Uzhhorod

Sustainable Urban Mobility Plan

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Table of content

1.0 Introduction

The aim of the project, and accordingly the plan developed within its framework, is to identify and solve problems in the sphere of transport and mobility in Uzhhorod, in particular:

1. Identifying existing mobility issues;
2. Determining the interests and expectations of residents and businesses;
3. Developing a common vision of mobility;
4. Definition of strategic goals to be achieved in the implementation of the SUMP;
5. Formation and evaluation of several scenarios of sustainable mobility development, definition the most effective;
6. Development of a list of measures necessary for the implementation of the SUMP, determination of priority implementation of these measures;
7. Coordination of the plan and list of measures with interested parties;
8. Monitoring of the effectiveness of measures.

Basic principles of the plan development: modern approaches to sustainable urban development, improvement and creation of sustainable, high-quality infrastructure, increase of population mobility and optimization of the choice of means of transportation.

1.1 What is SUMP and what goals does it have?

A sustainable urban mobility plan (SUMP) is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It is based on existing planning practice and principles integration, participation and evaluation.

The sustainable urban mobility plan is a modern type of transport planning, introduced at the official level by the European Commission (EC) in 2009. According to EC recommendations - the main task of SUMP is the implementation of quality mobility within the city and outside it, stimulating the use of more environmentally friendly means of transportation, ensuring transport accessibility for the population, reducing the travel time of residents of settlements, curbing the motorization of cities thanks to the development of public transport, cycling and walking.

SUMP will create a strategy of development of mobility of the city of Uzhhorod in long-term perspective, having agreed existing proposals and measures with the goals of the city. This document will answer to key questions related to optimization of mobility of residents and guests of the city.

Source: Luxembourg Times luxtimes.lu

The development of the SMP is a high-quality tool for planning city mobility, with the help of which it is possible to achieve the following goals:

1. Improving walking and cycling mobility

- Development of strategy of development of the pedestrian area;
- Development of concept of development of bicycle network;
- Creation and improvement of quality of public spaces;
- To improve accessibility to attraction objects by providing for the needs of pedestrians, in particular elderly persons, people with disabilities and parents with small children;
- Integration of existing agglomerations into pedestrian communications, bicycle network and public transport networks.

2. Strengthening the role of public transport

- Make public transport more attractive;
- Optimization of the urban transport system;
- Purchase of mobile composition of friendly to small-scale population groups;
- Construction of new and reconstruction of existing stop pavilions taking into account the needs of small-scale population groups;
- Construction of transport and transplanting units;
- Introduction of alternative public transport;
- Integration of public transport networks into existing agglomerations.

3. Improvement of road traffic safety

- Improvement of the state of the street-road network and road infrastructure;
- Introduction of Vision Zero program (zero mortality);
- Improvement of light regulation and installation of new light objects;
- Improvement of physical safety for users of all types of vehicles;
- Improving safety of pedestrians, cyclists and motorcyclists;
- Giving priority to public transport in the organization of traffic.

4. Arrangements for the parking space

- Unloading of the driveway and sidewalks of the central part of the city from cars;
- Construction of paid parking in the centre of the city;
- Arrangement of parking in residential areas.

5. Reducing the negative impact of the car transport to the environment

- Possibility to introduce public electric transport in the structure of passenger transportation;
- Popularization of private electric transport and development of necessary infrastructure;
- Popularization of LPT, bicycle transport, walking and development of necessary infrastructure for this purpose;
- Recommendation of introduction of effective mechanism of control over observance of norms of noise pollution;
- Introduction of an effective mechanism of monitoring of air pollution by motor transport;
- Stimulating the city's residents moving to constant mobility modes.

1.2 Methodology of development of a plan for sustainable urban mobility

The source documentation includes materials that are freely available: information from online resources (Google Maps, OpenStreetMap, Navizor, Cadastre Map of Ukraine, Wikipedia), numerous articles, reference resources for cultural, historical, architectural and transport theme in Uzhhorod.

The current master plan, complex transport scheme, city development strategy and other urban planning documents, plans and strategies related to the city of Uzhhorod, statistical data on population size and employment; data of the street-road network and public transport have been provided by the customer. These materials have become tools for detailed analysis of city mobility and checking of the possibility of implementation of project decisions.

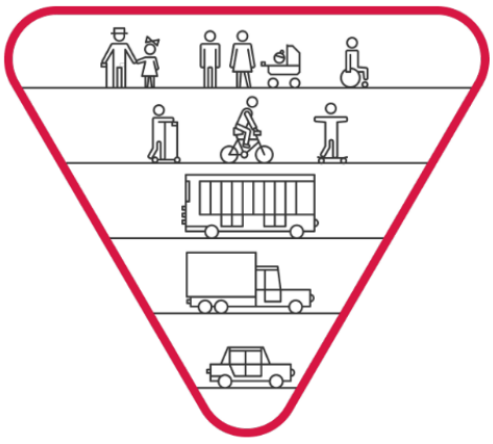
Hierarchy of urban mobility:

Pedestrian

Bicycle transport

Public transport

Logistic transport



Private transport

The process of developing the PSUM in the city Uzhhorod consists of two main parts, which in turn are made up of several stages:

Complex analysis of the current state of mobility of the community and city

- Studying of previous researches, strategies, plans, proposals concerning transport and mobility;
- Carrying out field and cameral researches of traffic organization and calculation of traffic intensity at the most important intersections of the city;
- Analyzing of the work of public transport, assessment of the state of public transport;
- Assessment of the effectiveness of the current public transport and traffic management system in the city Uzhhorod;
- Studying of urban planning, and definition of the vector of city development;
- Analyzing of the state of transport infrastructure of the city;
- Determination of the quantity and quality of the main transport and transiting units of the city;
- Analyzing of transport accessibility for all users;
- Analyzing of traffic safety situation in the city;
- Meeting with stakeholders and analyzing the information received.

The development of effective measures for the implementation of the Sustainable Urban Mobility Plan includes:

- Plan elaboration for network optimization and public transport improvement;
- Development of a promising network of bicycle paths and the sequence of their realization;
- Drawing up of a road safety plan;
- Developing of possible strategies (scenarios) for the growth of sustainable mobility;
- Defining strategic (long-term) directions of urban transport infrastructure improvement;
- Development of a set of socio-economic, ecological and transport indicators, which will determine the presence or absence of progress in the field of urban mobility;
- Development of a step-by-step plan for implementation of sustainable mobility measures with estimation of the cost of realization;
- Development of the mechanism of control over the implementation of the sustainable mobility plan and the monitoring of progress in the field of urban mobility;
- Taking into account the interests of small-scale groups of the population (people with disabilities, parents with infants, aged persons, etc.) at realization of all measures;
- Proposals for improvement of light regulation and installation of new traffic light objects;
- Development of measures of balanced use of the street space by different users and for different modes of mobility.

Developing of the SMP is a new way of planning mobility to provide all citizens with transport facilities for access to key destinations and services and to improve safety and protection citizens of the city.

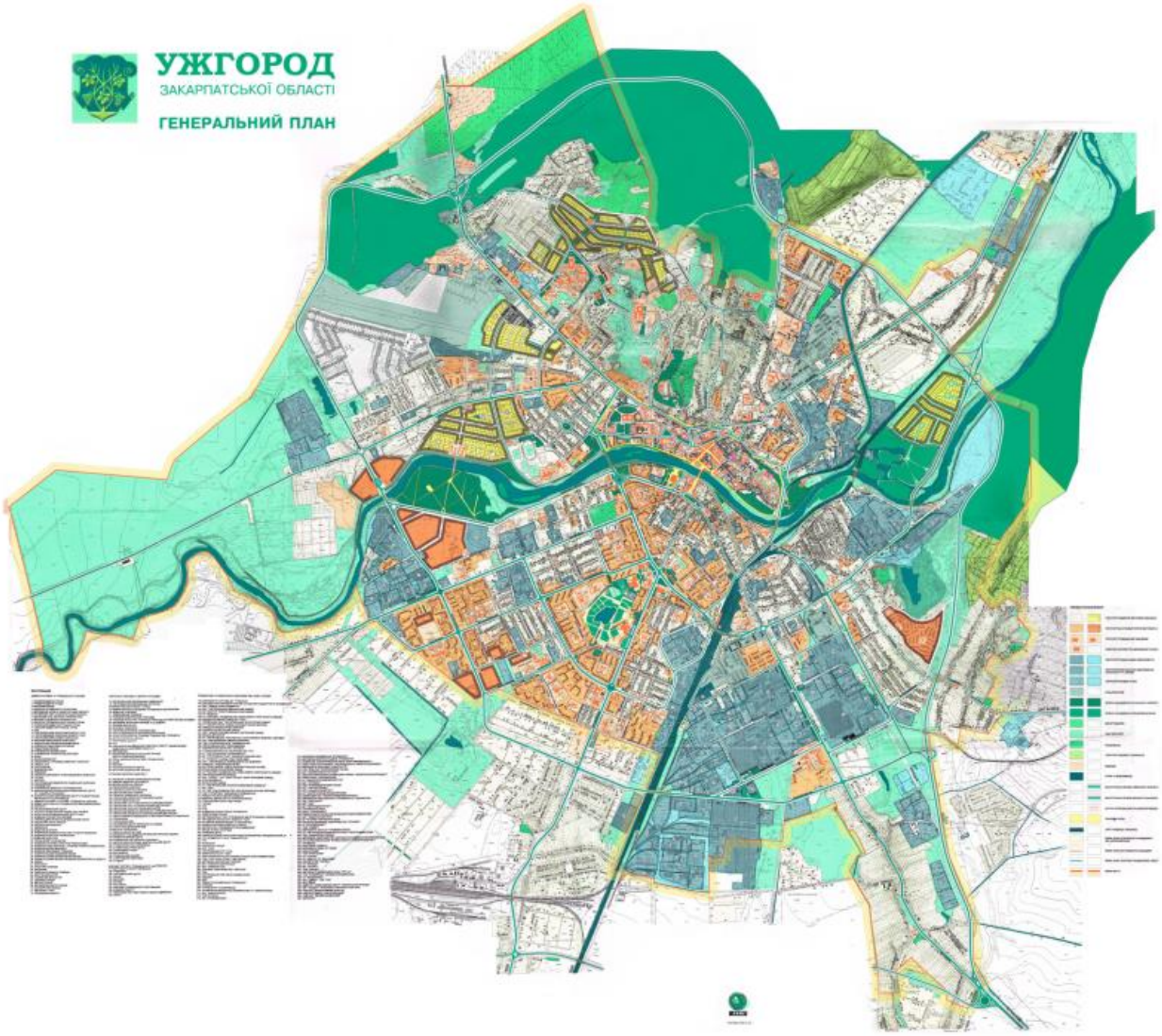
1.3 Primary review of available data and documents

At the preparatory stage of SUMP development, it is extremely important to review the available data and documents, developments and practices in the field of urban mobility, which have the potential to be a good start for the analysis of the initial data and the planning of further stages of work. The main regulatory documents related to sustainable urban mobility, on which the SUMP of Uzhhorod is based, are:

- The general plan of the city of Uzhhorod, approved by the decision of the Uzhhorod City Council on June 4, 2004 No. 313;
- Regulations of the Uzhhorod-2030 City Development Strategy;
- Regulations of the Bicycle Infrastructure Concept of the city of Uzhhorod, approved by the decision of the session of the Uzhhorod City Council No. 63 dated February 2, 2021);
- Law of Ukraine "On Local Self-Government in Ukraine";
- Law of Ukraine "On Regulation of Urban Development Activities";
- Law of Ukraine "On Improvement of Settlements";
- Uzhhorod city improvement rules, approved by the decision of the Uzhhorod City Council dated 26.12.2006 No. 136 (with changes and additions).

There are additional materials related to the development of the plan, which are of a reference nature and used in the work:

- Guidelines "Development and implementation of SUMP " (second edition) and additions to them;
- Development of sustainable mobility: best practices of Ukrainian cities;



General plan of the city Uzhhorod

- Recommendations of the German Society for International Cooperation GIZ;
- Recommendations of foreign platforms for the development of Sustainable Urban Mobility, links;
- Recommendations of the European Commission on issues of urban mobility and transport;
- Approved plans for sustainable urban mobility of Ukrainian cities.
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At the preparatory stage of development of the plan of sustainable urban mobility of the city Uzhhorod pays special attention to numerous social and economic data of the city, data of street network, existing schemes of traffic organization, schemes of technical location traffic control data, public transport data, city video surveillance cameras in the city, etc.

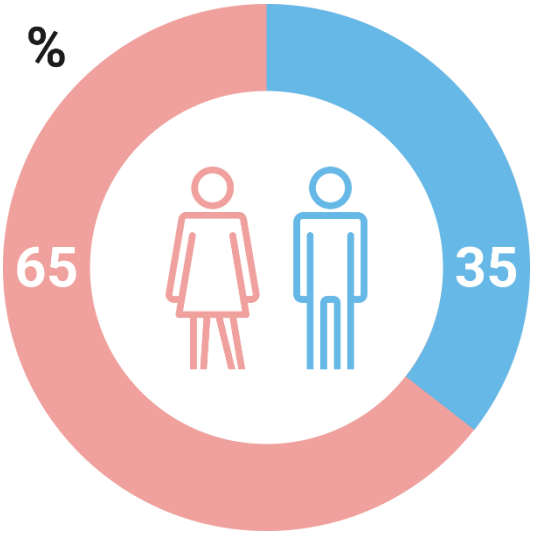
1.4 Public opinion poll

A sociological survey is an important source of information when developing a strategic document such as the Sustainable Urban Mobility Plan. It helps to find out the current opinion of local residents about urban mobility.

The goal is to identify problems in pedestrian and bicycle infrastructure, private and public transportation, and to improve the accessibility situation in the city.

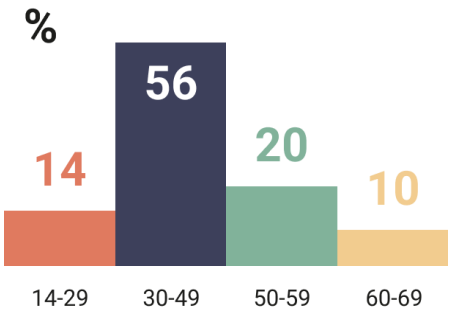
As part of the development of the Sustainable Urban Mobility Plan, an anonymous online survey (CAWI) was conducted by the 4Service Group team in Uzhhorod. The survey involved 1% of of the city's population (about 120 thousand residents), men and women aged 14 and older.

The research was attended by **35% of men** and **65% of women**.



Age profile of respondents:

14-29 years old - 14%
30-49 years old - 56%
50-59 years old - 20%
60-69 years old - 10%



Average monthly family income.

The graphical curve shows the average monthly family income. To summarize, the largest share of the population - 32% - belongs to well-off families that fully cover their monthly needs. 20% are families with normal income, but buying a multicooker or a suit requires some savings. 14% are low-income families and 6% are on the verge of poverty. Only 2% of the population can afford any expenses. 12% of people surveyed refused to answer the question about their family's average monthly income.

Forced to save on food	6%
It is enough and shoes, you need to save or or borrow money.	14%

Enough for food and necessary clothes and shoes. For such purchases as a nice suit or dress, a slow cooker, you need to save up.	20%
Enough for food, clothes, shoes, and other things. However, you need to save up for expensive items (such as a laptop or TV).	32%
Enough for food, clothes, shoes, and more expensive items. For such purchases as a good car, an apartment, you need to save or borrow.	14%
I can make any necessary purchases at any time.	2%
Refused to answer.	12%

Availability of higher education

Respondents were asked about their higher education. A significant percentage of the surveyed residents of Uzhhorod indicated that they have higher education - 83%.

Area of residence

The spatial distribution of the population in the city of Uzhhorod is uneven, as is the distribution of places of employment. Among the surveyed residents, the majority live in such areas as: Bozdosh, Novy, Stantsiyny, Pyaniy Bazar. The least are Kalvariya, Chervenytsia, Horyany and Galagov.

- Bozdosh, Novy	25%
- Stantsiyny, Pyaniy Bazar	20%
- Center	9%
- Svepomots	7%
- Radavanka	6%
- Mine, Lesser Prague	6%
- BAM	4%
- Domanyntsi	4%
- sq. Sandora Petefi	4%
- Kompotnyy, Sadovyy	3%
- microdistrict near the Avangard Stadium	3%
- Dravtsi	3%
- Galagov (Big and Small)	2%
- Horyany	2%
- Chervenytsia	1%
- Kalvariya	1%

It is worth noting that 47% of respondents have lived in their neighborhood for more than 20 years without changing it. Also. 18% of respondents have not changed their place of residence for more than ten years.

Movement/travel in the city

The modal split is the ratio of of the number of trips made using different modes, is one of the fundamental databases of data necessary for the work on a sustainable urban mobility plan at the stage of transportation modeling. The mode share reflects the popularity of certain modes of transportation in a particular area and within the city as a whole.

It is also worth noting that the need and nature of movement within the city is significantly is significantly influenced by the employment of citizens. The working share of the surveyed population of Uzhhorod is 82% and 13% of those not working, 5% of respondents refused to disclose their employment.

90% were moving yesterday

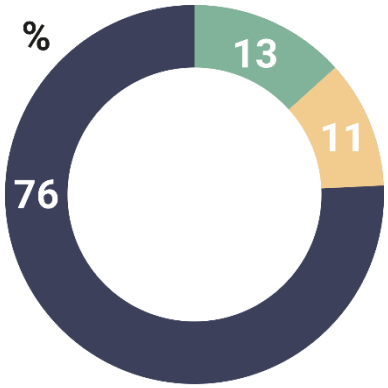
Has been moving around the city for the last week:

- Monday	26%
- Tuesday	7%
- Wednesday	13%
- Thursday	3%
- Friday	19%
- Saturday	16%
- Sunday	16%

A high percentage - 90% of the respondents had moved around the city "yesterday". 26% of those who did not move "yesterday" - most often did it during the week on Monday.

Does the job involve regular travel?

Of the surveyed employed citizens, 24% have jobs that require regular movement around the city (courier, sales agent, taxi or public transport driver). 13% of respondents, in addition to work related to regular movements, also have a stationary job.



According to the results of the population mobility survey, there are areas in Uzhhorod that lack convenient public transportation. This was confirmed by 33%, 39% denied this statement, and 28% of respondents found it difficult to answer this question. Every third respondent (33%) confirmed the most difficult connection with the Bozdosh and Novyi districts. According to the survey, there is a lack of convenient connections to the following districts of the city: BAM, Horyany, stadium Avangard.

33% indicate that there are areas in which there is a lack of convenient public transport connections.

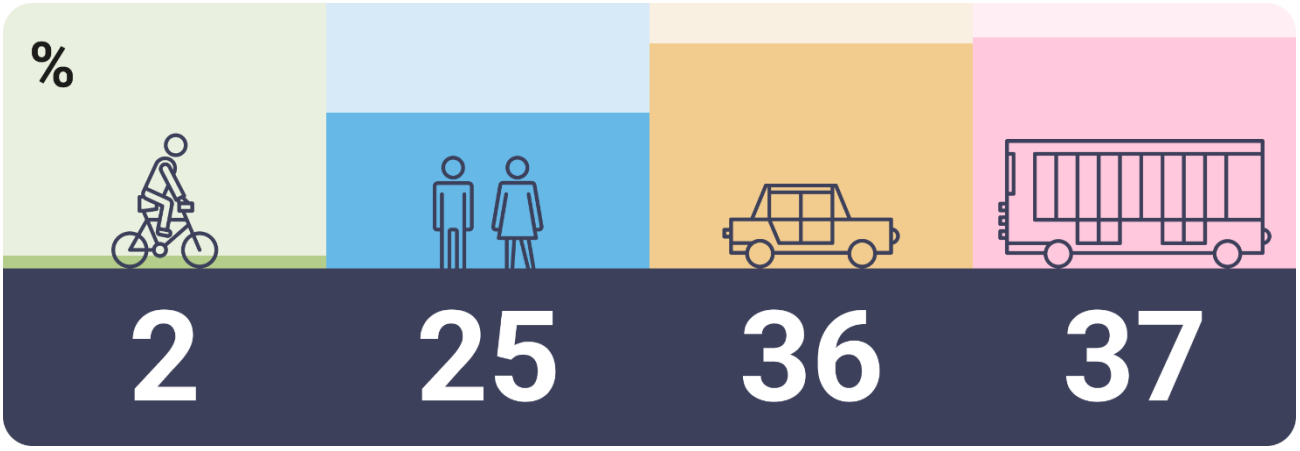
Areas that lack convenient public transportation (possibility to choose several answers):

- Bozdosh, Novy 33%
- BAM 16%
- Horyany 15%
- Kompotnyy, Sadovyy 15%
- Avangard Stadium 13%
- Shakhta, Mala Praha 13%
- Domanyntsi 11%

A third of those whose work is connected with regular movements note the city center as an area from where it is inconvenient to fulfill orders

How to get around the city

37% of people travel by public transport, 36% use private transport, 25% - move around the city on foot, 2% use bicycle transport.
To generalize, by a large margin the main means of transportation are private cars and public transport, while cycling is far behind.



The level of satisfaction of users with the work of public transport

According to surveys among users of public transport, the level of satisfaction with it was determined. 85% of people noted that they are satisfied with public transport trips buses, and only 7% - no. 8% do not use this type of public transport. City minibuses satisfy 41% of residents, the majority do not use suburban buses (51%). 26% of public transport users are satisfied with trips on suburban buses.

Public transport users, according to the survey, value reliability (certainty that the transport will be on time) and direct connection (no need to change/walk) the most.

Level of satisfaction with infrastructure facilities

Among the respondents, a high level of satisfaction with the following infrastructure objects was determined:

- coverage of public transport 69% of respondents
- condition of street lighting 58%
- state of HT stops 55%

The main problem infrastructure objects during the survey were:

- parking lots in the city center 78% of respondents confirmed
- condition of sidewalks in neighborhoods 66%
- parking spaces in neighborhoods 58%
- condition of ramps and exits on roads, bus stops and sidewalks in districts 58%

The average number of vehicles in the family

The level of motorization of the population is determined by the number of vehicles in a family. This indicator is determined by actually registered cars or by the results of surveys, i.e., actual ownership.

According to the study of population mobility, 54% of surveyed families in Uzhhorod have one car, 18% of families have two cars. In the city, 28% of families have at least one bicycle, 24% - two and 7% - three. In the warm season, at least twice a week, on average, 1 bicycle is used at least twice a week. With a high number of bicycles in the family, for a number of reasons, they are mostly they are mostly not used. Movement around the city by motorcycle/moped and electric scooter is significantly inferior: 92% and 91% of families, respectively, do not have this type of transportation at home.

Using of bicycle and electric scooter rental services

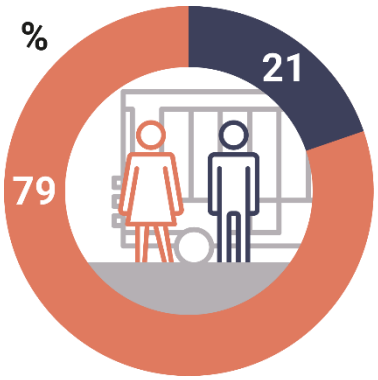
City bicycle/electric scooter rental is a system short-term rental of bicycles/electric scooters as a form of public transport. The rental system does an emphasis on short trips and, accordingly, a large number of users per vehicle in the system.

In the central part of the city, the population often moves over short distances. You can optimize these movements by renting bicycles and electric scooters. Currently, only 22% of respondents use bicycle/electric scooter rental services, among them the majority young people - people aged 18-29, on average 3.6 times a month.

Possession of a driver's license

72% of respondents have a driver's license. 91% of the surveyed men have a driver's license.

Public transport users



According to the results of social city population mobility survey Uzhhorod, women among all types of transport use public transport almost 4 times more often than men: 79% women, 21% men, respectively.

Barrier-free

The problem of the city is insufficient provision of barrier-free city infrastructure. 27% of surveyed city residents need to use ramps, exits from sidewalks to cross the road, etc.

Accessibility is also important an element of comfort for different groups people:

- small children (strollers or wheeled transport) 20% of respondents
- cyclists 9%
- elderly people 7%
- people on scooters 6%
- people with leg joint problems 6%
- persons moving to wheelchair 5%
- persons with visual impairments 3%
- pregnant women 2%
- persons with leg/leg injuries 2%
- other answers 24%
- difficult to answer 16%

Also, according to a survey of residents who need a barrier-free environment, they most often travel by car – 36%, by public transport – 33%, significantly less travel on foot - 26% and the minority ride a bicycle – 5%.

Yesterday's move

Yesterday's movements - movements that were made yesterday or the last movement on another day of the week, to establish the average daily number of movements the city.

Total volume of movements

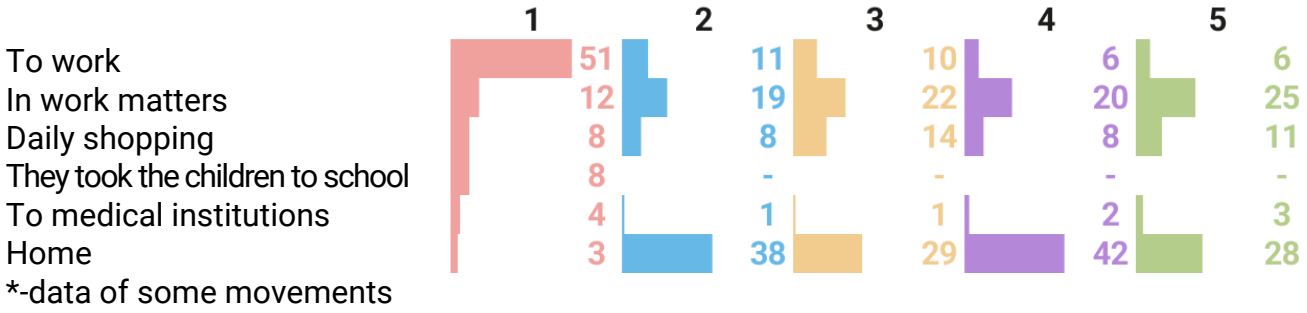
A third of the respondents have at least two movements per day, for example, from home to work - home from work. 20% have three movements per day and 20% - one. 12% of residents carry out 5 or more movements, a larger share of men, which is connected with the work of drivers, couriers, sales agents, etc.

Wherefrom?

The total volume of movements starts with point is home to 85% of the city's residents as a whole. A small share falls on other items. 5% start moving from work.

Where?

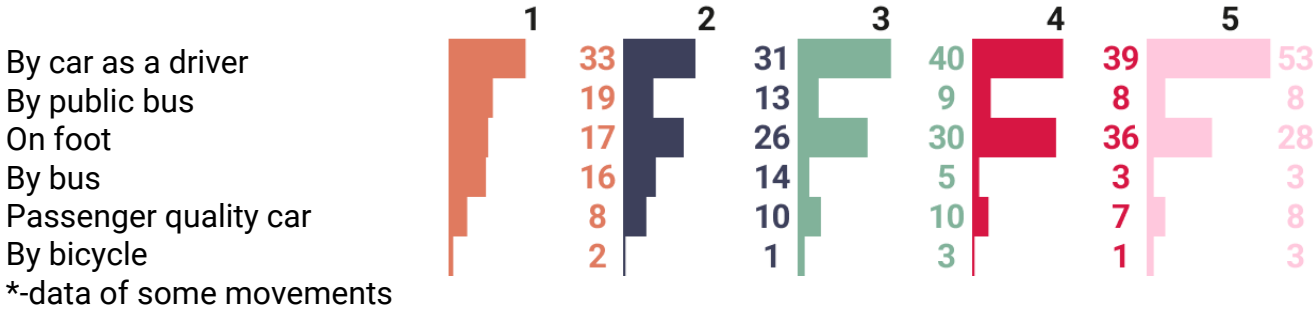
Having read the answers of the residents, where they went during the 1st, 2nd, 3rd relocation, it can be understood that half (51%) are making their first relocation to work. In work affairs, people move constantly, regardless of orderliness. People make their daily purchases most often on the third or fifth move. Some, before work, take their children to school - 8%, they go to medical facilities at the beginning or at the end of the day. The most numerous movement is home, it is either the second movement or the last one.



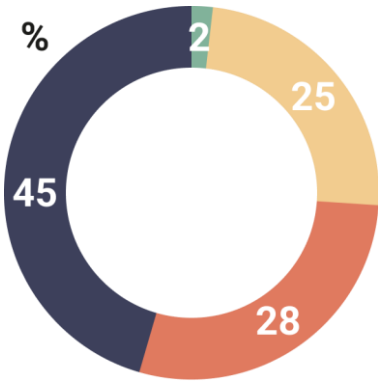
Used types of transport

When studying daily movements, in order to understand the further stages of the development of the city infrastructure, it is important to establish what type of transport is used most often by the residents of Uzhhorod.

During the whole day, residents most actively make their trips by car, the first movement - 33% and the fifth - 53%. A significant proportion moves on foot (2nd, 3rd, 4th movement) and do not use transport at all. 19% and 16%, respectively, usually make their first trip by public transport and minibus.



The method of making yesterday's movements



This diagram shows in percentage terms how the city residents made the above-mentioned movements yesterday. In total, for movements during the day, 45% of all movements were made for by car or taxi, a quarter (25%) by walking and 28% by public transport. Only 2% of all transfers were made on a bicycle.

Duration of arrival/ waiting

By analyzing the average pick-up time, waiting time for transport and movement, an average can be established the duration of the completed move. So, according to the results of the survey, it takes the longest to get there by public transport by transport - an average of 43 minutes. The duration of getting to the stop, waiting and the average duration of walking from the stop to the destination is 7 minutes. The trip itself lasts 22 minutes.

Moving on foot takes an average of 27 minutes, which is quite optimal. Such a transfer is usually carried out the shortest way. Traveling by private transport takes 26 minutes, of which 4 minutes are needed to reach the parking lot and 22 minutes are spent on the road. The fastest trip will be by bicycle - without additional waiting and pick-ups - only 17 minutes.

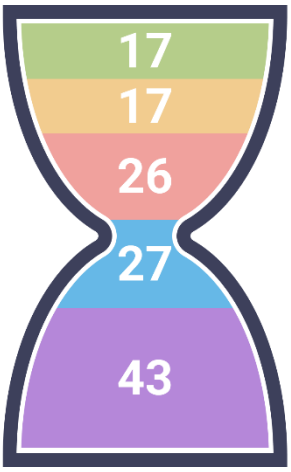
Bicycle

taxi/passenger vehicle

personal transport

on foot

public transport



2.0 Analyzing the current state of mobility

Uzhhorod is the smallest regional center of Ukraine, located in the West of Ukraine. The city is located at an altitude of approximately 120 m in the foothills of the Carpathians on the Uzh River (105 km in borders of Ukraine). The territory of the city is 41.56 km². The length of the city from north to south — 12 km, from east to west — 5 km. The highest point of Uzhhorod — Mount Velyka Daibovetska — 224 m. The area of green massifs and plantations is 1574 hectares, in addition, Uzhhorod is surrounded by forests. A significant part of the city area is the right bank part (Old Town), which somewhat larger than the left bank. The banks of the Uzh river are connected by 7 bridges: 4 pedestrian and transport bridges, 2 pedestrian and 1 railway.

