Developing the architectural image of Irkutsk in the current circumstances

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Abstract. The features and common factors of developing the spatial environment of the city based on the peculiarities of the natural landscape and historical heritage are considered in the research. Constructing three-dimensional model of the landscape as an element in the hierarchical structure will make it possible to determine the typical features of the landscape. Making the landscape unique the features will help to determine its smallest module, which visual properties should be preserved. The generalized schematic diagram of the hierarchy of landscape spaces should become a tool when trying to develop and preserve the original image of Irkutsk.

In 2010 the Ministry of Culture of the Russian Federation approved the list of historical settlements in Russia where there are 43 residential areas. Irkutsk is one of the settlements on this list and it claims to be the capital of wooden architecture of Siberia [1]. Since it was founded, over 350 years ago, the area of Irkutsk has increased from 1.69 hectares (the area of Irkutsk Kremlin in 1669-1670 years) to 27.7 thousand hectares (the current state) [2]. The growth of the city and its population contribute to a significant "sophistication of the urban planning pattern and it changes the nature of the plan (it becomes more fragmented)" [3]. In Irkutsk it is possible to trace both extensive (centrifugal tendencies in the city development), and intensive (centripetal tendencies in the city development) periods of development of the city [4].

In modern conditions, the decomposition of the planning structure is essential within the issue of preserving the distinctive image of Irkutsk.

The cultural landscape of the city is the result of layering built structures of different time reference in the natural landscape. Since the XVII century Irkutsk has gone through several periods of evolution. They all are characterized by their unique spatial planning, architectural and artistic systems in urban planning, which reflect the main features in the development of basic principles of architectural Siberian culture. The architectural culture arises from the evolutionary process of developing the city with increasing built-up density of its historical part. On the one hand, the peculiarities are determined by the natural changes of architectural styles, while on the other hand, they are influenced by fluctuating construction activities in different periods. As a result, the urban development is characterized by its being inhomogeneous both in the context of spatial planning and architectural composition, as well as by the design elements. The elements of the urban historical fabric of Irkutsk were divided in two categories. The first category was comprised of regular buildings for housing and commercial purposes. They were a contrasting featureless background for the churches, monuments, buildings intended for public use and private structures. The second category consisted of some large buildings, churches, monuments and public use buildings. They were essential for structuring the city environment. The buildings referred to the second category had to be bigger and stand out from the buildings of the first category to make the city appearance impressive. Such a relationship between the buildings of the dif-
ifferent categories influenced their architectural-artistic grouping at the early stages of the city development. Mutual interaction of "monostructure", which included very tiny number of unique public use buildings, and spontaneous development of "polystructure" (residential buildings) provided architectural integrity of Irkutsk in the past. Religious architecture was popular "monostructure" in Irkutsk. Ecclesiastic buildings such as churches, being large and picturesque, contrasted with single-storey buildings and created a magnificent panorama of the city. The terrain being hilly contributed to locating the most impressive buildings on the hilly sites. In this context they were felt as architectural dominants. The analysis of locating high-altitude position buildings (churches, cathedrals) in relation to the terrain and the river showed (Figure 1) that there are 3 groups of dominants in Irkutsk.

1. The group of high-altitude position dominants of river orientation (built along the Angara River and Ushakovka River): Kharlampievsky Church, Roman Catholic Church, Church of the Saviour, Epiphany Cathedral, Znamenskii Convent, Kazansky Church, Church of the Transfiguration.

2. The group of high-altitude position dominants located on the terrace edge: Church of the Exaltation of the Holy Cross, Jerusalem Church.

3. The group of high-altitude position dominants located in the central part of river terrace of the Angara River. Lost pieces of religious architecture (Kazan Cathedral, Tikhvin Church, Annunciation Church).

