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STREETSCAPE PLANNING METHODOLOGY AND DEVELOPMENT SCENARIOS. TERBATAS STREET EXAMPLE IN RIGA

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Abstract. The proportion of intensive building and pavement of the urban environment reduces the level of comfort of the population, thus, the streets are nowadays considered to be the essential public outdoor space, where it is necessary to increase the comfort and well-being of the population by reducing the transport load. Historic urban centres are often characterised by relatively narrow streets, without planting and with the intensive traffic, consequently, solutions need to be found to humanise these outdoor spaces. The publication provides the authors' experience in working with the planning of the preliminary research of Riga Terbatas Street and choosing a scenario method that is important for decision-making – because opportunities and options have to be evaluated according to the needs of the city residents and further development of the urban environment. The limited outdoor space of the street is a major challenge where it is necessary to realize both safety, environmental accessibility, ecological, aesthetic and cultural and historical ambitions and tasks. In the times of urban dynamism and variability, there is an important discussion with the public and non-governmental organisations: for this purpose, the scenario method allows some action plans to be evaluated and a decision to be taken for further design. The publication also contains a number of street planning principles to be used in the landscape architecture as validation for concepts and analytical summary of good practice examples. In the planning example, Terbatas Street in Riga has been chosen, which is one of the typical streets of historic centre of Riga, but with its charm and history. The research was carried out within the framework of the project for development of the initial technical documentation of the construction intention "The development of the public outdoor space and promotion of accessibility of Riga Centre and the neighbourhood of Brasa".
Keywords: streetscape planning, development scenarios, street landscape planning methodology

Introduction

In the urban daily rhythm, the street space has become not only a walking corridor, but also a cultural and social phenomenon that reflects the public interest, priorities and ability to adapt to changing conditions of urban environment, both economic and climatic. As a result, therefore, street design is currently a challenging process where both urban growth and the ability to adapt to societal demands, and citizen engagement, awareness of the importance of the street and the need to reduce transport load, and the ability to enter into an agreement on how to divide this narrow but so important part of the city. At such a point of view, the landscape of the city street justifies the holism of the landscape – comprehensive and inclusive – indeed, in the broadest sense. Similarly, the landscape is infinitely variable and diverse, it is mainly formed under the influence of socio-economic, political, technological, natural and cultural conditions. In each landscape, these impacting conditions are in particular interactions with each other, at different levels and at different times, acting with different force. Some of those circumstances could be primary to particular landscape, some – secondary, some could be as consequences, or vice versa, as the reason created as a result of the effects of other circumstances and their combination. Landscape changes not only by the impact of human exposure, it has its own internal variability. There are no two identical landscapes all over the earth, each is different in itself and in time and in perception cut [1; 10; 14;15]. Therefore, authors of the outdoor spaces of the city streets also perceive in this publication as a holistic phenomenon that is a dynamic and variable depending on times, perceptions and many other aspects,

The central part of the city historic centre is densely built and the size of the outdoor space per population is relatively small. It is no secret that the well-being of the population is an essential indicator of the growth and success of the city, where the outdoor space plays an essential role – the street is part of the outdoor space and most often one of the largest in the urban environment. Collaboration of citizens with city administration and planners, landscape architects and road engineers makes it possible to understand the city usage habits and partly predict city development scenarios – versatile and sometimes even controversial - it is a modern paradox where the outdoor space has been subjected to unprecedented high demands and expectations often based on the ideal vision of urban environment [6; 7; 18; 17].

Citizens' cooperation in urban planning is no longer newness or extra, it is a normal phenomenon that activates all interested parties – mainly users by understanding their experiences and daily habits. The formats of cooperation are so diverse – the most important thing is to realize the purpose with which we address the public – whether it is information, whether we want to understand their needs and the issues that need to be solved, whether the population is a part of a planning team that participates in the process not remotely, but is a full planning team. The involvement of modern technologies – such applications as GIS, in order to accurately attract problems to a particular place and to see trends and dynamics already cartographically [20; 28]. No less important are the position and recommendations of the ministry for promotion of population engagement, using the widest possible methods which allow to involve local communities and non-governmental organisations in a more creative way [2; 9; 17; 22].