The structure of the city has had a radial character since ancient times. Urban areas in different during the time spans of their existence developed along historically formed paths.

Such established directions that influenced the development of the city should include:

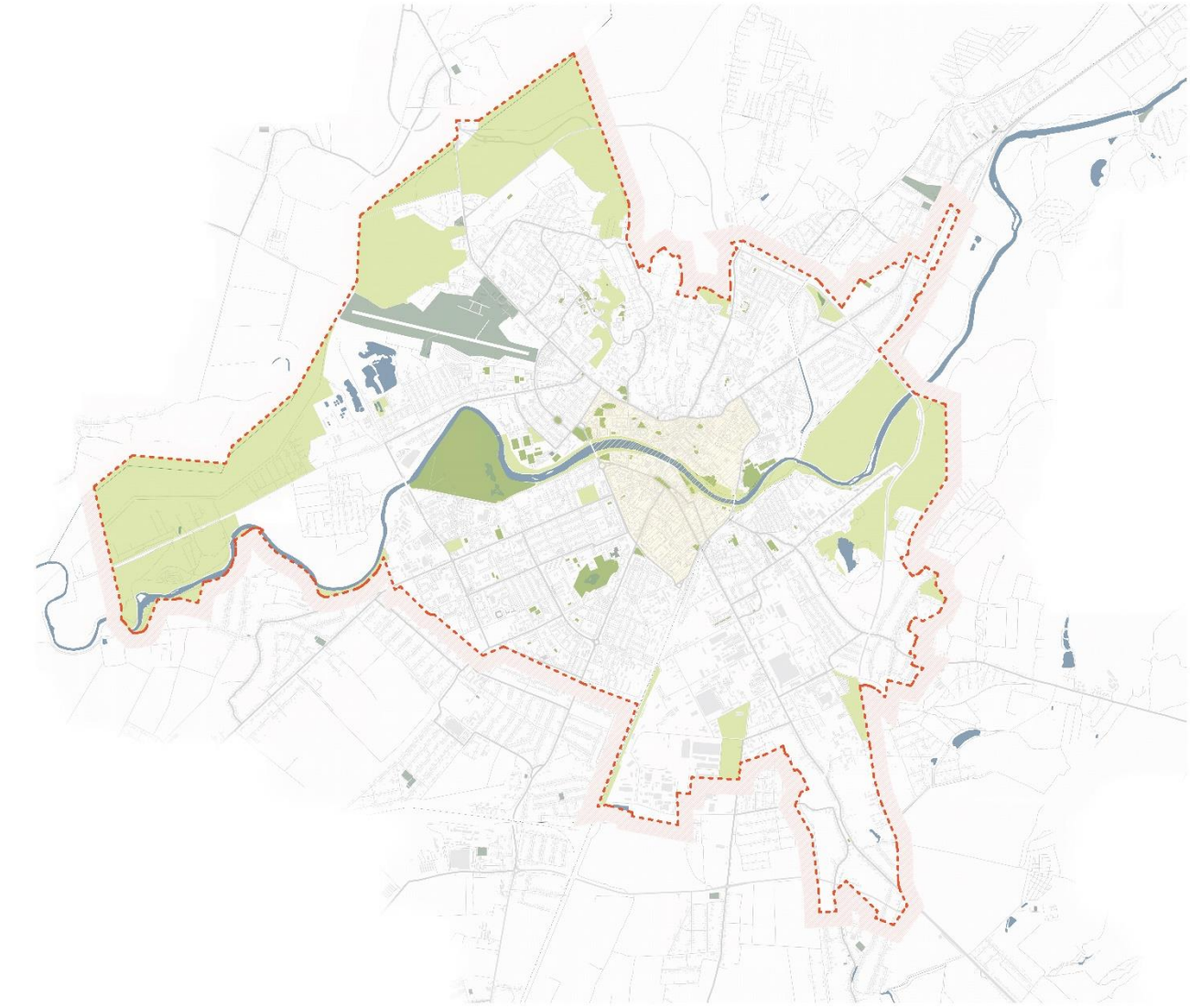
- the north-western direction, which within the city is formed by Sobranetska street, which leads from the historical center to the border with Slovakia and further to Mykhailivtsi and Pryasevo;
- the southern direction, which is formed mainly around Minayska street, which
- leads from the historical center to Chop and further to Hungary;
- the south-eastern direction, which is formed by str. Mukachevo and leads to Mukachevo, where it branches in the north-eastern direction to the Veretsky Pass and in the south- in the eastern direction to Khust, Vynogradov and Berehov and further to the territory of Hungary;
- the northern direction is formed by str. Domanynska and leads through the valley of the Uzha river to Uzhochki Pass.

The city of Uzhhorod received special development during the Czechoslovak period (1919-1938). It was a time of active urban planning process over the formation of modern architecture perfection of the central part of the city. It was during this period that the famous government Maly Galagov residential quarter.

A significant factor for the development of the city was the post-war period, when in the southeast industrial enterprises began to appear in the vicinity, which contributed to a convenient location approach railway tracks. The planning structure of this territory was carried out in a regular way with division into blocks, which are connected by cross streets with highways. In the right-bank part, the situation is different - industrial enterprises were partially absorbed the territory of the former manor building and destroyed the original planning structure. Thus creating an unfavorable situation from the point of view of preservation of historical architectural environment of the city.

Mobility is any way or form of movement in the city. In Uzhhorod available pedestrian, bicycle, car and transit traffic, as well public transport system. Residents of the city actively use it every day urban infrastructure, which is already overloaded. Uzhhorod needs complex and thoughtful interventions in the field of mobility. In order to implement qualitative changes, it is necessary to carry out an analysis of the existing urban development situation in the city.

2.1 Historical and landscape impact



Scheme of historical and landscape influence

The main factors that influenced the formation of the planning structure of the city of Uzhhorod, there are two factors: the presence of a water artery - the Uzh River and the natural conditions of the terrain.

Nature has created favorable living conditions in this area. The first is written mention of the city dates back to 1154 AD. The vast river valley seemed to be intercepted by the stone gates of the hills, which created a relatively narrow neck, which was strategic a find for ancient people as a place of profitable settlement and hunting.

The first settlement, which gave rise to the current city, arose at the most favorable point, which provided the best opportunity to control the terrain - on Zamkova Gora, the base which consists of andesite volcanic rocks that form a hill elongated from the north west to southeast. In contrast to the northern part of the right bank, the southern part the left-bank part of Uzhhorod is located on a plain that starts from the floodplain of the river it continues in the southern direction to the border with Hungary.

Picture: Panorama of the city of Uzhhorod (photo from Internet resources)

There are two types of landscaping in Uzhhorod. The first is formed due to natural landscape: starting from the territory of Veliky Galagov, a range of hills creates space in in the form of an amphitheater, which is elongated in the western direction to the border with Slovakia.

The second is organized by man: parks, squares, landscaping of streets and yards. Considerable attention was devoted to landscaping the embankment towards the Uzh River in the 20th century during Czechoslovakia republic. Along the embankments, avenues of different types of trees are planted for each plot. Along the Orthodox embankment there is

an alley of Japanese sophora, along the Kyiv embankment — a chestnut alley, which continues with a sycamore alley after the western transport bridge. Linden avenue - along the Nezalezhnosti embankment.

The ring road brought dissonance to the well-preserved natural environment, the engineering nature of which actively intervened in the preserved relief.

2.2 Street and road network

Scheme of the street and road network

Historical core
External transit
Main streets
Local streets

The city of Uzhhorod is the largest transport hub of the Transcarpathian region, through which a number of European and international highways, as well as an automobile route, pass through it of national importance. The city has two bus stations, a railway station and an airport of international importance. There is a checkpoint on the border with the city Slovakia. External communications of the city and its suburban areas are provided by air, by rail and road transport. On the formation of the street and road network (SRN) in the survey and project perimeter of the study area was influenced by a number of factors.

The first is the natural landscape features of the area on which the historical site is spread core. The height difference of the area prevails the most in the northern and eastern parts of the city.

The second factor is the structure of the city's development.

The third factor is the entrapment of the city within the former city fortifications and is more arbitrary development of areas adjacent to the historical core.

Main streets

Transport and pedestrian connections between residential and industrial areas and within them, between public centers is carried out with the help of main streets. To such belong to:

- the corridor of Str. Sobranetska - str. Podhirna - str. Drugets;
- str. Zahorska (to the intersection with Mykola Bobyaka Str.);
- str. Tyvodar Legotskyi;
- str. Mykola Bobiak;
- str. Kapushanska;
- str. Mykhailo Hrushevskyi;
- str. Mytna;
- prospekt Svobody;
- str. of Carpathian Ukraine (former Yury Gagarin Str.);
- str. Shumna;
- str. Minayska.

Local transit streets

Local transit streets perform an auxiliary transport function and connect main streets between each other. It is worth noting some streets that actually perform a function internal transit, namely:

- the corridor of Str. Miklosha Bercheny - str. Klyment Timiryazev;
- the corridor of Str. Oleksandra Hryboyedov - str. University;
- the corridor of Str. Budyteliv - str. Istvan Dendesi;
- the corridor of Str. Oleg Koshovoy - str. Olga Kobylyanska - str. Antonin Dvorak -
- Str. Hranitna;
- the corridor of Str. Volodymyr Goshovsky (formerly Bozhenka Str.) - Str. Alexandra

- Dovzhenka - Koryatovycha Square - str. Oleksandr Fedynets;
- the corridor of Str. Pavlo Chubynskyi (former Borodin Str.) - Str. Peter Gulak-
- Artemovskogo - str. Stantsiyna
- str. Zakarpattia;
- str. Ivan Franko;
- str. Volodymyrska;
- Slov'yans′ka naberezhna;
- str. Maria Zankovetska;
- str. Uspenska;
- str. Korytnianska;
- str. Oleksandr Mozhaiskyi.

Residential streets

Transport (without passing freight and public passenger transport) and pedestrian connections in residential areas of the city, exits to main streets regulated traffic is carried out at the expense of residential streets. The rest belongs to them streets and driveways, which include access to residential, entertainment, commercial, educational, medical, administrative and sacred territories.

Pedestrian streets

As for pedestrian areas, they are mainly located on the right bank of the historical core of Uzhhorod:
- naberezhna Nezalezhnosti;
- Pedestrian bridge;
- Yevhen Fentsyk square;
- Sandor Petefi Square (opposite the pedestrian bridge); - str. Corso;
- str. Augustyna Voloshyna (to the intersection with Kapitulna Str.); - lane Passage.

Corzo Street fully justifies its name, because translated from Italian it means "place for walks". This is a narrow street in the spirit of the Middle Ages. Together with str. Augustina Voloshyn, Yevhen Fentsyk Square and Passage Lane create a special authentic environment for walking through the old town.

On the left bank of the city, pedestrian areas are:
- Bohdan Khmelnytskyi Square;
- Cyril and Methodius Square;
- the passage between str. Kapushanska and str. Maria Zankovetska;
- pedestrian zone around Lake Kirpichka.

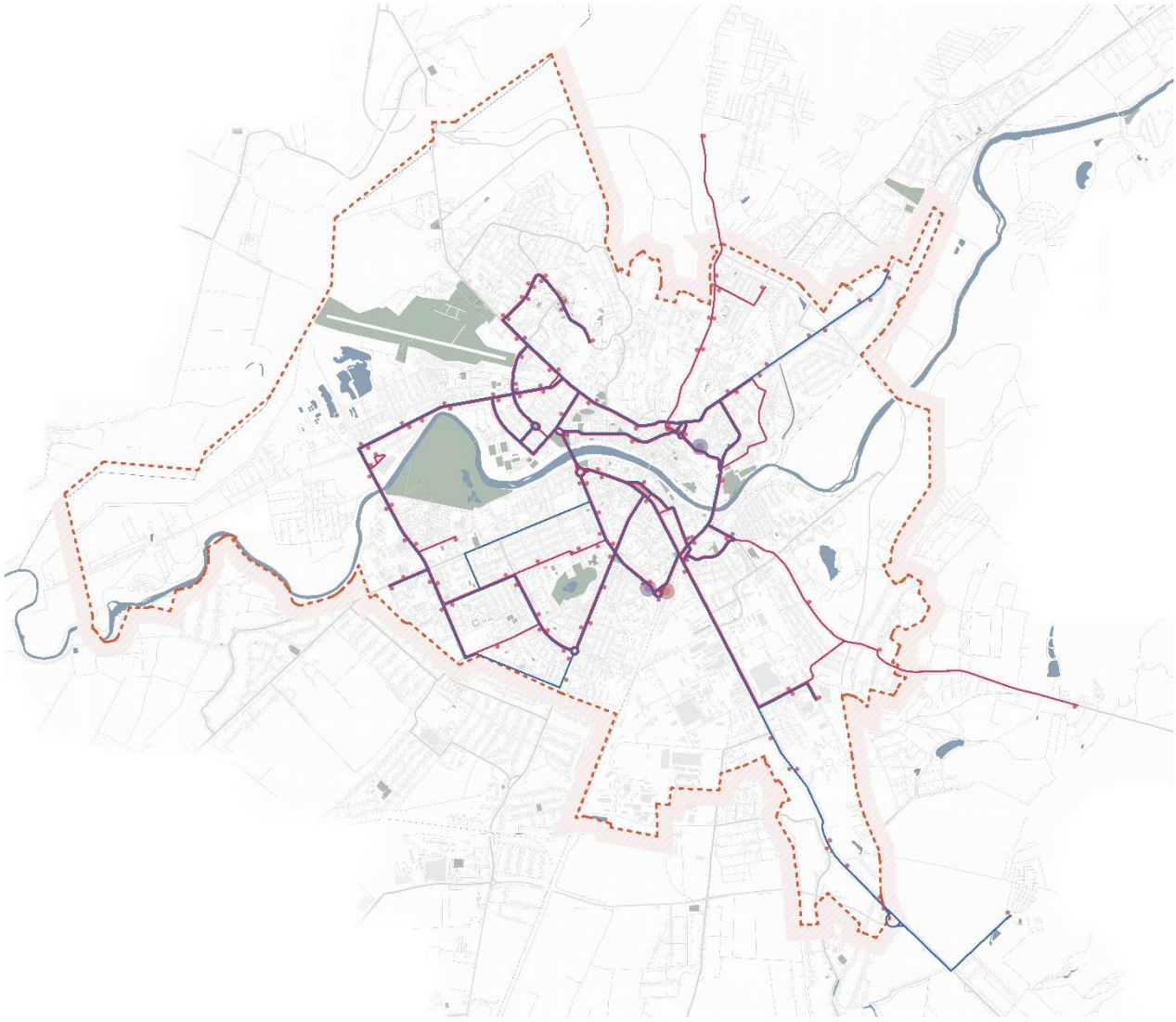
External transit

External transit within the city is carried out along the street. Starodomanynska, which bypasses Uzhhorod from north to south from the eastern side of the city. The approach to the city consists of 5 main directions of movement, namely:

- from the South-East side of the city, the highway M06 Kyiv – Chop (European highway E50), which within the city passes into Str. of Carpathian Ukraine, which in turn goes to the street. Mukachivska, which leads to the very center of the city;
- From the South side of the city, highway M06 Kyiv – Chop (European highway E573) approaches the city through the villages of Rozhivka and Minai, and further along the street Minayska and Svoboda Avenue all the way to the city center;
- the T-07-02 road enters the city from the South-Western side (motorway of territorial importance) and within the city limits passes into the street. Kapushanska, which also leads to the central part of the city;
- from the North-West to the North-East (in the direction from the checkpoint "Uzhhorod") the highway H13 Lviv – Sambir – Uzhhorod passes through the city, which in within the city limits is superimposed on the corridor of Str. Sobranetska - str. Podhirna – str. Drugetov.

Today, the street and road network of Uzhhorod is characterized by a pronounced vector in the central part of the city. Instead, the central part of the city is typical for everyone transformation of historical European cities into a unified pedestrian space. A railway line passes through the city from the South to the North-East part of the city separates the East and West of the city. Inadequate river and rail connections result in overrunning of vehicles. In addition to the congestion of the main main streets leading to the city center, today the street and road network is working at its maximum capacity.

2.3 Pu blic transport



Scheme of public transport

Private public transport

City public transport

Public transport stops

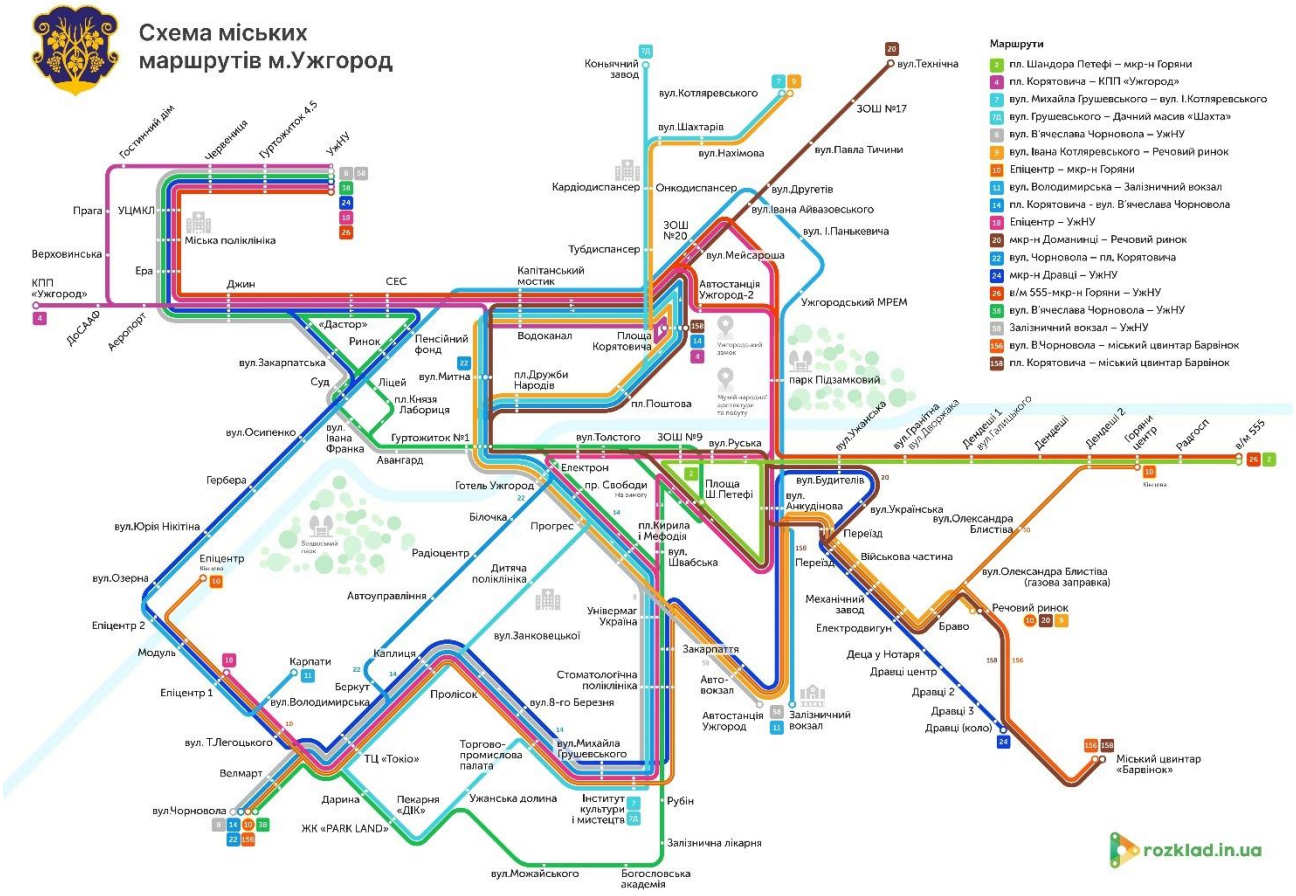
Bus station

Station

Public transport is an important mode of transportation in the city of Uzhhorod, despite the high level of use of legal vehicles. He uses it every day at least 37% of the city's residents. In accordance with the Resolution of the Cabinet of Ministers dated 03.12.2008 No. 1081 (with

amendments and additions) transportation of passengers on public city bus routes is carried out exclusively on a competitive basis.

The city has a fairly developed network of public transport. Total length of active routes is 313 km. The network of public transport routes is very important strongly influenced by natural and anthropogenic barriers of the city of Uzhhorod. The Uzh River is a railway track divides the city into three sectors with different character and density of buildings, street-road network and filling with attractions. It is mainly in the south of the city a district with "sleeping" massifs, and in the north - a district with a historical core and an administrative one function This leads to oversaturation of the public transport network in some areas of the city and on some sections of the streets, as well as to the deficit of the public transport network in those areas of the city where there is little passenger traffic.



Scheme of city public transport routes

There are 3 road bridges across the Uzh River, as well as 2 railroad crossings across the railway. Through the automobile bridge that passes in the western part of the city along the street Bobyaka is served by 3 public transport routes. There are 6 routes in the central part of the city of public transport pass through the Transport bridge. Through the bridge that passes in the eastern part of the city along the street Ankudinova has 3 public transport routes. 6 routes cross the railway track in the area of street Ankudinova. 7 routes pass along the street Minayska.

The route network of the city Uzhhorod has 17 regular public transport routes. On six routes, which serves CE "Uzhhorod municipal transport" run 12 meters low-floor buses Electron A18501, their number 27 cars, total passenger capacity 102 persons (including 30-33 seats), produced by joint Ukrainian-German enterprise "Electrotrance". Three private carriers using 85 different vehicles of small and medium capacity to serve the other 11 city routes.

Most vehicles have GPS-trackers connected to a single system of traffic management of city passenger transport, which gives an opportunity both the carrier and the organizer of passenger transportation to receive objective data for the control over the fulfillment of contractual obligations of carriers, to carry out on-line control over the observance of schemes and schedules of traffic of vehicles, monitoring and tracking of inappropriate use of buses.

The online GPS monitoring system informs passengers about the movement of public transport. The resource is posted on the official website of the city council and in the mobile application "Dozor City". Therefore, every passenger has the opportunity to receive in real time up-to-date information about the arrival time of the bus at the stop and information about routes cities, a list of stops through which the route runs, and separately about bus traffic.

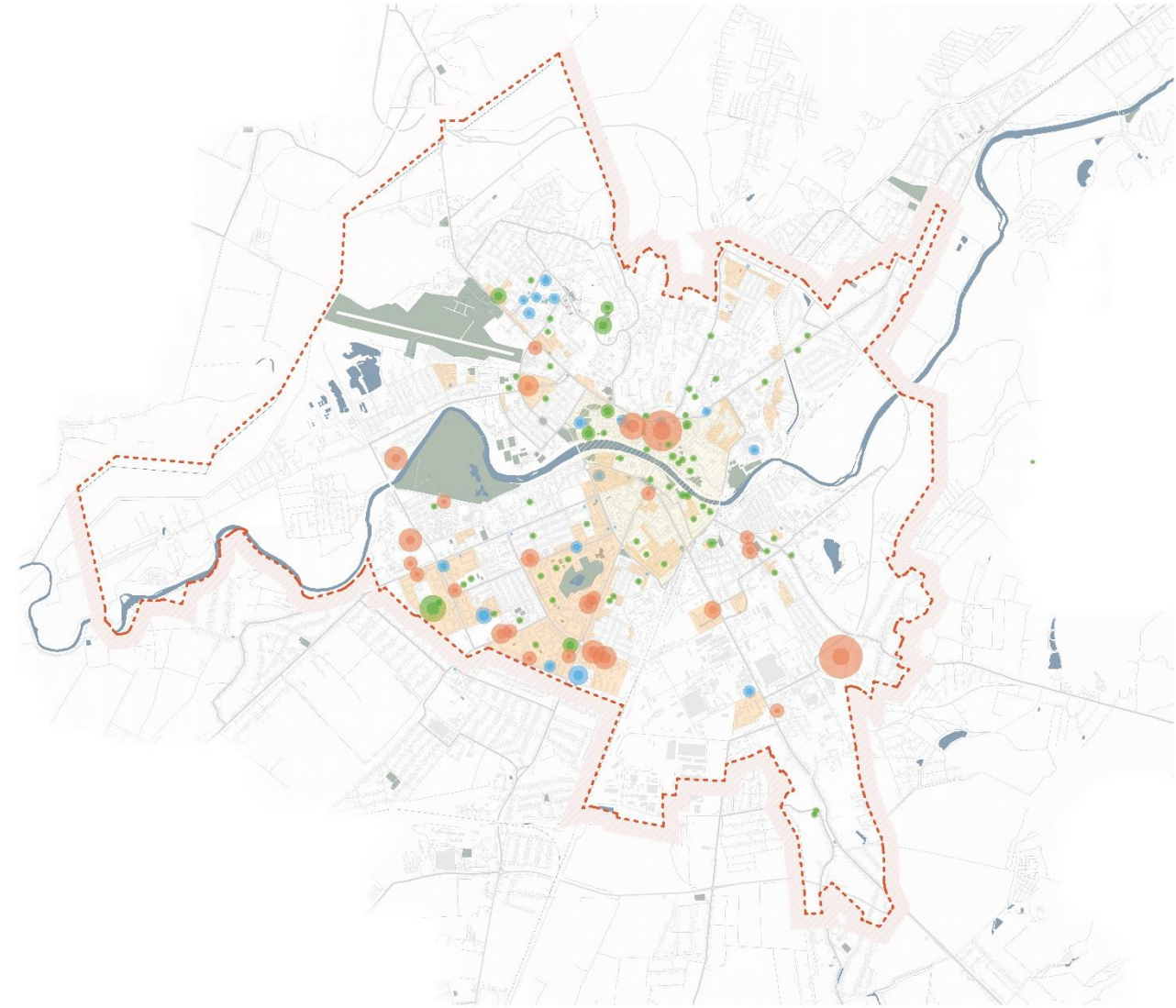
For the convenience of residents and guests of the city, a comprehensive scheme of city traffic has been developed routes, its design, is posted at bus stops and on the city's official website advice Public transport timetables are posted in the all-Ukrainian mobile app the Rozklad.in.ua application, on the information panels at some of the city's bus stops, at website https://uz.rozklad.in.ua/, as well as on the official website of the city council in the section "Public transport".

In accordance with DBN B.2.2-12:2019 "Territory Planning and Development", pedestrian distance approaches to the nearest stop should not exceed: 250 m in the central part settlement and 600 m - in the zones of individual manor buildings. When performing such conditions - placement of stops complies with the norms. Radiuses in the central part of the city public transport stops do not always meet the above norm of 250 m. On the section of Volodymyr Goshovskyi Street, Oleksandr Dovzhenko Street, Koryatovych Square to the street Oleksandr Fedynets, 1.3 km long (routes No. 7, 7D, 9, 14, 20, 22), there are only three public transport stops. On most streets in the central part of the city, through which public transport routes are laid, distances between stops do not meet the established norm of 250 m. Some central streets or their the sections are used as transit for buses and minibuses, therefore the railway station stops on there are none at all. In remote parts of the city, the radius of availability of stops covers less part of the territory This is especially true for some new residential areas and remote areas district with low-rise and manor buildings.

There are 183 public transport stops in the city of Uzhhorod. Currently in the city operates three "smart" stops ("department store "Ukraine", "Kyril and Methodia Square (Cathedral)", "Sq. Koryatovych"), which are integrated into the GPS-monitoring system and equipped with an electronic scoreboard. Electronic bus arrival forecast boards are also available at the hotel bus stops "Uzhhorod", "Uzhhorod Institute of Culture and Arts", "Tokyo", "Mytna Street".

Not all public transport stops comply with current norms and standards, and not all of them are in satisfactory condition. There is no landing platform with a necessary rise of 0.2 m at most stops. At remote ones waiting pavilions at bus stops are in an unsatisfactory condition or are completely absent. Landscaping elements are in an unsatisfactory condition or are also missing, which creates significant discomfort.

2.4 Influence of nodes of attraction



Scheme of attraction nodes

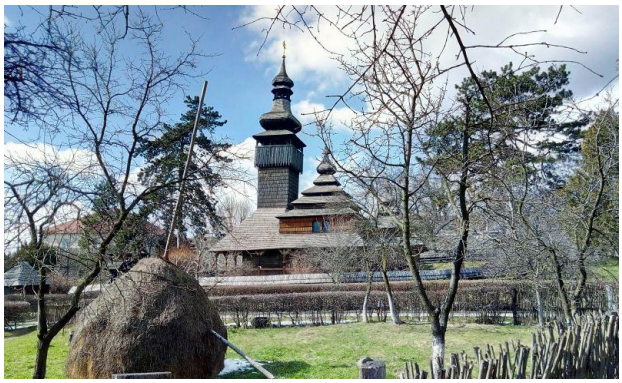
The city of Uzhhorod has a large number of attractions that are connected to each other. These connections affect the development of infrastructure and mobility in general, forming key nodes of attraction. The nodes of attraction, in turn, dictate the corresponding development scenarios territories where they are located. All of them can be classified into the following categories:

Historical core

The main traffic magnet is the central historical part of the city, as it is in it is home to the main hubs of attraction - trade, a large number of educational institutions institutions, medical, financial and administrative institutions, as well as many institutions that provide a variety of services. Also, the historical center generates, to a greater extent, tourism flow. Among the main magnets for tourists and guests of the city, can be singled out the Uzhhorod castle and the Museum of Folk Architecture and Life. It definitely acts as an active magnet refined embankment of the Uzh River.

The main traffic load falls on the entrances to the historical part of the city (streets Miklosha Bercheny, Shumna, Pidhirna, Oleksandra Dovzhenka and the Transport bridge).

Picture: Uzhhorod castle
(photo from Internet resources)



Picture: Museum of Folk Architecture and Life
(photo from Internet resources)

Commercial

The Uzhhorod Market, located in the central historical part of the city. The commercial hub creates a significant pedestrian and vehicular traffic along Oleksandra Fedynets Street and Koryatovych Square. Additional inconvenience is caused by randomly parked cars within the roadway. IN in the south-eastern part of the city is the "Krasnodontsi" market, where purchases are made locals and visitors. Also an active magnet is the " P”yanyy " market, which is located in the southern part of the city. Traffic jams also constantly form near food markets there is chaotic car parking. In the western part of Uzhhorod there are shopping malls centers "Tokyo" and "Epicenter", and in the northern part there is a shopping center "Dastor". Data the centers act as active magnets in the volume-spatial organization of the city of Uzhhorod.

Picture: "Krasnodontsi" Market (photo from Internet resources)

Picture: Uzhhorod market

Medical

Medical care institutions that attract a flow of people are Zakarpattia regional clinical hospital named after A. Novak, Uzhhorod central city clinical hospital, Uzhhorod City Polyclinic, Uzhhorod City Children's Polyclinic, Polyclinic No. 2, Uzhhorod city center of primary health care, regional clinical oncology dispensary, Uzhhorod City Children's Hospital, Regional Infectious Disease Hospital, Psychiatric Department of the Regional Clinical Hospital, Uzhhorod City Maternity Hospital, Regional tuberculosis dispensary, Regional clinical cardiology dispensary and a number of private institutions located throughout the city. In the north of the city can be traced the largest concentration of medical facilities. The basis of this cluster is Uzhhorod the central city clinical hospital, around which a number of other medical institutions are located.