The history of international urban planning proves that a skyline is built with a view to contrast vertical constructions and terraced buildings. The historical parameters allow explaining the objective laws in the ratio of high-altitude position elements and the level of terraced buildings. At the end of XIX century the architect Mertens claimed that the emphasis of the skyline depends on the ratio of the vertical constructions and the average height of buildings. He made the conclusion taking into consideration the fact that the contrast can be created through building vertical constructions against clearly visible horizontal landscape. He identified the optimum relationship of such vertical constructions (churches) to the overall level of buildings as 1:2, 1:3, 1:4 (where one unit is the height of the buildings that are located near the vertical structure). In Irkutsk the proportion of the height of Kharlampievsky Church to the residential buildings was the following: \( h : h_1 = 5m : 48,040 m = 1: 9,608. \)

This proportion between vertical dominants and residential buildings is closely related to the storey factor (the number of storeys in a building). A few cities in the world could have preserved their original appearance due to having implemented regulations for controlling the number of storeys in buildings. St.Petersburg is referred to such cities where building high-rise constructions in the centre could be authorized only providing the regulatory requirement (1766) "The Committee on the Stone Construction of St. Petersburg" that says that buildings of 10 sazhens high (old Russian measure of distance equal to 2.13 m) is allowed on the embankment of the Neva River.
Today, when large-scale housing construction is increasing and the centre of the city is being reconstructed, the problem of regulating the number of storeys is increasingly relevant. Especially within the process of revitalization of the city landscape it is necessary to restore without damaging its original appearance. It is highly recommended that monuments of architecture contributing to Irkutsk architectural image should be preserved. Building new high-rise constructions has to meet the need for combining with the historical architectural ensembles and monuments. The only way to preserve and develop the multifaceted image of the capital of Eastern Siberia is to take into consideration its historical architectural composition. There is a trend in Irkutsk to develop mid-rise buildings. But it changes the panorama of the city. According to Evreinov Y.N. the panorama of the city can be impressive under condition of its balancing with the natural environment since buildings have to be integral to the landscape and adapt to it. City space should improve the landscape when making it dynamic and expressive, or calm in terms of the urban planning situations. The analysis of the functional areas of Irkutsk shows that there is a disproportion in their structures. Theoretically, the proportion should be 1:2:3 [6]. A. G. Bolshakov believes that in order to achieve a balance of interests in developing the city centre, the new urban policy should be based on the natural relationship of values and morphotypes. The author analyses the restoration of the centre of Irkutsk emphasizing the high quality of organizing the space. He suggests that the balance of values and their proper distribution on the territory of the historical centre of the city should be based on the urban planning rules and regulations [7]. N. N. Baranov considers that configuration of the terrain and water surfaces - seas, lakes, rivers, channels and reservoirs as natural factors have a certain influence on the skyline of the city. The terrain being hilly contributed to locating the biggest and the most impressive buildings on the hilly sites (castles, cathedrals, palaces or monuments). In this context, they are felt as architectural dominant ensembles and it is the terrain that contributes to it [8].

It is necessary to choose an appropriate approach that will make it possible to find the landscape key as a spatial system that is structurally varied but unique to determine well-balanced compositional relationships between the buildings and the landscape in order to preserve the original appearance of Irkutsk. There are some issues to analyse here:

1. To identify the criteria for the three-dimensional (spatial) structure to be well-balanced.
2. To point out the properties that allow describing the territory as a three-dimensional structure.
3. To work out the typology of relationships between the elements of spatial structures of the city and the landscape.

4. To identify the criteria of the maximum permissible level of the relationships between the buildings and landscape.

5. To design the generalized schematic diagram of the hierarchy of landscape spaces as a tool to manage the development and preserve the original appearance of the city.