Nowadays, more and more scientists, doctors and anthropologists talk about the necessity to interest people being outdoors – physical exercise, walking, social communication, mental health and contact with elements of nature in the urban environment are necessary – all these themes highlight the need for the contribution of landscape architects to urban planning – regaining more and more comfortable and green infrastructure – the streets play a key role here, as a large scale park, or even a small square, is not within reach for everyone every day, however the outdoor spaces of the street are our everyday landscape. Improvements made on the local landscape planning scale are essential to improve walkability. This new concept of planning focuses directly on inviting a modern person

outdoors, to go for walks. An important understanding – which invites citizens to take a pleasant and comfortable walk on the streets of the city – trees and shadows, rich planting, developed street infrastructure, quality of cover and developed micromobility [4].

Certainly, when designing the new streets, it is possible in advance to plan their spatial proportions, underground communication corridor and reserve space for planting – such planning practices are not complex and are easily responsive to better ideas for realization. A different, even opposite situation is the status of existing street spaces in the city historic centre – where the width of the street is constant, where are many entrances, existing underground communications and status of the cultural and historical heritage. However, the intensity of usage and interested parties are much more than the physical parameters of the street. These discussions about the reconstruction and arrangement of engineering communications are topical in all European cities, and it is also a painful issue for Riga City, which is related on the one hand to the financial burden, complex administrative and bureaucratic process – therefore the underground space of the city is one of the strongest obstacles in planning the outdoor space of the street. Urban underground is a serious resource which is needed for many urban services, including planting and rainwater infiltration, but a thick network of engineering communications blocks this resource, preventing its full usage – a kind of ecosystem service where underground resource is undervalued. This is also the principle of sustainability: how we use urban resources, how sensibly underground space has been used [3; 25;30].

Taking into account both the holistic phenomenon of the landscape and requirements of the quality of modern outdoor space, the purpose of the publication is to offer a planning method of the streets of historic centre based on a scenario assessment, analysing the most up-to-date information of each place and the needs of the interested parties, as well as the overall experience of best practice in urban environment planning.

Object and Methodology

In the planning example, Terbatas Street in Riga has been chosen. The research was carried out within the framework of the project for development of the initial technical documentation of the construction intention "The development of the public outdoor space and promotion of accessibility of Riga Centre and the neighbourhood of Brasa". This publication is the second part of the authors' urban environment street research and planning methodology. The first publication is dedicated specifically to the research process: it should be noted that the planning method described in this publication should not be carried out without the research part.

Terbatas street is in Riga Centre neighbourhood and it is a part of historic centre of city. Terbatas Street starts at the intersection of Brivibas Boulevard and Merkela Street and ends at Tallinas Street, with a total length of 1,790 metres. For the first time, Terbatas Street was mentioned in 1810 in the list of streets of Riga as an out town extension of the Kalku Street, which went further to Terbatas Highway. With the expansion of the city in 1861, Kalku Street was extended to Leger (Matisa) Street, in 1884 to Riepnieku (Tallinnas) Street. But already in 1885, Kalku Street was renamed to Terbatas Street. Later, in the early 20th century, most of the suburban wooden buildings along the street were demolished and replaced by multi-storey masonry buildings which have been preserved even today. Several national romanticism-style buildings stand out in street building. Nowadays, the street is the street of active centre of Riga with a relatively high intensity of pedestrians and traffic, the intensity of public transport is low, however the multifunctional usage is widespread – the first floors of buildings are occupied by shops, catering and service companies, while upstairs are located residential and office premises. The pavement of a driveway of the street is the historic granite paving stone, which is the cultural and historical heritage of the historic centre of Riga, while in the pedestrian zone is asphalt and concrete paving stone. The structure of the planting is small – only a few trees on the street section closer to Matisa Street. Some of the cross streets had already gone through the reconstruction – there are many public discussions about this and satisfaction levels vary. It should be noted that Terbatas Street also experienced an experiment becoming a pedestrian street for a short time during the summer, where active events took place – in general, this experiment was noted as positive and was supported by residents (Figure 1, 2).

