuring safe and smooth movement of cyclists in the planning of construction and repairs of streets and roads included in the scheme of placing of objects of Cycling infrastructure development Concept for Cycling infrastructure of Poltava	■			Management and organization	4.3
C20	Integration of new districts / zones new buildings with a network of Cycling infrastructure of Poltava on the level of planning for these areas	■	■	■	Infrastructure	4.1, 4.3
C21	Integration of 57-district and "artsklady" district with a network of Cycling infrastructure of Poltava on the level of building	■			Infrastructure	4.1, 4.4
C22	Organization of contra-flow movement at one sided roads	■			Infrastructure	4.3
C23	The integration of Bicycle transport with public transport		■		Infrastructure	1.4, 4.1, 4.3

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
C24	The development of cycling routes that connect the city with suburban area according to the concept of development of Cycling infrastructure in Poltava		■	■	Infrastructure	4.1, 4.3
C25	The European mobility week	■	■	■	Promotion and awareness	4.1
C26	The holding of activities by Bike to work	■	■	■	Promotion and awareness	4.1
C27	Holding of the Bicycle day	■	■	■	Promotion and awareness	4.1
C28	Development and implementation of the tourist Bicycle tours	■	■	■	Promotion and awareness	4.1
C29	Popularize the use of electric bikes		■	■	Promotion and awareness	4.1
C30	Holding of lessons of bike riding in educational institutions	■	■	■	Promotion and awareness	4.1
ITS1	Development of the concept "ITS Poltava"	■			Management and organization	3.1, 3.2, 3.3, 3.4
ITS2	The establishment of responsible authority for the organization and management of the unified data system	■			Management and organization	3.1, 3.4
ITS3	The creation of a unified information system of collection, processing and analysis of sustainable development of the city	■			Monitoring and data collection	3.1, 3.2, 3.3
ITS4	Development and updating of transport model of the city	■			Monitoring and data collection	1.2, 3.1
ITS5	The implementation of "Safe city"	■			Infrastructure	3.1, 3.2, 3.4, 6.1
ITS6	Development of the concept of implementation of the automated system of traffic management in the city of Poltava		■		Infrastructure	1.2, 1.5, 2.4, 3.3, 3.4, 6.1

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
ITS7	Integration of the system "Safe city" with the Uniform system of collection, processing and analysis of sustainable development of the city		■		Infrastructure	3.1, 6.1
ITS8	Development of an interactive map of the city and the surrounding areas		■		Promotion and awareness	3.1, 3.3
ITS9	Improvement of the skills of city planners and transport engineers in the field of transport planning and ITS	■	■	■	Capacity development	3.1, 6.2
P1	Development of the concept of Parking space and tariff policy in Poltava	■			Management and organization	2.1, 2.2, 2.3, 2.4, 6.1
P2	Creation of municipal service for control of Parking	■			Management and organization	2.1, 2.2, 2.3, 2.4, 6.1
P3	The concept of the movement, unloading and parking of freight transport within Poltava	■			Management and organization	2.1, 2.3, 2.4
P4	Arrangement of paid parking areas	■			Management and organization	2.1, 2.4, 4.3, 5.3
P5	Arrangement of parking zones by payment terminals and video surveillance	■	■	■	Management and organization	2.1, 2.4, 4.3, 5.4
P6	Arrangement of out-of-street parking zones	■	■	■	Management and organization	2.1, 2.4, 4.3, 5.5
P7	Gradual arrangement of places for recharging electric cars in parking zones in the planned amount of 5% of the total number of parking spaces		■	■	Management and organization	2.1, 2.4, 4.3, 5.6
P8	Development and implementation of navigation and information about the availability of parking places	■			Promotion and awareness	2.1, 2.4, 3.3, 6.1
P9	The construction of the systems for temporary storage of vehicles within adjacent areas	■			Infrastructure	2.2, 5.3

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
P10	The construction of a system for permanent car storage		■	■	Infrastructure	2.1, 2.4, 6.1
P11	Arrangement of parking places for long-term storage of bicycles near transport-junction knots	■	■		Infrastructure	2.1, 2.4, 6.2
P12	The construction of Park-and-ride car parks outside the city centre with the possibility of quick and comfortable transfers to public transport to continue the trip to the centre		■		Infrastructure	1.4, 2.1, 2.4
P13	The development of cargo terminals and the transport and logistics centre on the periphery of the city			■	Infrastructure	2.3, 2.4, 6.1
P14	Improvement of the skills of city planners and transport engineers in planning and Parking space organization	■	■	■	Capacity development	3.1, 6.2
P15	Improvement of the skills of city planners and transport engineers in planning freight transport in urban areas	■	■	■	Capacity development	3.1, 6.2
P16	The introduction of a system of monitoring of the use of Parking spaces	■	■	■	Monitoring and data collection	3.1, 6.2
P17	Obligations of public institutions and institutions of Commerce to organize a parking space for the temporary storage of private cars	■			Management and organization	2.3, 6.1
P18	Obligations of public institutions and institutions of Commerce to organize a parking space for the temporary storage of bicycles	■			Management and organization	2.3, 4.3, 6.1
P19	Account for the movement of freight transport in planning the development of new territories and development of a detailed plan of the territory	■			Infrastructure	2.3, 2.4
PT1	Conduct regular training in the field of management, development of Public transport and the collection and analysis of traffic data to members of the relevant local authorities	■	■	■	Capacity development	1.1, 1.2

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
PT2	Changes to the conditions of the competition for the transportation of passengers on city bus routes	■			Management and organization	1.1, 1.2
PT3	The creation of a single centralised management system of public transport in the city	■			Management and organization	1.1, 1.2
PT4	Development and approval of the concept of integration of public transport and Poltava agglomeration		■	■	Management and organization	1.1, 1.2, 1.3, 1.4, 3.2
PT5	The introduction of an automated accounting system for fare payment (AASFP) in urban passenger transport of Poltava	■			Management and organization	1.1, 1.2, 3.2
PT6	The introduction of common ticket for all public transport		■		Management and organization	1.1, 1.2, 1.4, 3.2
PT7	Route optimization of urban passenger transport	■			Management and organization	1.1, 1.2, 1.3, 1.4
PT8	Development and implementation of new schemes of road traffic organization from proration for public transport		■		Management and organization	1.1, 1.5, 3.4
PT9	The construction of a new bus station in the direction Poltava-Kremenchuk		■		Infrastructure	1.1, 1.2, 1.4, 2.1
PT10	The elimination of the commuter bus station on central market	■			Infrastructure	1.1, 1.2
PT11	Construction of the trolleybus line in the districts "57" and "artsklady"		■	■	Infrastructure	1.1, 1.2, 1.4, 2.2
PT12	Construction of transport-transfer nodes at commuter transport stops and their integration with the system of urban transport		■		Infrastructure	1.1, 1.2, 1.4, 2.5
PT13	Arranging of toilets for staff (drivers, conductors) on the routes		■		Infrastructure	1.1, 1.2, 1.4, 2.6
PT14	Purchase of low-floor trolley buses	■	■	■	Infrastructure	1.1