Educational

Educational hubs of traffic attraction include local educational institutions, namely preschool institutions, comprehensive schools and extracurricular institutions, State higher educational institution "Uzhhorod National University", Transcarpathian Academy of Arts, Augustyn Voloshyn Carpathian University, Separate structural subdivision "Uzhhorod Trade and Economic College of the State University of Trade and Economics", Department of Vocational Pre-Higher Education, Communal institution of higher education "Uzhhorod Institute of Culture and Arts" of Zakarpattia Regional Council, Communal Institution "Uzhhorod Music Vocational College named after D. E. Zador", Vocational College of Arts named after A. Erdeli of the Transcarpathian Academy of Arts, Natural humanitarian professional college of the State Higher Educational Institution "Uzhhorod national university", Uzhhorod Humanitarian and Economic College of Carpathian Augustyn Voloshyn University. Traffic is mainly generated near them in the morning the time when most pupils or students are going to study. Most educational institutions located near and directly in the historical center. There is also a large number in the north and southern parts of the city. There is an insufficient number of educational institutions in the northwestern and southeastern parts of Uzhhorod. This makes it necessary students to get to the city center. Which, in turn, entails formation traffic jams in the morning and evening

Picture: Uzhhorod National University (photo from Internet resources)

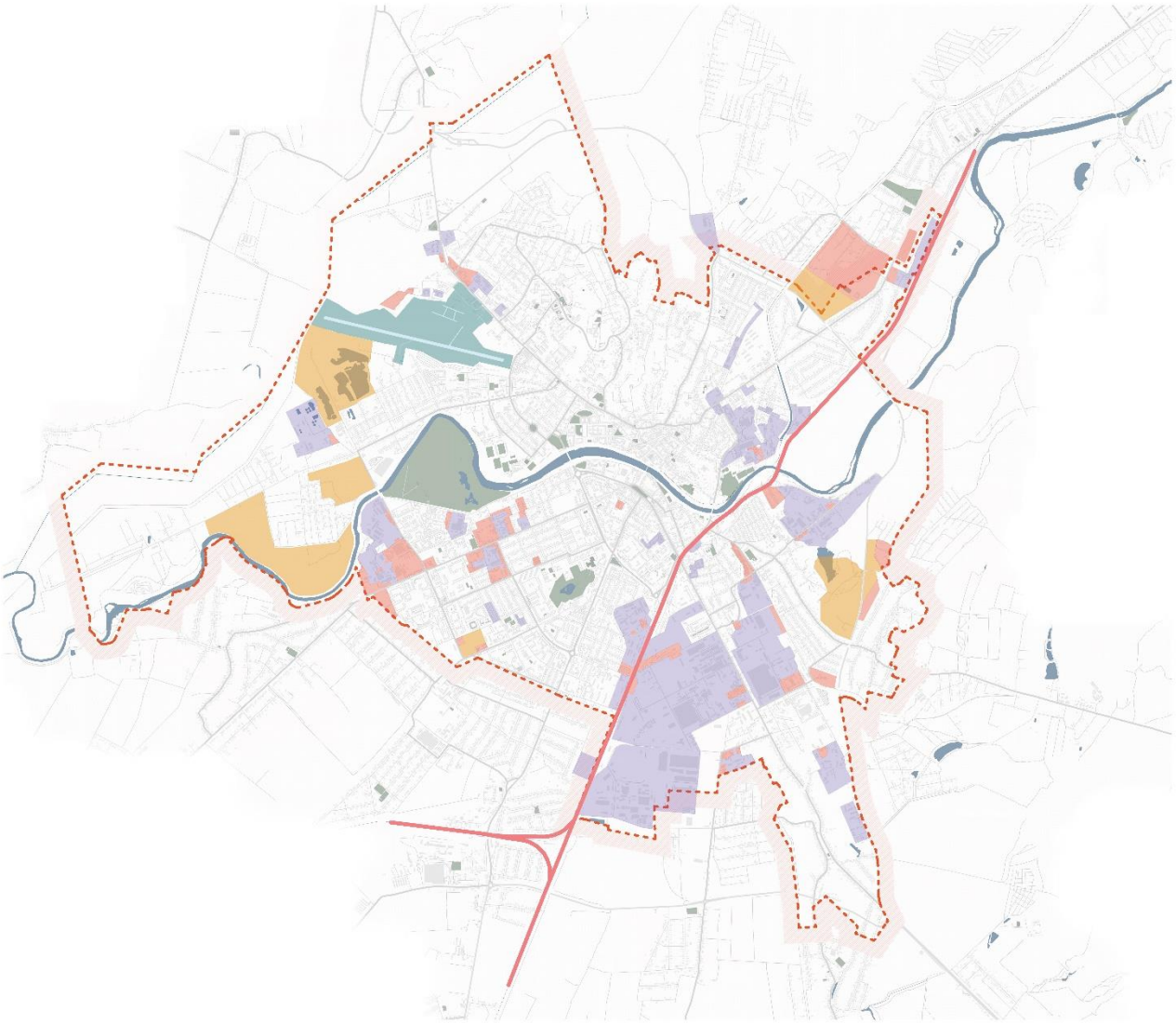
Picture: Carpathian University named after Augustina Voloshyna (photo from Internet resources)

2.5 Impact of industrial and disharmonious areas

Industrial objects

In the southeast of the city of Uzhhorod there is a pronounced industrial zone, closely connected with the railway. Here are a number of former industrial enterprises - "Electrodvigun", "Mechanical Plant", "Turbogaz", and others. Some businesses continue work ("Ungweier", "INTERFIL"). Now the enterprises are in private ownership and are only partially used.

There is a concentration of industrial areas in the western part of the city. Now these enterprises are almost not exploited. Some of these territories are losing their functionality appointment. Private and public buildings are starting to be built in their place. Near the intersection of Mykola Bobyak Street and the Kapushanska part of the industrial areas changed its functional purpose, namely, the residential complex "Crystal", shopping center "Epicentr" was built, megastore "Welmart" and a number of other non-industrial objects. Near the intersection of streets Kapushanska and Oleksandra Radishcheva, several private residential buildings were built and non-industrial facilities. Within the intersection of Sobranetska and Verkhovinska streets "European quarter" housing complex, "ATB" supermarket, "Europa" hotel-restaurant were built. Near "Mercedes-Benz" salon is located on Oleksandr Blest Street.



Scheme of influence of industrial and disharmonious territories

- Industrial objects
- Disharmonious objects
- Revitalized territory
- Airport territory
- Railway

Picture: Elektrodvigun Plant, Uzhhorod (photo from Internet resources)

Picture: Turbogaz Plant, Uzhhorod (photo from Internet resources)

The disharmonious area on the eastern edge of the city is being actively built up with private houses. Compared with the General Plan of Uzhhorod in 2004, today the share of territories allocated for industrial activity, decreased by 14.3%.

Disharmonious objects

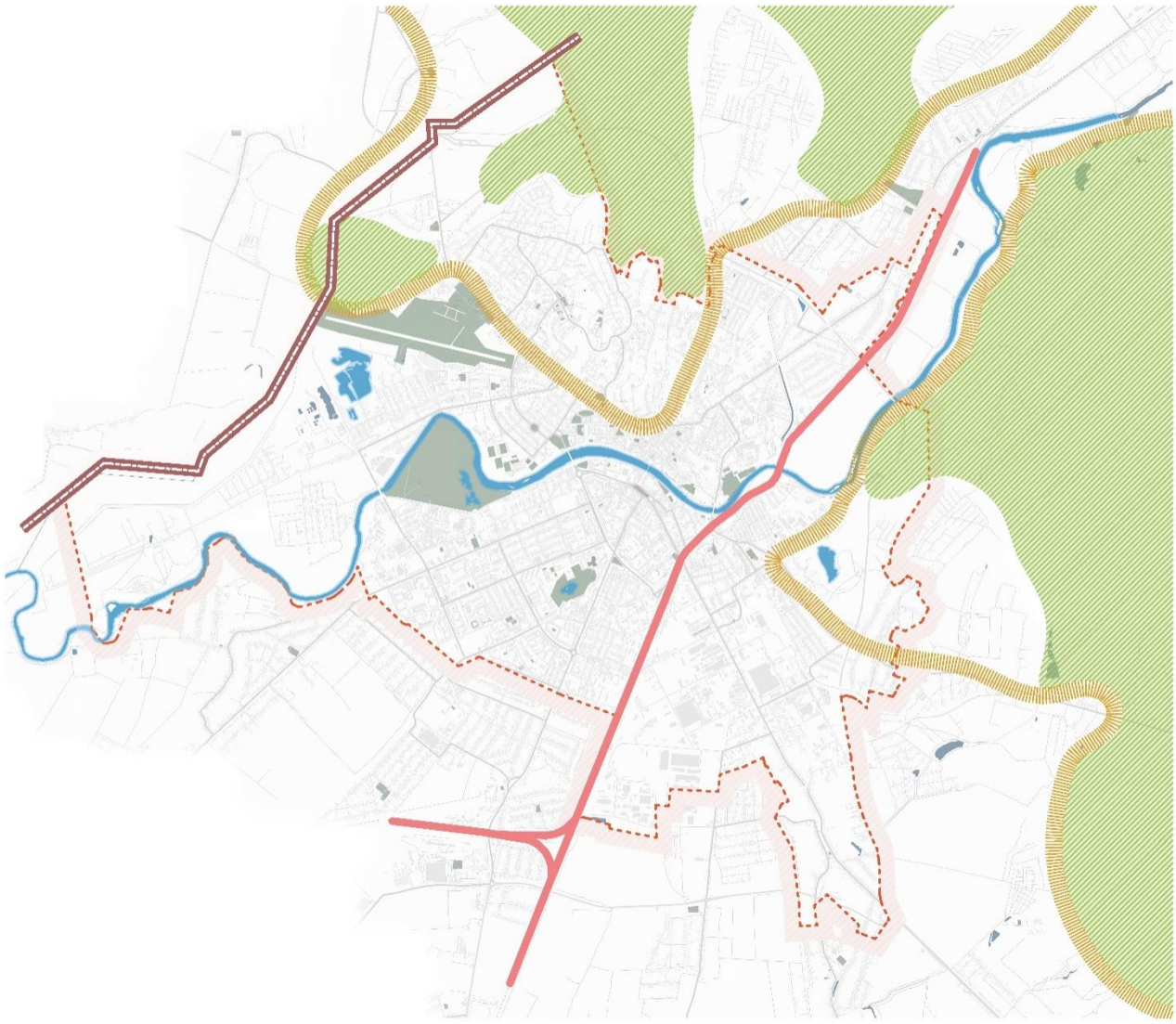
As for disharmonious territories, the situation is not critical. The historical center and its the neighborhood does not have pronounced disharmonious areas. They are usually alone occur on the outskirts of the city and near the border zone. These are abandoned used ones quarries and overgrown virgin lands. Radvansky quarry can be included among these whose history dates back to the 20th century. Andesite was mined on it, which was crushed into next to the built factory. Now the quarry is flooded and very dangerous. There are no prepared beaches on it, so it is officially forbidden to swim there. But it does not interfere many residents of Uzhhorod actively violate this ban, which leads to tragic consequences.

In the western part of the city on the street Zahorska is located in the territory of private development. This area is developing very slowly. A large number of overgrown and cluttered land plots, there is no hard surface on the access roads to these territories, unimproved and the embankment of the Uzh River is dangerous in places.

In general, there is a tendency to decrease the number of disharmonious territories in the city due to the expansion of private development.

Picture: Radvansky quarry (photo from Internet resources)

2.6 Barriers to development



Scheme of influence of development barriers

- Natural relief
- Forest massifs
- Reservoirs
- State border
- Railway

Considering the urban planning structure, Uzhhorod has five pronounced barriers to development:

The first is close to the border with the Slovak Republic in the northern west, the length of which is 7.5 km.

The second is the Uzh River, which bisects the city horizontally, thereby creating a parkland zone and embankment.

The third is the formed forest massif on the hills of the north and east, which complicates development free territories in these directions.

The fourth is the transit of the railway through the entire city, which divides Uzhhorod vertically in half. The presence of only two railway crossings creates discomfort in movement.

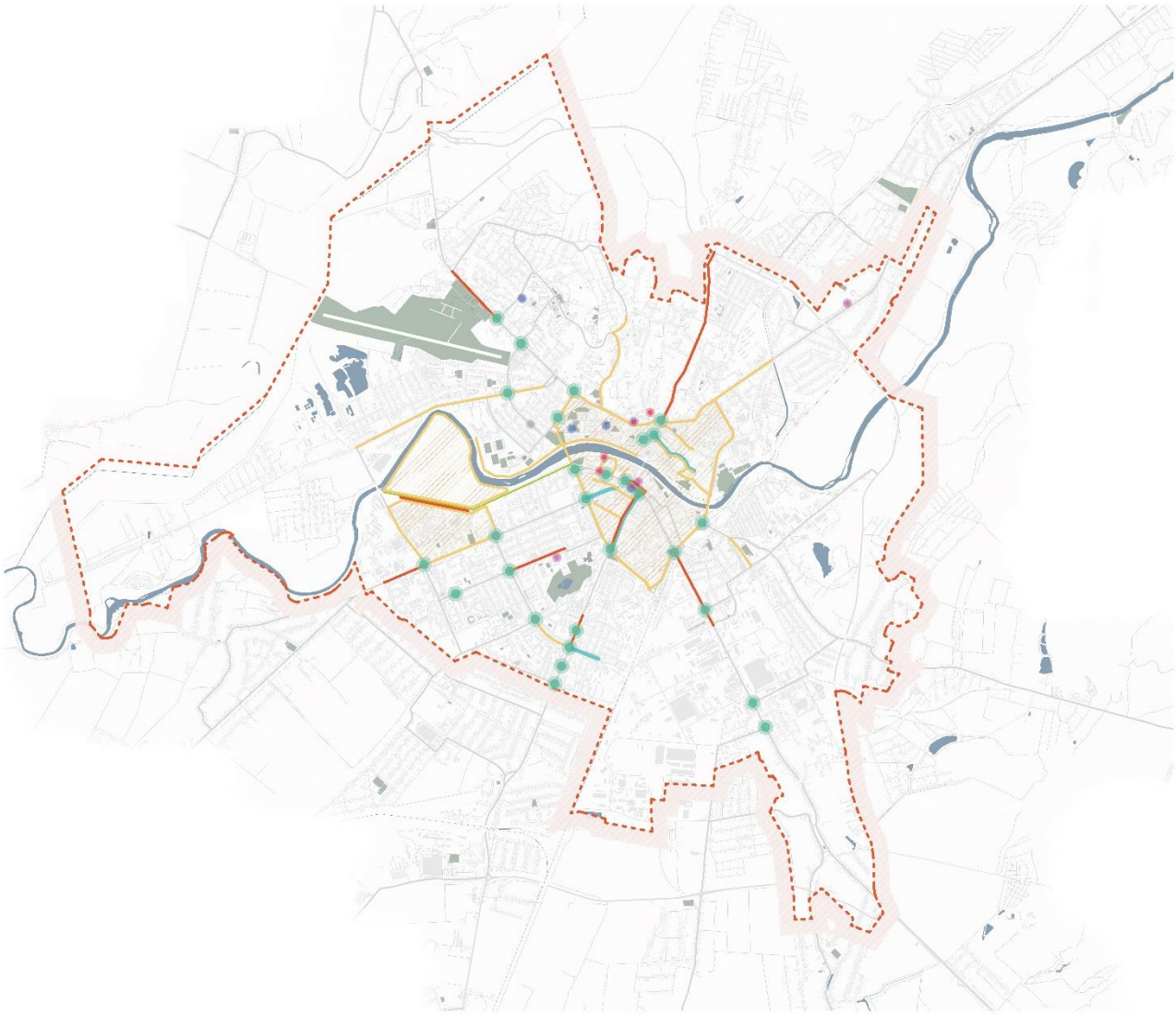
The fifth is the lack of unification of the territorial community of Uzhhorod with adjacent suburban communities villages into one administrative entity, which complicates the organization of mobility between nearby settlements and the city.

2.7 Problems in the field of road safety SWOT analysis

One of the obligatory components of the creation of SUMP is the involvement of the city community and stakeholders before its development. That is why the Public Association FORZA team is working to improve quality of the plan held 13 public discussions on issues of sustainable urban mobility with citizens and Uzhhorod specialists in this topic. In general, during the discussions before them about 200 people joined.

According to a social survey of city residents and the results of meetings held with representatives of various layers of the community, a scheme was developed that reflect sperception of road safety problems:

In particular, the following participated in the discussions:
- persons with disabilities and parents of children with disabilities;
- parents of minors and underage children;
- persons of respectable age;
- internally displaced persons;
- architects and urban planners;
- leaders of local student self-government, representatives of city schools;
- students, members of the Council of Young Scientists and teachers of the Uzhhorod National University university;
- cyclists and users of LPT;
- motorists;
- carriers providing public transport services;
- employees of the transport department of the Uzhhorod City Council;
- employees of the Department of Urban Planning and Architecture of the Uzhhorod City Council;
- employees of the urban infrastructure department of the Uzhhorod City Council;
- employees of the municipal guard department of the Uzhhorod City Council;
- managers of communal enterprises and condominiums.



Scheme of problems in the field of road traffic safety

- Chaotic parking
- Unsatisfactory lighting
- High speed of vehicle movement
- Unsatisfactory quality of sidewalks
- Existing adjustable intersections

Absence:

- parking space for people with disabilities
- bike racks
- pedestrian crossings

Meeting with architects and urban planners

Meeting with motorists and carriers

In meetings with specialists of specialized offices/ departments of the Uzhhorod City Council the developers of SUMP Uzhhorod - LLC "Urban Consulting" also participated directly. The meetings were held with the aim of identifying problematic issues, needs, vision and measures improvement of urban mobility in various aspects and components, namely:

- network of pedestrian infrastructure, including playgrounds and public spaces;
- spaces for people with disabilities (persons using wheelchairs; prostheses;
- with vision and hearing impairments);
- bicycle infrastructure;
- public transport systems;
- connections between the districts of the city (nodes of attraction – residential quarters; recreation areas residential quarters, etc.);
- reducing the use of private cars;
- parking infrastructure;
- safety of various traffic participants;
- other issues important to meeting participants.

Meeting with youth and students

Meeting with parents who have underage children

During consultations with the community and specialized structural units of the city council regarding problems with urban mobility in Uzhhorod, the residents are most concerned and specialists of the city, the following categories of issues:

- Unsatisfactory lighting.
The public of the city emphasizes the unsatisfactory lighting of road and pedestrian areas and lighting of pedestrian crossings along Slavyanska embankment.

- Chaotic parking.
It is observed most often in the central part of the city, which creates a number of problems for traffic pedestrians and the movement of public and private vehicles, in particular: the corridor of Str.Oleksandr Dovzhenka - Koryatovych Square - str. Oleksandr Fedynets, central part Str. Sobranetska and Str. Podhirna, corridor, str. Oleksandr Dukhnovych - str. Chapter, part of the street Kapushanska, str. Shvabska and part of str. Pavlo Chubynskyi. Complicated the situation with randomly parked cars on the street. Nebesnoi Sotna, str. Panasa Myrnogo, str. Mykhailo Luchkai, on Zhupanatska Square, as well as near the nodes of attraction described above.

- High speed of movement of vehicles.
Active residents of the city mark the following streets as dangerous in terms of vehicle speed: partly Slovianska embankment, str. Kapushanska (toward the exit from the city), str. Maria Zankovetska (from Mykhailo Hrushevsky Str. to Istvan Secheny Str.), Str. Minayska (from rings on the street Mykhailo Hrushevskyi to Str. Vasyl Surikov), str. of Carpathian Ukraine (from rings to the street Korytnianska), str. Sobranetska (within the airport), corridor of Str. Miklosha Bercheny - str. Klyment Timiryazev (in the direction of the exit from the city), str. Schwabska and Square Sandora Petefi.

- Unsatisfactory pavement quality.
Neglected, destroyed, and sometimes completely absent sidewalks in the city and near residential areas. The pedestrian part of the city in many areas has a certain number of problems, namely: lack pavement and pavement, abnormal width, a number of obstacles and height differences (high curbs, protruding entrance steps), cars parked on sidewalks and pedestrian zones, irregular ramps, which make it difficult for pedestrians to move.

In the central part of the city on Str. Oleksandr Dukhnovych - str. Kapitulna, str. the Lev Tolstoy - Kyiv embankment - it is not convenient to move to the historical monuments of the city. Alisher Navoi Lane, str. Koshytska, str. Julia Zhemaite, str. Andrii Novak, str. Mykhailo Hrushevskyi, str. Yenkivska, str. Drugetiv - lack of normal sidewalks. In the district Svobody Avenue, Str. Carpathian Ukraine, str. Zagorska, Bozdosky Park, str. Corso, Str. Tyvodar Legotskyi is an unsatisfactory cover. Str. Yarotska, str. Oleksandr Fedynets, Str. Shvabska, str. Kapushanska, str. Andria Palaia (former Telman Str.), "Pyanyy" market - irregular width of the sidewalk (in some places due to parked cars). On the embankment Nezalezhnosti- lack of barrier protection along the river. There is no match for pedestrians and unsatisfactory coverage are also noted by city residents near the station area.

- There are adjustable intersections.
There are 28 regulated intersections in the city. They are located on the main city roads main streets, namely: str. Sobranetska, str. Kapushanska, str. Minayska, str. Mykhailo Hrushevskyi, ave. Svobody and str. Carpathian Ukraine. Connect groups noticed about insufficient time for pedestrians, especially people with disabilities, to cross the streets and low-mobility population groups, in particular at the crossing over Svobody Avenue near 16th floor and the intersection with Minayska. There are mostly none at regulated intersections voice messages that create danger and inconvenience for the visually impaired.

- Parking spaces for people with disabilities.
Connect groups noted the lack of parking spaces for people with disabilities, first of all, next to the children's polyclinic on the street Dmytro Mendeleev; children's hospital on the street Brashchaik brothers; along with the department of labor and social protection of the population Uzhhorod City Council on the square. Sandor Petefi and along the street Oleksandr Griboyedov.

- Bicycle network.
The public of the city emphasizes the disjointedness and lack of proper arrangement bicycle infrastructure, increased risks to the life and health of cyclists and users of LPT who move in the general traffic flow. Sufficient quantity there are few or no bicycle racks throughout the city. First of all, next to educational institutions: Faculty of Law, Uzhny Novgorod State University, str. Kapitulna, Uzhhorod Secondary school of grades I-III No. 9 on the square. Shandora Petefi, Uzhhorod Secondary School I-III degrees No. 17, str. Domanynska, Uzhhorod Secondary School I-III degrees No. 15 on the street. Maria Zankovetska; Specialized comprehensive school of grades I-III No. 4 on Sq. Zhupanatska.

- Pedestrian crossings.
Active residents of the city of Uzhhorod point out the need for safe pedestrian crossings transitions at the intersections of Str. Vysoka (formerly Petrova Str.) - Str. Tsegolnianska, Kyiv Embankment - Ave. Alishera Navoi, avenue Alishera Navoi - str. Lev Tolstoy. A frequent problem at pedestrian crossings is the lack of contrasting markings and tactile elements.

The generalizing scheme of the synthesis of all researched aspects reveals the main axes of connection between historical area, objects of historical and cultural heritage of the city, economic zones activities, public spaces, recreational areas, transport hubs and disharmonious territories.

Synthesis scheme of the project perimeter

As part of the analytical and investigative work together with representatives of the city authorities, active citizens and interested parties conducted a SWOT analysis.

SWOT analysis

STRENGTHS:

- city compactness
- short distances
- attractive climate
- availability of green areas
- close location of the city to the state border
- availability of pedestrian street spaces
- an attractive pedestrian core
- polycentricity of the city
- small population of the city
- a river
- appearance of large-sized buses as part of public transport
- public interest in changes in the field of mobility

WEAKNESSES:

- very often street repairs do not include sidewalk repairs
- protracted capital repairs
- cycling infrastructure is insufficient
- the majority of public transport belongs to private carriers
- absence of electric transport as part of GT
- narrow streets
- chaotic and disorderly traffic on light private transport (LPT)
- small city budget
- lack of opportunity for territorial expansion
- adjustment of cyclograms at traffic lights
- a small number of electric charging stations for cars
- driving culture of city residents
- disregard of traffic rules by some cyclists
- speed of cars on some city roads
- lack of safety islands
- insufficient number of parking spaces
- a small number of parking lots during the construction of new residential and commercial buildings
- uncontrolled construction
- passing through the city of a highway of state importance
- theft of bicycles
- not enough green areas
- insufficient environmental awareness
- a negative example of some city residents who are opinion leaders

OPPORTUNITIES:

- a city of sustainable mobility
- new, high-quality public spaces
- sister cities
- transport cooperation with the surrounding OTG
- using the experience of the "Chop" autoport
- development of slow tourism
- Uzhhorod is a city of students
- Uzhhorod is a green city
- development of air and water transport
- attraction of grant programs
- development of public bicycle transport
- organization of international cycling events
- joining the EU transport network

THREATS:

- low-quality repair of streets
- flooding of city streets during heavy rainfall
- inadequate implementation of infrastructure projects
- increased traffic jams on city streets
- instability of the situation in the state
- long-term military operations on the territory of the state
- infrastructural neglect of certain areas of the city
- the infrastructure is not keeping up with the city's expansion
- increased chaotic construction
- decrease in the number of jobs
- outflow of qualified workers
- lack of necessary funds for implementation of development plans
- investment unattractiveness
- irrational use of funds in the direction of mobility
- inability to integrate and assimilate internally displaced persons into the life and functioning of the city
- the tightness of the city within the existing administrative boundaries
- increased corruption

3.0 Vision

According to the City Development Strategy "Uzhhorod - 2030", approved by the decision of the 32nd session of the city Council of the II convocation of January 18, 2019, No. 1382 vision of the strategic perspective in the transport sphere sounds like:

ENSURING PEDESTRIAN DOMINATION AND NON-MOTORIZED VEHICLES

In 2030, pedestrians, cyclists and public transport will have priority in everything, the dominance of pedestrians and non-motorized transport will be ensured. The number of pedestrians in the city should increase to 50 percent of road users. The center of Uzhhorod will be by pedestrians, except for traffic by residents' cards, commercial cars, night traffic, public traffic "clean" transport. Creating a competitive and efficient transport system, innovative development of the transport industry, implementation of international investment projects, promotion of ecologically clean and energy-efficient transport, as well as barrier-free mobility and interregional integration will enable:

- promote accessibility and ensure the right to mobility for all users, in particular, children, women, the elderly, people with physical disabilities;
- to balance different needs in mobility, in particular the needs of citizens, business circles and industry;
- to balance the development and mutual integration of all modes of transport;
- to improve operational and financial efficiency of transport;
- ensure efficient use of city space by transport infrastructure and services;
- increase the level of safety and quality of life of city residents;
- contribute to the reduction of energy use, CO emissions and other harmful emissions,
- noise pollution.

The strategic priority of the development of the city's transport system is the creation competitive and efficient transport system, innovative development of the transport industry with the aim of promoting ecologically clean and energy-efficient transport, ensuring unimpeded mobility and the integration of city residents, the dominance of pedestrians, public and non-motorized transport in the living space of the city.

3.1 Priorities and goals

1. Development of public transport and quality transport offer

Public transport is the basis of the sustainable mobility systems of most successful cities. He significantly more efficient than private cars, in terms of capacity, effective street area road network and the amount of emissions. Improving the quality of public transportation transport is another important goal of the sustainable mobility plan, which is designed to bring to a serious improvement of the quality of movement in the city in general. Raising the standard for public transport will automatically raise the desired standard for other components as well of the transport infrastructure of the city of Uzhhorod.

Source: varosh.com.ua - low-floor bus Electron A18501

According to the mobility plan, under the concept of improving the quality of public transportation by transport you need to understand:

- development of a high-quality public transport system;
- the development of electric transport and the creation of an efficient transport system,
- ensuring innovative development for the purpose of promoting ecologically clean and
- energy-efficient transport;
- renewal of rolling stock of public transport;
- prioritization of public transport traffic;
- introduction of an efficient and accessible system for all categories of passengers
- automated accounting system for public transport fares for all categories passengers;
- creation of a single dispatching center of city public transport.

2. Increasing road safety

Reduction of the mortality rate and severity of consequences due to traffic accidents for all participants traffic and reduction of socio-economic losses from traffic injuries, as well as introduction effective traffic safety management system for ensuring the protection of life and health of the population is one of the main priorities of SUMP.

Goals of improving road safety:

- implementation of traffic management schemes to calm traffic, optimization of traffic flow, reduction of the risk of road accidents;
- increasing the number of regulated and engineering-equipped pedestrian crossings;
- modernization and expansion of outdoor street, road, and pedestrian lighting networks

- transitions, sidewalks;
- improving the safety of pedestrians, cyclists and motorcyclists.

3. Reducing the negative impact of road transport on the environment provides initiatives and incentives to accelerate the use of transport with zero emissions (not only electric transport, but also bicycle and micromobile traffic), use of renewable energy to power transport, level monitoring air pollution and compliance control.

- the possibility of implementing public electric transport in the structure of passenger transport;
- popularization of private electric transport and development of the necessary infrastructure;
- popularization of LPT, bicycle transport, walking walking and development of the necessary infrastructure;
- recommendation for implementation of an effective control mechanism in compliance with noise pollution standards;
- implementation of an effective level monitoring mechanism air pollution by road transport;
- stimulation of city residents to switch to stable regimes mobility (walking, cycling, light personal and public transport). Decrease in indicators use of private cars;
- providing access to key social services in the city center and sub-centers for all population groups;
- ensuring the monitoring of the state of mobility, forecasting its changes and prompt adaptation to such changes.

4. Introduction and popularization of cycling (taking into account provisions Concepts of bicycle infrastructure in Uzhhorod, approved by the decision of the session of the Uzhhorod City Council No. 63 dated February 2, 2021)

Since the bicycle is not the only means of transport that can be used according to the principle of "from door to door", is one of the key goals of the sustainable mobility plan for the city of Uzhhorod integration of cycling into the general system of urban transport infrastructure of the city, as a full-fledged mode of transport and achieving a significant share of trips by bicycle from of the total number of transfers (up to 5% of all transfers in the medium-term horizon planning and more than 10% - in the long term). This requires a certain systematicity in the development of the bicycle network, so that the two-wheeler is not just a fun attraction or response to the popular trends of the time, and became an equal component in the transport network Uzhhorod.

Source: boomerang-boardshop.ua

The goals of the mobility plan regarding the introduction and popularization of cycling:

- improving a barrier-free, safe and connected bicycle network for daily commuting on
- work and active recreation;
- development of the bicycle parking space through the construction of interceptors
- bicycle parking near public transport stops and within transport interchanges hubs, bicycle parking lots for temporary storage in front of the entrances to shopping centers,
- enterprises, institutions and educational institutions, places of permanent storage of bicycles in the composition of residential complexes;
- increasing the intensity of safe use of bicycles, electric scooters, other types of LPT, as well as the introduction of a short-term bicycle rental service (Bikesharing – "bike sharing");
- consideration of bicycle infrastructure in planning, construction and reconstruction objects of transport infrastructure and improvement of territories.

