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# Features Functional Planning Organization and Composition of the Coastal Territories of the Central Part of Novokuznetsk

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**Abstract.** A review of the current state of world practice in urban coastal development showed increasing interest in coastal zones as cities grew. Coastal areas are considered as contact areas of cultural (urbanized) and natural landscapes. The study identified the main urban planning problems related to the development of coastal territories, outlined the directions of effective use of the coastal zone of the center of the Siberian city of Novokuznetska. The article analyzes the evolutionary development of the planning structure of the city of Novokuznetska, noting the stages of its historical formation over two centuries. The requirements for the comfort of the city and the prospects for its further planning changed over time, and as a result, there was a need for urban planning reconstruction with appropriate changes to the earlier completed and approved draft master plans.

## 1. Introduction

The relevance of the work is to study the dynamics of modern processes of the functional planning organization of urban coastal territories, taking into account the study of their genesis, identifying the latest versions and trends in the creation of new architectural and planning elements of the urban environment, as important factors in shaping the image of the city in the architectural, artistic, historical aspect.

*The aim of the work* is to identify the features of the formation of the coastal territories of an industrial Siberian city as components of its spatial planning complex, the formation of principles for improving their composition with the maximum preservation of cultural and natural landscapes.

The object of study is the architectural and planning structure of the city.

The subject of the study is the features, principles of formation and development of the functional planning structure of the city with the solution of landscaping tasks.

*Research Objectives:*

- To analyze the features of urban development, identify the main problems of the formation and development of the planning structure of the city of Novokuznetsk;
- Based on the analysis of world urban planning concepts, develop the principles of functional planning organization of coastal territories;
- Perform testing of the concept in the project proposal for the construction of the city embankment of the Tom River in Novokuznetsk.



## 2. Theoretical part

The research methodology is based on the study of archival, cartographic materials, as well as domestic and foreign literary, scientific and design works, using the method of comparative analysis of the planning of the studied region according to development periods. The theoretical part of the research is based on the scientific works of V. Magel. "Novokuznetsk. The history of the creation of the master plan of the city: monograph" [1], Blaginykh EA "The architectural and urban culture of the Kemerovo region (XVII - the first half of the XX century): a monograph" [2], V. Grigorieva and Ogorodnikova I.A. "Problems of greening cities in the world, Russia, Siberia" [3], Tetior A.N. "Ecology of the built environment" [4], by Richard Registrar, "Ecocities: building cities in balance with nature" [5]. The chronological framework of the study covers the time period XX - beginning. XXI centuries

*Scientific novelty is:*

- in a comprehensive systematization and identification of urban development features of the architectural and planning structure of Novokuznetsk;
- in the development of principles for improving the processes of functional planning organization of urban coastal territories in the context of global trends in urban development;
- in the development of a scientific concept for arranging the embankment of the Tom River of the city of Novokuznetsk.

*Practical significance.*

The conclusions obtained in the study can be used as a basis for further scientific development, integrated into the research methodology of planning elements of the urban environment, in the domestic practice of environmental design and reconstruction. The results of the study can also be adapted into educational programs in the direction of Architecture in higher educational institutions.

## 3. Suggestions and research results

### 3.1. Features of the planning structure of the city of Novokuznetsk

Novokuznetsk - an important economic, transport and cultural center of Siberia, the first by area, as well as the oldest city of the Kemerovo region - is one of the largest metallurgical and coal mining centers in Russia.

Since its inception, the city of Novokuznetsk has been systematically growing and being built, in accordance with the developed urban planning documentation, taking into account its prospects and the solution of urban development problems facing it. Four periods of its modern formation can be distinguished. So, in 1929, a competition was announced for a planning project for a new city formation at a metallurgical plant, and various design groups developed projects for a comfortable living environment. The first project of Sotsgorod for Kuznetskstroy was completed by the chief architect of Frankfurt am Main, Ernst May.

In 1950, the "Draft master plan of the city of Stalin" was approved by architects B.E. Svetlichnogo and G.M. The blind. The town-planning formation of the developed functional and planning structure of the city and its five districts began: Kuibyshevsky, Yuzhny, Starokuznetsk, Zavodskaya, Baidaevesky. A three-beam scheme of the main highways in the development of the Central District was laid. This master plan, implemented taking into account all the territorial features of the city and the prospects for its further development, has become the defining modern planning structure of Novokuznetsk.

In 1979, the "Draft master plan of the city of Novokuznetsk for the period of its implementation until 2000" was approved. Authors of the project architects B.A. Foals, G.N. Tumanik and others. In these years, new districts Novoilinsky and Novobaydayevsky began to be built up. But the public center of the city and its functional planning structure continued their development without access to the main waterway - the Tom River.