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
PT15	The overhaul and current repair of rolling stock of trolleybus Park	■	■	■	Infrastructure	1.1
PT16	Technical re-equipment of contact, cable network and traction substations	■	■	■	Infrastructure	1.1
PT17	The construction of the trolleybus line to micro districts "Ognivka", “Sady-2”, “Dendropark”	■	■		Infrastructure	1.1
PT18	Construction of new traction substations		■		Infrastructure	1.1
PT20	Purchase of low-floor buses for city routes		■		Infrastructure	1.1, 1.3
PT21	Conducting the audit of state of stopping points in Poltava	■			Monitoring and data collection	1.1, 1.3
PT22	The repair and reconstruction of roadside stations in accordance with the norms and standards and tailored to the needs of people with limited mobility	■	■		Infrastructure	1.1, 1.3
PT23	Creation of a unified public transport dispatch system	■			Monitoring and data collection	1.1,1.2, 3.1, 3.3
PT24	Monitoring compliance with the terms of the tenders for the transportation of passengers	■	■	■	Monitoring and data collection	1.1, 1.2
PT25	A study on the mobility of the population	■	■	■	Monitoring and data collection	1.1, 1.2
PT26	The study of the level of satisfaction of the population by public transport	■	■	■	Monitoring and data collection	1.1, 1.2
PT27	The introduction of the public bike rental (Bike sharing)		■		Infrastructure	1.4, 4.1
PT28	The introduction of a system of public car rental (car share)			■	Infrastructure	1.4
PT29	The construction of the line of the funicular from the Cathedral square to St. Anatoly Kukoba (Proletarska)			■	Infrastructure	1.1, 1.3, 1.4
PT30	Additional equipment of rolling stock of public transport by means of satellite	■			Infrastructure	1.1, 1.2, 3.4

	Actions	Year of implementation			Category	Compliance with Goals
№		2023	2028	2033		
	tracking					
PT31	Installation of information boards with timetables of transport at stops	■	■		Promotion and awareness	1.1, 3.4
PT32	Developing and promotion of a mobile app to display current information about traffic with screen reader functions for visually impaired people	■			Promotion and awareness	1.1, 3.3
PT33	Integration of new districts / zones new development in the public transport network on the level of planning for these areas	■	■	■	Infrastructure	1.1, 1.2, 1.3
PT34	Integration of 57 and Artsklady districts in the public transport network on the level of building	■	■		Infrastructure	1.1, 1.2, 1.4
PT35	Establishment of urban policy "Developer contributions"	■			Management and organization	1.1, 1.2, 1.3
PT36	Changing the organisation of traffic on the ring road around Corpusnyi Sad	■			Management and organization	1.1, 1.2, 1.3, 1.4
W1	Development and implementation of Program for Street Design	■			Management and organization	1.3, 5.1, 5.2, 5.3
W2	Updating the rules of landscaping for the maintenance of sidewalks and other pedestrian infrastructure	■			Management and organization	5.1, 5.3
W3	Creation of an unhindered land route between the Korpusniy Sad and the pedestrian part of the Sobornosti street	■			Management and organization	5.1
W4	The creation and approval at the municipal level the responsible for the development of pedestrian infrastructure terms of reference	■			Management and organization	5.1
W5	Repair and reconstruction of pedestrian infrastructure of central part of Poltava	■	■	■	Infrastructure	5.2, 5.3
W6	Expanding of pedestrian zone of Sobornosti street	■			Infrastructure	5.2, 5.3
W7	Sitting facilities introduction in public spaces	■	■		Infrastructure	5.2, 5.3, 6.2

	Actions	Year of implementation			Category	Compliance with Goals
№		2023	2028	2033		
W8	Public toilets establishment in public spaces		■	■	Infrastructure	5.2, 5.3, 6.3
W9	Overhaul of outdoor lighting networks with replacement of lamps with LED lamp on LED	■	■		Infrastructure	4.3, 5.3, 6.1
W10	Development of pedestrian corridor between Sobornosti str and Peremohy park		■		Infrastructure	5.2, 5.3
W11	Repair and reconstruction of pedestrian infrastructure in residential areas of the city		■	■	Infrastructure	5.2, 5.3
W12	Development and implementation of city navigation (for pedestrians, cyclists, tourists)		■	■	Promotion and awareness	3.3, 5.2, 5.3
W13	Construction of walking tourist routes		■		Promotion and awareness	5.2, 5.3
W14	Development of recreational zones near Vorskla river	■			Infrastructure	5.2, 5.3
W15	Reconstruction and repairing of small parks ("squares")	■	■	■	Infrastructure	5.2, 5.3
W16	Reconstruction and repairing of boulevards	■	■	■	Infrastructure	5.2, 5.3
W17	Reconstruction and repairing of parks	■	■	■	Infrastructure	5.2, 5.3
W18	Development of recreational zones near Kolomak river	■			Infrastructure	5.2, 5.3
W19	Introduction of traffic calming measures at pedestrian crossings	■	■		Infrastructure	5.3, 6.1
W20	Introduction of "smart" pedestrian crossings			■	Infrastructure	3.4, 5.1, 5.2, 5.3, 6.1
W21	Reconstruction / repair of sidewalks, roads, land, over ground, underground passages taking into account needs of low-mobility categories of population	■	■	■	Infrastructure	5.2, 5.3

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
W22	Prohibition or restriction of traffic on the major roads of the city, and giving priority to pedestrians and cyclists on weekends and holidays	■			Infrastructure	6.1
W23	Development of high quality pedestrian passes in new city districts / on development territories and integration them with existing city pedestrian passes network	■			Infrastructure	5.2, 5.3
W24	Restrictions on the movement of individual transport along the ring of Soborna Street (Korpususy Sad) from Zlatomisto to Kadetskiy corpus from the side of the Poltava city council and giving priority to pedestrians and cyclists on weekends and holidays		■		Infrastructure	5.2, 5.3
W25	Monitoring and audit of pedestrian infrastructure	■	■	■	Monitoring and data collection	5.1, 5.2, 5.3, 6.1
W26	Capacity building of self-governing authorities representatives (workshops / trainings) in the field of walking and development of barrier-free environment	■	■	■	Capacity development	5.1
W27	Development pedestrian route and construct a suspension bridge on Vorskla near Pryrichnyi Park			■	Capacity development	5.2, 5.3
S1	Development of "Vision Zero concept for Poltava"	■			Management and organization	6.1, 6.2, 6.3
S2	Establishment of municipal authority, responsible for road safety coordination in Poltava	■			Management and organization	6.1
S3	Development and implementation of programme for repairing, maintenance and monitoring of street infrastructure	■			Management and organization	6.1
S4	Development and implementation of programme for road safety increase	■			Management and organization	6.1
S5	Organization of exits from the adjoining territories to the main streets in one level with the sidewalk	■	■	■	Infrastructure	6.1