The planning process has been preceded by a study (described in a separate authors' publication) during which

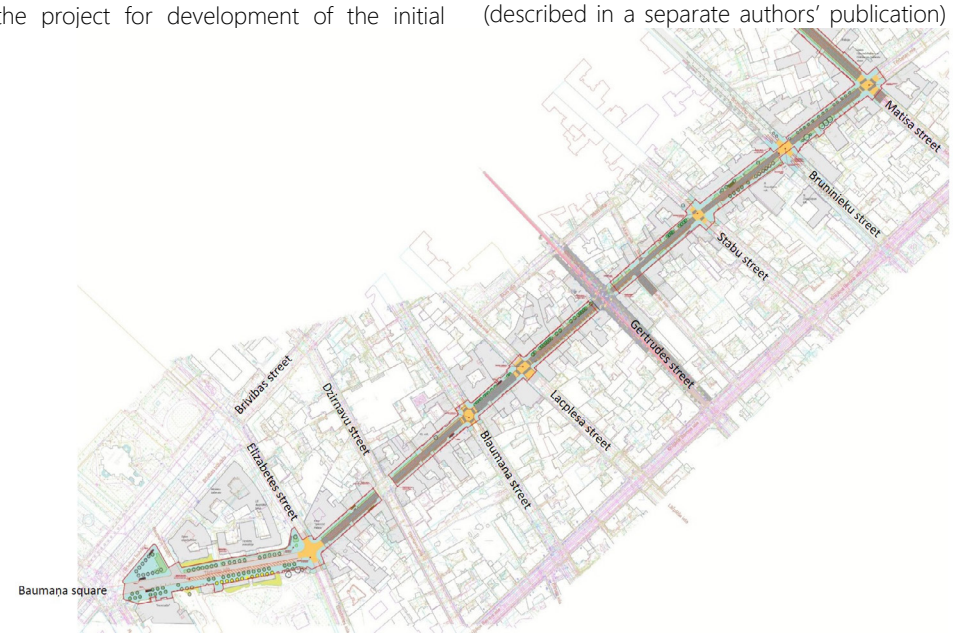

Fig. 1. The map of Terbatas Street [map by authors, 2023]

Fig. 2. Current situation of Terbatas Street [photos by authors, 2023]

the following aspects have been analysed:

- Study and evaluation of the current situation, related documents and projects;
- Study of the related development and planning documents and implementation options of their requirements and solutions;
- Development projects connected to the territory of the route, binding researches, concepts and guidelines;
- Evaluation of the spatial structure of the territory and the links between urban environment objects. Pedestrian and cyclist traffic directions and main attraction objects;
- Evaluation of the historical development and cultural-historical values of the public outdoor space and landscape of the route sections;
- Analysis of socio-economic factors;
- Analysis of technical aspects;
- Analysis of institutional and legal aspects;
- Analysis of environmental aspects.

