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URBAN PLANNING APPROACHES TO PLANNING THE BEAUTIFICATION SYSTEM OF RESIDENTIAL AREAS DURING THEIR RECONSTRUCTION

The analysis of planning experience of inhabited localities urban beautification in view of reconstruction was undertaken in the article. The question of Ukrainian experience of urban beautification system in accordance with approved standards and State Constructional Standards was envisaged. Analysis of validation state of local documents in urban beautification field was carried out and it has shown deficient percentage of regulatory documents approval on local level, which is one of key issues of urban beautification development. Furthermore, detailed analysis of foreign experience of urban beautification planning and development trend of this system in such countries, as USA, Canada, France, Singapore, Hong Kong, Japan was carried out. It is shown that first and critical stage of planning of effective urban beautification is preparing and approving corresponding certificates and standards. Emphasis added to functioning normative legal documents on issues relating to urban beautification, in accordance to which the territory reconstruction in mentioned countries is realized. It was established that reference direction of urban beautification development in mentioned countries lies in parking lots removing out of the borders of curtilage or underground parking arrangement, landscape gardening development and classification of such territories by levels of urban gardening, territory reconstruction in accordance with typical schemes of street infrastructure development, urban gardening, cycle paths, etc. It is shown that problem solution of habitable open grounds organization on city level resides in usage intensification of such territories, and on the level of residential compounds – in increasing exploitation properties of open grounds. As a result of undertaken analysis it was established that raised problem of increasing the effectiveness of residential area usage within residential areas imposes complex approach, including question of land development intensiveness, architectural and planning organization and open grounds beautification.

Keywords: urban beautification, urban development, reconstruction, landscaping and public amenities, urban gardening, landscape architecture, curtilage

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1. Introduction

Throughout the historical development of mankind, the socio-economic conditions of its existence have been inextricably linked to the improvement of the territory where they lived. People have tried to create favorable living conditions and to use the territory rationally. Landscaping has always created social and aesthetic comfort for residents.

In recent years, more and more attention has been paid to the state of the sphere of settlement amenities. This is due to the fact that the improvement of settlements is directly related to the life of the population and includes the maintenance of the territories of settlements in proper condition, their sanitary cleaning, preservation of public facilities, as well as natural landscapes, other natural complexes and objects, organization of proper maintenance and rational use of territories, buildings, engineering structures and objects of recreational, environmental, health, historical, cultural and other purposes, creation of conditions for the realization of rights by entities in this area [1].

The reconstruction of the territory has a significant impact on various elements of the improvement system, which include the subsystem of maintenance of the street and road network, the subsystem of outdoor lighting, the subsystem of landscaping, the subsystem of communal services, the subsystem of engineering protection of the territory, the subsystem of maintenance of adjacent territories. In this context, it becomes important to analyze the experience of planning the system of improvement of residential areas during their reconstruction, as well as the choice of the optimal method of territory reconstruction and its impact on the objects of the improvement system [20].

2. Urban beautification planning in Ukraine

The historical development of human settlements is closely related to the socio-economic conditions of development, especially of urban settlements. There is an inextricable link between the development of human settlements and the formation of state regulation, civilization processes, and religion.

The historical experience in the field of urban planning and landscaping is considered from the Renaissance (XIV-XVI centuries). The history of urban planning in pre-revolutionary Russia, which at that time included a significant part of the territory of modern Ukraine, was characterized by a particularly low degree of improvement and occupied one of the last places in Europe in this regard [1].

The competence of the system of state regulation in the field of settlement improvement is assessed by ensuring the rational placement and maintenance of all improvement facilities. In the modern world, the improvement of settlements is impossible without proper quality of engineering networks, in particular, electrification, gasification, telephony, transport, water supply, and sewerage. The development of utility networks cannot be considered without taking into

account environmental aspects, namely, landscaping, flood protection, air, soil and water pollution control, etc.