	Actions	Year of implementation			Category	Compliance with Goals
№		2023	2028	2033		
S6	Construction of safe and inclusive ground pedestrian crosswalks	■	■	■	Infrastructure	5.3, 6.1
S7	Construction of a one-level overpass at the intersection of Myru and B. Khmelnitskoho streets		■		Infrastructure	6.1
S8	Construction of a one-level overpass at the intersection of Sobornosti Street, M. Biryuzova, Zinkivska on the railways crossings		■		Infrastructure	6.1
S9	Construction of a one-level overpass at the intersection of Raisa Kirichenko and Yevropeys'koyi		■		Infrastructure	6.1
S10	Construction of a one-level overpass at the intersection of Yevropeys'koyi and European and Nebesnoyi Sotni		■	■	Infrastructure	6.1
S11	Implementation of the reconstruction project of the M-03 / E40 Kyiv-Kharkiv road in the city of Poltava		■		Infrastructure	6.1
S12	Realization of pilot infrastructure projects in order to increase traffic safety in the city		■		Infrastructure	4.3, 5.3, 6.1, 6.2
S13	30 km/h zones introduction		■		Infrastructure	6.1
S14	Construction of a bypass road		■		Infrastructure	2.4, 6.1
S15	Development of street and road passports in Poltava	■			Monitoring and data collection	1.5,2.1, 2.3
S16	Road Traffic Safety Audit School Routes	■			Promotion and awareness	6.1
S17	Construction and elimination of high danger areas on school routes	■			Infrastructure	6.1
S18	Revision of existing hierarchy of streets and roads	■			Infrastructure	2.4, 6.1
S19	Implement inclusive planning practices for increased security infrastructure		■		Promotion and awareness	6.1

№	Actions	Year of implementation			Category	Compliance with Goals
		2023	2028	2033		
S20	Including independent "road safety audit" component to the projects of streets repairing and reconstruction	■	■	■	Management and organization	6.1
S21	Conduct "Road safety audit" for streets and roads of Poltava	■			Monitoring and data collection	4.3, 5.3, 6.1
S22	Development of City Road Safety Monitoring and Data Collection System	■	■	■	Monitoring and data collection	6.1, 6.2
S23	Creation of a special technical commission for investigation of fatal accidents	■			Monitoring and data collection	6.1, 6.2
S24	Installation of the equipment of the automatic video recording system of traffic violation violations	■			Infrastructure	3.4, 6.1
S25	Activities in the field of road safety promotion by police	■	■	■	Promotion and awareness	6.1, 6.2
S26	Promo campaign for safety speed limits in the city	■	■	■	Promotion and awareness	6.1, 6.2
S27	Conduction of traffic safety lessons in educational institutions	■	■	■	Promotion and awareness	6.2
S28	Participation of the city in Days of road safety and others	■	■	■	Promotion and awareness	6.1, 6.2
S29	Capacity building of self-governing authorities representatives (workshops / trainings) in the field of road safety	■	■	■	Capacity development	6.1, 6.2
S30	Development and implementation of programme Emergency reaction to accidents		■		Management and organization	6.1, 6.3
S31	Organization of safe land transitions and crossings, arrangement of a crossroads while designing new territories, in particular on the Lazurna str. (microdistrict artskladi, 57)	■			Infrastructure	6.1, 5.3, 4.3

Chapter 9 Monitoring system

Monitoring is a crucial element of any strategic document. Ongoing strategic management is only possible with an effective and reliable monitoring scheme. This enables a midterm evaluation of the execution of particular tasks and achievement of goals. The monitoring process is a tool for the objective feedback and reflection on whether the goals that have been set are being achieved or not. Typical key performance indicators are used for measuring development. Such performance indicators are a type of quantitative measurement that allow to see the progress or trend.

For SUMPs, it is recommended to not only use output indicators (such as the number of infrastructures built or trainings provided) and transport activity indicators (such as motorisation rates or traffic flows), but in particular also outcome indicators that directly measure the goals impacted by mobility. Such synthetic mobility indicators usually include also social (safety, satisfaction), environmental (emissions, noise, energy consumption, land use) and economic aspects (price level of transport services, costs and advantages for local authorities and consumers).

SUMP indicators for Poltava have been developed in a highly participatory and iterative process together with the goals for sustainable mobility. The indicators were thoroughly checked for their comprehensiveness and ability to show the progress in achieving the goals.

This chapter describes the monitoring system with a clear structure: for each goal there are one or more indicators that reflect the nature of the goal and allow to monitor its progress. The goals are organised according to priorities and for each priority there is an overall indicator that is relevant to all goals. Each goal has a current status unless such data is not being collected currently and a goal value to be achieved for future periods of 5, 10 and 15 years. At the end of the chapter, there is a table that groups indicators into monitoring tools. Monitoring tools contain a description, the frequency of data collection and the responsible body.

Different indicators have different frequencies of data collection, some of them are collected daily (like road accident data) and grouped into reports quarterly while others are collected once in a year or even few years (for example, the mobility survey). However, it is important that data in all indicators is comparable and that corresponding time periods have been selected.

PRIORITY 1.
Improving the attractiveness of public transport

Overall indicator

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
1.0.	Share of public transport in urban modal split	Trips carried out by public transport divided by total number of trips according to the mobility survey in Poltava	%	55[35]			

Goal 1.1 Improving the quality of public transport services

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
1.1.1.	Punctuality of public transport	Number of vehicles that arrive to a stop for no more than 1 minute before or 4 minutes after the scheduled time	%	N/A			
1.1.2.	Reliability of public transport	Number of complete journeys divided by number of journeys that were pre-scheduled	%	N/A			
1.1.3.	Quality of public transport fleet	Number of public transport fleet that complies with the adopted quality fleet requirements divided by the total number of vehicles in the public transport system	%	N/A			
1.1.4.	Accessibility of public transport	Number of the population that has access to public transport divided by total population	%	87.9[9]			

Goal 1.2 Introduction of efficient public transport management system

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
1.2.1.	Share of municipal management transport	The percentage of rolling stock that is subordinated to municipal transport. Estimated as number of rolling stock owned by municipal transport enterprises or subordinated to company-administrator, divided by the total number of rolling stock	%	15[36]			
1.2.2.	Public transport monitoring level	The percentage of integrated routes that are being integrated into the unified control system that is being operated or accessed by the city and is used to monitor public transport operations	%	24[37]			

Goal 1.3 Improving conditions for people with limited mobility

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
1.3.1.	Accessibility for people with reduced mobility – vehicles	Number of vehicles, equipped for people with disabilities divided by the total number of vehicles in the public transport system	%	11[38]			
1.3.2.	Accessibility for people with reduced mobility – stops	Number of stops, equipped for people with disabilities divided by the total number of vehicles in the public transport system	%	0			
1.3.3.	Integrated transfer points	Number of stops where urban and suburban transport are integrated into a transfer point	units	N/A			