A scenario method had been chosen to guide the planning process more successfully. During the process of the preliminary research a number of possible scenarios for the development of Terbatas Street have been defined, which have been discussed both in the working groups and with interested parties. The scenario method is the final phase of the project stage, which, after the involvement and discussions of the involved parties, as well as the discussions of the working group, leaves the decision-making to the experts. Therefore, the scenario method was used to avoid a subjective focus. Several scenarios were initially discussed with the involvement of interested parties and citizens, but no consensus was reached. To use the results of the scenario method in the planning process, each of the scenarios was analysed in relation to the requirements of the Riga planning documents, as well as to the quality criteria of modern public outdoor space. The scenario that meets the requirements in most cases also got the most points, but the detailed development and analysis of the scenario, and discussion, which are the next project processes, are also important. A number of aspects affecting the choice of the scenario should be mentioned here:

- Compliance with existing planning documents (planning of Riga historical Centre, development concept of cycle infrastructure, etc.);
- Provision of the current traffic intensity of the street;
- Options for street historical spatial structure preservation;
- Fulfilment of the conditions for preservation of the heritage of the historic centre of Riga (historic stone paving stone);
- The possibilities for micromobility and the provision of intensity of usage are developing more and more actively;
- Safety considerations (unsafe situations arise from the combination of pedestrian and micromobility movements);
- Opportunities for the development of public transport routes;
- Serving the business interests (activity and opportunities, interest in using the outdoor space of Terbatas Street as a potential business development area);
- Connection with the provision of adjoining street infrastructure through street micromobility (existing and planned situation).

It is important to note that reaching the scenarios is also related to the whole preliminary research process involving local government specialists and related local government service structures, representatives of non-governmental organisations, as well as a core working group consisting of landscape architects, road engineers, local government specialists from the development department. Involvement of residents and stakeholders through joint walks, discussing project proposals, and examining situations on site. In addition, meetings were also organized and informative materials were prepared, reviews and opinions were summarized.

A fragment of the plan has been prepared for each scenario according to the current situation and according to specified parameters, a cut that already spatially shows as well parameters for the street structure and each scenario is evaluated according to the mentioned above parameters.

Results and Discussions

During the planning process, the authors of the publication adhered very strictly to a number of concepts of good practice that allow the outdoor space of the street to be made comfortable and in line with modern needs.

Basic elements of urban environment green infrastructure are cores (large green areas) that form units around themselves, and corridors – which are basically streets with small green areas. Since sustainable urban environment green infrastructure is based on the functioning of the whole urban environment as a single organism, thus the role of corridors

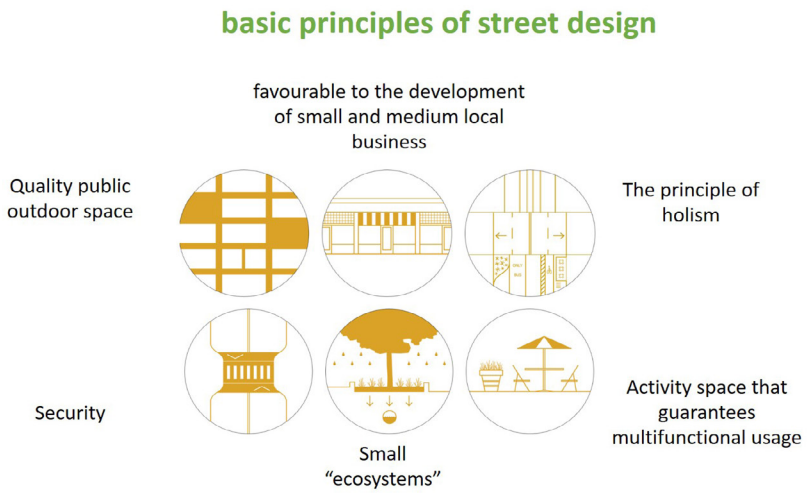

Fig. 3. Diagram image - Basic principles of Street Design [photos by authors, 2023]

is crucial. Therefore, the design of the outdoor spaces of a sustainable street stands out as one of the key issues for urban environment development. In the planning process, it is important to place emphasis on a safe, appropriate to human-scale environment that promotes more active staying outdoors and socialisation of people, the usage of the activities and services offered by a city or settlement. Together, it also contributes to economic prosperity and growth, the creation of a socially qualitative, responsible and based on shared communication and action community, which are relevant and important for Riga City. These findings have become important cornerstones in the planning of a modern urban space, highlighted by leading world urban planners who have worked on planning on such cities that today are valued as examples of good practice in sustainable cities (Copenhagen, Stockholm, Malme, etc.) [16].