5. Increasing the priority of pedestrian traffic

Walking is an important part of people's daily mobility. Pedestrian the infrastructure should ensure a high quality pedestrian environment. Pedestrian transitions and other infrastructure facilities should be accessible to all sections of the population, especially for people with disabilities. Improvement of conditions for pedestrian traffic is possible for conditions:

- introduction of engineered overhead pedestrian crossings;
- creation of new pedestrian zones;

- creation of a network of pedestrian routes, including through pedestrianization individual streets and squares.

High-quality pedestrian infrastructure in the city of Uzhhorod should be connected and unobstructed, accessible and convenient, safe and suitable for the area.

6. Improvement of regulation of automobile traffic and freight transport

The sustainable urban mobility plan envisages reducing the traffic load on the streets of the city, thanks to the reorganization of traffic and the rethinking of the street space.
As a result of the implementation of the Sustainable Urban Mobility Plan, the city will receive:

- improvement of road navigation;
- solutions for the movement of freight transport and logistics (development of the delivery scheme cargo to the central part of the city and pedestrian zones, creation of concentration centers and cargo distribution);
- development of parking space and management of transport demand:
- implementation of a smart system of parking organization, implementation of zoning parking spaces, creation of a network of intercepting parking lots, parking restrictions in the central part of the city, creating a parking guide.

The plan of sustainable urban mobility sets the goal of taking measures to organize the space for parking, provision of conditions to reduce the load on the street and road the city's network of logistic transport and unhindered movement of pedestrians and cyclists and

Having done the analysis the current state of mobility in Uzhhorod, it is possible to conclude about the need for measures and tools that need to be applied for rational intervention in the urban environment.

3.2 Creating a scenario for mobility development

A scenario is a description of a possible development of events that may happen in the future. Various scenarios make it possible to carry out multivariate diagnostics and develop implementation policy taking into account various directions of changes in the urban environment. Thanks to the method scenarios can be used to predict future possibilities. The method of scenarios formulates something that cannot be predicted in the future with certainty. In contrast to linear interpretation of current trends, scenarios allow planners to prepare for various possible future events. The main advantage of using the scenario method is in that if less likely scenarios become reality, for example, due to the unexpected political or technological change, planners will already be prepared and able respond and take action accordingly.

To identify the most likely occurrence of events in the city of Uzhhorod and develop scenarios, a constraint level-based method was used. Implementation of the developed measures will require further organizational capabilities, financial resources, as well as public support, which are prerequisites for the successful implementation of all planned

measures, and the complete transformation of urban mobility. Thus, it was developed and applied matrix based on these three most important application limitation factors
policies of sustainable urban mobility:

- the level of organizational capabilities and the ability to accept important changes by the city
- self-government;
- availability of financial resources (regardless of sources of income);
- an active public position supporting or rejecting changes according to the plan development.

Scenarios help stakeholders better understand what the outcomes will be measures considered in SUMP. By illustrating different future situations, scenarios help assess the implications of current trends, measures already programmed, and new policy decisions.

3.3 Overview of scenarios

The method used is the method restrictions, provides for three stages that have to take place during the implementation of measures. The scale of implementation will depend on three the most important limiting factors.

At the first stage of implementation, they can there will be three variants of the "Anabiosis" scenario. It is characterized by the fact that there are two limiting factors that delay the process implementation of measures provided for in the plan sustainable mobility.

The first version of the scenario "Anabiosis" reproduces the situation in which the driving force is the force for implementing changes public associations and unions, and the city community is willing and ready to qualitative changes in the field of urban mobility. In this version, the limiting factors disinterest and passivity appear city government, lack of necessary financing.

The second version of the Anabiosis scenario considers the situation when the city has sufficient supply of financial resources, and the possibility of additional external ones infusions into the city budget, but the level organizational capabilities and ability to accept radical solutions is very low. Also very low support from the population. In such a inertia of the community and the local situation self-governments suspend development urban mobility.

The third version of the Anabiosis scenario reflects the situation when the urban self-government has a high organizational level and can also make volitional decisions and act. But, unfortunately, there are not enough financial resources to implement qualitative changes. Passivity population, and sometimes a negative reaction on changes, reduce opportunities for development of urban mobility.

The second stage of implementation of measures for implementation of the sustainable mobility plan is called "Preparation". Its peculiarity is that among the three the most important limiting factors only one remained influential.

The most difficult version of the scenario "Preparation" is a situation when for implementation of sustainable plan measures there is only one factor of mobility restrictions, but this is a low level organizational capabilities and not ability to accept changes by the city self-government. Despite this, according to the first version of the scenario "Preparation", the city has enough internal financial potential, a is also interesting for additional external of infusions into sustainable projects mobility.

The city community has a desire for realization changes in this direction, and public organizations are trying to convey to the local power importance to act. Displacement possible with an active public position.

The second version of the scenario "Preparation" shows the situation when deterrent the factor is the lack of financial resources resources. However, with active and conscious positions of the city government and support public organizations, search for resources will give a result after a certain deadline so that the city could go to the final stage and implementation of the vision of sustainable mobility.

In the third version of the "Preparation" scenario the situation is considered when the city owns sufficient financial resources and cooperates with foreign donors on different implementation programs of individual measures of sustainable mobility. the only one the limiting factor is indifference community, its lack of understanding of the need transformations.

To move to the next stage of implementation the authorities need urban mobility work in two directions:

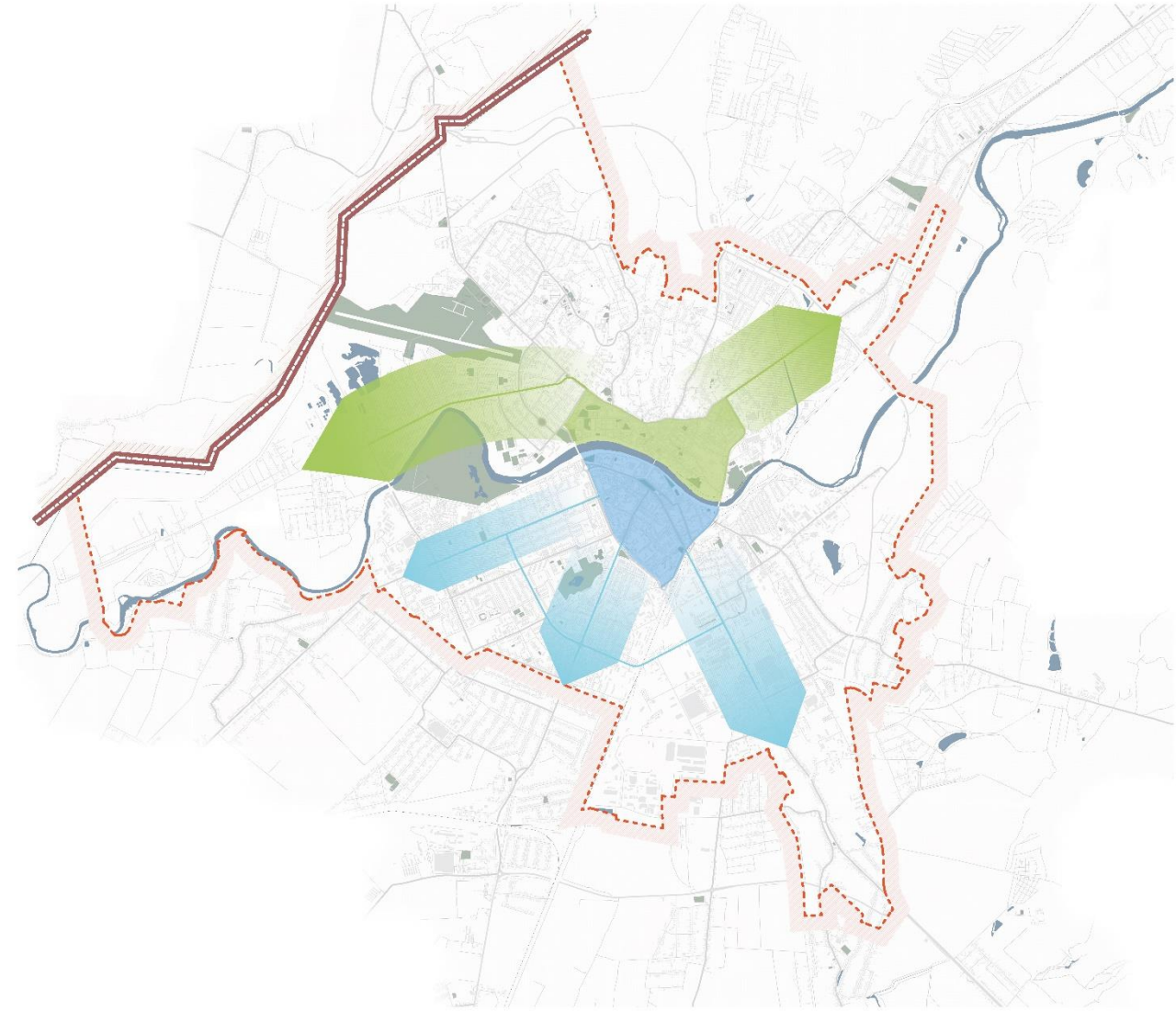
I. effectively carry out purposeful educational work with the community;

II. start implementing the mobility plan of the most necessary effective measures which will quickly show the result.

After overcoming the first two stages **the third - final stage of embodiment** comes sustainable urban mobility plan - "Transformation". To implement the final scenario you need to rule out all factors limitation. Under such conditions: high levels of organizational capabilities and ability to accept changes by the city self-government, the availability of sufficient financial resources, active public positions on supporting changes according to the plan development, large-scale implementations are possible plan of sustainable mobility of Uzhhorod. It is a troublesome and long way, but his it is possible to pass if followed action plan.

3.4 Space vectors in city development

Given the historical and landscape factors, limiting factors and urban structure, Uzhhorod has five distinct directions of further development.



City development scheme

Historical core

State border

Potential

Vectors development

Analyzing the historical development vector of the project area, which was formed from of the historical core in the direction of Str. Sobranetska to the north, it is noticeable that this direction is practical exhausted its potential due to the difficult landscape conditions in its

path and abutment to the border with the Slovak Republic. The foundation of the right bank part of the city is laid the picturesque character of the street network, therefore, the urban areas developed along the history formed paths.

Preservation of the architectural and urban heritage with the preservation of the foundations of the structure and the character of the building should become one of the main values in further development the city of Uzhhorod. The modern space of the city needs:

- comprehensive development in current directions and implementation of planning principles territories that will ensure spatial continuity and multifunctionality of the city;
- multifunctional agricultural areas with a favorable living environment, which must correspond to social, ecological and urban planning conditions;
- development of green corridors on the main pedestrian routes;
- arrangement of public spaces that provide all the necessary processes life activities of the population.
-

In the latest period of the city's life, the development of the northern part of Uzhhorod should be developed in the following directions:

- the first direction should be developed to the west along the str. Zagorska. This vector development needs to be continued and strengthened, because it has a significant territorial resource, therefore, it has great urban planning potential.
- the second direction - the corridor of Str. Drugetiv and Str. Domaninska, which is located between two slopes and leads through the valley of the Uzh River to the Uzhotsky Pass.

The left-bank part of Uzhhorod is a street structure adjacent to Sandor Petefi Square, was formed on the basis of the road network, which diverged in a fan at a given point in the direction the nearest settlements. The newly developed territory was used for industrial purposes enterprises. One of the important factors of their arrangement was the possibility development of access railway tracks. The planning structure of these districts was decided in a regular way with a breakdown into blocks that are connected by cross streets with the main ones radial highways.

Three directions of further development of the left bank of the city can be distinguished:

- the southern direction, which is formed mainly around Minayska street, which leads from the historical center to Chop and further to Hungary;
- the south-eastern direction, which is formed along the street of Carpathian Ukraine and leads to Mukachevo, where it branches off in the north-eastern direction to Veretsky Pass and in the south-eastern direction to Khust, Vynogradov and Beregov and further to Hungary;
- the south-western direction, which is formed by str. Kapushanskaya and leads to Storozhnytsia, in the direction of the Slovak Republic.

For these territories, which today are used as warehouses, industrial, commercial and in turn, have a disharmonious character, it is necessary to reconsider the functions and their place in the urban part of Uzhhorod.

4.0 Implementation of the sustainable mobility plan

Measures of balanced use of street space for different users are developed with mobility priorities in mind. Despite the preferred method moving through the city, everyone, in turn, is to one degree or another a pedestrian. Therefore, the main attention is allocated to pedestrians, including the less mobile population groups and to the creation of all conditions for their safe and convenient movement through the city.

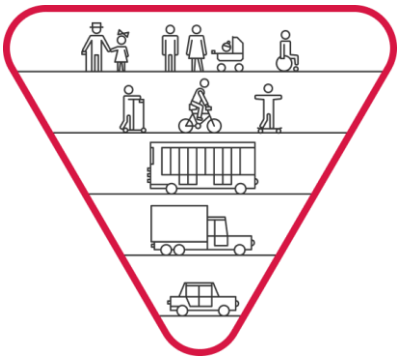
Pedestrians

Bicycle transport

Public transport

Logistic transport

Private transport



All the proposed measures are aimed at the city developing its mobility comprehensively and harmoniously. It is necessary to understand that it is extremely difficult to estimate the cost of all measures, because they will depend on the financial capabilities of the city and the interest of executive bodies in their implementation.

4.1 Measures to improve conditions for pedestrians and people with limited mobility

Pedestrian traffic is the basis of daily movements in the city and is a natural way of movement. Qualitatively designed pedestrian infrastructure and its maintenance in proper technical condition, basically meets people's needs for movement.

Pedestrian traffic prioritization measures should provide conditions for walking and to create an attractive, comfortable and barrier-free urban environment, which, in turn, will encourage people to move on foot.

According to the sociological survey of the city's residents and the results of the meetings held a number of wishes were worked out with representatives of various layers of the community comfortable and safe pedestrian movement:

High-quality lighting.
It is recommended to comprehensively update the lighting of the road and pedestrian areas installation of lighting of pedestrian crossings on the main main streets with using modern lighting devices and alternative energy sources.

Comfortable sidewalks.
The pedestrian part of the city in many areas has a certain number of problems, namely: lack pavement and pavement, non-standard width, a number of obstacles and a height difference, which makes it difficult pedestrian traffic.

It is necessary to ensure a comfortable and safe stay of pedestrians on city sidewalks, pedestrian and recreational areas, barrier-free and accessibility are one of the main priorities for future projects of reconstruction and capital repairs of the street and road network cities.

- Safe pedestrian sidewalks.

Active residents of the city of Uzhhorod point out the need for safe pedestrian crossings transitions at the intersections of str. Vysoka – str. Tsehol′nyans′ka, Kyyivs′ka embankment – avenue Alishera Navoyi, avenue Alishera Navoyi – str. L′va Tolstoho. The following block of measures is aimed at strengthening the management potential of the city, improvement of the existing pedestrian infrastructure, inclusion of less mobile population groups to city life.

Str. Oleksandr Fedynets

All measures were divided into the following categories:
- capacity building;
- infrastructure;
- promotion and informing.

Measure	Category	Planning horizon		
		5 years	10 years	15 years
Regular training of existing staff full-time city planners and engineers transporters in the field of planning and organization of pedestrian space and its barrier-free.	Capacity building			
Development of the concept of creating green corridors connecting city districts.	Capacity building			
Development of the concept of pedestrian development space	Capacity building			
Development and approval of the program or concepts of barrier-free pedestrian development city infrastructure.	Capacity building			
Creation in the structure of the city council management and appointment of a responsible person persons for the development of pedestrian infrastructure in town.	Capacity building			
Repair, reconstruction of existing and construction new public spaces.	Capacity building			
Creation of conditions for provision accessibility of people with disabilities to stops public transport and facilities social and engineering and transport city infrastructure.	Infrastructure			
Arrangement of pedestrian street crossings accompanying sound signals for less mobile population groups.	Infrastructure			
Carrying out works on the improvement of parks and recreation areas in the city.	Infrastructure			
Creation of a map of recreation areas, tourist routes and landmarks	Infrastructure			

city objects.				
Carrying out major repairs, reconstruction and further maintenance of proper condition of pedestrian spaces and sidewalks	Infrastructure			
Creation of barrier-free pedestrian corridor along the Uzh River.	Infrastructure			
Reconstruction and arrangement of pedestrian walkways transitions, sidewalks and roadsides taking into account needs of less mobile population groups.	Infrastructure			
Installation of night surface lighting pedestrian crossings and approaches to it.	Infrastructure			
Installation of raised pedestrian crossings level with the sidewalk where necessary for increasing the level of crossing safety and not prohibited by road category.	Infrastructure			
Arrangement of street furniture, parklets, etc other small architectural forms in one design codes of the city.	Infrastructure			
Creating a safe, barrier-free, comfortable and attractive pedestrian infrastructural (in particular with arrangement places to sit and rest, public toilets, etc.).	Infrastructure			
Providing green care plantations	Infrastructure			
Improvement of the city navigation system, which will include general information about city.	Infrastructure			
Implementation of monitoring and auditing pedestrian infrastructure.	Promotion and informing			
Creation of a database of pedestrian objects infrastructure to be adapted for less mobile population groups.	Promotion and informing			
Conducting city-wide actions dedicated to stimulating residents move around the city on foot.	Promotion and informing			

The advantages of walking as a mode of transportation are widely recognized. It is environmentally friendly and a sustainable way of moving around the city, which has a positive effect on health. The city of Uzhhorod has a good spatial structure and great

potential for creating a comfortable pedestrian area an environment that will encourage people to move on foot.

4.2 Action plan for the implementation of bicycle infrastructure

The key goal and task of the plan for the implementation of bicycle mobility in the city is the creation safe and convenient infrastructure that would turn bicycle transport into an efficient one an alternative to private or public transport. That is, the inclusion of bicycle transport in city-wide transport infrastructure.

Source: mukachevo.net

The implementation of the plan for the implementation of bicycle mobility in Uzhhorod will allow:

1. Reduce the number of cars on the city streets and reduce pollution, reduce noise levels, which will have a positive impact on the city's ecology.
2. Create a high-quality infrastructure that will increase the mobility of residents and simplify to hard-to-reach areas and the city as a whole.
3. Identify priority areas for the development of cycling infrastructure, that can be implemented in the future.
4. Expand the range of cycling users, which will relieve public transport public transport and reduce the number of private vehicles.
5. Improve traffic safety by reducing the number of motorized vehicles on the roadways of motorized vehicles on the roadway.
6. Provide cyclists with equal traffic conditions traffic conditions.

7. Develop and implement programs for the development of urban infrastructure development programs in line with the United Nations Sustainable Development Goals and the Uzhhorod Development Strategy Sustainable Development Goals and the Uzhhorod Development Strategy.

Bicycle infrastructure in the city of Uzhhorod is just beginning its development. At the moment development of SUMP in various parts of Uzhhorod, nearly 7 km of bicycle lanes have been arranged and cycle paths, mainly of a recreational nature. Only cycling infrastructure on the street Tyvodar Legotskyi has a pronounced transitive meaning. Now it is important to create a network of bicycle paths precisely in the directions of the main connections in the city. At the same time, it is worth it take into account that the network must be homogeneous, without significant gaps to ensure comfort of use and reduce the number of possible detours of certain areas. Importantly to provide cyclists with the opportunity to move freely from one point of the city to the opposite, guaranteeing safety and quality of connection.

The cycling infrastructure of individual districts has be developed individually, taking into account functional zoning and existing street the road network of the city.
Basic quality requirements bicycle infrastructures there are:

1. Ensuring traffic safety
If we compare motor transport and bicycle, it is worth noting that through different speed of movement and, especially, different weight category of vehicles, the cyclist is a rather vulnerable participant city traffic, therefore the safety of movement city is an extremely important event at creation of bicycle infrastructure.

2. Direct routes, without bypassing
A quick and convenient way to get out of one one part of the city to another is one of the most common reasons for using bicycle transport. This is ensured by the straightness of the routes and the absence of detours, as well as absence of a large number of intersections, traffic lights, climbs, etc.

3. Absence of obstacles
If the bicycle network is well thought out and coherent throughout the city, the cyclist can to easily get from one point to another within the city.

4. Integration of the bicycle network into the environment
The integration of cycle paths and cycle lanes into the existing transport infrastructure increases the likelihood of choosing a bicycle over a car.

5. Comfort.
In addition to safety, a sense of comfort and peace of mind is important when using a bicycle. If the environment (car, pedestrian) is friendly to other road users, and the city's infrastructure and the city's infrastructure provides all users with a place and safety, cycling will will become more popular.

Depending on the density of the bicycle network and the number of bicycle trips, cities are usually are divided into three key categories:

- Start-up cities
- Progressive cities
- Champion cities

Uzhhorod is a "beginner city" and it is important for this category of cities to make cycling a possible, safe and acceptable way of transportation for any group of residents.
For cities at the initial stage of cycling infrastructure development, more attention should be paid to to the infrastructure.

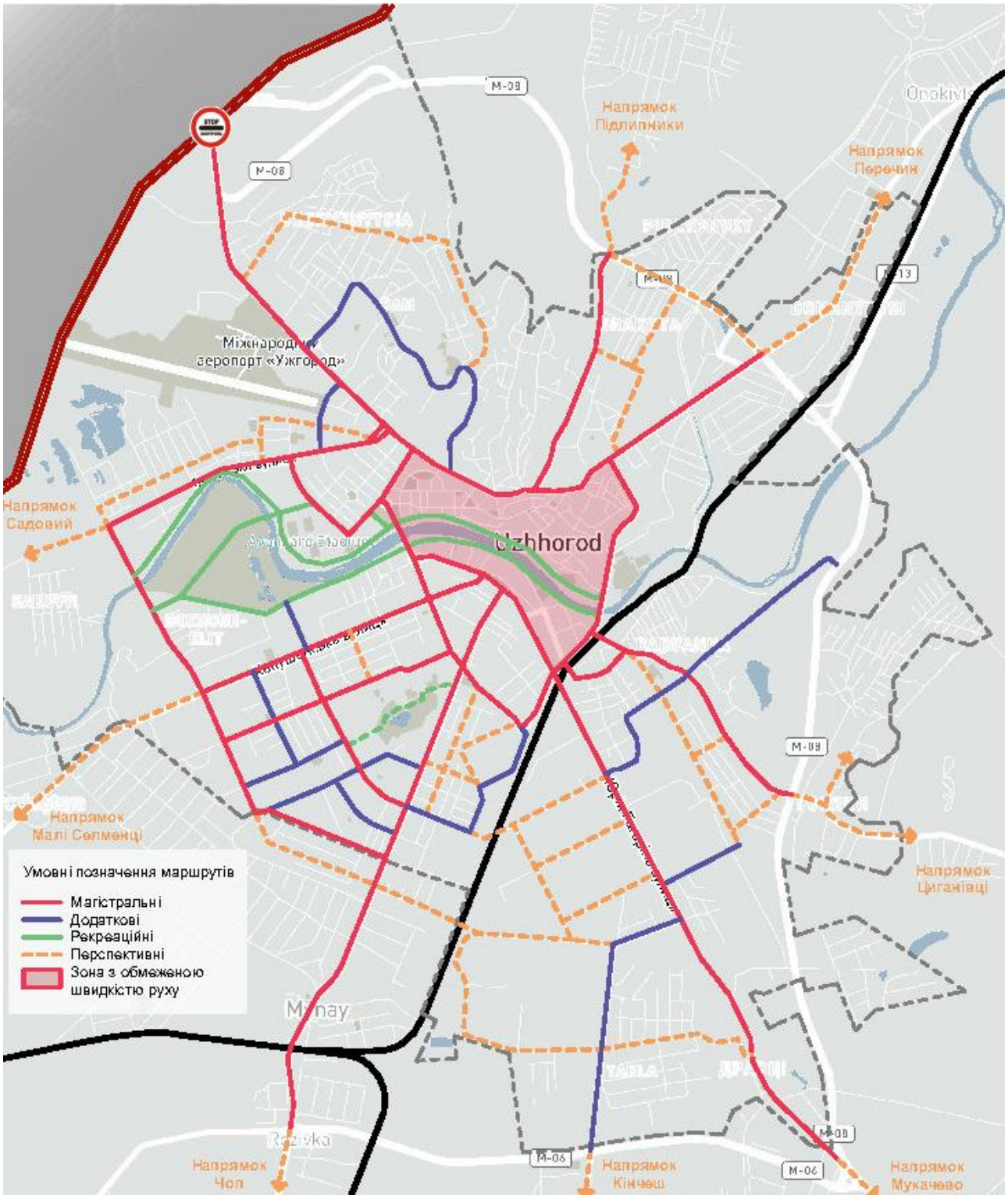
Analyzing the existing street and road network, the condition of individual streets and roads (width, traffic intensity, availability of greenery, etc.), one or another form of cycling is chosen of cycling is chosen. This can be a bicycle lane or a one-way or two-way bicycle lane, and it is also possible that a cyclist moves in the same lane as vehicles.

The Sustainable Urban Mobility Plan, in accordance with the provisions of the approved concept of Uzhhorod's bicycle infrastructure, the following is proposed:

Accommodation in a historically formed center bounded by streets Sobranetskaya, Shumna, Akademika Shpenik, Mukachivska, through Shandora Square Petefi and further along Lev Tolstoy Street, across the Masaryk Bridge and closing the ring along Mytna Street, a zone with a traffic limit of up to 30 km/h for a comfortable and, most importantly, safe movement.

As for the trunk routes of the cycling network, the main ones are Sobranetska street: from Domanynska, str. Drugetiv to the Vyshnye Nimetske border checkpoint. In the south-western part of the city, this is the direction of Kapushanska street - village Mali Selmentsi. In southern: str. Shvabska - str. Minayska - village Rozivka. In the south-eastern part of the city: the street of Karpatska Ukraine, which connects the city center and the industrial district, in the eastern part of the city - the direction of Istvana Dendesi Street, which leads to the "Radvanka" district, as well as the direction Str. Miklosha Bercheny - Str Klyment Timiryazev, and further to Shakhta.

Creating a high-quality and extensive cycling infrastructure is a top priority for for new cities. The availability of safe and comfortable bicycle routes is the most important reason to encourage citizens to use bicycle transportation.



Scheme of proposed cycle routes for the city of Uzhhorod

Integration of the bicycle network with public transport

Although a bicycle is a means of transport that is mostly used for small trips distance, nevertheless, it can be a means of getting to a certain point and further using another vehicle.

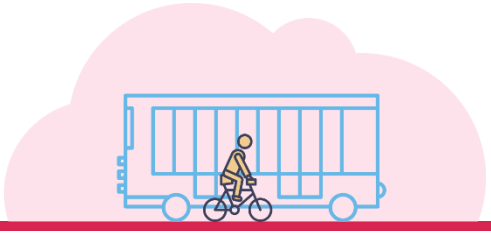
When analyzing public transport routes and surveying residents of Uzhhorod regarding areas of the city that are difficult to get to by public transport can be done the conclusion that the combination of these two types of movement can expand the area of accessibility cities.

The combination of these types of transport is possible in two formats:

Having reached a public transport stop or station by bicycle, you can:
- leave it in the parking lot and continue the journey by public transport;
- ride in public transport together with a bicycle.

The last point is that it is possible to transport a bicycle in public transport to use bicycle transport in various weather conditions, even if it is likely to rain or precipitation.

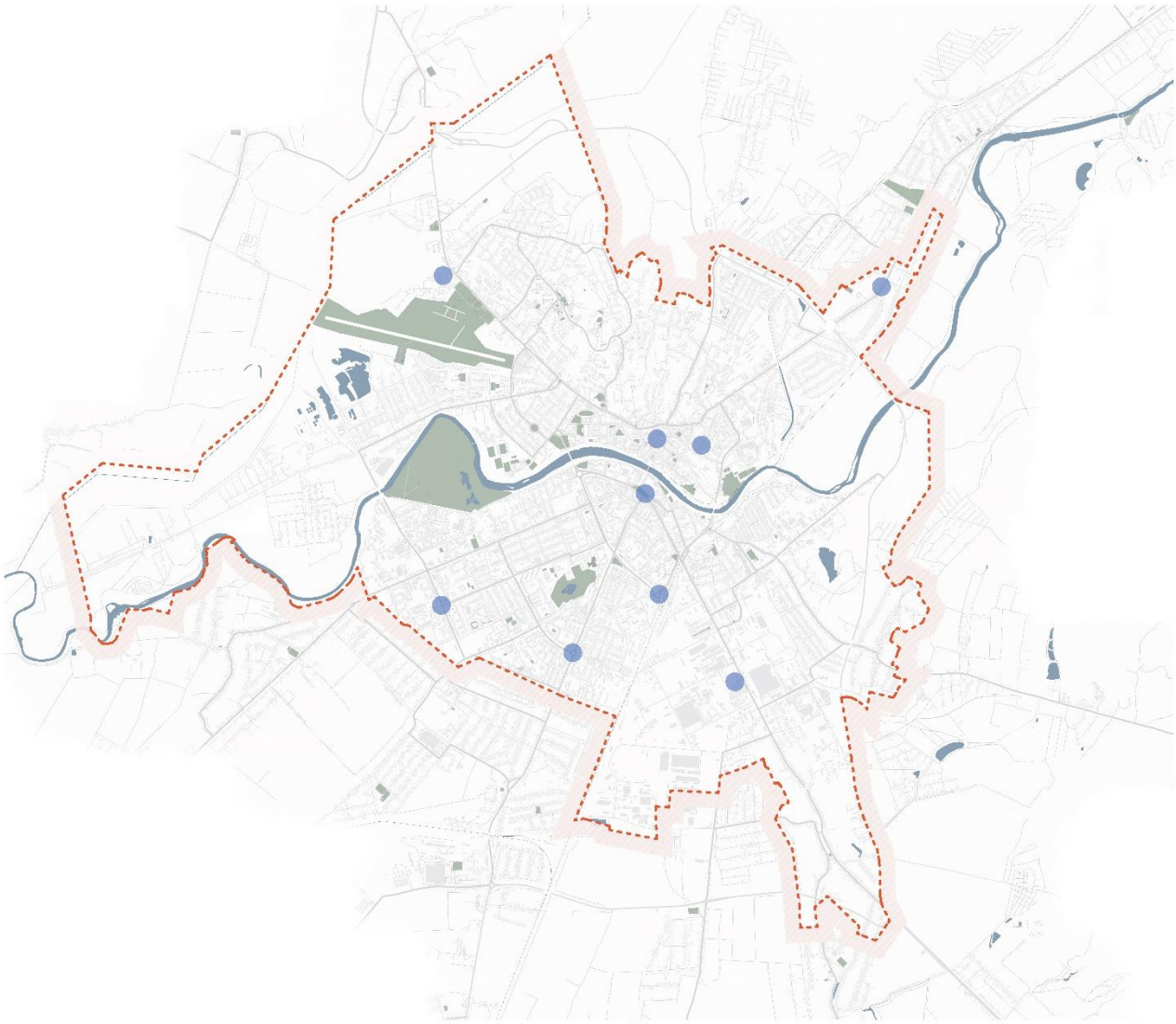
Regarding the statistical data, the potential of the combination of bicycles and public transport in one trip can be defined in at least two countries: in the Flemish part of Belgium 22% of trips to the train station are by bicycle, and in the Netherlands - 39% of the total of the number of trips to the station are bicycle trips.



Recommended places for bicycle parking as part of transport and transfer hub (TTH)

Given that the bicycle will normally remain in the parking lot for more than two hours, users have higher requirements for storage reliability.