Also, the impact of choosing a favorable territory for the construction of enterprises and residential areas on the scope and types of work on the improvement of settlements should not be underestimated. To successfully solve all the interrelated tasks of planning, development and operation of settlements, an integrated approach is required to ensure the best possible service to the population and cost-effective architectural and planning solutions for all types of construction, taking into account the prospects for its development. E. Pryakhin paid attention to the historical prerequisites for the creation of the sphere of improvement [3, 4]. Analyzing the existence of the USSR, Pryakhin notes that the improvement of settlements begins to receive attention at the all-Union, republican and local levels. The relevant regulatory framework was being developed. The main regulatory document for the improvement of the territory at that time was SNiP III-10-75 Territory Improvement [5].

The main regulatory document for the improvement of territories is the DBN B.2.2-5:2011 Landscaping [6] and the DBN B.2.2-12:2018 Planning and Development of Territories [7]. These norms establish general provisions for the design of new construction, reconstruction and overhaul of public amenities and are mandatory for compliance in the design, execution and acceptance of works on the improvement of the territories of settlements. Regardless of subordination and form of ownership, these rules apply to the following improvement facilities:

- parks (hydro, meadow, forest parks, culture and recreation parks, parks-monuments of landscape art, sports, children's, historical, national, memorial, etc.), recreational areas, gardens, squares
- monuments of cultural and historical heritage;
- squares, squares, boulevards, avenues;
- streets, roads, driveways, lanes, descents, pedestrian and bicycle paths, stops and facilities of urban public transport, parking lots;
- beaches;
- cemeteries;
- other public areas;
- adjoining territories;
- territories of enterprises and territories assigned to them under the terms of the contract;
- water protection zones within settlements;
- coastal protection zones within settlements.

In addition to the national regulation in the field of landscaping, local landscaping programs, landscaping action plans, landscaping rules, green space preservation development programs, sanitation schemes, etc. are adopted in settlements. However, an analysis of the state of implementation of the requirements [1] stipulated by the legislation in the field of settlement improvement (table 1) shows that not all local governments comply with the requirements of the Law of Ukraine "On Beautification of Settlements" [8].

Table 1. The status of approval of local documents in the field of settlement improvement in 2010-2015

Settlements that have approved regulatory documents, %.	Years					
	2010	2011	2012	2013	2014	2015*
Beautification programs	13	14	20	19	22	21
Beautification action plans	26	30	37	38	39	40
Rules of beautification planning	21	27	36	39	41	42
Programs for the development and preservation of green areas	5	6	7	8	12	12
Sanitary cleaning schemes	21	25	28	32	38	40
Rules for keeping pets	6	7	17	17	17	17

*Data excluding the occupied territories of Ukraine.

The change in indicators for the period 2009-2013 demonstrates a slow trend towards ensuring the implementation of legislation on the improvement of settlements, in terms of the obligation of local governments to approve the necessary local regulations.

Planning of the beautification system of residential areas during reconstruction should meet the following requirements [6]:

- during the reconstruction of amenity facilities, it is mandatory to provide for the creation of a barrier-free environment for people with reduced mobility in accordance with DBN B.2.2-17;
- the reconstruction of civil (residential and public) buildings and structures with regard to low-mobility groups, functional and planning elements of structures, their land plots, communications, evacuation routes, accommodation, service premises, as well as their information and engineering equipment should be carried out in accordance with DBN B.2.2-17;
- detailed territory plans for residential and mixed-use neighborhoods and their reconstruction should include places or areas for walking animals;
- organization of the relief of the territory being reconstructed, as a rule, should be oriented towards maximum preservation of the relief, soil cover, existing green spaces, conditions of the existing surface drainage, use of soils that are removed on the construction site;
- if trees are located in areas of intensive pedestrian traffic or in areas of construction and reconstruction activities, in the absence of other types of protection, protective trunk fences with a height of at least 0.9 m shall be provided, depending on the age, species of tree and other characteristics;
- green spaces demolished during the reconstruction and construction of new buildings and structures shall be compensated;
- the scope, nature and location of compensatory landscaping shall be determined on a case-by-case basis. The compensatory landscaping project is included as an independent section of the reconstruction project.