In 2010, a new "Master Plan for the Urban District of Novokuznetsk" was approved, the authors architects O.E. Kazakevich, A.Yu. Belsky. As a result, the development of the city was forced to go in the direction of the territory located next to the floodplain of the Tom River, swampy and flooded by

flood waters. Mistakes were made in assessing the suitability of the territory, taking into account the prevailing wind direction, its flooding and the presence of minerals in the city. The most important unrecorded natural feature is that the wet territory of the river valley, surrounded by mountains on all sides, is poorly ventilated, and industrial emissions into the atmosphere accumulate in it.

Negative features of the urban development plan are noted: a decentralized planning structure of the city, residential quarters are located near industrial zones; their dispersed location stretches over 40 km along the bend of the Tom River; sleeping areas are far from the center; there are no comfortable embankments. Positive features of the planning structure of the city: historical radiation system of streets in the Central region; sufficiently large "green spaces" (including the laying of new alleys and squares).

### *3.2. Principles of functional planning organization of coastal territories*

When analyzing and systematizing the methodology, world practices of designing green and sustainable cities, the main components were noted:

- the use of renewable energy sources: wind generators, solar panels or biogas created from waste water;
- the creation of various agricultural structures, plots within the city (in the center or suburbs) in order to shorten the path of food products from the place of growth to the final consumer, which in turn will reduce financial costs and lower the cost of production;
- reducing the need for air conditioning - tree planting (shading) and color lighting of the surface, the installation of natural ventilation systems, an increase in water bodies and green spaces to a level of at least 20% of the city's area. These measures are also aimed at combating the "heat island effect" caused by the abundance of concrete and asphalt, which make urban areas several degrees warmer than the surrounding rural areas [6];
- improving the operation of public transport, increasing pedestrian zones, creating public spaces leading to a reduction in car emissions, in the future, the use of vehicles with zero emissions;
- Optimization of building density in order to make public transport more viable;
- reduction of urban sprawl, the search for new ways to maximize bring the place of residence of the population to the points of employment;
- green roofs;
- active home;
- sustainable urban drainage systems;
- energy-saving systems / devices;
- garden and landscape design with the preservation of clean water.

The listed components and some basic measures for the greening of the city [7, 8] form the basis of the concept, as they are universal and can be applied to almost any city, regardless of their geographical and political location.

The main problems of embankments in single-industry towns were identified:

- undeveloped pedestrian infrastructure due to the dominance in the urban environment of embankments as transport highways, in natural areas - the lack of a road transport network;
- lack of organized approaches or descents to the water;
- Difficult access to embankments due to rare pedestrian crossings or unorganized approaches;
- the uniformity of recreational and leisure opportunities;
- low level of comfort of recreation areas near the water, which is expressed in the lack of places for short-term rest, shelters from the weather, the absence of small architectural forms and public toilets.

Based on international experience in organizing modern embankments, the principles that should be considered when designing and reconstructing were identified:

- the convenience of functional relationships with external objects;
- rational functional organization of the embankment;
- creating conditions for the provision of popular services that satisfy all the needs of vacationers;