City streets are an important part of the public outdoor space, fulfilling the linking function and the function of "green corridors." Therefore, the street as a public outdoor space faces a number of tasks:

- to ensure priority for accessibility of pedestrian and public transport environments;
- to ensure the development of green infrastructure;
- access to buildings and outdoor spaces for house management and first responding transport;
- streets provide daily routes for residents, making tranfer easier;
- the streets must have a wide range of functions: ecological, organisational, recreational, social and health-enhancing function [5].

The are the basis for outdoor space planning on streets (Figure 3):

- security issues play an important role in street design;
- street is a quality public outdoor space in the urban environment, fulfilling both the transfer and representative functions;
- outdoor spaces which are favourable to the development of small and medium local business – multifunctional possibility and infrastructure of outdoor space;
- streets are an activity space that guarantees multifunctional usage of the street outdoor space, linking it to businesses, residents and their common interests;
- streets should be formed as small "ecosystems" which are a part of urban green networking, promoting both urban biodiversity and reducing unfavourable conditions created by climate changes;
- the principle of holism – a set of elements has more value than the sum of individual elements – it is important in a single design approach [19].

The street outdoor space clearly defines its zoning, which at once is related to environmental accessibility and safety issues, therefore keeping with clear zoning is essential for planning the street outdoor space. On analysing the situation on Terbatas and Miera streets, it should be recognised that the existing street spatial structure is unable to meet optimally qualitative requirements for outdoor space, thus, alternatives to reducing transport load, such as sections of one-way and pedestrian streets, as well as reducing parking spaces, should be considered [21; 24].

Different technical parameters are also important for street outdoor space zoning:

- functional area of access to buildings – door opening area, steps, cellar windows, signs, pots with plant composites, etc. – minimum 0,5-0,7 m;
- transfer area – flat surface, comfortable, wide enough – optimum width of 3 m, as far as possible, the widest pedestrian zone shall be provided based on the flow rate;
- the street equipment and greenery area – outdoor furniture, parklets, bicycle racks, information and communication posts, advertisements, etc. – a minimum width of 1.5 m and an optimum of 2.5 m to 3 m;
- it should be noted that parking (parked) areas are part of the street space, but are included in the driveway.

The street outdoor space clearly defines its zoning, which at the same time is related to environmental accessibility and safety issues, therefore, keeping with clear zoning is essential for planning the street outdoor space. On analysing the current situation of Terbatas Street, it should be recognised that the existing spatial structure of streets is unable to meet optimally qualitive requirements for outdoor space, thus, alternatives to reducing transport load, such as sections of one-way and pedestrian streets, as well as reducing parking spaces, should be considered [21;24]. The type and quality of the pavement, as well as the pavement widths, slopes, guideline system – not only on pavements, but also at public transport stops – plays an important role in ensuring accessibility of the environment.

Planting is an integral part of the urban environment. While acknowledging the challenges of planning new planting in existing street outdoor spaces, at the same time, priority should be given to existing planting, assessing the possibilities of improving their growing conditions. The project proposals explore and plan options for expanding and diversifying green

areas around existing plantations, giving advantages for as far as feasible more continuous and larger-area vegetation structures that can survive better in urban environments. Narrow (1-1,5 m) planting areas penetrated between cover strips should be avoided: in fact, such narrow lanes are subject to overheating and due to the concreting of the edges of the pavements, the amount of fertile soil at the base of the pavement is much smaller than the planned vegetation area. According to the study, for the development of the thematic planning of the greenery structure and public outdoor spaces of the city of Riga, it is necessary to plan a multi-level greenery structure, planning not only trees, but also shrubs, perennials, ground cover plants and vertical greenery [23].