For a broader understanding of the impact of reconstruction methods on the elements of beautification, an analysis of foreign experience in beautification during the reconstruction of the territory should be conducted. Beautification system of recreational infrastructure facilities in different countries has differences, but the comparison of this process is complicated by the existence of basic differences, including climatic, economic, political, as well as differences in the mentality and traditions of residents. These factors affect the typology and planning of human habitats.

Approaches to the beautification system planning of residential areas in Europe, America and Asia have significant differences, but the goal is the same: to create a complete and safe environment for improving living conditions.

3. Urban beautification planning in Europe

European cities have a rich history of urban planning, which has left its mark on modern urban development. The problem of urban renewal and historical heritage in European cities is solved by a small share of high-rise apartment buildings. The economic trends in modern Europe determine the level of improvement. Cities have a strong urban community that protects the rights of residents, preventing investors from turning Europe's richest cities into the most expensive ones. The planning of many European cities is based on two main ideas: universal design and pedestrian centeredness. The city, in particular, should be comfortable for everyone, but pedestrians and people with limited mobility are in the first place. That is why European cities separate wide sidewalks from the roadway with bollards, make convenient exits for wheelchairs, use various methods to reduce the speed of cars in the city, and make all garbage bins and traffic light buttons at a level convenient for people in wheelchairs. The streets of cities are equipped with furniture, but the premise is that these objects should be durable, safe, comfortable, and in keeping with the architecture and style of the district or city. The maintenance of the courtyard area is the responsibility of the residents of the buildings, which explains the efficiency and durability of the infrastructure objects chosen [9].

Economic trends in the development of recreational infrastructure can also be seen in the example of courtyard areas and playgrounds, as the latter are built at the expense of residents, so one can often see one playground for several buildings.

In France, there is a High Quality Environment Standard (Haute Qualité Environnementale, HQE) - a green building standard based on the principles of sustainable development [10]. This standard was first adopted in 1992 at the Earth Summit. The standard is monitored by the Association for High Environmental Quality (Association pour la Haute Qualité Environnementale (ASSOHQE)). The standard is valid in 23 countries and takes into account such specific features of different countries as climate, regulatory framework, construction practices, and organizational aspects.

The use of standards improves the efficiency of water and energy consumption, waste management, and the creation of healthy and comfortable conditions for residents. There is HQE certification for every type of building: residential, office, educational, medical, etc. Buildings, infrastructure facilities and neighborhoods are certified both at the design stage and at the stage of reconstruction or operation.

The development of Paris is planned for 10 years in the so-called Strategic Movement Plan (Plan de déplacements urbain, PDU). This plan sets out objectives to reduce air pollution, improve the behavior of residents, increase the efficiency and convenience of citizen movement, and improve recreation areas, etc. The working plans and projects for the improvement of infrastructure facilities are managed by the City Hall, which controls these projects for compliance with European standards of accessibility, safety and environmental protection (HQE).

Parisians first test new ideas in small areas. If the new idea has a favorable outcome, it is extended to other parts of the city. In modern residential areas in the suburbs of Paris, renovation is used, i.e. the adaptive use of territories, buildings, structures and complexes with a change in their functional purpose and further use. For example, the André Citroën Park was created on the site of an automobile plant on the Seine River, and the Boulogne-Billancourt industrial zone is to become a cultural landmark in 2023, the "Island of Arts". Europeans use the renovation of industrial zones as one of the most promising areas of urban development [11].

Also, inactive or inefficient production facilities, as well as industrial areas that impede the full development of urban infrastructure, are being converted into social housing or housing for the middle class. The infrastructure of such neighborhoods is quite convenient, with courtyard areas free of cars and recreational facilities. Most of the courtyards are equipped with two-level underground parking lots (Fig. 1), on the surface of which there are landscape compositions. The landscape design of the courtyards has a natural character.

