

## Organization of Open Public Territories in Cities with Difficult Terrain

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Moscow 1972 st. Gorky bus stop in front of the Cosmos cafe at 11.30 pm. A group of people are waiting for the bus. The young guy is outraged by the lack of transport. An elderly man with a hat explains that buses are not designed to serve passengers, but to serve the streets. The streets are not built for people, the guy objects. The elderly man answers - for the city. The guy is at a loss.

**Keywords:** urban architecture, open public spaces, difficult terrain, seismic, transport.

**Abstract.** The article discusses the organization of open public spaces in conditions of difficult terrain on the example of Yerevan city. An important factor is added here: the seismicity of the area, which makes the open public areas even more important. It is shown that the last thirty years has led to numerous phenomena: pollution, degradation of public spaces, a decrease in green spaces. To improve the situation, it is proposed to revise the existing transport network, to withdraw transit flows from the centers of residential areas, which will free up significant territories, provide townsmen with open spaces in order to create more comfortable conditions.

### Introduction

For the first time in the last seven thousand years, the population of cities has caught up with the rural population and continues to grow. The alarm of many scientists (biologists, geographers, physicians, etc.) predicting the future is natural (Fig. 1). The world has reached its point of bifurcation, the point of no return. "A bifurcation point is a state of a system, after passing which it can no longer return to its original state of equilibrium. After passing the bifurcation point, the system (population) has no chance to restore its numbers. It is known that shortly before the population passes the bifurcation point, it goes through a phase known as critical deceleration. In this phase, the system, as it were, loses its buffering capacity (the ability to adapt) - it begins to react strongly to the slightest changes in the surrounding parameters, for example, changes in temperature or humidity and new types of housing, vehicles" [1]. The world has reached the stage when man and human consciousness must change. The city as an artificial system is also approaching its bifurcation point. This also applies to the central zones of residential areas, where the most expressive public and residential ensembles, most government institutions, educational institutions, cultural, educational and entertainment facilities, sports, shopping and entertainment complexes are concentrated. "It is no longer enough to understand and evaluate, to conduct observations, but at the same time it is time to act - to restore what was lost. It is too early to talk about sustainable development. Still, people began to think about how natural conditions can help or, conversely, damage the development of cities. Sufficient experience has been accumulated, which requires comprehension and study, including in urban planning" [2].

"A common feature of almost all cities, regardless of their geography, economic viability and stage of development, is the lack of proper attention to the people who use urban space. The traditional functions of the city as a place of meeting and communication of citizens are degrading or disappearing" [3].

Experts from the UN Urban Program Habitat list several key elements of the development of comfortable cities: optimizing building density, improving the public transport system, encouraging

cycling, increasing pedestrian zones, resource efficient buildings, and smart and efficient urban management [4].

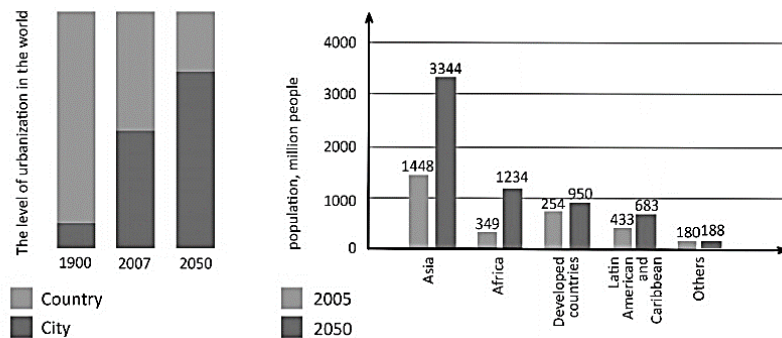


Fig. 1. The level of urbanization in the world

Still in the 19th-20th centuries architects began to sound the alarm about the undesirable changes in the urban environment due to the impact of technological advances. Currently, the interest of city planners and urbanists in public spaces is constantly growing. A growing number of different specialties are interested in this issue. To create systematized open public territories (OPT) - the territory of social communication and comfortable urban space, we need to look for more effective ways, techniques and principles of their creation. A well-organized OPT can contribute to the activation of social ties of city residents, improvement of the environment, organization of transport infrastructure and the comfort and safety of road traffic. The level of development of the system of open public space in cities determines the level of development of the entire urban infrastructure [5].

## Methodology

As a result of research, we can say that nowadays the most vulnerable problem for the largest cities is the transport problem [6]. The development of transport has led to the construction of new highways, which in turn has led to an increase in cars in cities. In this interconnected process, cars have taken all the vacant spaces in the city. They fill the sidewalks at night. Numerous options for restricting transport, such as the use of odd and even numbers on different days, adopted in Athens, the application of a tax on entry to London city center did not bring the expected results [7].