Goal 1.4 Development of multimodal and integrated public transport

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
1.4.1.	Public transport multimodality	Number of public transport options (e.g. typical forms of public transport are buses, trolleybuses, trams, and metro, other types of public transport are considered like car sharing, public bike sharing, municipal taxis, etc.)	units	2			
1.4.2.	The share of bicycle-friendly public transport	Number of vehicles (buses or trolleybuses) which are equipped to carry bicycles divided by the total number of vehicles in the public transport system	%	0			

Goal 1.5 Prioritising public transport in traffic

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
1.5.1.	The length of dedicated public transport infrastructure	The total length of all infrastructure that provides public transport and is separated from other right of way traffic, such as bus lanes,	km	0			

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
		trolleybus lanes, etc.					
1.5.2.	Number of intersections with public transport priority	Total number of intersections where an adaptive traffic signal with priority for public transport is installed	units	0			

PRIORITY 2.
Improvement of parking space

Overall indicator

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
2.0	Parking concept	Developed and approved by Poltava City Council parking concept The concept should contain information about the hierarchy of the streets of Poltava, parking rates, and a description of the organisational structure of the parking management system in the city	Yes or no	No	Yes	Yes	Yes

Goal 2.1 Relieving the traffic area and sidewalks in the city centre from parking

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
2.1.1.	Parking rules violations	The number of parking rules violations per 1000 registered cars	Units/ vehicle	N/a			
2.1.2.	Implementation of a paid parking system	Number of paid parking spaces equipped with appropriate means of collection and approved by the executive body of Poltava City Council	units	0			

Goal 2.2 Provision of a sufficient number of parking spaces of adjoining areas in residential areas

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
2.2.1.	Parking spaces	Number of parking spaces including the number of parking spaces for people with disabilities in the territory of parking lots	units	388[39]			
2.2.2.	Parking space density	The density of parking refers to the number of parking spaces divided by the area of territory of parking grounds.	units/ km^2	66246, 99[39]			

Goal 2.3 Organisation of parking lots near public and commercial institutions

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
2.3.1.	Bicycle parking	Total number of bicycle parking lots in the city	units	58			
2.3.2.	Organisation of parking space	Total number of car parking lots in the city	units	13[39]			
2.3.3.	Accessibility of parking for people with disabilities	Total number of officially defined car parking spaces for people with disabilities in the city	units	N/a			

Goal 2.4 Relieving the central part of the city fromlarge-sized vehicles

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
2.4.1.	Cargo terminals and platforms on the periphery of the city	Total number of cargo terminals and platforms on the periphery of the city	units	N/a			
2.4.2.	Large sized vehicles regulation	Regulation about restrictions of the circulation and parking of large-sized vehicles	Yes or no	No			

PRIORITY 3. Collection and analysis of data about the city and creation of an intelligent transport system

Overall indicator

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
3.0.	Unified Information System	Availability of a Unified Information System with high level of cyber security	Yes or no	No			

Goal 3.1 Decision-making is based on data

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
3.1.1.	Access to Unified Information System	Number of municipal institutions with access to submitting data to and receiving information from the system	units	No			
3.1.2.	Road safety data collection system	Availability of a system of data collection about traffic accidents in the city according to European standards	Yes or no	No			

Goal 3.2 Implementation of an electronic payment system for transport services

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
3.2.1.	Paid parking	Total number of parking ticketing machines in the city	units	0			
3.2.2.	Stations of the public share system	Total number of stations of the public share system in the city	units	0			
3.2.3.	Electronic payment system implementation	Number of rolling stock equipped with electronic payment system divided by total number of rolling stock	%	0			

Goal 3.3 Provision of information to road users

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
3.3.1.	Informing public transport users	Number of stops equipped with real-time electronic	units	0			

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
		information boards					
3.3.2.	City service monitoring system	The system that allows to interactively monitor the work of different city services, such as public transport movements, snow clearing machines, bike sharing locations, etc. in real time	Yes or no	No			
3.3.3.	Parking information system	Total number of zones equipped with systems to inform about the availability of parking spaces in the city	units	0			
3.3.4.	Traffic information system	Total number of boards informing about traffic conditions in the city	units	0			

Goal 3.4 Infrastructure renovation in accordance with the latest technologies

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
3.4.1	Concept of traffic lights upgrading	The detailed concept that has information on current state of all traffic lights in the city and providing a concept of the gradual improvement of them, considering transport prioritisation and safety goals.	Yes or no	No			

PRIORITY 4. Development of cycling

Overall indicator

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
4.0.	Share of cycling	Trips carried out by cyclists divided by total number of trips according to the mobility survey in Poltava	%	1,8[9]			

Goal 4.1 Promotion of cycling among citizens and tourists

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
4.1.1.	Cycling promotion	The overall number of implemented activities related to promotion of cycling in the City of Poltava per year	units	18			
4.1.2.	Bike rental services	Number of bike rental services of municipal or private form of ownership	units	3			
4.1.3.	Public bike-sharing system	Unique users or annual number of trips conducted	persons	0			

Goal 4.2 Creating a management mechanism for the development of cycling

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
4.2.1.	Cycling officer	Availability in the structure of the municipality of the responsible person for the implementation of the concept approved by city council.	Yes or no	No			
4.2.2.	City cycling programme	A developed and approved city target programme with dates, implementation plan and funding	Yes or no	No			

Goal 4.3 Creating the ability to cycle through the city quickly and safely

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
4.3.1.	Cycling funding	Amount of money spent on cycling infrastructure from city budget per year	thousands UAH	0			
4.3.2.	Length of cycling infrastructure	Total length of high quality cycling infrastructure in the city	km	1,2			

PRIORITY 5.
Development of pedestrian spaces and accessibility

Overall indicator

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
5.0.	Share of walking	Trips carried out by pedestrians divided by the total number of trips as result of the mobility survey in Poltava	%	30.5 [9]			

Goal 5.1 Increase of attractiveness of walking mode in the city

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
5.1.1.	Public space and walking design standard	Developed and approved public space and walking design standard	Yes or no	No			
5.1.2.	Pedestrian zones	Length of pedestrians–onl-zones	km	0.31			
5.1.3.	Public space comfort – sitting facilities	Total number of sitting slots in public spaces	units	N/a			
5.1.4.	Public space comfort – public toilets	Total number of public toilets in public spaces including toilets for disabled and children	units	N/a			
5.1.5.	The number of events promoting walking per year	The overall number of implemented activities related to the promotion of walking in the City of Poltava	units	N/a			

Goal 5.2 Development of safe facilities for pedestrians

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
5.2.1.	Length of improved walking infrastructure	Average annual length of walking infrastructure that was improved by the City of Poltava, which includes: repair or reconstruction (bringing back the technical state); upgrading and	km	N/a			

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
		modernisation (repair and introduction of new elements or better technical standard); building a new infrastructure.					
5.2.2.	Accessibility of pedestrian crossings	Number of well-organised pedestrian crossings that are fully accessible for limited mobility groups divided by total number of crossings in the city	%	N/a			
5.2.3.	Share of on-land pedestrian crossings	Number of on-land pedestrian crossings divided by total number of crossings in the city	%	N/a			