The issue of identifying and preserving the original architectural appearance of the city is related to evaluating its aesthetic qualities. So, there appears a question about the criteria for their evaluation. M. E. Weitens points out that under northern conditions there are two factors that make the original appearance of cities expressive and unique: nature and urbanization. There is one feature that is common for such cities as Murmansk, Kirovsk and Apatity. What unites them is the visual relationships between the city environment and the natural environment. Those cities where the relationships are provided by the urban planning pattern, which highlights the most picturesque spaces of natural surroundings, the urbanscape is notable for being the most expressive and original. Monchegorsk and northern part of Murmansk are referred to such cities. The architectural precedent of Murmansk proves that one of the possible directions to develop a distinctive appearance of a northern city is contrasting residential buildings, where wind-protective designing methods are employed, with the natural landscape. Clear functional zoning to locate the industrial port area and residential area in different levels had a positive impact on developing the urban environment of Murmansk. Its terraced spatial type allowed the observer to see clearly the terraces from top. Research of Leningrad Scientific Research Institute proved that there can be different modes of communication with the natural environment depending on the severity of climate. There are three types of the modes: closed, nominally open and open regimes [9]. Bolshakov A. G. points out the sustainable development of the landscape as a criterion of harmony for the architectural environment, as its being disturbed cannot be aesthetically appealing [10]. Irkutsk geologic environment has experienced radical changes during its three centuries development due to the increasing man-caused impact. Besides the geologic environment, there have been changes of other spheres, such as air pollution, which is facilitated by the terrain features of the territory [11], soils [12].

Since the city and natural spaces interact on a regular basis, they have to be considered and evaluated through one and the same criterion. Spatial structures of the landscape and the city can be taken as a criterion for such an evaluation. Y. Raninsky touches upon the consistency in developing the historical city and speaks for a special "ensemble of spaces". First and foremost, the city image depends on the type of relationships these spaces have. It can be spacious or cramped, open to light and air and, conversely, gloomy and closed. Its being picturesque and regular is primarily reflected in its spaces. People do not see the plan of the city. Spatial relationships are the first thing the observer perceives in the process of understanding and building a city image [13]. To find these relationships, it is necessary to generalize natural forms in their hierarchical structure. It will make it possible to understand the geometric patterns of constructing the spatial structure of the landscape, to show the structural diversity and unity of the natural environment and to quantify information about the physical parameters of the space. Furthermore, it will contribute to obtaining an objective basis for architectural and spatial composition. It provides the opportunity to use common graphic symbols to denote the forms of urban and natural spaces. Z. N. Yargina claims that the spatial structure of the landscape is always a certain sign of originality. Its allocation allows for a long-term potential assessment of the development of the urban fabric, while maintaining uniqueness in the appearance of the city. This is due to the fact that the urban fabric is developed to meet social requirements (sanitary and hygienic, socio-psychological, socio-demographic, socio-economic, socio-cultural). Constructive and technological needs evolve within the economic and social progress of society and are not so stable. The architectural planning stereotype of urban spaces and typical means of building make both different areas and even cities similar. The structural diversity of landscape spaces being unique due to their aesthetic characteristics creates a stable system of spatial orientation in time and can play an important role in the development of individual features in the architectural and artistic appearance of cities [14].
When remembering the history of urban planning and the history of urban development, we should not forget that in many cases cities were located on those lands that are now classified as being inconvenient. In order to be protected against enemies’ attacks steep slopes and hills of the landscape were used. Settlements in the bends of the rivers were founded to make it easy to move. Various natural anomalies of certain areas contribute to developing specific individual architectural appearance of urban environment. Natural factors, both favourable and unfavourable ones, affect the original appearance of the planning structure and architectural solutions of the building significantly [15].

Thus, looking for the elements of original architectural image of cities, it is important to start with the identification of the three-dimensional structure of the natural landscape. Selecting and building the hierarchy of the three-dimensional structure of the landscape gives the opportunity to identify distinctive features that make the landscape unique. The main feature is a hierarchical mosaic structure of spaces that certain landforms have. The generalized schematic diagram of the hierarchy of spaces can be one of the tools to monitor the development of high-rise focuses of the city. It shows that the right-bank territory of the city is located on four levels and the bank-side that faces the Angara River is steeper than the bank-side of the River Ushakovka. It is more dissected and rhythmical. The diagram allows creating a potential structure of high-rise dominants of the four levels. The vertically organized system could reflect a certain spatial structure of the landscape as the hierarchy line of religious buildings could show the situation in the historical part of the city at its initial stage of development.

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