For Yerevan, along with many tasks inherent in the problems of urban development, such as transport problems, a low level of provision of green spaces, difficult terrain, another important factor is added - the seismicity of the territories. This, in turn, predetermines the increase in the importance of open spaces in the structure of the city. Firstly, as a necessary factor for areas with high seismicity (providing the necessary gaps between buildings to provide approaches to destroyed buildings in order to provide first aid), and secondly, as a place for people to communicate. "Good public spaces play a critical role in attracting investment, intensifying use and activities, providing security, increasing property values, generating municipal revenues; providing opportunities for economic interaction and expanding livelihood opportunities. An effective, connected network of public spaces has an impact on economic productivity by increasing the efficiency of the supply chain, reducing production costs, and increasing the mobility of goods and people. Public space provides important benefits for all forms of business, both formal and informal. In particular, in such public spaces where informal business can be conducted, invaluable livelihood opportunities are created for poor urban residents" [4].

## Results

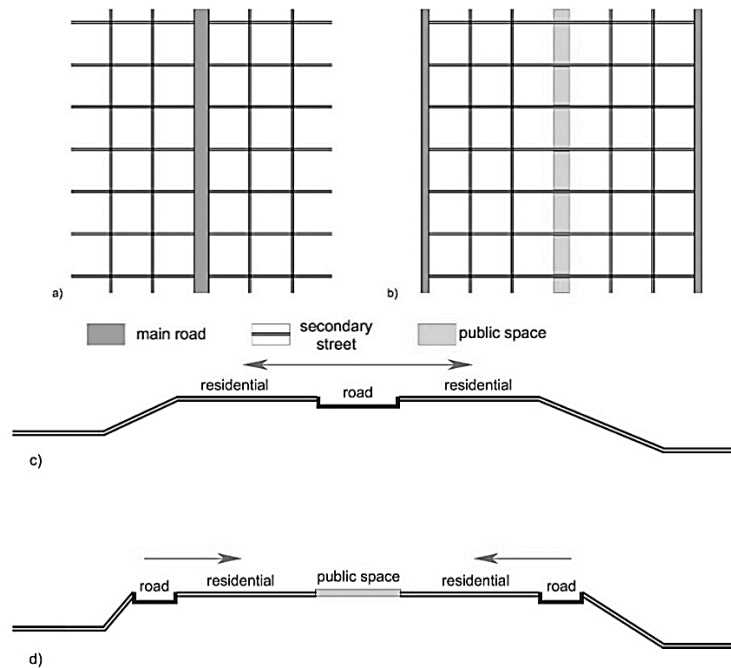
The specificity of the transport network, formed in conditions of difficult terrain, is the discrepancy between the length of the path and the speed of communication in different directions, large deviations in the density of the transport network in certain areas of the city. The main factor in improving

transport services for the population is not an increase in the speed of communication, but an increase in the capacity of street networks. If the northern part of the city (Arabkir plateau, Nor-Nork, Kanaker-Zeytun, Old Nork) is island formations in terms of terrain morphology, then the southern part has a relatively flat terrain. The center of Yerevan has a horseshoe shape and is the border of these zones. However, both parts have basically the same transport and planning structure, namely a rectangular network of streets with a pronounced central axis from which streets of district significance branch off in perpendicular directions (Fig. 2). If the main transport highways in the north would not pass along the center of the territories, but along the contour, then in the absence of cross-cutting highways, the speed of movement would increase several times. This would relieve the central parts of the districts and return the necessary functions to the streets (Fig. 3), "freeing pedestrians from isolation and separation, to revive the role of the street as an arena without regulated rules, as a meeting place with a diverse - spiritual, cultural, material attraction" [8].



Fig. 2. Island formations: Arabkir plateau, Nor-Nork, Kanaker-Zeytun, Old Nork

The UN Open Working Group, responsible for the development of the Sustainable Development Goals 2016-2030, has proposed as the 11th goal "building inclusive, safe, resilient and sustainable cities". One of the proposed goals is formulated as follows: "by 2030, ensure universal access to safe, inclusive and accessible, green and public spaces, especially for women and children, the elderly and people with disabilities.



**Fig. 3.** a) existing street network scheme, b) proposed street network scheme, c) section of a scheme, d) section of b scheme

## Conclusion

The expediency of transferring transport routes outside the center of residential areas in conditions of a difficult terrain has been revealed, this makes it possible to increase the number of OPT, which is a necessary factor in conditions of high seismicity and helps to improve the social activity of townsmen.

The larger the city, the more problems it has. Big cities, accumulating numerous human resources, talented specialists in various fields of science and art, financial opportunities, challenge the existing and emerging problems [3]. OPT organization issue is very urgent for Armenia, especially for Yerevan, as 1/3 of the population of Armenia lives here.

Many architects and sociologists' study in detail the effective transformations of OPTs. L. Lofland, D. Jacobs, K. Lynch and Y. Gail views OPTs as an integral part of urban life, where the life of the population takes place [9]. At the present stage of urban development, our task as city planners, is to turn the city to face the townsman.

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