During the work on the urban mobility plan, based on observations and focus meetings groups, the following list of important solid waste is TTH:
1. Railway station - Bus station "Uzhhorod 1".
2. Bus station "Uzhhorod 2".
3. Street Carpathian Ukraine.
4. "Domanyntsi" railway station.
5. Shopping center "Tokyo".
6. Str. Minayska
7. Koryatovych Square.
8. Shandor Petefi Square.
9. Uzhhorod International Airport (prospective TTH).



Scheme of arrangement of bicycle parking spaces as part of transport and transfer hubs

The main recommendations regarding the placement of bicycle parking spaces at transport interchanges:

- basic provision of bicycle stands and racks is recommended, ideally covered and protected from the weather. The optimal distance is no more than 50 m from transfer places;
- if possible, arrange a small number of boxes (as an additional service), which for rent for storing bicycles. Recommended placement 50-100m from transfer places;
- with the increase in the number of cyclists, it is worth creating collective storage facilities, which work on a subscription basis;
- free bicycle parking must be provided at the largest interchanges indoors and under supervision. The distance to the transfer point is up to 250 m.

Arrangement of bicycle parking lots

Every cyclist has individual needs for storing their own transport tool. Convenience and security are key requirements. Convenience - the ability to leave the vehicle as close as possible to the point of departure and the point of arrival. Security - availability of the vehicle whole and undamaged. The main influencing factor to ensure these two requirements is the duration of parking, which is divided into short- and long-term storage of bicycles.

Short-term storage.
Convenience - getting to the destination and speed usability has a higher priority than safety features. For example, it can be bicycle parking near a supermarket or public catering establishment.

Long-term storage.
The most important condition is a high level of security. That is, they can be the same bike parking near supermarkets and catering establishments, but the user will no longer be a visitor, but a worker. Therefore, bicycle parking even in one and the same place can serve different types of users in different ways.

The number of bicycle parking spaces for different types of institutions must be calculated individually taking into account the initial demand and demand in the future, to increase the number of parking spaces at the tendency of piling bicycles and the lack of free space. If it is a bike park a private institution designed only for employees, you can conduct a survey, given the growing popularity of bicycle transportation.

Table No. 4. Functions, duration and types of bicycle parking

			parking duration		
			short (daytime) (<2 hours)	long (daytime) (<5 hours)	Long (night time)
	type of parking facilities		stands or counters in public places	covered, guarded or supervised	covered, guarded or supervised
points of departure – destination	recommended distance to the building entrance		up to 50 m	50-100 m	up 250 m
	places where people live (medium- and high-rise buildings)				+
	transport and transfer hub (railway station, bus station)	bicycle + public transport		+	
		public transport + bicycle			+
	schools	students and teachers		+	
		visitors	+		
	enterprises, office space	employees		+	
		visitors	+		
	trade	employees		+	
		visitors	+		
	entertainment/leisure	employees		+	
		visitors	+	+	
	visitors to residential buildings		+		

Bicycle storage in residential areas

The problem of bicycle storage is also relevant in residential areas, and not only in public. Considering the area of a large number of residential buildings dating back to Soviet times ("khrushchevki" and panel houses of typical layouts throughout the territory of Ukraine, social housing), as well as the limited possibility of placing a bicycle in 1-2 room apartments, it can be concluded that there is a growing need for the possibility of storage outside the home.

The lack of sufficient space and, as a result, the possibility of storing a bicycle at home is tight related to the desire to use a bicycle in everyday life. One of the reasons there are also no elevators, and the daily movement of the vehicle from floor to floor is not possible for everyone.

The presence of reliable bicycle storage places near the house significantly increases the attractiveness this type of transport for daily use.

According to the best European practices, there are two ways of organizing bicycle storage apartment buildings:

- premises for collective storage. This is a space organized for storage a few bikes that only vehicle owners have access to and what can be located inside or outside the house. The desired location radius is 150m, which is convenient to use;
- street garages. There may be small collective storage facilities for 5-8 bicycles installed in different places. Usually, such garages have the size of a car, so they can be installed in one of the parking spaces.

Source: gavailer.ru, docklyne.com

Principles of choosing bicycle rental and electric scooter rental points

City bike rental is a system of short-term bike rental, as type of public transport. The bicycle rental system focuses on short trips and, accordingly, a large number of users for each bike in the system.

In the central part of the city, the population often moves over short distances. You can optimize these movements by renting a bicycle.

Similar bicycle rental systems have already been launched in many cities of Ukraine, such as Kyiv, Lviv, Vinnytsia, Ivano-Frankivsk, Kharkiv, etc.

Recommendations for bicycle coverage and accessibility for successful operation:

- placement near key points of attraction (streets with saturated shopping areas, office centers, shopping malls, landfills, residential areas, higher education institutions, etc.);
- the distance between stations is no more than 500 m, preferably up to 300 m;
- mass informing of city residents and visitors and encouraging their use;
- if possible, a combination of a bicycle rental subscription with an electronic ticket
- on public transport.

Funding for the launch and expansion of the public bicycle rental system may occur at the expense of the city budget or at the expense of private companies. Potential rental value for different types of subscriptions are determined by companies based on information about priority number of stations/locations and bikes, plans to expand the network, attractiveness placement of advertisements, duration of the "season" and potential number of users.

It is also recommended to use the Handbook at the stage of preparation for the launch of the bicycle rental service on planning the launch of public bicycle rental, published in 2018 by the Institute of Transport and Development Policy (ITDP).

Source: itc.ua, kh.vgorode.ua m

It is recommended to start the public bicycle rental system after creating a basic one bicycle networks on key routes and improvement of general traffic safety on the streets.

Measures to increase the safety of bicycle transport users

In addition to the popularization of bicycle transport, it is necessary to ensure the equal rights of users transport on the carriageway. This applies to drivers of motor vehicles. After all it is they who pose the greatest danger to a cyclist if the rules are not followed traffic. A cyclist cannot physically harm a car driver to such an extent. Ago it is important to develop a culture of behavior on the road. One of the best types of promotion using a bicycle is a feeling of safety and equality.

One of the tools is social advertising. Social advertising should inform about risks and encourage safe behavior. Key aspects of risky behavior on which it is necessary to pay attention to social advertising messages. Customers of social advertisements can be made by the city council, as well as by businesses or non-governmental organizations. Format (video, poster, online banner, interactive game, etc.) and communication channels (TV, radio, local newspapers, social media, bulletin boards, etc.) should be identified directly during the preparation of the advertising order depending on the target audience and budget.

Table No. 6. Information work with transport users

Motor vehicle drivers (in particular route vehicle)	Users of bicycle transport
• Place of a bicycle in traffic; • An interval of at least 1.5 m when overtaking cyclist • Opening the driver's door at parallel parking along street, having made sure of in the absence of a cyclist nearby • Give way when turning right a cyclist who is moving straight	• Place of the bicycle in traffic • Use of lanterns, headlights and of light-reflecting elements in dark time of day • Information about maneuvers (turns, stop) • Transferring a bicycle on foot at crossing the street on a pedestrian crossing

Examples of social advertising, developed by the NGO "Association of Cyclists of Kyiv"

Explanation of the given illustrations:

1 - Driver!
Meter interval please

2 - Are you moving?
Look under the mirrors

3 - Not so sharp!
Your door is unsafe

4 - Turn on the flashlight!
Visible cyclist - living cycli

You should also take care of traffic safety measures.

Cycling schools are organized for students and schoolchildren. Older people can also join them people who are just starting to use bicycle transport. The project involves open training in traffic rules, bicycle maintenance, and first aid for road traffic victims.

Bicycle school in Ivano-Frankivsk. Source: report.if.ua

The purpose of training on traffic safety is:

- increase the confidence of novice cyclists on the road;
- explain and focus attention on safety-critical traffic rules,
- show in practice how to safely move through the streets (with bicycle infrastructure and without), interact with drivers, pedestrians, other cyclists;
- to inform about how to equip a bicycle and check its serviceability for higher education security.

Training can be conducted:

- by order of companies and municipal institutions for their employees;
- on the basis of higher educational institutions for students and employees;
- on the basis of schools for high school students (14+ years old);
- in various districts of the city for all those who wish to do so with prior registration.

The measures provided for in the plan are divided into three main categories:

- infrastructural changes;
- management and organization;
- monitoring and data collection.

Measure	Category	Planning horizon		
		5 years	10 years	15 years
Accommodation in historically formed the center is a zone with a traffic limit of up to 30 km/h	Infrastructure	+		
Construction of a bicycle route on Str. Sobranetska (from the city limits at point pass with the Slovak Republic to Str. Domaninskaya)	Infrastructure	+		
Construction of a bicycle route along the str. Miklosha Bercheny - str. Klyment Timiryazev	Infrastructure	+		
Construction of a bicycle route along the srt. Kapushanska	Infrastructure	+		
Construction of a bicycle route along the str. Minayska - str. Shvabs'ka	Infrastructure	+		
Construction of a bicycle route on Str. Istvana Dendeshi - str. Ukrainian - str. Budyteliv	Infrastructure	+		
Construction of a bicycle route along the str. Carpathian Ukraine	Infrastructure	+		
Construction of a bicycle route on Svoboda Avenue	Infrastructure		+	
Construction of a bicycle route along the str. Zagorska	Infrastructure		+	

Construction of a bicycle route along the str. Maria Zankovetska	Infrastructure		+	
Construction of a bicycle route along the str. Mykhailo Hrushevskyi	Infrastructure		+	
Construction of a bicycle route along the str. Akademika Shpenik - str. Shumna	Infrastructure		+	
Construction of a bicycle route along the str.Ivan Franko - str. Mytna	Infrastructure		+	
Construction of a bicycle route along the str. Mykola Bobyaka - str. Mozhays′ka	Infrastructure		+	
Construction of a bicycle route along the str. Oleksandra Hryboyedov - str.University – str. Koshyts′ka	Infrastructure			+
Construction of a bicycle route along the str. Zakarpat·s′ka	Infrastructure			+
Construction of a bicycle route along the str. Oleg Koshovoy - str. Olga Kobylyanska - Str. Antonina Dvorzhaka - str. Granitna	Infrastructure			+
Construction of a bicycle route along the str. Oleksandr Blest to Str. Obyiznoyi	Infrastructure			+
Construction of a bicycle route along the str. Korytnianska	Infrastructure			+
Construction of a bicycle route along the str. Stantsiyna - str. Peter Hulak-Artemovskyi - str. Oleksandr Borodin	Infrastructure			+
Construction of a bicycle route along the str. Bereznya 8	Infrastructure			+
Construction of a bicycle route along the str. Oleksandr Bogomolets	Infrastructure			+
Construction of a bicycle route along the str. Fedora Dostoyevs′koho	Infrastructure			+
Construction of a bicycle route along the str. Oleksandr Radyshchev	Infrastructure			+
Construction of bicycle paths and arrangement of bicycle lanes within the framework of implementation capital repairs and reconstructions city streets	Infrastructure	+	+	+
Arrangement of bicycle racks counter lane on one-way streets	Infrastructure	+		
Arrangement with the help of marking on regulated intersections within the	Infrastructure	+		

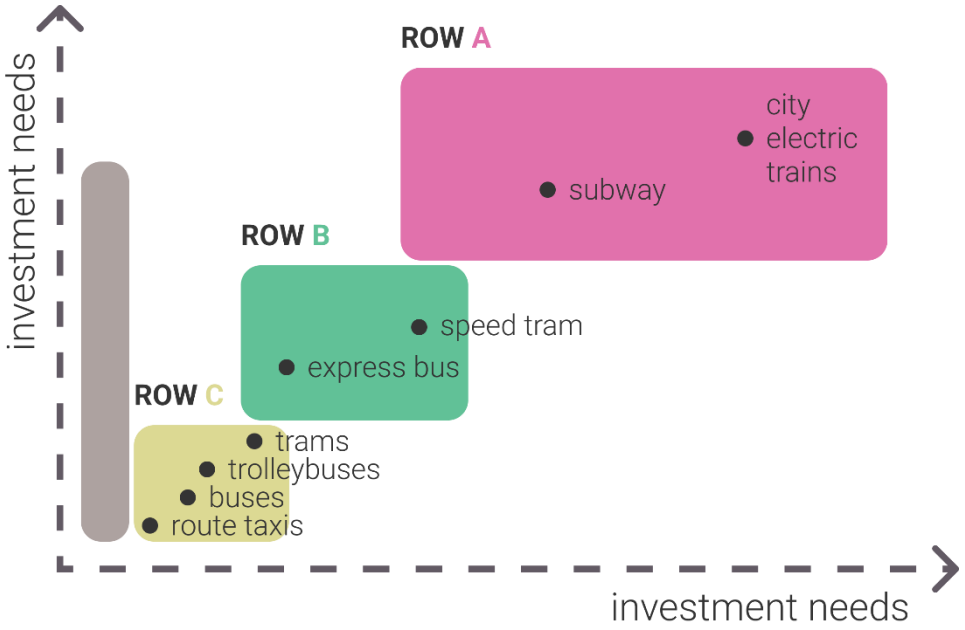
stop line and pedestrian crossing "Bike boxes"				
Installation of bicycle parking in the warehouse transport and transfer nodes	Infrastructure	+	+	
Arrangement of bicycle parking lots near social institutions and facilities attraction	Infrastructure	+	+	+
Arrangement of a bicycle network stations for charging electric bicycles and LPT	Infrastructure	+	+	+
Launch of the city bicycle rental system and LPT	Promotion and informing	+	+	+
Work with bicycle owners creation of collective storage facilities in residential areas of the city	Promotion and informing	+	+	+
Conducting safety cycling school traffic on the basis of schools and universities	Promotion and informing	+	+	+
Marking of recreational bicycle routes	Promotion and informing	+	+	+
Carrying out annual counts of the quantity cyclists on city streets	Promotion and informing	+	+	+
Promotion activities cycling	Promotion and informing	+	+	+
Conducting tourist bicycle tours	Monitoring and data collection	+	+	+
Appearance in the structure of the municipality employee responsible for development and operation of bicycle infrastructure	Management and organization	+		
Permit to transport bicycles in public transport	Management and organization	+		
Improvement of cleaning of the right lane road parts from sand mixture in spring period	Management and organization	+	+	+
Integration of new building zones with the network bicycle infrastructure of the city is still at a stage planning of these territories	Management and organization	+	+	+

4.3 Action plan for optimization of the public transport network and development

One of the most painful questions that can only be raised in the discussed sustainable mobility is the efficiency of city movement. The solution of this issue is one of the key to successful developing and functioning of the urban environment.

What types of urban transport are there today? What are the ways to move residents and visitors of the city? If we think globally, there are two main directions:

- private transport
- public transport



The less efficient way to move a large number of people is private transport (car, bicycle, scooter, etc.). Even with increased investments in the development of the street - road network, private transport has no opportunity to solve the issue of the movement of people in the urban environment.

Public transport with category ROW C is moving with private transport in the general flow. ROW B is a public transport that has its own dedicated infrastructure, but on regulated and unregulated intersections moves together with all other traffic participants.

Uzhhorod owns public transport from the ROW C category at this stage of its development and has every opportunity to move to the ROW B category in the future.

Opportunities of introduction of corridors with priority of public transport and mass high-speed transportation systems

Transporting the maximum number of passengers in the most efficient way is one of the main goals of public transport. Therefore, for this, it is necessary that the transport that transports the residents and guests of the city can constantly move without delays. Public

transport will gain demand among citizens and become profitable if it is convenient, timely and predictable. This can be achieved, in the realities of the city of Uzhhorod, only thanks to priority in traffic, in particular: separate lanes and traffic light regulation for public transport.

As of today in the city Uzhhorod is not so many streets, which would be suitable for the installation of allocated traffic lanes for public transport. The urban planning structure of Uzhhorod is already formed. There is a short historical center and residential neighborhoods. The existing street-road network of the city is not flexible enough to global changes. Limited are landscape, financial and administrative opportunities.

Scheme of arrangement of allocated traffic lanes for public transport

Local streets

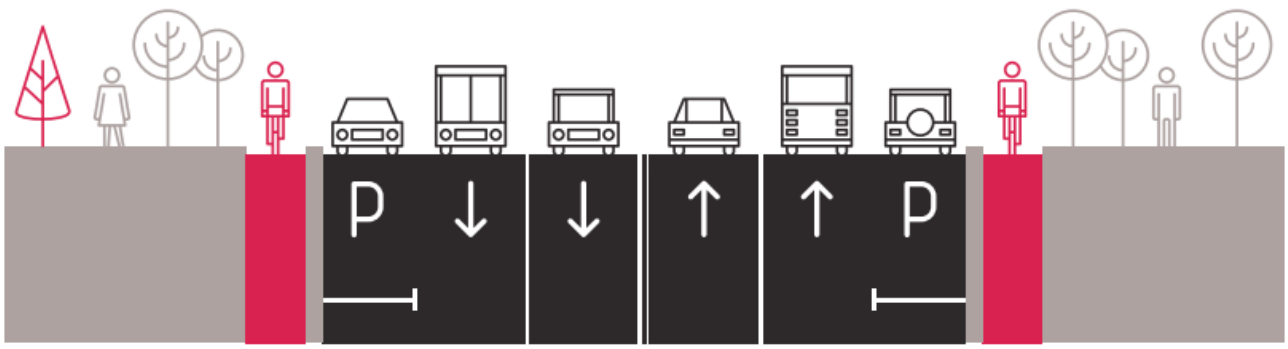
Transport hubs

Streets with separated by public transport

The scheme of improvement of the public transport network within the framework of development of the plan of sustainable urban mobility for the city of Uzhhorod provides for the arrangement of the allocated traffic lanes for public transport on some parts of the city streets. In the central historical part of the city - is Koryatovych Square, which offers closing of the entrance for private transport with the possibility of public transport. In the southern part of the city to arrange the allocated traffic lanes for public transport is necessary on the following streets:

- str. Hrushevskyi from the street Zankovetska to the roundabout on the street. Minayska (separated traffic lane on the even side of the street);
- str. Minayska from the roundabout on St. Hrushevskyi to Cyril and Methodius Square;
- Svobody Avenue;
- str. L'va Tolstoy;
- sq. Shandora Petefi;
- str. Mukachevo;
- str. Mytraka;
- str. Robocha from st. Mytraka to St. Russian;
- str. Ruska from st. Robocha to st. Ankudinova.

The city of Uzhhorod has no possibility to arrange a full system of mass high-speed passenger transportation at this stage of development. The city does not have the appropriate number of population, and the street-road network is formed to push away from the compact historical building. Instead, the transition of the public transport network to the ROW B category, which has its own dedicated infrastructure, but on regulated and unregulated intersections moves together with all other traffic participants - possible at the stage of implementation decisions of the plan of sustainable urban mobility.



Carrying out reconstructions (arrangements) of sections of the city's street and road network

In the city of Uzhhorod it is necessary to carry out regular reconstruction of the street-road network. First of all, it is necessary to bring to the appropriate state the main magistral roads, which build the transport frame of the city.

The main transport corridors that primarily need planning and spacial changes according to the "from facade to facade" principle are:

Stage I

- str. Bozhenka - str. Dovzhenka - square Koryatovycha - str. Fedynets;
- sq. Cyril and Methodius;
- sq. G. Kirpy;
- the intersection of Str. Zagorska - str. Bab'yaka - str. Yen′kovs′ka;
- the intersection of Str. Pidhirna - str. Bercheny;
- the intersection of Str. Shumna - str. Druhetiv.

Stage II

- str. Sobranetska - str. Pidhirna - str. Druhetiv - str. Domanynska;
- sq Bohdana Khmel′nyts′koho - str. L′va Tolstoho - square Shandora Petefi - str. Mukachivska
- str. Mytraka - str. Robocha - str. Rus′ka;
- Ave. Svobody;
- str. Hrushevs′koho;
- str. Mynays′ka.

Stage II

- str. Zahors′ka;
- str. Shchedrina;
- str. Shumna - str. Ankudinova - st. Stantsiyna;
- str. Bercheny - str. Tymiryazyeva;
- str. Kapushanska;
- str. Lehots′koho - str. Bereznya 8.

The specified streets, squares and intersections must be equipped multimodal, taking into account all traffic participants, including those with limited mobility, ensuring public transport the maximum priority of traffic on the roadway of the street space.

Placement of stops and transfers points

New stops of public transport and transfer points and reconstruction of existing ones should be arranged according to the DBN V.2.3-5:2018 Streets and roads of settlements and the GBN V.2.3-37641918-550:2018 Stops of road transport.

Stops of the route transport are distributed on the final and intermediate. Intermediate stops by using are classified:

- personified, intended for a separate route or separate vehicles, for example, route taxis;
- transfer stations, where the direction of movement of individual passengers changes, movement along a different route;
- compatible, intended for two or more routes of the same direction.

Source: varosh.com.ua - public transport stop

Public transport stops can be single, including combined, if the total rate of movement of route vehicles does not exceed 30 units/hour. Stops that serve several routes of the same type of vehicles with a total rate of movement of more than 30 units per hour are considered double stops. If the rate of movement of various types of vehicles is more than 30 units per hour, landing platforms at the stop (at the transport and transfer hub) may be dispersed.

The main elements of the state-standards stops are:

- a stop platform, which is arranged on the sections of the streets in the settlement;
- boarding platform;
- car pavilion or canopy with a bench or benches;
- pedestrian paths and sidewalks with a hard surface;
- appropriate technical means for organizing road traffic;
- engineering communications and landscaping elements.

The width of the a stop platform depends on:
- passenger flow;
- waiting time for passengers for shuttles, based on the estimated density of passengers on the platform of 2 people/m2, but not less than 1.5 m.

Stops of public transport that moving together with other means of transport should, as a rule, be located behind intersections at a distance of at least 5 m from the pedestrian crossing and 20 m from the intersection to the boarding platform. Arrangement of stops can be either without check-in "pockets" or in the form of an open "pocket". When reconstructing streets with separate traffic lanes for public transport, it is recommended to build stops with drive-in pockets.

Conditions for safe and comfortable waiting for route transport in any weather and ensured conditions for convenient boarding and disembarking from it must be created at all public transport stops located on the territory of the city. The stop should be located and arranged in such a way that:
- the pavilion and route transport, located at the stop, were not an obstacle to visibility and visibility for drivers of other vehicles;
- pedestrians (future passengers) could arrive at the boarding platform without obstacles, moving outside the roadway on the sidewalk or pedestrian path;
- the movement of passengers to transfer to transport of another route took place along the shortest and safest route;
- passengers in wheelchairs could move freely from the bus stop to the sidewalk or footpath. At all bus stops, it is recommended to install information and electronic boards predicting of public transport arrival time.

The final stops on public transport routes must be equipped to ensure that route transport can be turned around. They arrange a place to turn around right next to the bus stop. The network of city streets may be used to turn around traffic, but the average distance of traffic for turning around should not exceed 300 m.

Implementation of measures to optimize the network and development of public transport plan

For ¼ of the population of Uzhhorod, public transport is one of the basic means of transportation. If more detailed - 36,0% - moderately use PT, and 16,2% - very often. In sum, it is 52,2% of urban residents, for whom public transport is not an integral part of their life. The sustainable mobility plan provides a number of measures aimed at ensuring timely, quality and affordable services. Public transport should be such that it should be willing to use all residents of the city.

The actions envisaged by the plan are divided into three main categories:
- Infrastructural changes;
- Management and organization;
- Monitoring and collecting data.

Measure	Category	Planning horizon		
		5 years	10 years	15 years
The structural axes of the city should be developed and improved	Infrastructure	+	+	+
The priority of passage at traffic lights and dedicated lanes for public transport, especially in areas where traffic jams are formed should be implemented	Infrastructure	+		
The convenient landing platforms should be provided. Acceleration of boarding and landing of the passengers at bus stops. "Pockets" should be avoided, except where it is necessary.	Infrastructure	+		
Design and construction of transport connecting units	Infrastructure	+	+	
The reconstruction of transport depot and ATP with installation of modern equipment, creation of proper working conditions, installation of modern washing machines should be done	Infrastructure	+		+
Renovation of bus stop complexes and pedestrian approaches to them, taking into account the needs of people with reduced mobility	Infrastructure	+	+	
Arrangement of toilets and rest areas at the final stops of public transport	Infrastructure	+	+	+
An independent audit of the work of the structural unit dealing with public transport should be conducted	Infrastructure	+	+	+
The audit of economic efficiency public transport routes should be conducted	Management and organization	+	+	+
A program of phased implementation of the priority of movement of all public transport should be developed	Management and organization	+		
The city's transport route network with the transfer of part of the routes from the main thoroughfares to parallel streets to optimization	Management and organization	+		
Traffic schedules and electronic traffic arrival boards should be placed at bus stops	Management and organization	+		
Obligatory systematic training of public transport drivers should be organized for the purpose of providing them with quality	Management and organization	+	+	+

transportation services. Study of entrance to places of stops				
System of a single electronic ticket for all types public transport should be introduced	Management and organization	+		
Purchasing by the city of large-sized, low-rise rolling stock.	Management and organization	+	+	+
Competitive lots from high, medium, and low-efficiency routes will be formed for further drawing	Management and organization	+	+	+
A population mobility study should be conducted	Monitoring and collecting data	+	+	+
An audit of the state of the city's bus stops should be conducted	Monitoring and collecting data	+	+	+
A systematic interviewing of the satisfaction of public transport users should be conducted	Monitoring and collecting data	+	+	+

Proposals for improving the scheme of the public transport network

The public transport network's location diagram includes changes for some routes. Also, having studied the current situation and requests of the community of the city, having analyzed the non-existent routes, there is a proposal to restore some routes, changing their configuration.

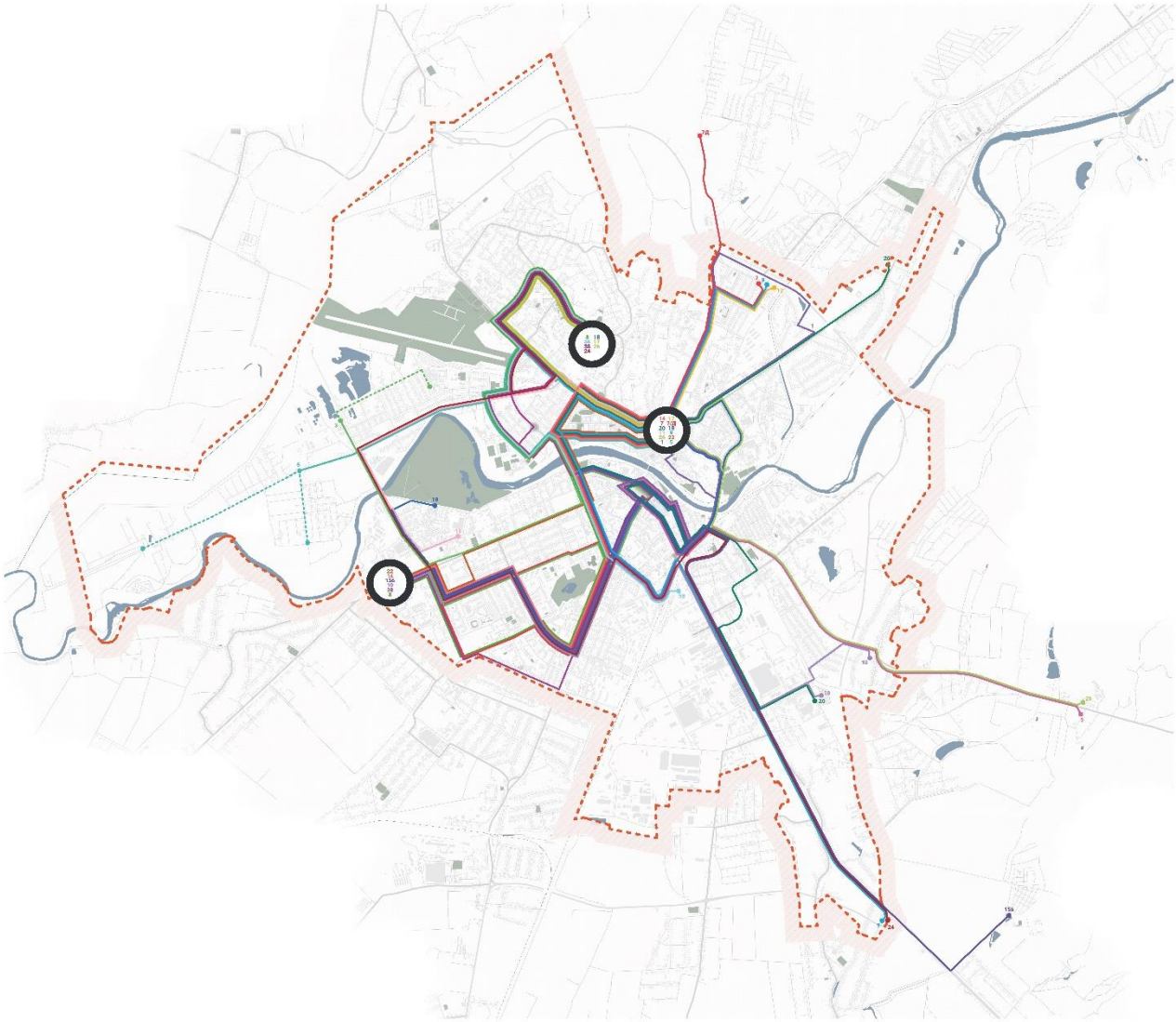
Route No. 1 "Railway station - str. Starodomanynska" (across Sandor Petefi Square, sq. Koryatovycha, str. Drugetiv) is a new proposed route that will connect the north-eastern district of the city with the railway station through the central part, spread over on the left and right banks of the Uzh River.

Route No. 3 "Str. Yenkivska — square Sandor Petefi" (across Maria Zankovetska St., St. Kapushanska) is a new proposed route that will connect the western district of the city with central part of Uzhhorod. Buses in the direction of the center will move along the street. Maria Zankovetska, and will return back along the street. Kapushanska. The route has potential the direction for development towards St. Gvardiyska, but for this it is necessary to carry out reconstruction this street.

Route No. 5 "Str. Zagorska - square Koryatovych" (across Ivan Franko St., "Dastor" Shopping Center) – another new route that will connect the western district of the city, the private sector along the street. Zahorska with the city center. Since the western part of the city has a significant potential to consolidation of the territory, the proposed route has a potential direction for development to the side St. Tyutyunova or further west along St. Zagorska.

Route No. 18 ""Epicenter" — UzhNU" (via Sandor Petefi Square, Koryatovycha Square) is necessary continue along the street Mykola Bobiak on Sloviansk embankment to provide access to Bozdo Park.

Route No. 20 "Domanyntsy" microdistrict — Rechovyi rynok" (through Koryatovycha Square) at the entrance to railway crossing changes its direction and moves along the corridor of St. Oleg Koshovoy - str. Olga Kobylyanska - str. Antonina Dvořák - st. Andriy Palaya and will return back to your route.



Project scheme of public transport routes

4.4 Action plan to improve road safety

In the field of road safety, there are several key challenges that a sustainable urban mobility plan should address, namely:

Excessive use of private vehicles	**Speeding**
Chaotic parking	**Irregular logistic transportation**

In order to increase the safety, comfort and efficiency of road traffic, the sustainable mobility plan envisages the development of a comprehensive approach to street reconstruction in the city. The street space in the modern urban environment is subordinated principle of multimodality. Each separate planning unit (transport hub, street, square, park, square, etc.) must be linked into a single system.