Goal 5.3 Creation of a municipal management system for walking facilities

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
5.3.1.	Walking officer	The presence of a responsible person for walking infrastructure in the structure of the city municipality or establishing the position of the mayor's advisor on development of pedestrian space and mobility	Yes or no	No			
5.3.2.	Public participation regarding public space	Number of public discussions about development of public spaces with participation of citizens	units	N/a			

PRIORITY 6.
Increasing road safety

Overall indicator

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
6.0.1	Traffic mortality	The total number of people	persons	18[40]			

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
		killed as the result of traffic accident within the administrative borders of the City of Poltava					
6.0.2	Injured in traffic accident	The total number of injured persons through traffic accidents within the administrative borders of the City of Poltava	persons	295[40]			

Goal 6.1 Creation of safe urban environment

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
6.1.1.	Road safety rate	Total number of accidents divided by city population	Accident / 1000 inhabit.	0.04[41]			
6.1.2.	Child safety	Number of killed and injured children-pedestrians as the result of traffic accidents within the administrative borders of the City of Poltava	persons	n/a			
6.1.3.	Pedestrians safety	Number of injured pedestrians as the result of traffic accidents within the administrative borders of the City of Poltava	persons	101[40 42]			
6.1.4.	Road Safety funding	Amount of financing allocated for road safety measures per year	thousands UAH	N/a			

Goal 6.2 Improvement of traffic culture

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
6.2.1.	Violations of traffic rules	The number of violations of traffic rules fixed by police	units	N/a			
6.2.2.	Road safety capacity building	Number of municipality and police representatives who attended capacity development programmes in the field of road safety	units	N/a			
6.2.3.	Road safety	Number of lessons on road	units	N/a			

Ref. No.	Indicator	Description	Unit	Base year	2023	2028	2033
	education	safety in educational institutions (schools, colleges, kindergartens, universities).					

Icon	Name of tool	Description	Frequency of data collection	Potential Responsible	Indicator number
	Mobility Survey	Survey of residents regarding their movement in the city. The mobility survey includes general information about the person (gender, age, education, etc.), general information about person's mobility, access to different transport options, number of trips, selected modes, location, time of movement, etc. The sample should be random and account for the general demographic and social-economical structure of the city. It may include suburban areas. Seasonal variation of mobility should be accounted for. It is recommended to conduct the survey throughout a year or for both, the winter and summer period.	Every 5 years	Department of Transport and Communications of Poltava City Council	1.0 4.0 5.0
	Public transport rolling stock and infrastructure report	Report on quality and quantity of vehicle fleet (percentage of vehicles equipped for people with reduced mobility, to carry bicycles, with electronic payment system), length of lanes and number of intersections with priority movement of public transport, number of stops with real time electronic boards	Annually	Department of Transport and Communications of Poltava City Council	1.1.3 1.1.4 1.3.1 1.3.2 1.4.1 1.4.2 1.5.1 1.5.2 3.2.2 3.2.3 3.3.1
	Public transport monitoring system report	Report on public transport performance indicators based on GPS tracking data including reliability of public transport (the ratio of the number of vehicles entering the route to the number indicated in the route passport), punctuality	Monthly	Department of Transport and Communications of Poltava City Council	1.1.1 1.1.2 1.2.1 1.2.2
	Public transport system	Report on the organisation of public transport routes should include information on accessibility of public	Annually	Department of Transport and	1.3.3

Icon	Name of tool	Description	Frequency of data collection	Potential Responsible	Indicator number
	organisation report	transport by population, share of municipal transport, integration of suburban transport		Communications of Poltava City Council	
	Parking management report	Report on availability and management of parking places	Annually	Department of Transport and Communications of Poltava City Council	2.0 2.1.2 2.3.2 2.3.3 3.2.1
	National Police Report	Report on road accidents in Poltava divided by types and degree of severity, violation of traffic and parking rules and availability of a system for data collection about traffic accidents in the city according to European standards. Availability of regulation of circulation and parking of large-sized vehicles through the city	Quarterly	Police (Department of traffic safety of the patrol police)	2.1.1 2.4.2 3.1.2 6.1.1 6.1.2 6.1.3 6.1.4 6.1.5 6.2.1
	Cargo terminals operation report	Report on number of cargo terminals and platforms on the periphery of the city	Annually	Department of Transport and Communications of Poltava City Council	2.4.1
	Report on the implementation of the city budget	Amount of funds allocated for road safety measures, for cycling infrastructure	Annually	Budget and financial Department or Department	4.3.1 6.1.6
	Education on road safety	Number of lessons on road safety in educational institutions and walking promotion	Annually	Department for education (check the name)	6.2.3 5.1.5
	Human resources report	Report on the availability of cycling and walking officers in the structure of the city municipality; number of representatives who attended capacity development programmes in the field of road safety	Annually	Department of personnel work, on issues of service in local self-government bodies and	4.2.1 5.3.1 6.2.2

Icon	Name of tool	Description	Frequency of data collection	Potential Responsible	Indicator number
				awards	
	Cycling infrastructure and development survey	Survey of availability and quality of bicycle infrastructure (bicycle parking facilities, length of cycling infrastructure), number of activities of cycling promotion, implementation and improving of cycling concept.	Annually	Department of Urban Development and Architecture of Poltava City Council (to be defined)	2.3.1 4.1.1 4.2.2 4.3.2 5.1.5
	Bike-sharing system and bike rental services report	Report on number of bike rental services and number of users and trips in bike-sharing system	Annually	Bike-sharing and bike rent operators	4.1.2 4.1.3
	Pedestrian infrastructure survey	Survey of length of improved walking infrastructure, well-organised pedestrian crossings, share of on-land pedestrian crossings	Annually	Department of Urban Development and Architecture of Poltava City Council	5.2.1 5.2.2 5.2.3
	Public spaces survey	Survey of the length of pedestrian zones, number of siting places and public toilets in public spaces. Should also include number of public discussions about the development of public spaces	Annually	Inspection on the land improvement, ecological and sanitary condition of the city of Poltava City Council	5.1.1 5.1.2 5.1.3 5.1.4 5.3.2
	Unified Information System report	Report on availability of a Unified Information System and number of municipal institutions with access to this system	Annually	Poltava City Council	3.0 3.1.1
	City service monitoring system	Report on the work of a system which gives the possibility to citizens to get information about traffic conditions, public transport movement, bike sharing locations etc.	Annually	Department of Transport and Communications of Poltava City Council	3.3.2 3.3.4