An important aspect is the alignment of the proportion of tree crowns with the architectural street value – not to significantly cover the culturally and historically valuable facades, but to plan the timber plants of compact crowns. It is no less important to regularly take care of crowns for existing trees, to design compact crowns for planned trees, according to the spatial structure of the street and the needs and growing conditions of each tree. Plantations plays an important role in street design. When thinking about sustainable development of the urban environment, street plantations are an essential element of the green structure of the outdoor space as they:

- perform the function of "green corridors" in the context of the common concept of urban environment planting;
- suspend flue gases and dust, reduce the noise from transport;
- create a pleasant and safe environment for pedestrians, cyclists and motorists, as well as shade on sunny days and in the heat;
- separate the pedestrian lane from residential houses and transport traffic;
- improve the urban landscape with human-scale planting elements;
- the possibility to plan integrated rainwater systems [7; 26].

Based on the concept of development of cycling traffic of Riga, it is important to respect and develop the common network. **Cycling traffic** can be an essential part of an efficient, sustainable and healthy lifestyle-oriented transport system. The historic stone cobblestone must be preserved in the zone of the historic centre of Riga; thus, it would be possible to go by bicycle along the driveway by creating the recommended cycling lanes (1 m wide), making it from an equivalent stone cobblestone, which is not visually, spatially and qualitatively different from the existing paving, but with the smooth surface. Paving bending machine should be used to reduce roughness. Similar solutions have been used in the old City of Copenhagen, Denmark (the recommended cycling lanes) and in the old City of Tartu, Estonia (cycling and pedestrian crossing).

Scenarios and their evaluation: three scenarios have been prepared, with corresponding drawings and sections, and their evaluation has been given (Table 1).

Scenario Nr. 1 (Figure 4) – One-way street with a preserved historic cobblestone pavement at full width, using part of the street for short-term equipment. Cycling infrastructure is not to be developed according to the concept of cycling infrastructure. Priority is given to pedestrian infrastructure.

Scenario Nr. 2 (Figure 5) – A one-way street with a preserved historic cobblestone pavement for one-way movement, allocating separately a two-way cycling lane. Pedestrian area is extended.

Scenario Nr. 3 (figure 6) – A two-way street with a preserved historic cobblestone pavement at full width, using the recommended cycling lanes and regulating the traffic speed (20 km/h). Pedestrian area is extended.

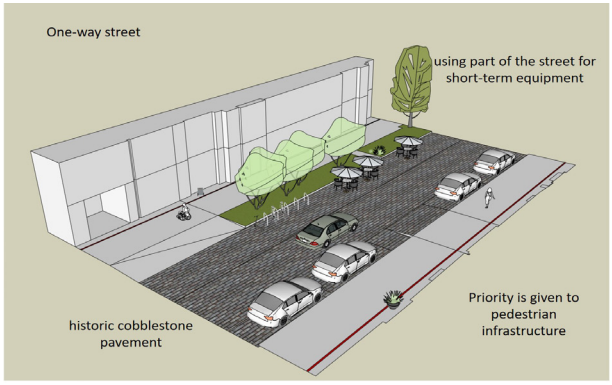

Fig. 4. Scenario Nr. 1 – 3D model [created by authors, 2023]

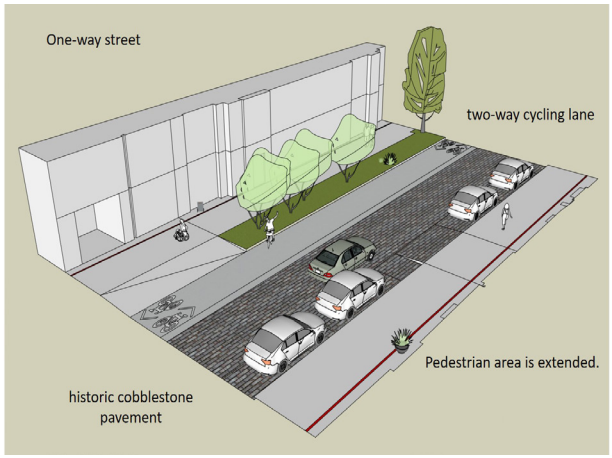

Fig. 5. Scenario Nr. 2 – 3D model [created by authors, 2023]