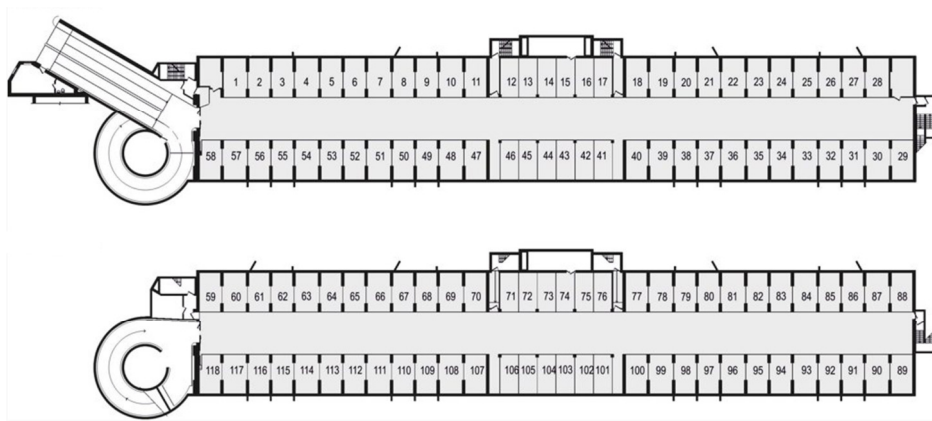


Fig. 1. Typical scheme of a two-level underground parking lot (France)

4. Urban beautification planning in America

USA. In the early 1930s, Franklin Delano Roosevelt's New Deal stimulated the construction of housing, including social housing. At that time, these were villages of single-family cottages with all the necessary amenities in the house. Paradoxically, for a very long time in the United States, social housing, despite its lower cost for residents, was much better and more comfortable than commercial housing. The poor paid a minimal rent for these "dormitories," and the state had to subsidize the maintenance of such housing. In 1949, the U.S. Congress passed the Housing Act, which, among other things, proclaimed the principle of "decent housing in a decent environment for every American." It was impossible to realize this slogan solely with the help of individual houses, so cottages were abandoned. Instead, the architects turned to the ideas of the Frenchman Le Corbusier, who proposed to freely place multi-storey "housing machines" in green areas and surround them with all the necessary infrastructure. Thus, in the early 1950s, massive demolition of slums and construction of social housing complexes with their own schools, shops, and hospitals began.

The city of St. Louis, Missouri, was not immune to this trend. In the mid-twentieth century, it was overcrowded, with many people living in old homesteads with shared toilets. "Black" and "white" slums were gradually engulfing the central neighborhoods, advancing from the north and south. The middle class fled from the dangerous central neighborhoods to the suburbs. So, in order to protect the business center, the authorities agreed to transform one of the neighborhoods adjacent to it.

The authorities considered various options for resolving the crisis. They even suggested reducing the number of storeys by collapsing the skyscrapers and reorganizing the layout. But in the end, it was decided to demolish the neighborhood. In 1972, explosions destroyed three buildings. The first of them was broadcast live. Two years later, the U.S. government authorized the demolition of the entire block. By 1976, the site was completely cleared [12].

In the United States, there are Landscape architectural graphic standards [13], a complete reference publication for everyone involved in landscape architecture, design, and construction.

The Graphic Standards for Landscape Architecture contains rules and standards for the construction and management of landscapes. More than 100 authors participated in the creation of the standard, led by the president (in the past) of the American Society of Landscape Architects Leonard J. Hopper.

The main objectives of the collection of Landscape Architecture Standards are:

- to provide a comprehensive view of landscape design technologies (Fig. 2);
- provide complete information for the work of a landscape architect and professional designer;
- ensure comprehensive environmental protection;
- use innovative technologies in the design and implementation of works;
- use all aspects of green technologies in design and construction.