ANNEX A Glossary

Term	Definition
Accessibility	The accessibility of an activity to an individual is the ease with which the individual can get to the places where that activity can be performed [1]
Alternative scenarios	Describe developments resulting from different choices of policies and measures
Indicator	A defined piece of data (usually quantitative) that is used to monitor progress in achieving a particular objective or target. For example, road accident numbers are one indicator of safety [1]
Integrated approach	Integration of practices and policies between transport modes, policy sectors, public and private agencies, authority levels and between neighbouring authorities [1]
Integrated bus station	Complex of buildings, structures, parking lots, with stopping point and other relevant infrastructure to provide necessary services and accessibility to the city districts
Integration	Combining policy instruments so that they reinforce one another in meeting objectives
Intelligent Transport System	Advanced applications which without embodying intelligence as such aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated and 'smarter' use of transport networks [*]
Intercepting parking or intercepting parking lot	Paid for underground or surface parking or a specially equipped area, located at the entrances to the city near major highways with good infrastructure transport interchanges to public transport, which allows the vehicle owner to leave your car at the required time and continue the movement in the central part of the city using public transport
Measure	In the context of SUMP, the term measure refers to a policy, campaign or project that is implemented to contribute to the achievement of the SUMP's objectives and targets
Mobility	Ease of moving about
Mobility management	Mobility management is a means to promote sustainable transport and manage the demand for car use by changing travellers' attitudes and behaviour The SUMP approach encourages a balanced development of all transport modes through actions that include technical, promotional and marketing-based measures as well as infrastructure [1]

[*] Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport

Term	Definition
Model	A (mathematical) representation of the relationships within the transport system (also linked to land use); widely used to predict the outcomes of transport strategies [1]
Monitoring	An ongoing measurement of progress through the collection of new data and/or collation of existing data sources[1]
Parking management	Strategies aimed at making better use of parking supply through altering the amount, location and design, regulation, pricing, and management of on- and/or off-street parking
Participatory approach	Involving citizens and stakeholders from the outset and throughout the process of decision making, implementation and evaluation, building local capacities for handling complex planning issues, and ensuring gender equity [1]
Person with reduced mobility	Any person whose mobility is reduced due to any physical disability (sensory or locomotor, permanent or temporary), intellectual disability or impairment, or any other cause of disability, or age, and whose situation needs appropriate attention and the adaptation to his or her particular needs of the service
Public space	Public places in the city, open to all residents and intended for mass public use
Reliability	For the public transport system, reliability means that vehicles depart on time and arrive at all stops on schedule [38]
Scenario	Possible future situation in terms of a range of factors such as economic growth, changes in population and household size, income and car ownership [38]
Stakeholder	Any person, group or organisation that is exposed to the proposed project, or that may affect the project and its implementation. This term includes the public as well as a wide range of other groups (e.g. business, authorities and special interest groups.) [1]
Sustainable mobility	Meets present generation mobility needs without compromising the future generation's ability to meet their own mobility needs
Tool	In the context of SUMP preparation, tools are a series of work practices or processes that can be utilised by planning authorities [38]
Vision	Provides a qualitative description of a desired urban future and serves to guide the development of suitable measures in sustainable urban mobility planning [1]
Vulnerable road users	Non-motorised road users, such as pedestrians and cyclists as well as motor-cyclists and persons with disabilities or reduced mobility and orientation [38]

ANNEX B Experts consulted in working group meetings

The list of carried out workshops and expert group meetings within Sustainable Urban Mobility Plan development

Ref. No.	Event	Date
1.	Steering Committee meeting on prioritization of Sustainable Urban Mobility Plan in Poltava	06.02.2018
2.	Steering Committee meeting on prioritization of Sustainable Urban Mobility Plan in Poltava: continuation	19.02.2018
3.	Working group meeting on improving the quality of public transport services in Poltava	19.03.2018
4.	Working group meeting on parking space organisation in Poltava	20.03.2018
5.	Working group meeting on launching an Intelligent Transport System in Poltava	21.03.2018
6.	Working group meeting on cycling development in Poltava	26.03.2018
7.	Working group meeting on development of pedestrian space and barrier-free environment in Poltava	27.03.2018
8.	Working group meeting on development of pedestrian space and barrier-free environment in Poltava	28.03.2018
9.	Steering Committee meeting on the approval of the goals and indicators of the Sustainable Urban Mobility Plan in Poltava	03.04.2018
10.	Workshop on scenario management of the city of Poltava	05.10.2018

List of experts consulted in workshops and expert working group meetings:

Ref. No.	Name	Organization	Ref. No.
1.	Bilozersky Yurii	Health department of Poltava City Council	8
2.	Boehler-Baedeker Susanne	Rupprecht Consult	10

Ref. No.	Name	Organization	Ref. No.
3.	Bryzhan Iryna	GIZ Poltava	1, 2, 3, 4, 5, 6, 7, 9, 10
4.	Chepurko Oleksii	Deputy Mayor	10
5.	Cherkun Roman	ME Poltava City Development Institute	1, 3, 6, 8, 9
6.	Chernyshova Olena	Dornier Consulting	1, 2, 3, 4, 5, 9, 10
7.	Denysenko Vadym	Dornier Consulting	1, 2, 3, 4, 5, 6, 7, 8, 9
8.	Derkach Oksana	Poltava City Council	2, 6, 9
9.	Dorohova Natalia	Department of education Poltava City Council	10
10.	Dudka Iryna	PLEDDG Project in Poltava region	9
11.	Elger Mathias	GIZ ISEK project	1, 4, 5, 10
12.	Gaidar Sergii	Infrastructure department of Poltava Oblast State Administration	1, 3
13.	Glasov Olexandr	ME Poltava City Development Institute	3, 6, 7
14.	Golubnycha Maryna	Branch museum-estate of Ivan Kotlyarevskyi	7
15.	Goncharenko Alyona	NGO Poltavska Platforma	9
16.	Gryn Serhiy	ME Poltava Service	5, 7
17.	Hlushko ЮOliia	NGO Mist	10
18.	Ivaniuk Artem	ME Poltava City Development Institute	6, 9

Ref. No.	Name	Organization	Ref. No.
19.	Karpenko Petro	ME PoltavaElectroAvtoTrans	1, 2, 8, 9, 10
20.	Kharchenko Oleksii	ME Decoratyvni kultury	7
21.	Kharytonova Olena	Department of Education of Poltava City Council	7, 8, 9
22.	Kozarenko Dmytro	ME CityLab	10
23.	Krechko Larysa	Department of culture of Poltava City Council	9
24.	Kulai Pavlo	Poltava College of Engineering and Transport Construction	1, 3, 4, 6
25.	Lavrusenko Ivan	Patrol Police Department in Poltava region	1, 5, 9, 10
26.	Levchenko Yurii	ME Poltava City Development Institute	1, 2, 3, 4, 7, 8, 10
27.	Liamin Andriy	Poltava City Council	1
28.	Marchyshynets Serhii	Infrastructure Department of Poltava Oblast State Administration	3
29.	Mikhailuk Anatolii	Patrol Police Department in Poltava region	2
30.	Mukha Tetiana	Poltava National Technical Yurii Kondratyuk University, GIZ ISEK Project	1
31.	Nasonov Oleksandr	Department of Health at Poltava City Council	7, 9
32.	Nurumov Valeriy	NGO VeloPoltava	6, 9
33.	Oliinyk Iryna	ME PoltavaElectroAvtoTrans	1, 2, 3, 8, 9