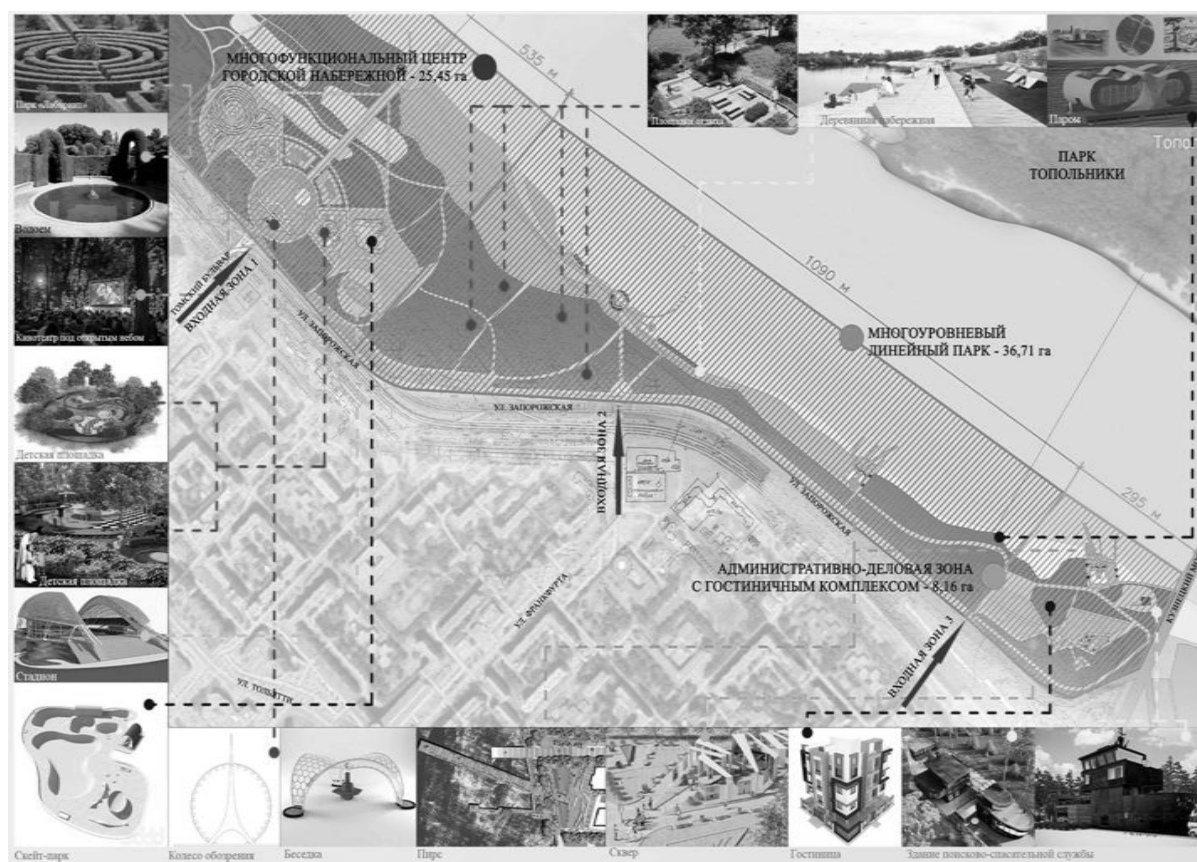
- multifunctional use of coastal space;
- Creation of a unified architectural ensemble of the embankment;
- a high level of landscaping and landscaping;
- The creation of an expressive panorama from the opposite shore;
- compositional integrity of the organization of the territory of the embankment;
- organization of convenient pedestrian connections;
- The removal of transit vehicles outside the embankment;
- separation of pedestrian and transport traffic on the territory of the embankment.

### 3.3. The concept of building a city embankment in Novokuznetsk

The design site is located in the Central District of Novokuznetsk. The relief of the site has a flat and partially hilly character, also includes a dam embankment. The Tom River, flowing through Novokuznetsk for about 40 kilometers, is no longer a mountain, but also not a flat river. The river is explosive, difficult to predict, which does not allow building classic embankments according to the type of Moscow or St. Petersburg. Only downstream - in Tomsk and Kemerovo, the Tom River becomes calmer and allows itself to be held in stone shores.

Therefore, a non-standard solution is required for the Tom River in the city of Novokuznetsk, taking into account its features and character, because the embankment significantly limits the channel.

As a result of the study, a concept was developed to equip the embankment of the Tom River in the center of Novokuznetsk, including: the introduction of the coastal space of the left bank of the river in urban fabric; providing it with high-quality well-being, diverse functional content for cultural recreation and entertainment; creation of pedestrian accessibility of these territories for residents of the district and city, for people with limited mobility.