Improvement of the street and road network of the city

Crossroads Oleksandr Fedynets Street and Tsentralny Lane

In the city of Uzhhorod, the level of motorization is increasing every year, thus increasing the load on the street and road network. Every street, from the point of view of traffic mobility, has its own functional capabilities, user requests and its hierarchical place in the city's street and road network (SRN). As of today, the SRN of the city needs some capital improvements. There is a need to organize and organize the parking space, to provide the necessary

conditions to reduce the load on the city's street and road network and the unhindered movement of pedestrians.

The daily movements of thousands of people in the city create traffic and pedestrian flows of high intensity on the street and road network of the city, which leads to significant time consumption on moving, as well as the occurrence of "transport fatigue" from uncomfortable travel conditions.

The development of the SRN of the city is carried out somewhat incorrectly:

- there is no system of urban planning, unregulated issues of land acquisition for the construction of city main streets and roads of continuous traffic, transport intersection, parking lot for cars and other road infrastructure objects;
- the network of main streets does not form a single continuous movement;
- main streets, which bring traffic flows to the central part of the city, have exhausted their carrying capacity;
- lack of dedicated public transport lanes;
- lack of a systematic organization of parking for private vehicles (there are point objects of paid parking).

SRN should provide the shortest and safest ways of communication for vehicles and pedestrians. Measures aimed at improving the road situation have be conducted in two directions:

- reconstruction of existing and construction of new elements of SRN and its infrastructure;
- increasing the throughput of the existing SRN;
- improvement of road traffic safety.

Scheme of changes to the street and road network of the city

- External transit
- Main streets
- Transport hubs
- Railway

Having analyzed the current situation and the effectiveness of the Uzhhorod SRN, the following suggestions were made for improvement:

1. Reorganize the existing traffic junctions: the intersection of Str. Sobranetska and Str. Starodomaninskaya; intersection of Str. Klyment Timiryazev and Str. Starodomanynska; intersection of Str. Domaninska and Str. Istvan Dendesi; roundabout on Mukachevo.

2. Continue the transport direction along the str. Zahorska, for the development of the district after the intersection of Str. Zagorska and Yenkivska street.
3. Create additional railway crossings in the following places: str. Oleksandr Mozhaisky from Str. Promyslova (formerly Mykola Ogaryova Str.); Str. Pavlo Chubynskyi from Str. Romana Shukhevicha (formerly Lavrishcheva Str.).
4. To create a full-fledged bypass of the city. For this, it is necessary to create a direction that would connect the street. Yenkivska from str. Starodomaninska, str. Oleksandr Blest (former str. Krasnodontsiv) from Str. Starodomaninska, str. Oleksandr Mozhaisky from Str. Mykola Ogaryova.

In addition, during the planning of the specified works, the needs for performing work on lowering curb stone on streets, roads (the edges of the carriageway, reinforced roadside strip) at crossings of footpaths (sidewalks), in places for motor vehicles to pass, installation of side stone at stops at level floors of public transport vehicles, arrangement of pedestrian crossings taking into account their use by persons with special needs who move in wheelchairs, and installation of sound signals at traffic lights.

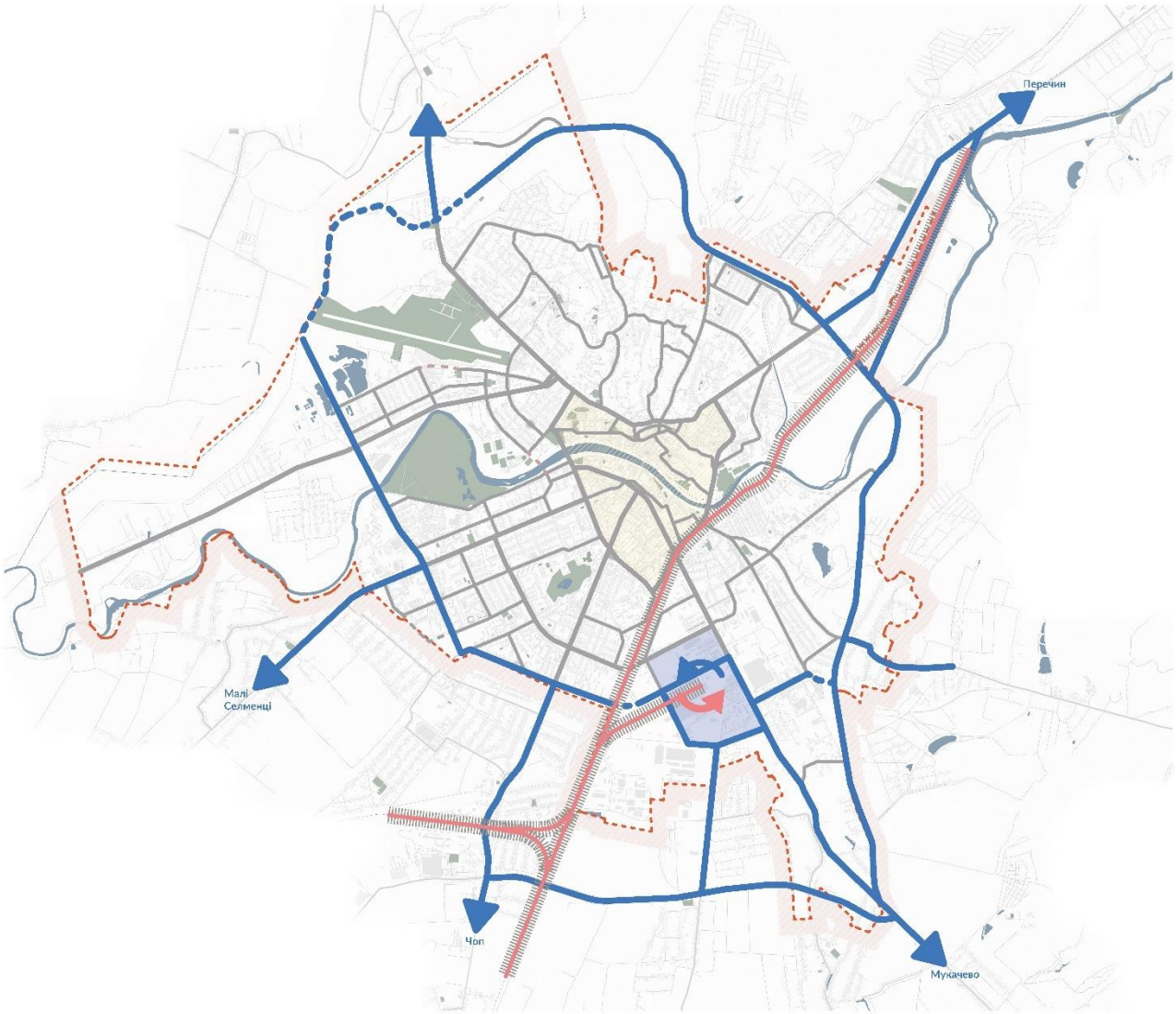
One of the important principles of the operation of the street and road network is its effective functioning, which is realized through the balanced operation of all its elements and the satisfaction of the interests of transport and pedestrian traffic and, as a result, the solution of important transport problems of all city residents.

Optimizing the movement of large-sized transport

The plan of sustainable urban mobility of the city provides for a bypass scheme of the LST, taking into account the implementation of the necessary changes to the city's street and road network. Transit and logistics the movement of large-sized transport should be carried out on the bypass road of the city with the possibility of unloading goods and cargo at intercepting platforms, which are expedient organize on the territories of the former industrial facilities of the city.

The industrial zone located there can serve as the best such transport hub to the east of the railway (it is possible to pick up by rail transport) in the area of Str. Romana Shukhevicha, str. Promyslova, str. Serhiy Martyna (former Partizanska Komuna Str.), Str. Korytnianska. In addition, the city should strengthen control over transit cargo by transport moving outside the defined logistics corridors.

Daily logistics movements must be carried out according to the established routes in allotted time. The practice of developed, advanced countries shows that the most optimal time for retail logistics, these are morning hours (from 5 a.m. to 7 a.m.) before at the beginning of the main traffic in the city.



Detour diagram of large-sized transport

Railway

LST movement

Place of loading/unloading

Infrastructure measures in the field of road safety

The priority solutions for the city of Uzhhorod are the use of traffic calming measures that will reduce the likelihood of road accidents or at least reduce their consequences. Among the activities, which must be implemented in Uzhhorod:

Islands of security

With the use of safety islands on the carriageway of the streets, areas where there should be no vehicles are "booked". Together with contrast lighting on in unregulated pedestrian crossings, they increase the safety of pedestrians by reducing the distance of crossing the carriageway and allowing people to simultaneously concentrate on one direction of movement, not two. Usually, the safety island is arranged at the expense of the space of the carriageway, thus narrowing it. The safety island encourages drivers subconsciously reduce the speed of movement.

Raised dividing line

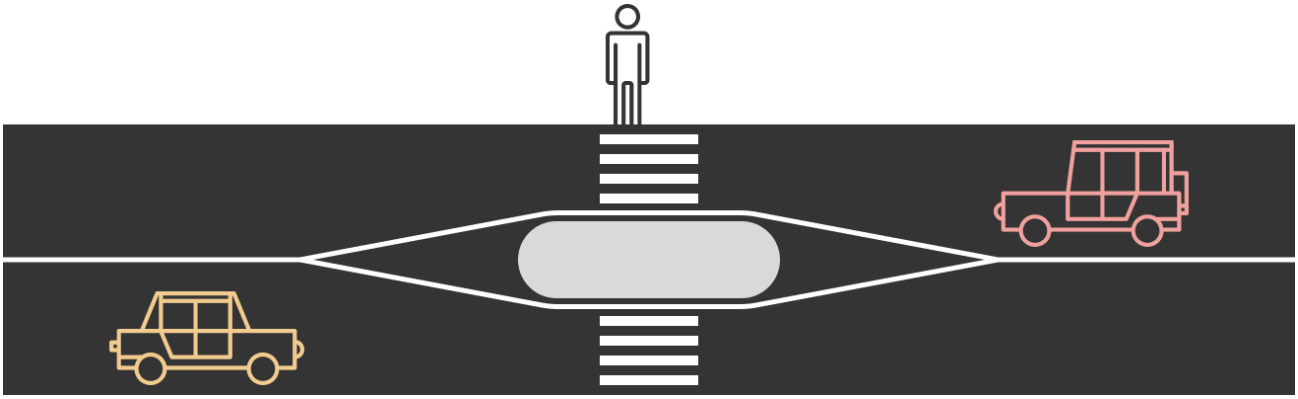
A raised dividing strip is a barrier in the middle of a street or road that separates traffic flows of oncoming or passing directions. Such an infrastructural measure does not provide the ability to overtake, which, in turn, allows you to avoid an oncoming collision. In addition, dividing lanes limit the possibility of making a left turn, allowing it in safer places, and also serve as safety islands when arranging pedestrians transitions. Raised dividing lanes must be installed on main streets with more than 4 lanes.

Increasing pedestrian crossings and intersections

Raising the pedestrian crossing to the level of the sidewalk in places where pedestrians cross or at unregulated intersections is one of the most effective measures to calm traffic which reduces the speed of the car and also provides barrier-free movement of pedestrians.

Limiting devices

Physical barriers must be installed at public transport stops that will prevent other vehicles from parking there. In addition, the installation of anti-parking columns will increase the safety of passengers waiting at the bus stop. When installing such devices on the sidewalks,



the direct impact of the vehicle on people is reduced or even eliminated when the vehicle leaves the sidewalk uncontrollably. Usually, in such places, anti-parking columns are arranged static (metal, concrete). They must be marked with reflective, enhancing elements visibility of a stop or sidewalk in the dark.

Private cars are part of the mobility system of any modern city. However, they are one of the elements of the system, not its only component. To achieve the goals of a sustainable and balanced mobility system, the city should encourage residents to use cars less often, especially in the central part of the city. All of the above measures are aimed at increasing the safety of road users, introducing new traffic management schemes, reducing injuries, and eliminating road deaths.

For more convenient implementation of measures, they were divided into the following categories:

- capacity building;
- infrastructure;
- promotion and information.

Measure	Category	Planning horizon		
		5 years	10 years	15 years
Improving the qualifications of existing personnel in the field of urban mobility (Department of urban infrastructure, Management urban planning and architecture)	Capacity building	+	+	+
Creation of analytical institutions on mobility planning (Spatial Development Agencies)	Capacity building	+	+	
Creation of a traffic safety audit commission for new infrastructure projects	Capacity building	+		
Traffic research accidents, injuries, mortality	Capacity building	+	+	+
Study of car speed Data collection and processing	Capacity building	+	+	+
Development of strategies and concepts related to improving road safety	Capacity building	+	+	+
Development of a complex scheme of organization traffic for all city streets	Capacity building	+	+	+
Assessment of the required number of traffic lights objects in accordance with the existing transport situation in the city	Capacity building	+	+	+

Development of the road lighting program and pedestrian crossings	Capacity building	+		
Making appropriate changes to the general city plan	Capacity building	+	+	+
Implementation of urban development strategies cycling infrastructure	Infrastructure	+	+	+
Design and reconstruction of streets (primary emphasis on the main ones main streets)	Infrastructure	+	+	+
Arrangement of road infrastructure anti-pockets, security islands, guide islands and rings	Infrastructure	+	+	+
Reducing the width of traffic lanes (according to street categories)	Infrastructure	+	+	
Reduction of the intersection area	Infrastructure	+	+	
Arrangement of streets with limited speed	Infrastructure	+		
Overhaul of external networks lighting with the replacement of lamps with LED ones lanterns	Infrastructure	+	+	
Application of the transport model of the city for further modeling of decisions	Infrastructure	+	+	+
Modernization of existing traffic lights (provide independent power supply traffic light objects	Infrastructure	+	+	+
Installation of new traffic lights on key intersections of the city	Infrastructure	+	+	+
Creation of an automated system traffic management	Infrastructure	+		
Installation of road equipment for traffic control and arrangement of the parking space (Automatic bollards, protective fencing, anti-parking pillars, etc.)	Infrastructure	+	+	+
Provision, maintenance and technical maintenance of regulation devices traffic	Infrastructure	+	+	+
Strengthening of road traffic safety on railway crossings and transitions to them	Infrastructure	+	+	
Road safety audit traffic (especially in the areas of traffic accident concentration)	promotion and information	+	+	+

Promoting the use of bicycles as means of transportation	promotion and information	+	+	+
Promotion of pedestrian use and reflective means by cyclists	promotion and information	+	+	+
Implementation of educational information companies, regarding road safety and compliance with traffic rules for schoolchildren	promotion and information	+	+	+
Spread of social advertising, regarding traffic and pedestrian safety	promotion and information	+	+	+

Today, unfortunately, the main incentive for compliance with traffic rules is punishment in the form of fines imposed by patrol police or parking inspectors (officials persons of the local self-government body). But the absence of a patrol car "nearby" leads to the systematic implementation of "insignificant" violations, which according to the participants traffic does not greatly affect safety (slight speeding on straight, long sections of streets; stopping "for five minutes" in a prohibited place; departure at a busy intersection; crossing the street where it is convenient, not at pedestrian crossings, etc.).

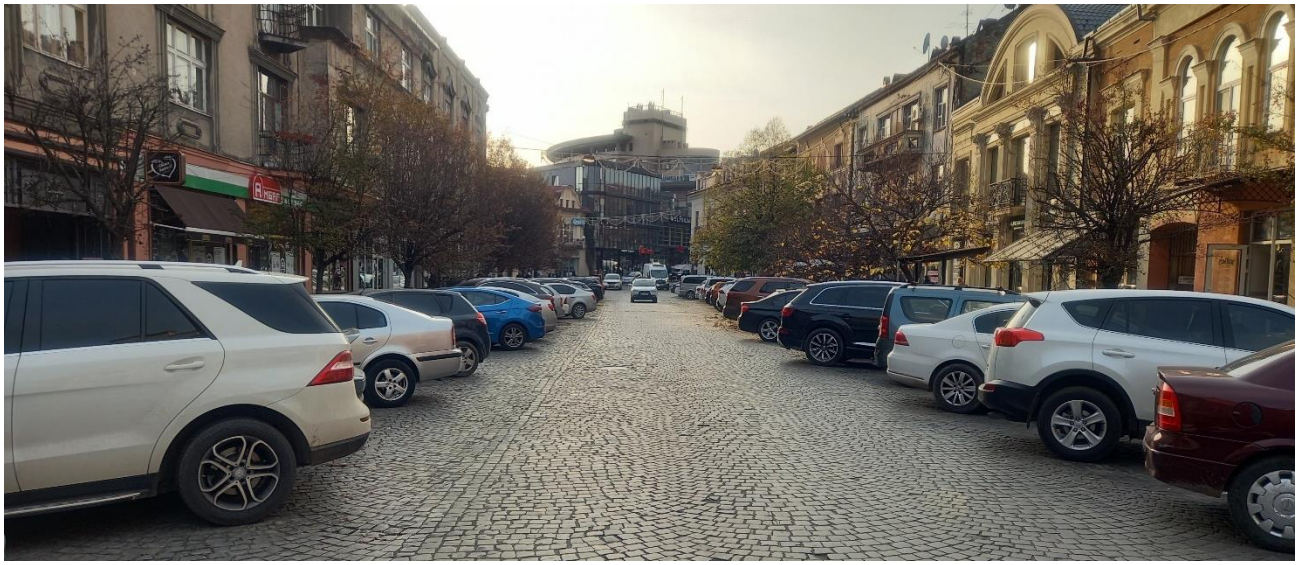
World practice has long confirmed that the most effective solutions for promotion road safety are precisely engineering solutions, the effectiveness of which does not depend on availability near the patrol car. A significant number of renovated in recent years streets of the city of Uzhhorod, unfortunately, this is not taken into account. As a result, they continue in the city wide roadways of the era of the "car boom", which are comfortable to drive in the 90s, should remain 110, but by no means the permitted 50 km/h.

The main cause of injuries and deaths of road accident participants is speed. Reducing the speed of movement significantly reduces the probability of significant injuries and death movement participants.

Despite the fact that the causes of road accidents are extremely numerous (drunkenness, driving without a license, etc.) and the city government cannot solve some of these problems without the help of the police, gravity the consequences of these road accidents depend most on the speed with which the vehicle was moving. Despite the fact that the city cannot reduce the number of those who drive without a license or in a drunken state, but the city has all the means to ensure that the consequences of dangerous driving are as little as possible death or maiming of citizens.

4.5 Concept of parking area development

In the conditions of constant growth in the number of private cars in the city of Uzhhorod, this is special the problem of a sufficient number of places for parking vehicles becomes acute. As part of the vision of Uzhhorod's development strategy, the task of creating conditions is of particular importance for the free and unhindered movement of all road users, first of all for pedestrians, cyclists and users of LPT.



Koryatovych Square parked by private vehicles

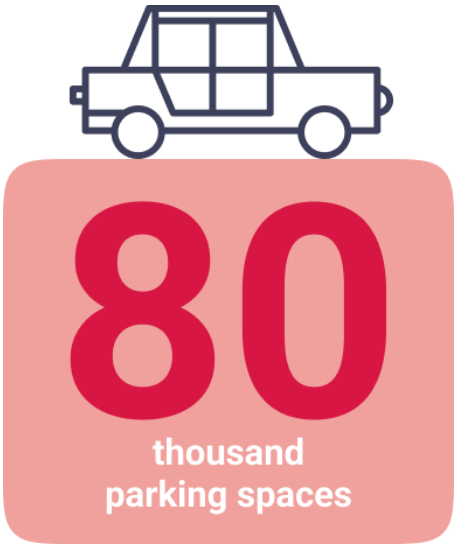
The concept of parking space development in the city of Uzhhorod was developed taking into account foreign experience in the field of parking, which is successfully used in European countries.

The existing parking system has the following problems:

- low level of compliance with parking rules;
- insufficiently effective compliance control mechanism parking and payment rules, as well as the mechanism for imposing a fine for violation of parking rules at existing paid parking lots;
- low payment discipline and, as a result, incomplete receipt of funds to the city budget;
- lack of convenient and available non-cash methods payments (mobile parking, payment cards, subscriptions);
- the inconsistency of the city's parking infrastructure with modern ones requirements;
- parking in residential areas of residential areas cities;
- an insufficient number of parking spaces in designated areas and specially equipped parking lots;
- lack of intercepting parking lots;
- inefficient technical support of the parking lot activity and information support.

The population of Uzhhorod at the end of 2022 was about 120,000 residents. With the beginning of full-scale military operations on the territory of Ukraine, the population of Uzhhorod increased by 40,000 at the expense of internally displaced persons (according to official data).

In European cities, the number of parking spaces in averages about 15% of the total number of city residents. Thus, coming out from the European experience, the need of the city of Uzhhorod is about 24,000 parking spaces for residents cities. According to the sociological survey of mobility 54% of the surveyed families in the city of Uzhhorod have one car, 18% of families have two, 3% own one three cars. Taking into account the pendulum population movement from suburban villages, actual need in parking lots (long-term and short-term parking) for private vehicles can to be up to 80,000 car spaces, which is 3 times more than the practice of European cities shows. Close the half of these cars "migrate" every day from residential areas to the central part of the city, occupying all possible permitted and forbidden parking space of the street and road network of the city.



The concept of parking space development in the city of Uzhhorod is aimed at solving problems with chaotic street parking and provision of the city's population parking services in sufficient quantity and of appropriate quality.

The purpose of the Concept of the development of parking space in the city of Uzhhorod is:

1. Creation of organizational, economic and infrastructural conditions for development parking space, which will provide a significant contribution to socio-economic development cities.
2. Provision of the necessary conditions to reduce the load on the street and road network of the city on working days due to flexible regulation of the cost of parking services in different tariff zones.
3. Establishing justified and flexible tariffs in order to implement profitable activities and regulation of loading of the city's street and road network.
4. Ensuring the transparency of calculations due to the maximum exclusion of the human factor and the introduction of innovative technologies when paying for parking services, namely: refusal of cash payments with replacement for non-cash payment methods (mobile parking, payment cards, season tickets).
5. Increasing the quality of parking services.
6. Increase in revenue to the city budget due to increased discipline from the payment of services through the introduction of a simple effective automatic control process for payment.
7. Sequential and phased arrangement and increase in the number of parking spaces on day and night parking lots.

8. Arrangement of intercepting parking lots and parking lots for transit logistic transportation.
9. Reducing the level of air pollution by vehicles, promoting development transport with zero emissions - bicycles, LPT, electric cars, etc.

Koryatovych Square parked by private vehicles

There are already several zones with parking, nevertheless, with the implementation of the steps of the sustainable urban mobility plan, especially in the field of public transport, there will be a need for changes in the organization parking. According to the ideology and examples of European cities, the cost of parking should be so high that up to 20% of parking spaces remain free. Concept the development of the parking space provides for the division of the city territory into four city-wide areas parking areas, as well as two additional areas with special parking conditions.

Parking areas:

I And the historical core of the city.

These are the streets and blocks of the central part of the city that are most congested with parking, especially those that create danger for users and restrict movement. With limitation speed of traffic in the center and subsequent transformation of the historical part of the city into a pedestrian area zone, it is worth providing for limited paid parking zones in specially allocated areas the streets These streets should have a one-way entrance and be perimeter-

organized by parking on them. Accordingly, moving counterclockwise or clockwise around blocks in the central part of the city, it will be possible to enter a street where parking is allowed and exit from the other side to continue driving in the same direction. At the entrance to the central part of the city, navigation stands should be additionally placed indicating the traffic pattern in the parking zones.
The first parking zone includes str. Volodymyr Goshovsky, str. Olexandra Dovzhenka, str. Yuriy Goyda, str. Dmytra Mendeleev, Narodna Square, str. Julia Stavrovsky- Popradova, str. Vyacheslava Prykhodka (formerly Mykhailo Lomonosov Str.), Str. Taras Shevchenko (from Mytna Str. to Yuriy Hoyda Str.), Str. Tomasz Masaryk, str. Brayshchak brothers, Str. Ferenza Rakotsi, str. Ivan Krylova, str. Oleksandr Fedynets, Zhupanatska Square.

II The territories are adjacent to the central part of the city

When movement is restricted in the central part the city is an important step-by-step implementation. Next step should be creation parking spaces (temporarily free) at roadway of the streets around the central one the territory of the city. This will provide a pedestrian access and ease of use from the location parking to any point of attraction in the center.

After creating places around the central part should be expanded the perimeter of the parking area. So, parking is close to the center paid, and remote - again temporarily for free. Such measures are step by step should reduce the number of users by private transport and create demand for public transport or bicycle infrastructure of the city.

The second parking zone is intended to be an alternative for those who want to leave their car in the historical center due to the price for parking, the number of parking spaces and the proximity of that main attractions in the historical core. It covers the territory of the city from the square Prince Laborets and str. Jan Hus on the west side of Str. Yarotska, str. Kapitulna, str. Augustina Voloshyna in the east, and also includes the central part of Sobranetska Street and Str. Pidhirna in the north of the city. In the south of Uzhhorod, the second parking zone covers the territory of the city from of the Uzh river to Ave. Svobody, str. Kapushanska, str. Andrii Novak, str. Shvabska, str.Mukachivska and str. Robocha.

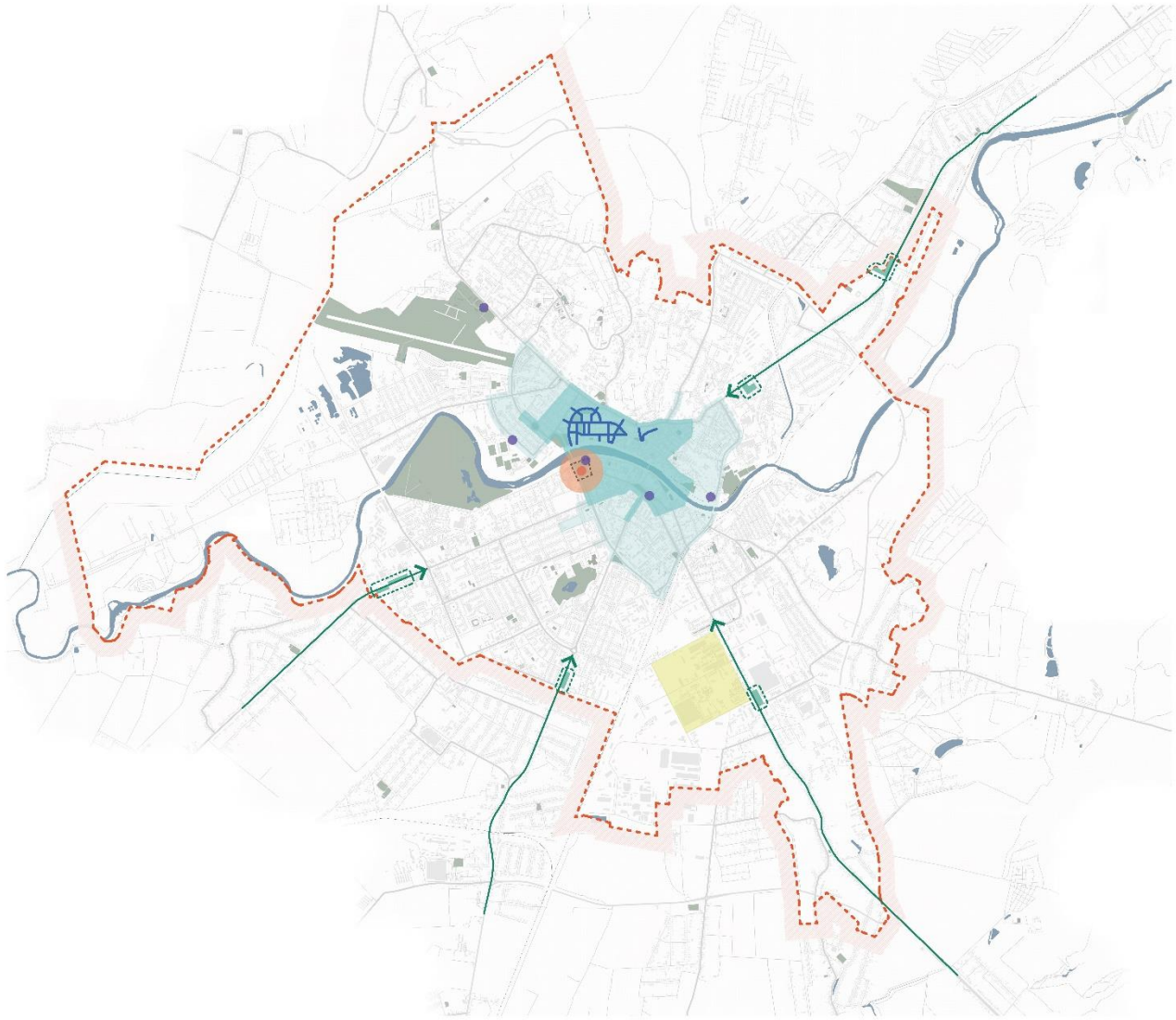
III Pendulum parking areas

These are other streets and areas of the city where parking problems arise from time to time, they do not pose a threat to traffic safety. But due to the proximity to the first two parking zones, they are should also be paid, so as not to drag the problems of chaotic parking onto them.

The third parking zone includes the streets that are located next to the second parking zone, namely: in the west, this is part of the street Zahorska and str. Sobranetska, str. Zakarpatska,

str. Gvardiyska, streets of Velikiy Galagov district; in the east are the streets around the Uzhhorod Castle from Str. Drugetiv to Str. Shumna and Str. Podgradska; in the south, the third parking zone extends to Ave. Svobody, Cyril and Methodius Square, railway station, str. Akademika Shpenik, as well as str. Vilmosh Kovac, and part of Vasyl Baloga, Oleksandr Popadynets, Istvan Secheny and Maria Zankovetska streets.

IV Special parking lots



Development scheme of parking development

I parking zone
II parking zone
III parking zone
Multi-level parking
Parking lots tourist buses
Transit parking lots large-sized transport
Intercepting parking lots

The concept provides for the arrangement of separate special sites for parking of large transit vehicles, tourist buses, etc intercepting parking lots P+R (Park&Ride).

Taking into account the peculiarities of the street and road network of the city, the location of the main part of industrial facilities to the east of the railway in the area of Str. Roman Shukhevych, str. Promyslova, Str. Serhiy Martyna, str. Korytnyanska, as well as the presence of external transit along the str. Starodomanynska, which by passes Uzhhorod from north to south from the eastern side of the city, the concept of parking space development provides for the arrangement of special parking lots for transit large-sized vehicles. Such platforms provided for further unloading of goods and cargo.

Kyiv embankment. Source: 34travel.me/gotoukraine

The city's high tourist potential dictates the need for special facilities parking lots for tourist buses. Given the significant dimensions of such buses, parking spaces should be convenient for parking maneuvers, and the location of the sites is close to significant historical places and within walking distance accessibility to the center. Of the approved existing tourist parking spaces it is advisable for buses to leave the parking lot on Str. Ivan Olbracht. Parking by Str. Oleksandr Fedynets is dangerous because of its narrow dimensions and insufficient visibility. The parking lot near the Uzhhorod airport is too far from the tourist parking lot city facilities, so it can serve as an additional parking lot for buses. The concept envisages several additional locations for the arrangement of parking lots seats and platforms for tourist buses:

- the site on Sandor Petefi Square (near the former House of Life);
- playground on the Kyiv embankment (near the skate park);
- parking spaces on the street Ivan Olbrakht (at the exit on Shumna Street);
- the site in front of the "Avangard" stadium (for parking of tourist buses);

- site near the Uzhhorod airport (reserve, if necessary for additional distance of tourist buses).