Ref. No.	Name	Organization	Ref. No.
34.	Pavlov Vitalii	Department of Tourism and Cultural Heritage at Poltava City Council	9
35.	Peretyatko Petro	ME Poltava City Development Institute	9
36.	Polishchuk Denys	Poltava City Council	9
37.	Popova Yulia	Poltava District Council	3
38.	Pospelov Vyacheslav	LLC Trek Service Control	1, 2, 3, 5, 9
39.	Puholovka Serhii	Department for Transport and Communications at Poltava City Council	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
40.	Pyvovar Iryna	GIZ Poltava	1, 4, 5, 9, 10
41.	Sadovnikova Iryna	NGO CityLab	1, 2. 6, 7, 9
42.	Savchenko Olha	Poltava National Technical Yuriy Kondratyuk University	10
43.	Shevelov Mykola	Department of city planning and architecture of Poltava City Council	10
44.	Siabro Yurii	Department for Transport and Communications of Poltava City Council	1, 3, 9, 10
45.	Sinelnyk Serhii	Department of Housing and Communal Services of Poltava City Council	4
46.	Solonyi Vitaliy	ME Poltava-Service	4
47.	Syrota Natalia	Department of Urban Development and Architecture of Poltava City Council	1, 2, 4, 5, 9

Ref. No.	Name	Organization	Ref. No.
48.	Tregubov Yurii	Department of land resources and cadaster of Poltava City Council	10
49.	Tverdokhlib Iryna	National Assembly of Persons with Disabilities of Ukraine	4, 7, 8, 9
50.	Vadymov Vadym	ME Poltava City Development Institute	1, 2, 4, 5, 7, 8, 9, 10
51.	Vasylenko Vyacheslav	ME MiskSvitlo	5
52.	Vasyliev Pavlo	Poltava National Technical Yurii Kondratyuk University	10
53.	Veryovkin Dmytro	NGO CityLab	8, 9, 10
54.	Zaytsev Yevgenii	ME PoltavaElectroAvtoTrans	1, 2, 3, 8, 10
55.	Zinyuha Maryna	Patrol Police Department in Poltava region	2

ANNEX C Changes in public transport route network

Table C.1. – Bus routes network

Route	Length, km	Initial point	Final point	Vehicle capacity	Number of trips	Comment
1	25	Viyskove mistechko	Krytyy rynok	45	35	unchanged
2	12	Kharchovykiv str.	Krytyy rynok	45	24	changes in route, increase in the capacity of rolling stock
4	25	Vlg. Chervonyy Shlyakh	Krytyy rynok	45	28	unchanged
5	19	Microdistrict Yakivtsi	Krytyy rynok	45	10	unchanged
6	14	Lugova str.	Krytyy rynok	45	30	unchanged
7	22	Krytyy rynok	Vlg. Rybtsi	45	50	unchanged
8	17	Koliyna str.	Krytyy rynok	45	50	unchanged
9	18	Ivonchentsi	Krytyy rynok	45	20	unchanged
10	30	Vlg. Chervonyy Shlyakh	Pizzeria	45	50	changes in route
11		Vlg. Zaliznychnykiv	Krytyy rynok			liquidated
13	22	Kolomenska str.	Krytyy rynok	45	25	changes in route
14		MBZ	Krytyy rynok			merging with A 18, increase in the capacity of rolling stock
15	10	Balakina str.	Technical University	45	34	unchanged
17	10	OTsEVUM	TC “Parovoz”	45	100	route without changes, increase in the capacity of rolling stock
18	29	MBZ	Heroyiv Stalinhrada str.	45	52	changes in route by joining A 14, increase in the capacity of rolling stock
19	14	Velykoternivska str.	Velykoternivska str.	45	92	route without changes, increase in the capacity of rolling stock

Route	Length, km	Initial point	Final point	Vehicle capacity	Number of trips	Comment
20	14	Bus station	Bus station	100	150	unchanged
21	14	Bus station	Bus station	100	150	unchanged
22	17	Microdistrict Ognivka	Vlg. Rozsoshentsi	45	33	changes in route
25	17	Budynok zv'yazku	Microdistrict Ognivka	45	30	unchanged
26	11	Budynok zv'yazku	Ognivska str.	45	150	changes in route, increase in the capacity of rolling stock
27	11	Budynok zv'yazku	Magazyn	45	30	unchanged
28		Zaturinsky railway crossing	Heroyiv Stalinhrada str.			liquidated
29	27	Microdistrict Dublianshchyna	Heroyiv Stalinhrada str.	45	60	route without changes, increase in the capacity of rolling stock
30	28	Auto-Aggregate Plant	Microdistrict Ognivka	45	76	changes in route, increase in the capacity of rolling stock
31		ХПП	Heroyiv Stalinhrada str.		34	liquidated
32	28	Vlg. Chervonyy Shlyakh	Sady 1	45	25	route without changes, increase in the capacity of rolling stock
33	31	Microdistrict Yakivtsi	Vlg. Horbanivka	45	38	changes in route, increase in the capacity of rolling stock
34	30	Zaturinsky railway crossing	Vlg. Horbanivka	45	50	route without changes, increase in the capacity of rolling stock
36		Instytut zv'yazku	Vlg. Horbanivka			liquidated
38		Instytut zv'yazku	Stanislavsky market			liquidated
39	27	Churaivny str.	Ognivska str.	45	120	route without changes, increase in the capacity of rolling stock
40	22	Railway station "Poltava	Ognivska str.	45	90	route without changes, increase in the

Route	Length, km	Initial point	Final point	Vehicle capacity	Number of trips	Comment
		Pivdenna"				capacity of rolling stock
41		"GRL" factory	School №16			liquidated
42	22	Vlg. Zaliznychnykiv	Ognivska str.	45	60	route without changes, increase in the capacity of rolling stock
43	26	Churaivny str.	Churaivny str.	100	140	route without changes, increase in the capacity of rolling stock
44	26	Churaivny str.	Churaivny str.	100	140	route without changes, increase in the capacity of rolling stock
45	13	Technical University	Ognivska str.	25	60	unchanged
47		Instytut zv'yazku	TC “Parovoz”			liquidated
49	21	Railway station "Poltava Pivdenna"	Vlg. Rozsoshentsi	45	90	route without changes, increase in the capacity of rolling stock
50	15	Instytut zv'yazku	Railway station "Poltava Pivdenna"	100	50	route without changes, increase in the capacity of rolling stock
51	21	Railway station "Poltava Pivdenna"	Railway station "Poltava Pivdenna"	100	60	route without changes, increase in the capacity of rolling stock
52	22	Railway station "Poltava Pivdenna"	Railway station "Poltava Pivdenna"	100	60	route without changes, increase in the capacity of rolling stock
53	14	Balakina str.	Ognivska str.	45	25	changes in route, increase in the capacity of rolling stock
54	20	Railway station "Poltava Pivdenna"	"GRL" factory	100	50	route without changes, increase in the capacity of rolling stock
55	24	"GRL" factory	Vlg. Rozsoshentsi	45	100	route without changes, increase in the capacity of rolling stock