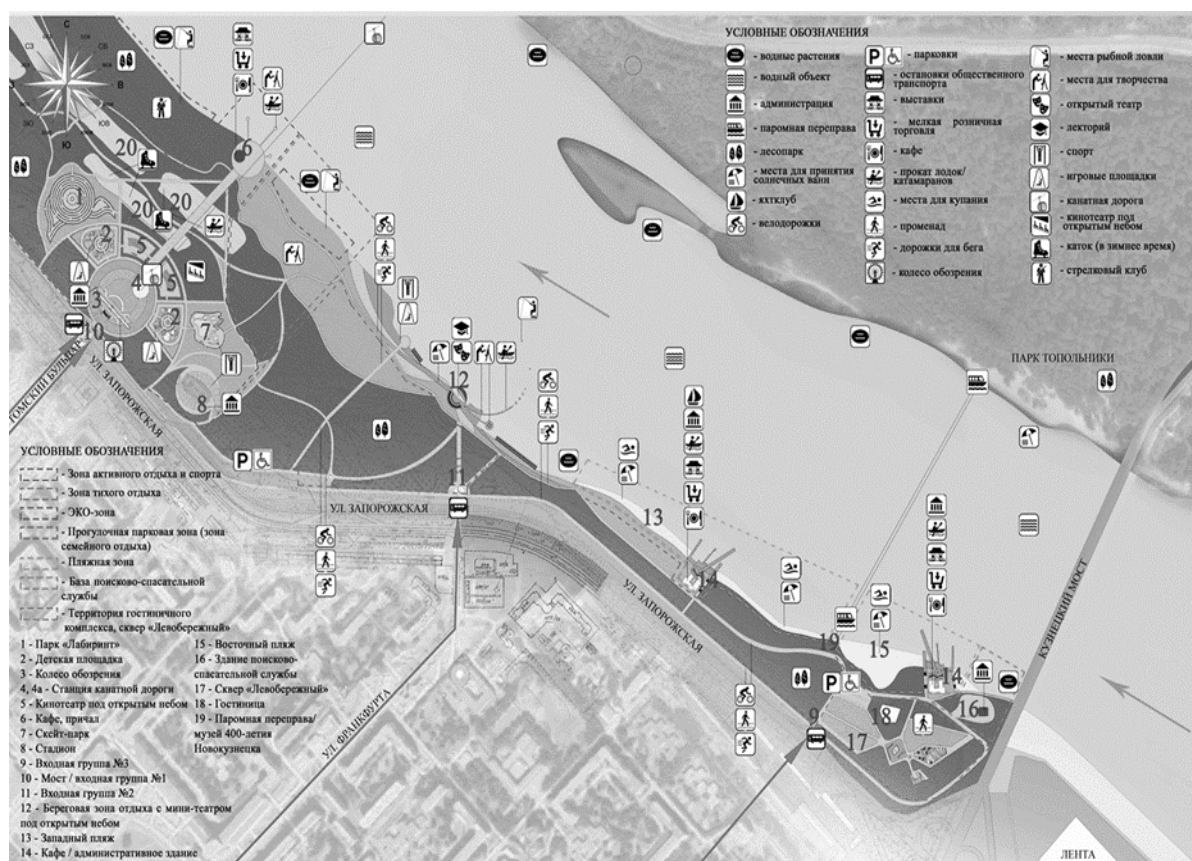


**Figure 1.** Macro zoning of the embankment territory is proposed.

Macro zoning of the embankment territory is proposed (Figure 1):

1. Administrative - business area with a hotel complex;
2. Beach and pedestrian walking area (bike paths, walking alleys with viewing platforms and a pier);
3. The zone of active recreation and sports - with sports and recreational, children's play and entertainment areas. The functional content of this part includes: outdoor playgrounds for children, a playground with outdoor sports simulators, a public and regional events venue with a theater stage and an open-air amphitheater, a summer cafe, and an open-air cinema. The difference in elevation of the natural topography was used when terracing the so-called beach area, planting it green, and arranging additional recreation areas (picnic, fishing, viewing platforms). It is also planned to place a cableway that will operate year-round.
4. The area is quiet and relaxing. The main theme of this part of the projected area is the creation of a recreational zone of the landscape park. It includes footpaths along the Tom River and parallel to Zaporizhzhya Street, a recreational area.

It is planned to place the administration, security, medical and rescue service in all micro-zones of the designed territory for the safe recreation of all residents.



**Figure 2.** Functional zoning and placement of infrastructure on the waterfront.

In the design part, work is expected in the following areas (Figure 2):

- arrangement of the embankment taking into account the compositional features of the historical city, the traditions of the organization of space associated with the geographical position, topography and planning structure;
- search for composite solutions providing visual communication and pedestrian access to the Tom River;



- development of functional zoning of the territory, taking into account the location of objects of sports infrastructure and social facilities attractive to residents of the city;
- arrangement of mini-platforms at viewpoints and at the intersection of pedestrian flows;
- ecological and aesthetic design of the coast, with the planting of trees and plants;
- improvement of iconic, communication zones along the embankment;
- development of routes along the embankment (transport, pedestrian, bicycle);
- Development of recreational beach complexes and infrastructure;
- organization of basic and decorative lighting, installation of benches, navigation elements, pavilions, public toilets;

Organization of a harmonious and large-scale space for people to relax residents and visitors of the city.

#### 4. Conclusion

The modern look of the city is changing in connection with the development of its architectural and planning structure, population growth, increasing needs of residents in cultural and social development, renovation of industrial territories and the creation of open spaces [9]. The study revealed the relationship and described the transformation of the functional, morphological, social and administrative structures of the planning elements of the urban environment, characteristic of the twentieth - early twenty-first century.

The article sets forth the principles for improving the processes of functional planning organization of urban coastal territories in the context of global trends in urban development [10,11,12]. The embankment in the central part of Novokuznetsk is designed in the form of open, well-maintained, landscaped spaces and a puddle. The entire territory of the coastal recreation area is a pedestrian zone with hard cover with the inclusion of landscaping, it is landscaped along the coastline of the Tom River.

The proposed concept is rational, can serve as a good example for the organization of embankments. The results of this work can be applied in urban planning when considering issues of coastal territories of the city of Novokuznetsk, as well as cities with similar climatic and urban conditions.

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