Intercepting P+R (Park&Ride) parking lots are located on the outskirts of the city near public transport stops. The idea of such parking lots is that there is an opportunity to leave park your car in a parking lot far from the center, and to get to the required location, you need to use public transport or a bicycle. Thus, the city center is unloaded from cars and traffic jams become less. Such P+R (Park&Ride) parking at the first stages of the implementation of the concept should be free, later - for a fee.

In the first stages, to popularize interceptor parking, users can receive free tickets or tickets at a special low price for travel in public transport. Such parking lots can solve the problem of oversaturation of the street-road network with private transport arriving from suburban villages, which surround the city of Uzhhorod.

Areas where parking is free

Streets and districts of the city of Uzhhorod, which can be free for the organized parking is, first of all, remote residential areas of individual housing and territory, on which there are no objects of mass attraction of visitors. This zone should also include outbuildings of multi-apartment housing with a clear organization in them parking space. Residents have priority for parking on such sites surrounding houses.

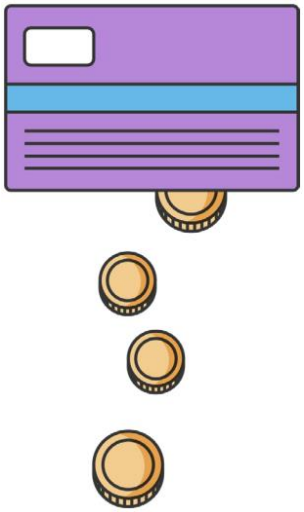
Streets of the city on which parking is prohibited

Due to various factors, parking of private vehicles may be prohibited altogether on some streets. This also includes those sections of streets where traffic rules prohibit stopping or parking. This applies primarily to overpasses and bridges, railway crossings, traffic junctions and those sections of streets where parking cars can lead to dangerous situations on the road.

Special attention should be paid to the impossibility of parking vehicles on sidewalks and green areas of city streets.

A transparent parking payment system can provide control over the use of parking space and collect funds for its development. At the same time, the system payment should be flexible depending on the parking zone, parking time and payment method. An effective payment system is possible with the help of:

- the use of mobile applications to pay for parking, as this is a more convenient way for many people;
- a differentiated tariff system depending on the zone to collect different fees for parking and time of day;
- installation of automated parking machines, which accept coins, banknotes or credit cards;



- introduction of contactless payment for parking with the help of cards or NFC tech nologies;
- use of electronic payment systems to do payment is more convenient and fast;
- the use of a prepaid system that will allow users reserve a parking space in advance and secure stable income from parking;
- the use of a subscription fee system that will allow users to pay a fixed amount for parking on a certain time;
- the use of a system of discounts and promotional codes that allow attract new users and increase revenue from parking;
- opportunities to use a cashback or credit system that will allow you to attract and retain customers;
- the use of a system of preferential tariffs for different groups of users, such as
- disabled people, pensioners, war veterans, etc.;
- warning systems about the expiration of parking fees to avoid fines for
- delay;
- installation of surveillance cameras and a system of automatic number plate registration signs to avoid violations and increase the efficiency of the payment system;
- opportunities for free first 15-20 minutes of parking to attract users and allow them extra time to deal with urgent cases or purchases goods;
- free parking opportunities for users who use electric cars or hybrid cars;
- the possibility of reducing parking rates for local residents in the vicinity of the parking lot;
- conducting regular analysis of the payment system to improve efficiency operation of the system and meeting the needs of users.

N	parking area	tariff UAH		
		one hour	a day	monthly pass
I	The historic core and streets, which is the biggest congested with parking	+	+	+
II	Territories adjacent to the central one parts of the city	+	+	
III	Pendulum parking areas	+		

At the stage of development, when the city of Uzhhorod will have a maximum pedestrian center with the possibility expensive parking, in the first two parking zones there will be an opportunity and demand for the implementation of multi-level parking lots.

The most obvious location for the construction of an underground multi-level parking lot with the square has a potentially large number of parking spaces (up to 700 parking spaces) Bohdan Khmelnytsky. It is worth noting that the construction of multi-level parking lots has low profitability for investors. The construction of such objects should be considered together with the construction of modern shopping and entertainment, sports or residential complexes. With in view of this, the relevant bodies of the Uzhhorod City Council should determine and reserve land plots for similar objects.

Today, the development of parking space is one of the most important tasks for most people cities and settlements of Ukraine, especially in those where demographic growth changes are observed population and urban development processes are actively taking place. Considering the constant the growth of private road transport, Uzhhorod already needs actively today to develop the parking space to provide residents and guests of the city with a comfortable and safe movement and prevent transport collapse. In this context, it is important know what steps need to be taken to realize the concept of parking space development, what means and methods can be used to achieve this goal.

Implementation of the concept of parking space development for the city of Uzhhorod involves the following steps:

- infrastructural changes;
- management and organization;
- promotion and information.

Measure	Category	Planning horizon		
		5 years	10 years	15 years
Arrangement of existing ones and creation of new ones parking spaces	Infrastructure	+		
Arrangement of existing garages cooperatives	Infrastructure	+		
Regulation of parking in residential buildings massifs, arrangement on outbuildings and inter-house territories of zones for parking	Infrastructure	+	+	+
Creation of intercepting parking lots and parking lots	Infrastructure	+	+	+
Construction of underground, surface and multi-level parking lots	Infrastructure		+	+
Arrangements at the entrances to the city are special equipped parking lots for transit large-sized transport, tourist buses	Infrastructure	+		+
Making changes to the comprehensive traffic organization scheme	management and organization	+	+	

Creation of tariff zoning paid parking in the city center	management and organization	+		
Introduction of a reliable electronic system parking fees that will allow collection funds to cover development costs parking space	management and organization	+		
Creation of existing and project maps parking lots, tourist bus parking, taxi, service transport	management and organization	+	+	+
Setting the characteristic that will be provide location information for parking	management and organization	+		
Introduction of a preferential system parking for people with disabilities opportunities and other categories of citizens, who need support	management and organization	+	+	+
Development of electronic monitoring system to track current information on availability of parking spaces	promotion and information	+	+	+
Installation of charging stations for electric vehicles and green areas diversion to parking lots	promotion and information			
Stimulating the construction of a network of motels	promotion and information	+	+	+
Development of an advertising campaign for familiarize residents with changes in the Parking Policy	promotion and information	+		

At the stage of development, when Uzhhorod will have the most pedestrian center with the possibility of expensive parking in several zones and created a paid and free parking with different distances from the center, it will be possible and demand for the implementation of multi-level parking.

4.6 Transport micromodeling

Micromodeling - (is one of the types of transport modeling) modeling at the level intersection of streets, part of a street or a separate section of the administrative district.

The transport micro-model is a simplified part of the transport infrastructure, where absolutely all road users can be displayed, and most importantly - a visual image of their interaction with each other. At first glance, the micromodel looks pretty simplified, reminiscent of an ordinary render, but in reality it is a powerful tool. Correctly collected data and properly calibrated model create the possibility of 100% compliance models the existing position.

Micromodeling allows you to impartially based on technical and operational indicators (such as average latency, number of stops, queue length, average network speed or level of maintenance of the intersection) to determine the optimal solution from all possible.

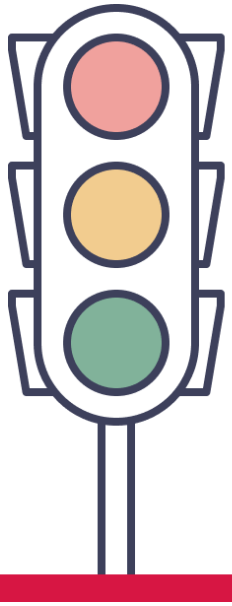
The main advantage of using micro-modeling for a transport engineer is:

- getting an answer to the question: "What happens if?...";
- making certain adjustments to the planning solution of the road network still on design stages;
- identification of critical places at the design site;
- saving investor funds.

An additional advantage of micromodeling is the time to create a model script and simplicity in source data collection. Typically, this is a standard set of engineer designer. A micromodel is a spectacular presentation of results that will help to determine faster critical places in the existing network and will help to quickly find the optimal solution.

Micromodel makes it possible to look at the difference between planning solutions not only in numerical values, but also in the form of imitation of motion.

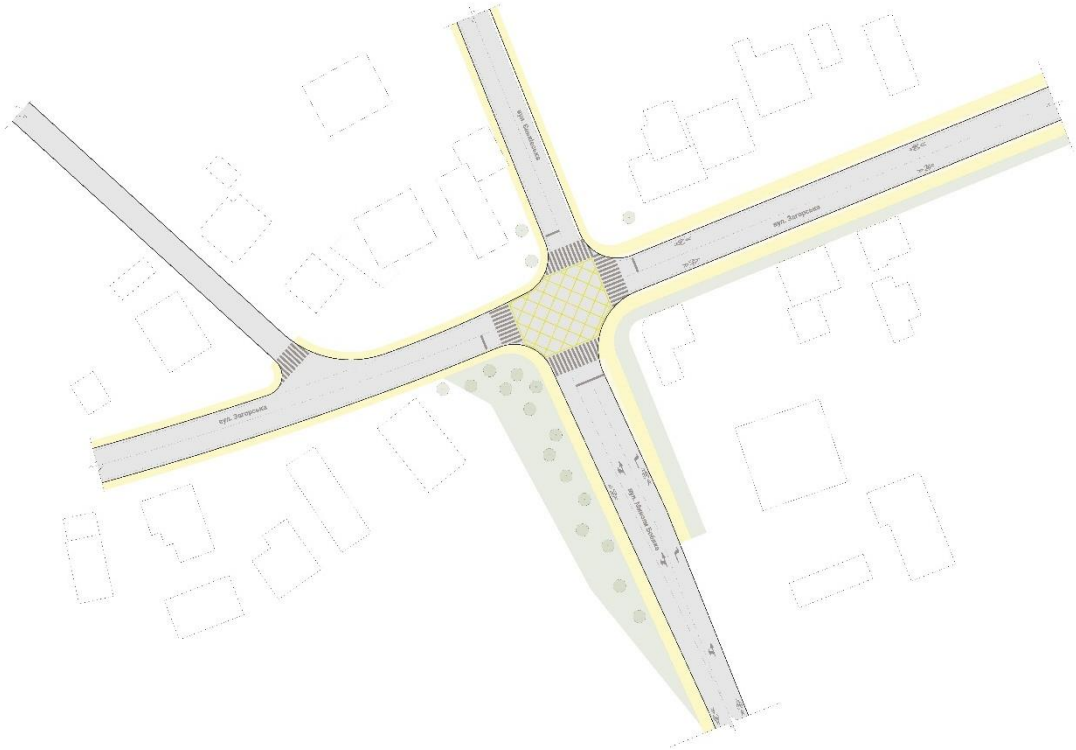
According to the terms of reference, draft projects of reconstructions with a scheme of organization have been developed traffic with the device of means of calming and sewerage of movement. Selected 5 (five) the most dangerous sections of the city's road network and areas subject to formation of plugs for which micro-modeling is performed.



Proposals for improving traffic light regulation and arrangement of new traffic light facilities have been provided:

Crossroads of Mykola Bobyak – Zagorska – Yenkivska streets

An adjustable intersection is arranged, which intersects from 4 directions of streets, each of which has 2 traffic lanes, 3.0 m wide and a reinforced lane 0.5 m wide. In the direction of Str. Mykola Bobyaka - Zahorska (right) and Zagorska - Mykola Bobyaka (left) has the highest volume of traffic. From the side of the street Mykola Bobiak's geometric parameters make it possible to arrange a channelized traffic lane, which will make it possible to unload the traffic flow.



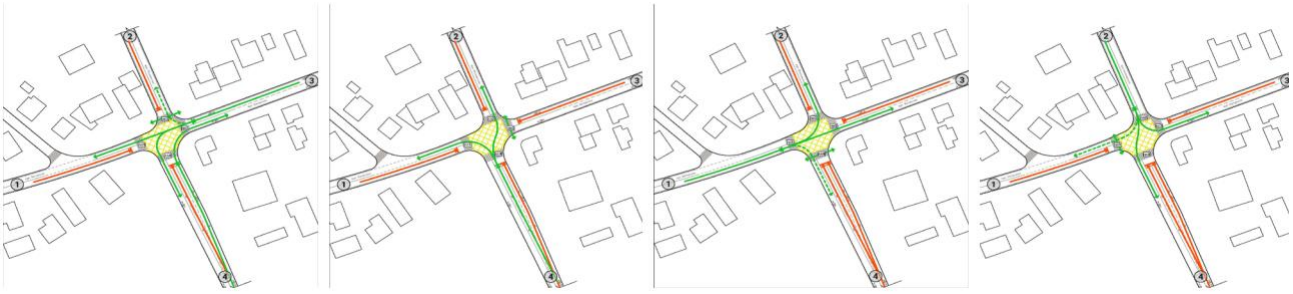
A pedestrian zone is also present, sidewalks within the site in compressed conditions are provided width 1.5-3.0 m. Technical areas of the sidewalk are provided with a width of 0.75-1.0 m, equipped with paved with pavement, it is proposed to restore in some places a zone with sowing of grasses and green plantations of trees.

Crossroads of Mykola Bobyak – Zagorska – Yenkivska streets

For conflict-free traffic of road users, a cyclogram of traffic flows from 4 phases has been developed.

Phased passing point:

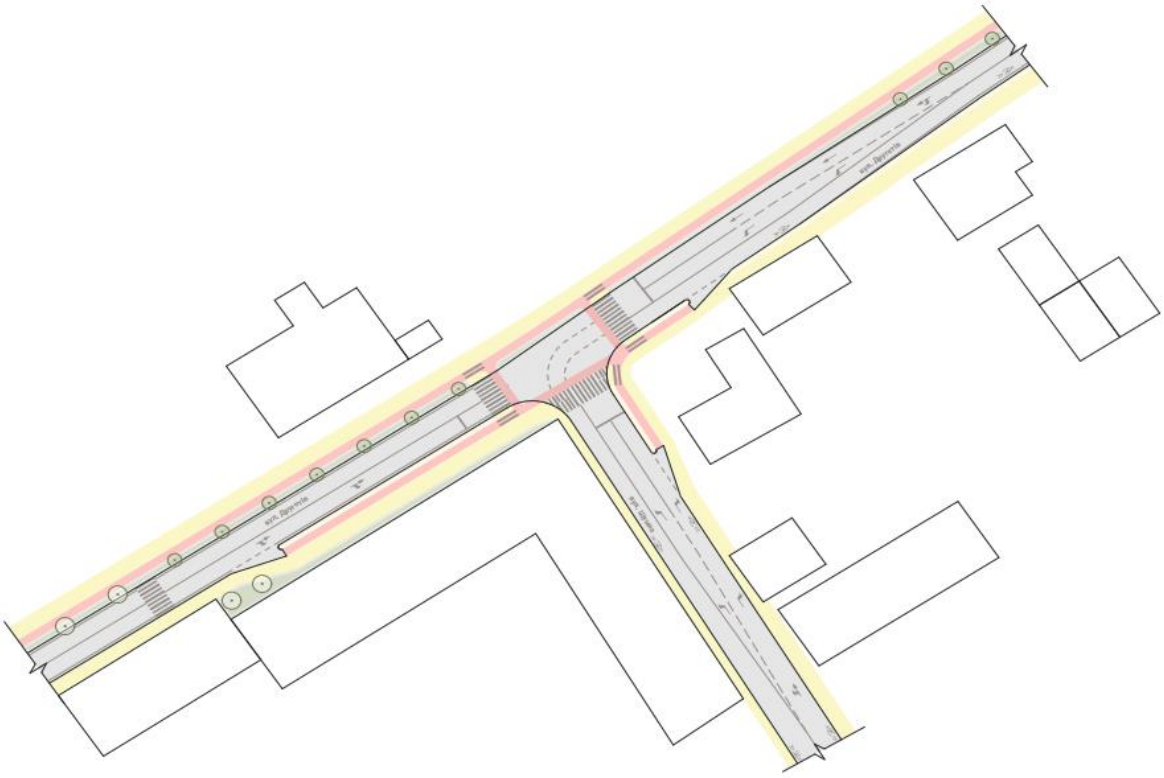
Phase 1 Phase 2 Phase 3 Phase 4



Traffic light object cyclogram:

Crossroads of Druhetiv - Shumna streets

An adjustable intersection is arranged, which is crossed by streets from 3 directions, each of which 2 traffic lanes each, 3.0 m wide and a reinforced lane 0.5 m wide. In the direction Str. Shumna – Druhetiv (right) and Druhetiv – Shumna (left) channelized traffic lane.



A bicycle path with bicycle crossings, wide, passes through the intersection 2.0 m. Pedestrian zone is also present, sidewalks within the site in compact conditions a width of 1.5 - 3.0 m is provided. Technical sidewalk areas are provided with a width of 0.75 - 1.0 m, equipped with a paved surface, it is also proposed to restore the area with by sowing herbs and green plantings of trees.

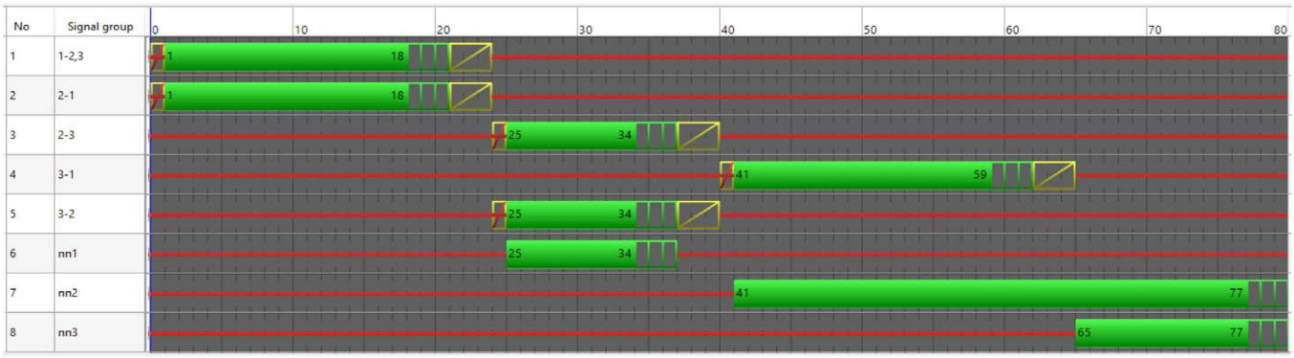
Crossroads of Druhetiv - Shumna streets

For conflict-free traffic of road users a cyclogram of traffic flows from 4 phases has been developed.

Phased passing point:

Phase 1 Phase 2 Phase 3 Phase 4

Traffic light object cyclogram:



Crossroads of Minayska Street - Cyril and Methodius Square

Traffic-controlled intersection with the installation of a traffic light object, which intersects with 4 direction streets. There are 4 traffic lanes on Cyril and Methodius Square, on the approach to the intersection has 2 channelized traffic lanes in each direction, the width of the traffic lane - 3.0 m and a reinforced lane with a width of 0.5 m. Minayska Street - 6 traffic lanes have been arranged, the width of each is 3.0 m. There is also a public transport stop in the pocket, the length of the stop platform is 45.0 m, and the width is 4.0 m. Along streets are arranged "pockets" for perpendicular parking of cars with allocated parking spaces for people with disabilities.

Shvabska Street – 2 traffic lanes, 3 m wide and a reinforced lane width - 0.5 m. A channelized traffic lane with a width of - 3.0 m.

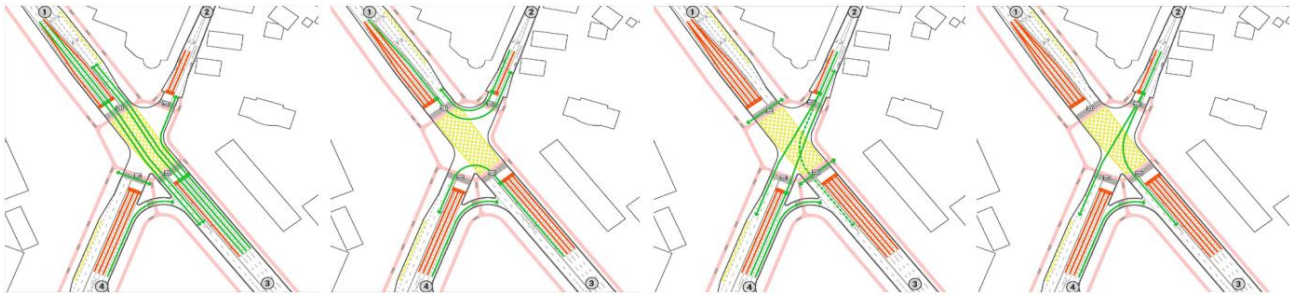
A bicycle lane in all directions with bicycle lanes passes through the intersection crossings, 2.0 m wide. A pedestrian zone is also present, sidewalks within the site in in compact conditions, widths from 1.5 are provided. The technical areas of the sidewalk are provided by width0.75 - 2.0 m, equipped with a paved surface. Along Cyril and Methodius Square (from odd side) a pedestrian space is arranged, which runs from the street. Maria Zankovetska poz the historical monument of the city - the monument "Volunteers of Transcarpathia", equipped with wide sidewalks with a compositionally laid cobbled surface, with the arrangement of flower beds for green areas, fountains and street furniture. The total width is 24.0 m with a length of 280.0 m. News zones with green areas were restored and designed trees and bushes.

Crossroads of Minayska Street - Cyril and Methodius Square

For conflict-free traffic of road users a cyclogram of traffic flows from 4 phases has been developed.

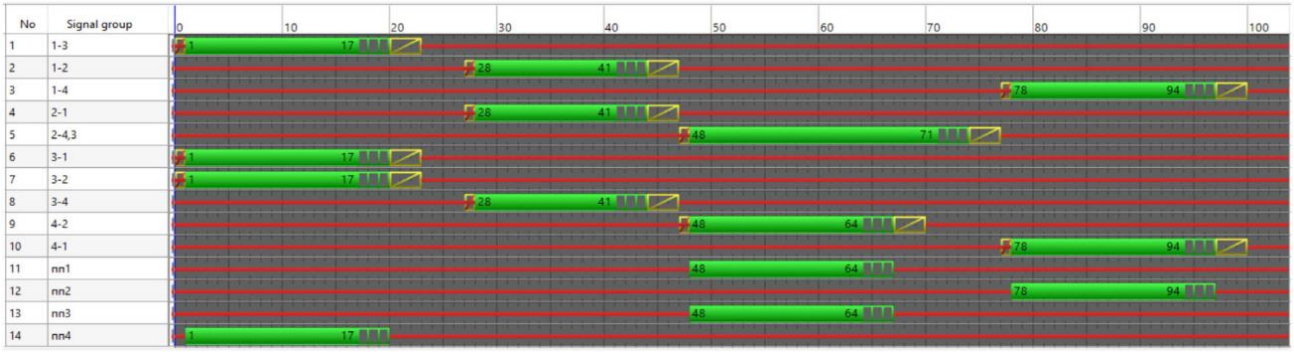
Phased passing point:

Phase 1 Phase 2 Phase 3a Phase 3b



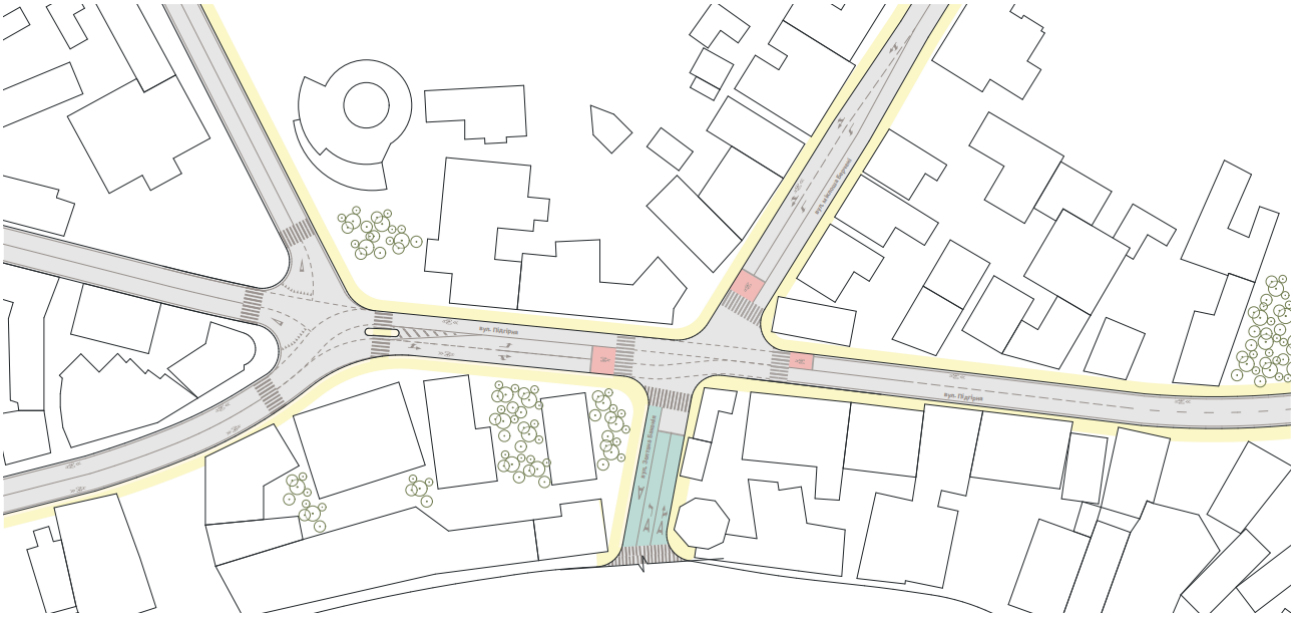
Phase 4

Traffic light object cyclogram:



Crossroads of streets Pidhirna - Miklosha Bercheny

Traffic-controlled intersection with a crossing traffic lightfrom 4 street directions. An additional left-turn lane is arranged on the western side. The width of each traffic lane is 3.0 m and the reinforced lane is 0.5 m wide. On the street Miklos Bercheny (from the North side) has 2 lanes and a left turn. Width of each traffic lane - 3.0 m and reinforced lane - 0.5 m.



Along the street Oleksandr Fedynets is arranged 3 lanes for public transport. Two lanes for exit to Pidhirna street and one lane for bus reception.

Within the intersection is also present bicycle traffic. Given that through unsatisfactory geometric parameters and dense development of streets on the project site, properly equip a bicycle shed infrastructure is not possible. Cyclists will move in joint traffic on carriageway of Str. Podhirna and Str. Miklosha Bercheny. To organize a safe departure bicycle and automobile transport means within the limits of the stop line and the pedestrian zone the transition is organized by "Bike Box" (The Bike Box is a safe area that is set up at intersections to reduce conflicts between by people riding bicycles and driving cars).

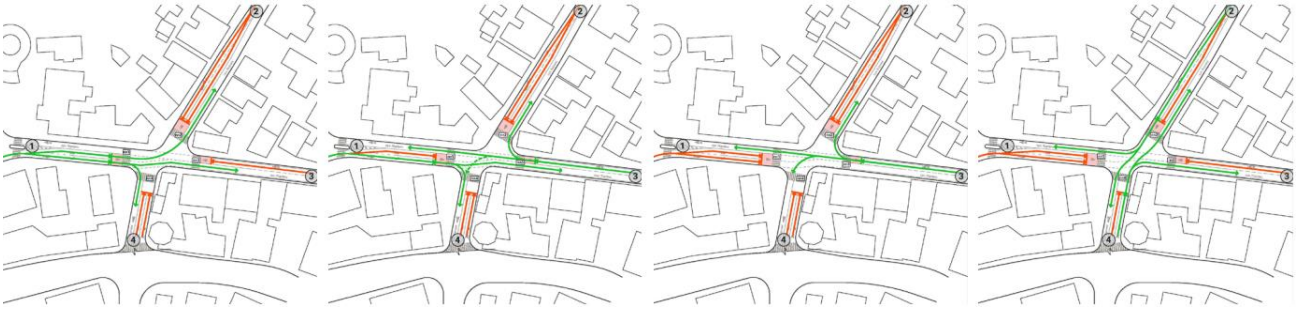
Sidewalks for pedestrian traffic within the site in compact conditions are provided with a width of 1.5 - 3.0 m. The technical areas of the sidewalk are provided with a width of 0.75 - 1.0 m and are equipped with paving stone coating.

Crossroads of streets Pidhirna - Miklosha Bercheny

For conflict-free movement of road users a cyclogram of traffic flows with 5 phases has been developed. The greatest intensity of traffic occurs along the str. Pidhirna.

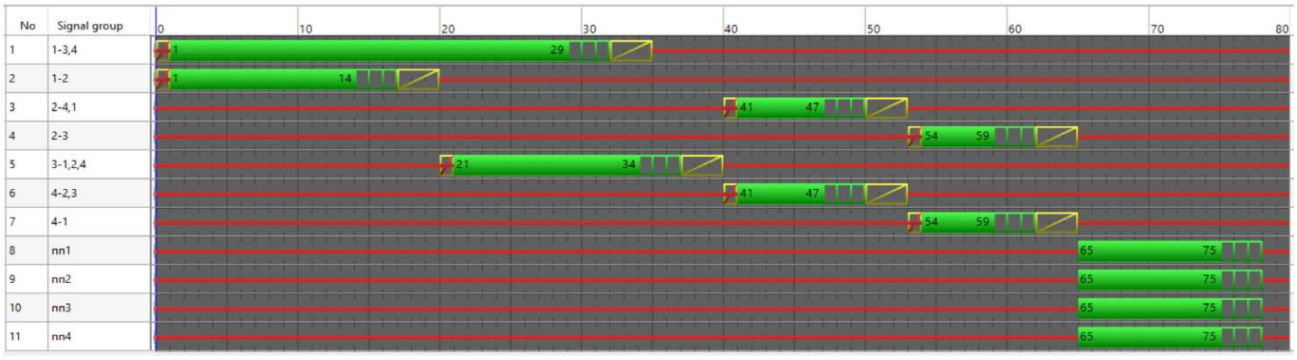
Phased passing point:

Phase 1 Phase 2a Phase 2b Phase 3



Phase 4 Phase 5

Traffic light object cyclogram:



Georgiy Kirpa Square

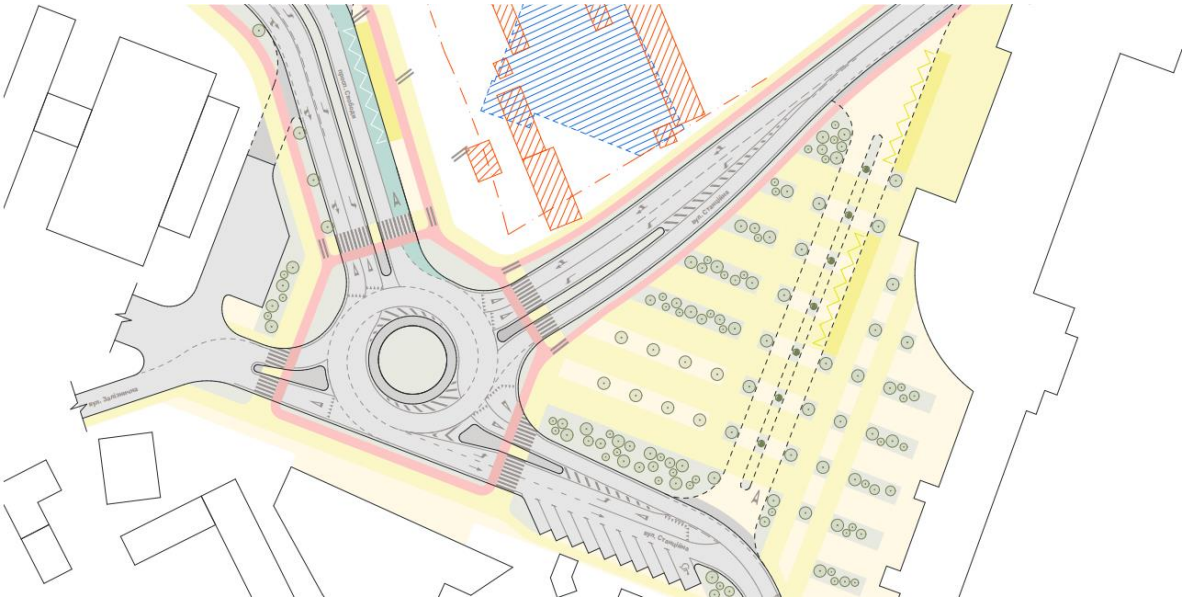
On this part of the design, a turbo ring is arranged (a type of roundabout with spiral traffic lanes) with two traffic lanes 4.0 m wide. This type of roundabout it is recommended to use it to reduce conflict points when rearranging the traffic lanes, improving traffic safety and increasing the speed of crossing the intersection. For safety of pedestrian traffic to the approach from each street to the roundabout pedestrian crossings equipped with guide islands. The roundabout contains 4 adjacent streets.