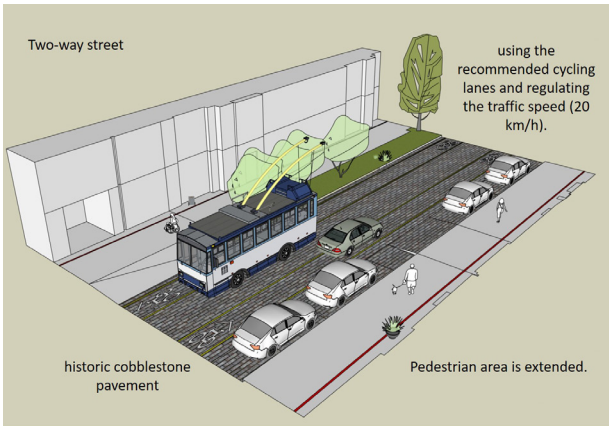

Fig. 6. Scenario Nr. 3 – 3D model [created by authors, 2023]

On assessing development scenarios according to a number of criteria the scenario Nr.3 is the most appropriate scenario. Working towards the goal of a "street with priority for pedestrians" set out in the Development and spatial planning of Terbatas Street, it is essential to resolve the organisation of transport traffic in the wider area (adjoining streets and routes) with the aim of limiting flows of passage traffics and reducing the role of the street for turning, including modelling of transport flows. The issue of the preservation or diversion of public transport, as well as the provision of micro-mobility infrastructure in adjoining streets will also be leading factors in the development of the street. At the same time, in both previous researches and strategic papers Terbatas Street is defined as a high pedestrian priority street, which is essential at future stages/projects of street development. All scenarios provide an opportunity for Terbatas Street to be used briefly, in short-term period, as a pedestrian street, being closed for events, but mostly adapted to it are scenarios Nr. 1 and Nr. 3.

Table 1. Evaluation of development scenarios [table created by authors]

No	Criteria / scenario	Scenario Nr. 1	Scenario Nr. 2	Scenario Nr. 3
1	Compliance with existing planning documents	M	MP	M
2	Provision of existing traffic intensity on the street	DM	M	M
3	Possibilities of preserving the historical spatial structure of the street	MP	MP	M
4	Increasingly developing opportunities for micromobility and the provision of intensity of usage	DM	M	MP
5	Provision of security considerations	MP	M	MP
6	Opportunities for the development of public transport routes	MP	MP	M
7	Securing the interests of business	M	MP	MP
8	Linking to the provision of adjacent street infrastructure	MP	M	M

*Keys – M – Meets, MP – Meets Partly, DM – Does Not Meet

Various methods and their combinations are used in the world today to study the outdoor space of the street - it all depends on the purpose and focus of the research. The analysis of street spaces is different - both to analyze the spatial structure and to analyze the behavior and well-being of pedestrians. We have also focused on research, especially in the city's historical centers. The most commonly used methods - space syntax analysis of metric urban street accessibility, subjective human perception and machine learning, surveys, document studies, and photo-documentation [8; 11; 12; 27; 29] Many researchers rely on map data and street view data [11; 12; 29], which, in turn, are replaced in our research with the exact topographical plan, inventory, as well as several surveys in nature and taking photos in real-time - so we use both the exact topographical data analysis and subjective human perception in our research when surveying the territories. From the method of space syntax analysis of metric urban street accessibility, we use such factors in our research as - safety, spatial structure development opportunities, and high-quality public outdoor space. On the other hand, we choose to replace surveys with face-to-face meetings with donors and representatives of interested parties directly in the street space, taking a walk together and discussing possible solutions, which are also chosen by other researchers [27].