Route	Length, km	Initial point	Final point	Vehicle capacity	Number of trips	Comment
56		"GRL" factory	Vlg. Rozsoshentsi			liquidated
57	25	Churaivny str.	"GRL" factory	100	60	route without changes, increase in the capacity of rolling stock
58	21	Iar	Iar	25	4	unchanged
59		Microdistrict Brailky	Microdistrict Brailky			liquidated
60		Kolomenska str.	Bus station			liquidated
61	37	Viyskove mistechko	Heroyiv Stalinhrada str.	45	50	route without changes, increase in the capacity of rolling stock
62	37	Viyskove mistechko	Sady 1	45	64	route without changes, increase in the capacity of rolling stock
66		Ivonchentsi	Heroyiv Stalinhrada str.			liquidated
67	20	"GRL" factory	Microdistrict Ognivka	45	54	new route
10A		Monastery	Krytyy rynok			liquidated
12/16	22	DBK	Krytyy rynok	23	42	merging of A 12 and A 16 routes
19a		Velykoternivska str.	Velykoternivska str.			liquidated
23/24	16,77524	Regional Research Station	Pass Chornovyi	100	40	route without changes, increase in the capacity of rolling stock

Table C.2. – Trolleybus routes network

Route	Length, km	Initial point	Final point	Interval, min	Comment
Tr1	13	Railway station "Poltava Pivdenna"	Kiev railway station	86,7	route without changes, number of departures increased
Tr12	20	Instytut zv'yazku	Churaivny str.	10,4	route without changes, number of departures increased
Tr15	14	Bus station	Bus station	7,8	route without changes
Tr2	21	Railway station "Poltava Pivdenna"	Vlg. Rozsoshentsi	15,6	route without changes, number of departures increased
Tr10	19	Vlg. Rozsoshentsi	Instytut zv'yazku	31,2	changes in route, reduced number of departures
Tr4	20	Railway station "Poltava Pivdenna"	"GRL" factory	15,6	route without changes, number of departures increased
Tr5	14	Bus station	Bus station	7,8	route without changes
Tr6	30	Railway station "Poltava Pivdenna"	Railway station "Poltava Pivdenna"	19	changes in route, reduced number of departures
Tr7	29	Instytut zv'yazku	Vlg. Rozsoshentsi	15,6	route without changes, number of departures increased
Tr8	18	Instytut zv'yazku	Heroyiv Stalinhrada str.	19,5	route without changes, number of departures increased
Tr 3	24	Vlg. Rozsoshentsi	"GRL" factory	25	new route
Tr 11	25	Vlg. Rozsoshentsi	Churaivny str.	30	new route
Tr 13	25	"GRL" factory	Churaivny str.	21	new route
Tr 14	26	Churaivny str.	Churaivny str.	26	new route
Tr 9	22	Railway station "Poltava Pivdenna"	Railway station "Poltava Pivdenna"	19	new route

ANNEX D Estimated number of parking spaces in transport zones

Transport zone	Number of parking spaces at the level of motorization:		
	according to mobility survey	registered in the city	forecast for 2031 year
1	162	242	528
3	352	528	1144
4	242	366	792
5	374	564	1224
6	220	330	712
7	960	1452	3146
8	2112	3182	6908
9	184	278	602
10	278	426	916
11	118	184	396
12	454	682	1482
13	118	176	382
14	718	1086	2354
15	646	968	2112
16	366	550	1196
17	602	910	1972
18	176	264	572
19	712	1070	2324
20	234	352	762
21	206	308	674
22	1364	2046	4444
23	1944	2926	6358
24	1518	2288	4972
25	300	454	990
26	572	858	1862
27	814	1218	2648
28	580	872	1900
29	388	586	1284
30	308	462	1004
31	514	770	1672
32	916	1378	2992
33	36	58	124
34	44	58	132
35	132	198	432
36	448	674	1460

Transport zone	Number of parking spaces at the level of motorization:		
	according to mobility survey	registered in the city	forecast for 2031 year
37	470	712	1540
38	520	784	1708
39	426	638	1378
40	360	542	1180
41	550	828	1796
42	36	52	118
43	44	74	154
44	190	286	624
45	198	294	638
46	146	220	484
47	96	140	308
48	146	228	484
49	140	212	454
50	308	462	1004
51	88	132	286
52	366	558	1210
53	162	234	514
54	212	316	690
55	492	734	1598
56	308	462	998
57	102	162	344
58	80	118	256
59	124	190	410
60	946	1422	3080
61	330	498	1078
62	1004	1510	3278
63	184	278	602
64	124	190	418
65	278	418	902
66	814	1224	2662
67	96	146	316
68	52	80	176
69	44	66	140
70	80	124	264
71	118	176	388
72	146	220	470
73	58	88	184
74	176	272	580

Transport zone	Number of parking spaces at the level of motorization:		
	according to mobility survey	registered in the city	forecast for 2031 year
75	110	168	366
76	190	286	624
77	110	168	374
78	132	198	426
79	300	454	982
80	278	418	910
81	168	250	542
82	52	74	162
83	52	74	162
84	146	220	484
85	118	176	382
86	124	184	396
87	66	102	220
88	564	850	1848
89	308	454	998
90	96	140	300
Сума	**31940**	**48070**	**104362**

ANNEX E List of key indicators of the transport system

Indicator	Units	Classification
Modal split	%	Environment
Greenhouse gas emissions	Tonnes	Environment
Traffic flows	Vehicles / time interval	Society; Economy
Road capacity	Vehicles / time interval	Society; Economy
Average travel time of private transport	h	Traffic efficiency
Average travel distance of private transport	km	Traffic efficiency
Average speed of private transport	km/h	Traffic efficiency
Level of service	%	Traffic efficiency
Public transport interval	min	Efficiency of public transport
Number of public transport routes	-	Efficiency of public transport
Number of stops	-	Efficiency of public transport
Average operating speed	km/h	Efficiency of public transport
Percentage of population within walking distance to public transport	%	Efficiency of public transport
Route index	-	Efficiency of public transport
Route non-linearity index	-	Efficiency of public transport
Average number of transfers	%	Efficiency of public transport
Passenger flows volume	Passengers	Efficiency of public transport
Average waiting time	min	Efficiency of public transport
Average travel time (in a vehicle)	min	Efficiency of public transport
Passenger flows alterability index	-	Efficiency of public transport
Average travel time of public transport	h	Efficiency of public transport

Indicator	Units	Classification
Average travel distance of public transport	km	Efficiency of public transport
Average speed of public transport	km/h	Efficiency of public transport
Maximum number of public transport routes on the road section	-	Efficiency of public transport
Maximum number of public transit routes passing through the stop	-	Efficiency of public transport
The total length of the public transport route network	km	Efficiency of public transport
The total length of the road-street network with public transport routes	km	Efficiency of public transport

ANNEX F Reference List

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