Svobody Avenue. The geometric parameters of the avenue allow for the arrangement of 4 traffic lanes, 2 of which are traffic lanes for public transport (PT). The width of the traffic lane is 3.0 m. The width of the traffic lane for PT is 3.5 m, the width of the reinforced lane is 0.5 m, there is a dividing lane along the axis, the width at the curb is 2.0 m.

Stantsiyna Street. From the North direction, 2 traffic lanes with a width of 3.0 m and a reinforced lane width of 0.5 m have been arranged to the roundabout. A channelized left-turn lane has been arranged at the approach to the roundabout. There are 2 traffic lanes from the South to the roundabout, 3.0 m wide and 0.5 m wide reinforced lane. There is also an entrance to the railway station for public transport and taxis. There is also a pocket for diagonal parking for 9 places and 1 place for people with disabilities.

Zaliznychna Street. There is 1 traffic lane, the width of which is 5.0 m. The entrance to the bus station takes this street.

Bicycle traffic is also present within the design area. The roundabout is equipped with bicycle paths and bicycle crossings 2.0 m wide. Sidewalks 2.25 - 3.5 m wide are arranged for pedestrian traffic. In order to prioritize and improve pedestrian traffic conditions on the territory of the station square, the level of the carriageway is arranged at one level with a pedestrian zone. The transport interchange and the entire territory is equipped wide sidewalks with a composite paved surface, with the arrangement of flower beds for green spaces and outdoor furniture.



4.7 Measures of balanced use of street area

Within the framework of the development of the plan for sustainable urban mobility of the city of Uzhhorod, measures of balanced use of street space by various traffic participants are proposed as an example of the demonstration corridor agreed with the customer, located in the historical part of the city, namely: str. Volodymyr Goshovsky - str. Oleksandr Dovzhenka - Koryatovych Square - str. Oleksandr Fedynets.

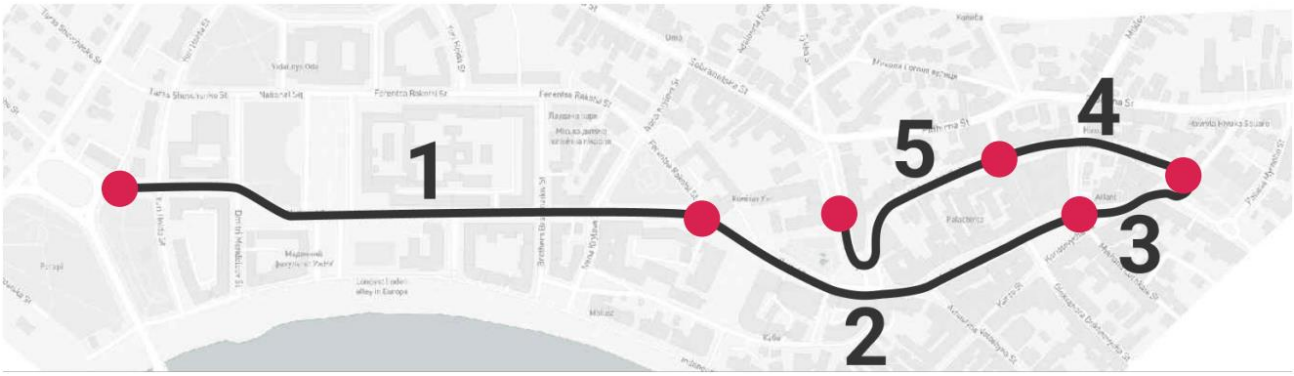
Str. Oleksandr Dovzhenka

Koryatovych Square

In the central part of the city of Uzhhorod, despite the critical situation today, there are all the necessary resources for safe, comfortable and efficient movement citizens. The historical center of the city should become the area of effect of traffic restrictions up to 30 km/h for all motorized vehicles. The plan of sustainable urban mobility also envisages the gradual expansion of the pedestrian zone on the streets of the central part of the city. It is proposed to limit the movement of cars on the str. Nebesna Sotnya, the southern part of People's Square. On part of Koryatovych Square and Oleksandr Fedynets Street, a multi-modal pedestrian space with only public transport is provided.

Road traffic organization scheme in the central part of the city

Part of the demonstration corridor along the str. Volodymyr Goshovsky - str. Alexandra Dovzhenka - square Koryatovycha is called to perform the main transport load in this historical part of Uzhhorod. The movement of cars and public transport will be from west to east. Corridor along the street Ferenza Rakotsi - People's Square. - str. Taras Shevchenko - one-way movement of private transport in the opposite direction. The organization of traffic on all other streets in the project perimeter of the central part of the city will be carried out according to the "loop" principle with one-way entry and exit with the possibility of leaving the car in the paid parking lot.



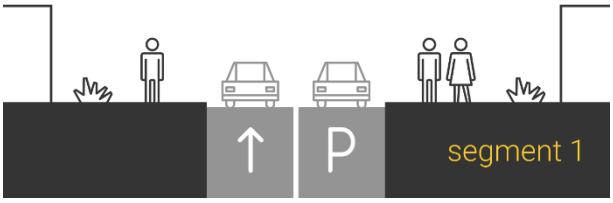
The scheme of division of the demonstration corridor into planning sections

The demonstration corridor, taking into account urban planning conditions and restrictions, traffic demand and load, can be divided into five consecutive segments, each of which is characterized by its special planning structure.

Segment 1

Crossroads str. Volodymyr Goshovsky - str. Yuriy Goyda and the intersection of Str. Oleksandr Dovzhenka - str. Ferenc Rakoczy

On this section, one-way traffic is arranged for private and public transport, the width of the carriageway is 5.0 m, of which the width of the traffic lane is 4.0 m and the width of the shoulders is 0.5 m. There are car parking spaces along the carriageway, width 2, 5 m, there are also parking spaces for people with disabilities with a width of 3.0 m.



Along the streets in the race pockets arranged new public transport stops, and geometric parameters have also been adjusted available stops, the width of the pockets is 3.0 m, stopping platform length is 25.0 m, and the width is 3.0 m. A pedestrian zone is also present, sidewalks within the site are provided with a width of 2.25-3.5 m. Technicals zones of the sidewalk are provided with a width of 0.75-1.0 m. It is also proposed in some places to arrange a zone with green plantations of trees and bushes 2.0 m wide.

In order to give priority and improve the conditions of pedestrian movement towards the embankment, it will be necessary to raise the surface of the carriageway to the same level as the pedestrian sidewalk of the adjacent territories, namely: Yuriy Hoyda, Dmytro Medeleev, Yuliya Stavrovsky-Popradov streets (former Mayakovskoho Street). Also, in the same level with the sidewalks the junction of str. Ivan Krylov.

Segment 2

Crossroads str. Oleksandr Dovzhenka - str. Ferenc Rakotsi and the intersection of the square Koryatovych - str. Mykhailo Luchkai

The second segment is the main pedestrian promenade of the demonstration corridor. On this segment, one-way traffic is arranged for public transport (dedicated PT lane), which allows you to quickly and comfortably reach your destination. Private transport is prohibited here.

Along the right and left side of the lane public transport provided holes with planted trees and new stops public transport without arrivals pockets. Length of landing pad is 25.0 m, and the width is 3.0 m.

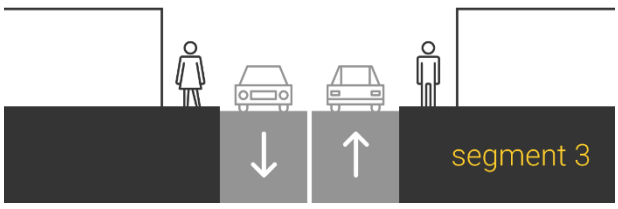
The connection of the street segment is a comfortable and barrier-free space for the movement of pedestrians, the surface of the carriageway is made in the same level with the pedestrian part, which makes it possible to arrange wide sidewalks with a compositionally laid paving. On this segment there are also recreation areas with street furniture, fountains and green spaces.

Segment 3

Crossroads square Koryatovycha - str. Mykhailo Luchkay and the intersection of the square Koryatovycha - str. Oleksandr Fedynets - str. Dmytro Vakarov

In this segment, it is proposed to arrange two-way movement of private and public vehicles. The total width of the carriageway is 7.0 m, of which the width of the lane is 3.0 m and the width of the shoulders is 0.5 m.

In order to ensure a safe crossing at the intersection of Koryatovych Square - Oleksandr Fedynets Street - Dmytro Vakarov Street, a roundabout has been arranged with the appropriate of the corresponding road markings and pedestrian crossings. The diameter of the ring is 12.0 m. At the same time also a flower bed is arranged in the center of the ring with green plantations, the diameter of which is 8.0 m. The width of the traffic lane is 6.0 m.



Sidewalks are arranged along the street and footpaths with a width of 2.5 to 3.0 m. There are also zones with organized landscaping at the same level as the pedestrian street part of At the junction of str. Zoltana Bakonia to Koryatovych Square is arranged "pocket" square.

Segment 4

Crossroads square Koryatovycha - str. Oleksandr Fedyntsia - str. Dmytro Vakarov and str. Oleksandr Fedynets, 25

The next segment of the demonstration corridor is a space with one-way transit traffic for public transport and taxis, which later returns to the street Miklosha Bercheny. The width of the traffic lane is 4.0 m. The surface of the carriageway is at the same level as the pedestrian zone. There is also a transport interchange in the "pocket" on this section. The width of the check-in "pocket" is 3.0 m, the length of the landing pad is 50.0 m, the width is 3.0 m. Nearby, near the Hotel "Nikol", there are three guest rooms parking spaces for stopping taxis.

The combination of a segment of streets is comfortable and barrier-free space for pedestrian traffic. The surface of the carriageway on the same level with the pedestrian part that makes it possible to arrange wide sidewalks with composite paved pavement.

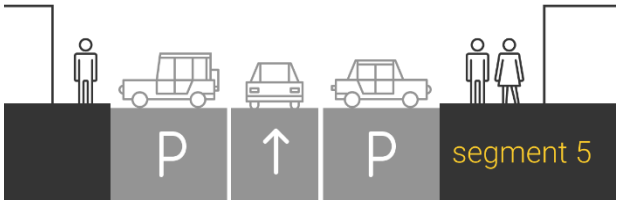
Recreational areas with outdoor furniture and green spaces are also arranged on the plot.

Segment 5

Str. Oleksandr Fedynets, 25 and the intersection of Str. Oleksandr Fedynets - str. Oleksandr Dovzhenka - sq. Zhupanatska

On this section, one-way traffic of vehicles is arranged, starting from Str. Oleksandr Fedynets, 23 to Zhupanatska Square. The width of the traffic lane is 4.0 m. The intersection of Str. Oleksandr Fedynets - str. Oleksandr Dovzhenka - sq. Zhupanatska projected as raised in one level. Str. Oleksandr Fedynets is equipped with parking spaces on both sides, of which 60 (6 parking spaces for people with disabilities) diagonal parking spaces.

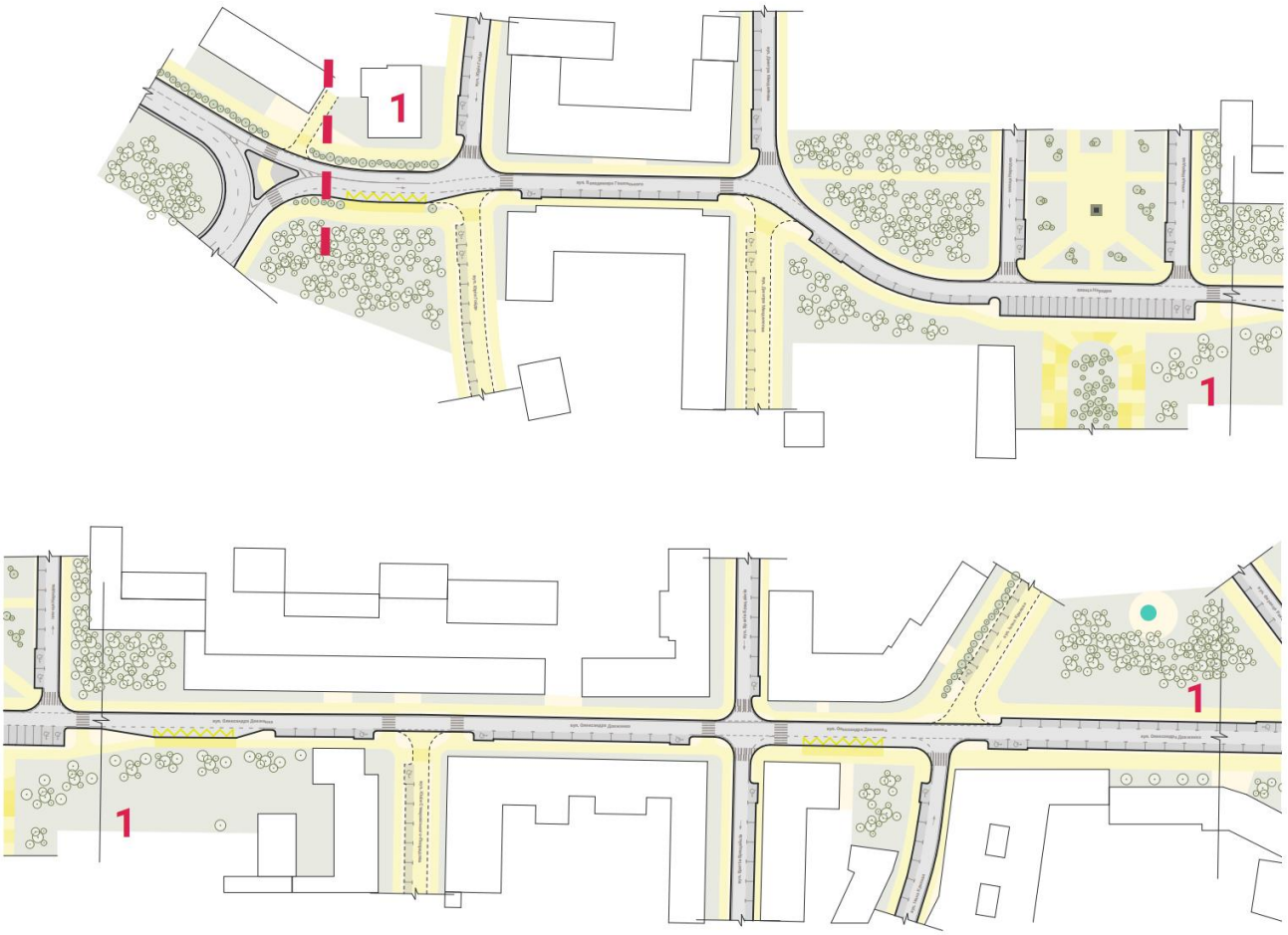
Zhupanatska Square accommodated 7 places parallel parking (within the site designing). Diagonal parking lots on the street Oleksandr Fedynets are divided between with flowerbeds with green plantings. The width of flowerbeds is 2.0 - 3.0 m.



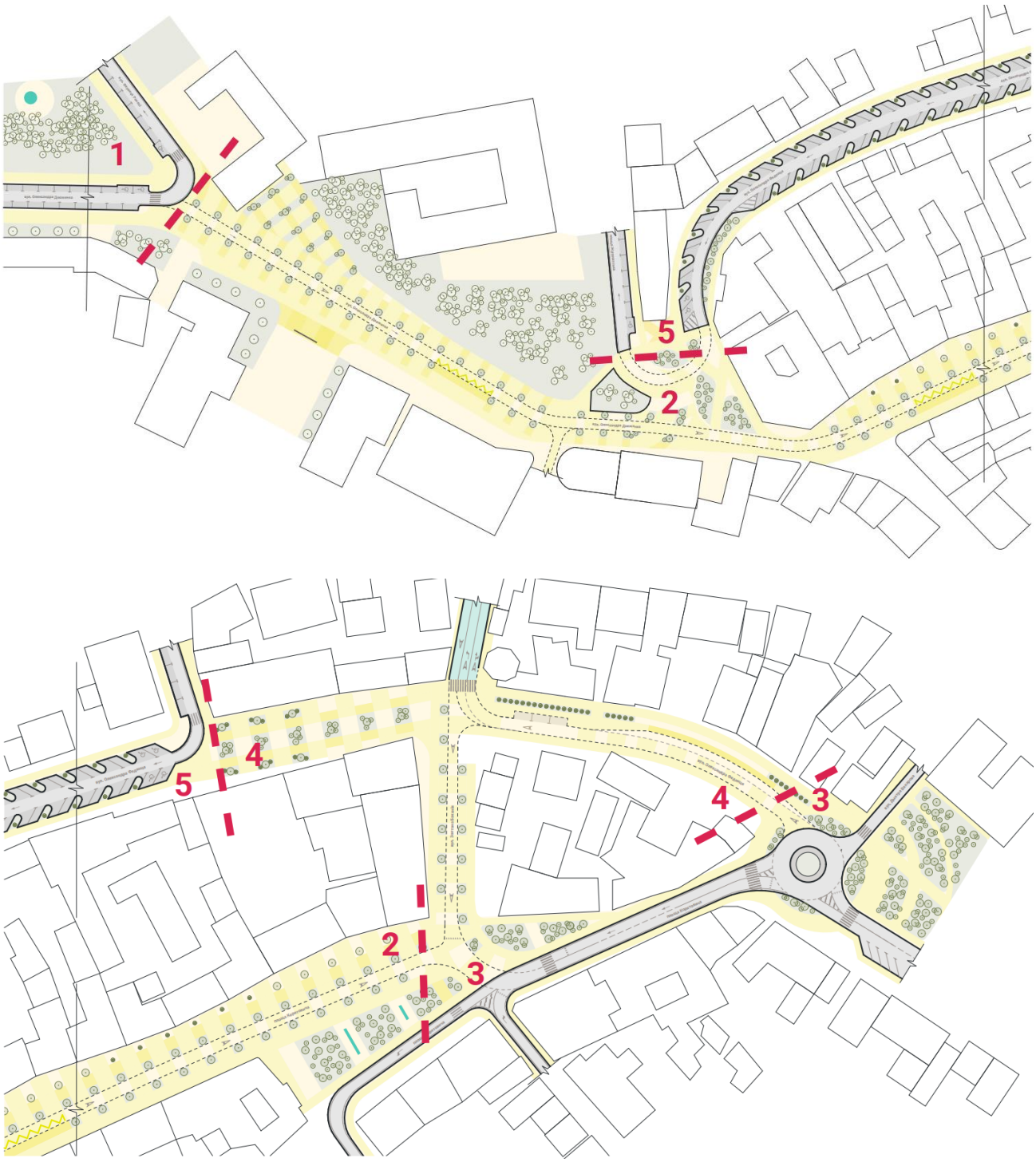
This entire section of the demonstration corridor is a prime example of how to optimize parking demand in the city center.

The pedestrian part of the streets in tight design conditions is equipped with sidewalks on both sides, 2.0 m wide. The intersection of Str. Oleksandr Fedynets - str. Oleksandr Dovzhenka - sq. Zhupanatska is designed in one level. On the street Oleksandr Fedynets, a pedestrian zone is equipped with wide sidewalks with a composite cobbled surface. There are also recreation areas with outdoor furniture and greenery.

Visualization of the demonstration corridor on segment No. 2



The scheme of the demonstration corridor on segment



The scheme of the demonstration corridor on segment

4.8 Monitoring system

Monitoring the implementation and operation of all measures related to pedestrian and bicycle mobility and the movement of private and public vehicles, monitoring of their results, compliance of projects with the principles of sustainable mobility, their adjustment, making proposals should be carried out thanks to the formed working group.

Such a structural unit should consist of representatives of existing institutions:
- the department of urban infrastructure;
- management of urban planning and architecture;
- communal enterprises, local activists;
- public organizations.

The composition of the working group and its status must be approved by the order of the mayor of Uzhhorod. The working group should actively communicate with city council departments and other interested parties. For more productive work, the working group should be divided into two divisions, in particular:
- Analytical;
- Sociological.

The analytical unit is designed to monitor implementation of measures from the plan of sustainable urban mobility, monitor their effectiveness and, if necessary, make corrections and proposals. This includes monitoring. Monitoring can be carried out using the so-called indicators, that is, the number or percentage of completed objects and their effectiveness.

The sociological unit should conduct surveys of city residents regarding their movement through the city, namely:

1. **On foot.** Availability and quality of pedestrian infrastructure, green corridors and public spaces, condition of sidewalks and reductions.
2. **By bicycle.** The condition of the bicycle network, the presence of markings, appropriate road signs and bicycle parking lots.
3. **By public transport.** Assessment of comfort, reliability, safety, clarity of the schedule, waiting time, the need to transfer, the time required to travel to a stop, the status of stops.
4. **By railway and suburban connections.** The condition of the bus fleet, the safety and comfort of movement, the number and regularity of flights, the amount of passenger transportation.
5. **By car.** The condition of the road surface, the feeling of safety on the road, the presence of traffic delays, accidents in areas, places where the speed limit is exceeded, parking. These data can also serve as a certain indicator of the effectiveness and efficiency of implemented measures.

The working group must regularly report on the results of its activities to higher management bodies. The report should include an analytical part and a presentation part with the presentation of individual activities and projects that have been completed or are still continuing. On the basis of such reports, appropriate reflections should be made:

- what steps were taken to implement the measures;
- when and why delays and changes occurred;
- what consequences can be observed;
- were there any discrepancies with the desired and expected result.

The monitoring process is a tool for obtaining objective feedback and showing whether the set goals have been achieved or not. Thus, it is possible to develop urban mobility step by step and make adjustments according to the requests and needs of local residents. Implementation of measures will be gradual and will not cause significant discomfort.

5.0 Annexes

Annex A. Glossary

Acceptance rate is the maximum number of vehicles, pedestrians or cyclists that can cross a cross-section of a traffic lane or intersection per unit of time.

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.

Alternative scenarios are changes that occur as a result of different choices of strategies and measures.

Disharmonious territory is a part of the territory that, by its spatial and compositional characteristics (excessive height, aggressive design), is incompatible with the surrounding area the existing environment or building and harms the visual perception of nearby objects.

Engagement is the process of identifying stakeholder groups and taking into account their interests, needs and values at the appropriate stages of the planning process.

Evaluation is a judgment of the completed project against the milestones and outcomes required at various points during the planning process or after implementation.

Green corridor - these are routes for slow walking and cycling mobility that have intense landscaping.

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.

Individual transport (IT) - motor vehicles of individuals, used by them only for their own needs.

Intercepting parking or intercepting parking lot - paid underground or surface Parking or a specially equipped area, located at the entrances to the city near major highways with good infrastructure transport interchanges 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.

Integrated approach - integration of practices and policies between transport modes, policy sectors, public and private agencies, authority levels and between neighboring authorities.

Integration - combining policy instruments so that they reinforce one another in meeting objectives.

Large-size transport (LST) is a vehicle with or without cargo, at least one of the overall parameters of which exceeds the permissible parameters established on the territory of Ukraine.

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.

Monitoring - an ongoing measurement of progress through the collection of new data and/or collation of existing data sources.

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.

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.

Preliminary evaluation - ex-ante (expectation). The process of evaluating how well a scheme or strategy will work. This can help make effective decisions between options.

Public space - public places in the city, open to all residents and intended for mass public use.

Public transport (PT) is a network of passenger transport that serves a wide area in general as opposed to private transport such as private cars or rental cars.

Road traffic organization (RTO) is a set of measures aimed at increasing the safety and comfort of all road users, and reducing the time of delays.

Rolling stock (RS) - units of road, railway, tram, trolleybus transport.

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.

Service radius (availability) – conditional normative distance from institutions and institutions of daily, periodic or episodic service to residential buildings or the territory of residential development of the settlement, which is established by urban planning documentation, taking into account pedestrian or transport accessibility.

Social equality – taking into account the needs of the entire community, including vulnerable groups of the population, such as children, the disabled, the elderly, low-income families, minorities, etc. Guarantees equal access to public services, accessibility and availability of mobility options. Develops an equitable labor market and facilitates employment through transport-related measures.

Stakeholder - any person, group or organization 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.)

Stakeholder participation – involvement of residents and stakeholders from the beginning and throughout the decision-making, implementation and evaluation process, building local capacity for performing complex tasks of planning and ensuring gender equality.

Street and road network (SRN) is a system of transport and pedestrian links between the elements of the planning structure of the city and parts of its territory, which is intended for organizing traffic and pedestrians, laying engineering communications and improvement.

Sustainable mobility - meets present generation mobility needs without compromising the future generation's ability to meet their own mobility needs.

Sustainable urban mobility plan (SUMP) is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It is based on existing planning practice and principles integration, participation and evaluation.

Tool - in the context of SUMP preparation, tools are a series of work practices or processes that can be utilised by planning authorities.

Transport accessibility – the possibility (potential and real) of reaching a certain place (point of space, part of the territory) by vehicles on the existing transport network.

Transport Model – representation of connections within the transport system (also related to land use); is widely used to predict the results of transport strategies.

Transport and transfer hub (TTH) is a nodal element of the planning structure of the city for transport and public purposes, in which passengers are transferred between different types of urban passenger and external transport or between different lines of the same type of transport, as well as passing passenger service by facilities social infrastructure.

Vulnerable road users are non-motorised road users, such as pedestrians and cyclists as well as motorcyclists and persons with disabilities or reduced mobility and orientation.

Annex B. List of streets through which main, secondary and recreational bicycle routes pass

Highway transport routes:

Check point "Vyšné Nemecké" – str. Sobranetska - str. Drugetiv - str. Domanynska	6,7 km
Str. Klymentina Timiryazeva - str. Miklosha Bercheny	2,0 km
Str. Shumna - str. Akademika Shpenik - str. Stantsiyna (to the railway station)	2,6 km
Str. Ukrayins′ka - str. Istvan Dendesi	2,5 km
Str. Budyteliv	0,3 km
Str. Lev Tolstoy - Sh. Petefi Square - Str. Mukachivska – Str. Carpathian Ukraine	6,2 km
Str. Shvabska - str. Minayska	4,7 km
Str. Maria Zankovetska	2,0 km
Str. Kapushanska	2,4 km
Str. Mykhailo Hrushevskyi	1,5 km
Str. Mykola Bobyaka - str. Tyvodar Legotskyi - str. Bereznya 8 - str. Olexandra Mozhaisky	3,7 km
Str. Zagorska - Vitaliya Postolaki square	2,4 km
Str. Ivan Franko - str. Mytna	1,8 km
Transport Bridge - Svoboda Avenue - Cyril and Methodius Square - Svoboda Avenue	2,2 km

Total 41 km

Additional transport routes:

Str. Oleksandr Hryboyedov - str. University – str. Koshyts′ka	3,0 km
Str. Oleg Koshovoy - str. Olga Kobylyanska - str. Antonina Dvorzhaka - str. Hranitna	2,8 km
Str. Oleksandr Blyst (to Ob'yizdna Str.)	0,6 km
Str. Korytnianska	3,7 km
Str. Stantsiyna (from the railway station) - str. Pavlo Chubynskyi	1,0 km
Str. Academician Korolev	0,7 km
Str. Fedir Dostoevsky	0,8 km
Str. Bereznya 8	1,3 km
Str. Oleksandr Bogomolets	0,9 km
Str. Zakarpatska (to the intersection with Zagorska Str.)	0,6 km
Str. Oleksandr Radyshchev	0,4 km

Recreational routes:

from the street Mykola Bobyaka - Park embankment - str. Zagorska - along the Uzh River to – Nezalezhnosti Embankment – Yevhen Fentsyk Square – Botanical Embankment – Pidzamkovyy park	5,1 km
Slavyanska embankment – Bozdoskyy Park – Slavyanska embankment – Kyivska embankment - Orthodox embankment	5,0 km

Prospective routes:

Str. Verkhovinska - str. Lozova - str. Korolenko - str. Solovina - str. North	3,4 km
Loop road E50 from Klyment Timiryazev to Str. Domaninskaya	1,5 km
Str. Ivan Silvaya (to the intersection with Ivan Fogarashiya Str.) - str. Ivan Fogarashiy - Str. Ilya Bodlakovich	1,1 km
Str. Ivan Kotlyarevskyi	0,8 km
Str. Andrii Palaia	1,8 km
Str. Danylo Halytskyi	0,3 km
Str. Oleksandr Blyst (from Obyizdna Str.)	0,7 km
Str. Bolgarska - str. Ivan Churgovych - str. Trudova - str. Yuriy Zhatkovych (to Str. of Carpathian Ukraine)	3,3 km
Str. Bolgarska - str. Shiroka (through the village of Minai) - str. Poleva - to Str. Tivodar Legotsky	2,3 km
Str. Zaliznychna - str. Dubova - str. Peter Hulak-Artemovskyi	1,2 km
Str. Vasyl Komendar	1,1 km
Str. Vasyl Surikov	0,5 km

Prospective directions:

North: the direction of the village Podlypniki and the direction of the city of Perechyn (the village of Domanyntsi, the village of Onokivtsi, etc.).

East: the direction of the village Tsyhanivtsi

South: the direction of the city of Mukachevo (the village of Barvinok, the village of Pidhorb, the village of Velyki Lazy, etc.), the direction of the village of Chaslivtsi (the village of Kinchesh, the village of Korytnyany, etc.) and the direction of the town of Chop (the village of Rozivka, the village of Kholmok, etc.).

West: the direction of the village Mali Selmentsi (Storoznytsia village, Tarnivtsi village, etc.).