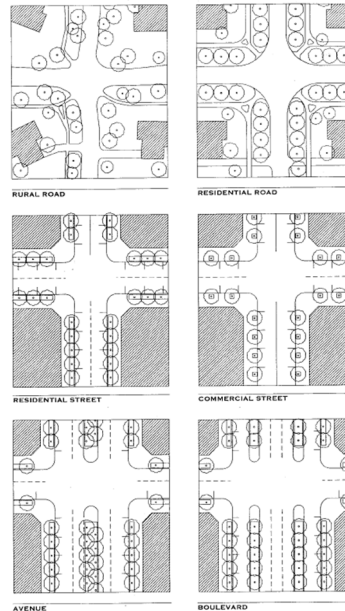


Fig. 2. Types of street landscaping in accordance with the American standard Landscape architectural graphic standards

The collection of Standards covers tasks for specialists of all professions involved in landscape design. The content of each section on materials and technologies provides:

- information about materials for landscape design;
- information on the types of materials used in landscape construction;
- the relationship of different materials to each other and other resources;
- consideration of current industrial standards;
- consideration of the impact of seasonal, traditional, and innovative changes;
- examples of the use of fundamental detailed solutions;
- information on seasonal maintenance and upkeep of landscape architecture objects.

The United States also has Time-Saver Standards for Landscape Architecture [14]. These standards are aimed at saving time for landscape architecture work and contain information on building materials, pavement designs, energy and resource-saving technologies, construction procedures, land reclamation, including soil and vegetation restoration, new landscaping concepts, etc.

New York City has a Street Design Manual that was first published in 2009 [15]. This publication (Fig. 3) defines a single standard for improvement projects. The Street Design Manual is a general vision of the appearance of the street and road space in New York City.

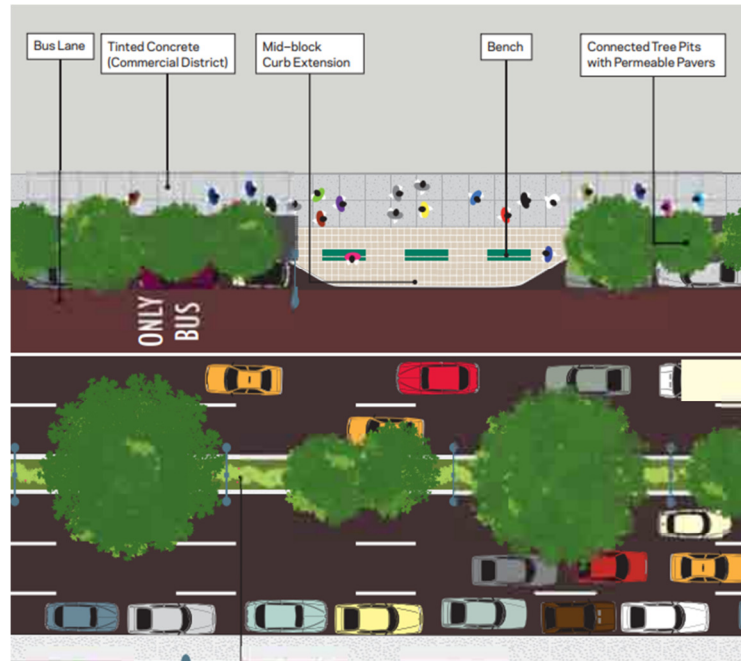


Fig. 3. Typical scheme of main streets in accordance with the standard New York City Street Design Manual

Canada. The principles and approaches to city development and the improvement of street and public spaces are set out in many documents and regulations. The main document is the Toronto Official Plan, adopted in 2010. The plan addresses the problems of city development, taking into account the integration of new development into existing infrastructure, and ensures the protection of streetscapes and plantings [16].

Toronto's Official Plan (Urban Design Guidelines) is designed to ensure the city's continued development and to realize its potential in areas such as transit, street infrastructure, and environmental protection. According to the Official Plan of Toronto, the management and supervisory function is vested in the Department of Planning of the city with the involvement of the public community.