Conclusions and Recommendations

The scenario method allows to assess possible directions for different development for one street, which is the basis for discussion for the development of the street outdoor space. The method allows both spatial (by precise parameters) and functional and aesthetic verification of urban planning proposals. It is essential to carry out preliminary research and identification of interested parties and to include a summary of all wishes in the scenario format. Without question safety issues certainly remain at first place, but a comfortable place to live for residents is key to urban viability - the reason people chose to live in a noisy and active downtown. The example of Terbatas Street is complicated with its cultural and historical heritage (the historic granite cobblestone), which is harder to reconcile with environmental accessibility issues and demands tolerant attitudes, and is one of the makers of the site identity. The scenario method is also applicable during the preliminary research of other existing street reconstruction projects – it also allows the municipality to discuss its vision and to prepare the task more precisely for technical projects already, where one of the scenarios can be unmistakably implemented.

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Kopsavilkums

Pilsētvides intensīvais apbūves un seguma īpatsvars mazina iedzīvotāju komforta līmeni, līdz ar to arī ielas mūsdienās ir uzskatāmas par būtisku publisko ārtelpu, kur nepieciešams palielināt iedzīvotāju komfortu un labsajūtu, mazinot transporta slodzi. Pilsētu vēsturiskie centri bieži ir ar samērā šaurām ielām, bez apstādījumiem un ar intensīvu transporta kustību – līdz ar to ir jāmeklē risinājumi šo ārtelpu humanizācijai. Publikācijā ir sniegta autoru pieredze, strādājot ar Tērbatas ielas Rīgā priekšizpētes plānošanu un izvēlotiesscenārijumetodi,kasirsvarīgalēmumupieņemšanai– jo iespējas un varianti ir izvērtējami atbilstoši pilsētas iedzīvotāju vajadzībām un pilsētvides tālākajiem attīstības plāniem. Ielas ierobežotā ārtelpa ir liels izaicinājums, kur nepieciešams realizēt gan drošības, gan vides pieejamības, gan ekoloģiskās, gan estētiskās, gan kultūrvēsturiskās ambīcijas un uzdevumus. Pilsētvides dinamiskumā un mainīguma laikmetā ir būtiska diskusija ar sabiedrību un nevalstiskajām organizācijām – šim nolūkam scenāriju metode ļauj izvērtēt dažādus rīcības plānus un pieņemt lēmumu tālākai projektēšanai. Publikācijā ir ietverti arī vairāki ielu plānošanas principi, kas izmantojami ainavu arhitektūras jomā, kā konceptu pamatojumi un labas prakses piemēru analītiskais apkopojums. Plānošanas piemērā ir izvēlēta Tērbatas iela Rīgā, kas ir viena to tipiskām ielām Rīgas vēsturiskajā centrā, bet ar savu šarmu un vēsturi. Pētījums veikts - būvniecības ieceres sākotnējās tehniskās dokumentācijas izstrāde projekta „Rīgas Centra un Brasas apkaimes publiskās ārtelpas attīstība un pieejamības veicināšana" ietvaros. Publikācija ir otrā daļa no autoru pilsētvides ielu izpētes un plānošanas metodoloģijas. Pirmā publikācija ir veltītā tieši izpētes procesam – jāatzīmē, ka plānošanas metode, kas aprakstīta šajā publikācijā, nav veicama bez izpētes daļas. Scenāriju metode ļauj izvērtēt dažādās attīstības iespējamos virzienus vienai ielas, kas ir pamats diskusijām ielas ārtelpas attīstībai. Metode ļauj gan telpiski (pēc precīziem parametriem), gan funkcionāli gan estētiski pārliecināties par pilsētplānošanas priekšlikumiem. Būtiski veikt priekšizpēti un iesaistīto pušu apzināšanu un ietvert visu vēlmju apkopojumu scenāriju formātā.