The Urban Design Streetscape Manual [17], designed for street design, is an online resource open to all external users. Professionals and potential developers can execute projects in accordance with the recommendations, requirements, and options for the improvement of specific streets contained in the system. For example, government officials gathered in Toronto and announced that Sidewalk Labs, a subsidiary of Alphabet, would be redeveloping a 12-acre area of the southeast waterfront.

Today, there are several industrial buildings and parking lots in the area. In just a few years, there will be a technology community called Quayside.

Sidewalk Labs has already allocated \$50 million for the project, and Google will move its headquarters to the outskirts of Toronto. Once the company finalizes the concept, it plans to expand the redevelopment to the entire 800-acre waterfront area. It will be a fully Google-built neighborhood with a touch of Canadian flavor. Sidewalk Labs promises to introduce all kinds of sensors everywhere, collecting a constant array of information about traffic, noise, air, energy consumption, traffic and garbage collection. The cameras will help the company understand more elusive things: whether people enjoy living in a given space, how often residents visit the clinic's doctor when the flu season comes, whether this corner is the best place for a grocery store, who its customers are, locals or visitors from another neighborhood.

5. Urban beautification planning in Asia

Hong Kong. Hong Kong is a city and a country at the same time, with a huge shortage of land. It is this feature of Hong Kong that has led to the principles of improving the living environment. A vivid example of this statement is the Tin Shui Wai residential area, which was built in 1987-2001 to relieve the overcrowded city center. Tin Shui Wai is a residential area in the park zone, which consists of 211 typical single- or two-storey residential buildings with a height of 40 to 55 floors, located on an area of 4.3 km².

The peculiarity of Tin Shui Wai is that despite the shortage of land and population density (approximately 300,000 people), the adjacent areas are well landscaped, there are a large number of parks and squares between the buildings with excellent pavement, outdoor lighting and street furniture, sports and children's playgrounds.

The idea of human-centeredness is evident in the improvement of infrastructure facilities, namely: all public transport stops are connected to each other and to the entrances by covered galleries, which allows residents to move comfortably in any weather; cars do not have access to courtyards (only bicycle parking is allowed); there are multi-level parking lots on the borders of the district; the entire district is covered with bicycle paths that are separated from pedestrian and vehicular routes.

Since 1990, Hong Kong has been implementing the Hong Kong Planning Standards and Guidelines (HKPSG) (last revised in 2016), developed by the Planning Department of the Hong Kong Government. These standards contain 12 chapters covering various areas of activity: trade, utilities, industry, transportation, environmental protection, etc. There are separate standards for urban design and landscaping, such as the Recreation, Open Space and Greening standard, which contains requirements for urban landscaping and greening, as Hong Kong requires mandatory landscaping and greening of all vacant spaces, including rooftops.

The fourth section of the Urban Design Standard and Guidelines contains a large amount of practical information (drawings, diagrams, tables, etc.) for designers.

The section describes:

- scope and objectives of the standards;
- guidelines for the design of recreational areas;
- the hierarchy of recreation and open space;
- correlation between active and passive open space;
- standards for the provision of recreation facilities and principles for calculating standards for recreation facilities;
- planning for a greener city;
- planning guidelines in the field of greening;
- standards for the provision and calculation of green space standards;
- preservation of existing trees in the development area;
- greening policy;
- standards of allocations for the main types of activities in the areas of landscaping.

The fourth section of the standard provides for standards for the provision of recreational and green areas, as well as standards for the provision of recreational and green areas for the elderly.

Singapore. The main social strategic goal for the country's leader in the 1960s was to "turn the people of the country into the owners of the country". To achieve this goal, Lee Kuan Yew introduced a program of social housing construction, which became available to all Singaporeans on very attractive terms – residents pay only a small part of the cost of housing and long-term installments for the rest of the cost at low interest, but without the possibility of further sale of this property [18].

Residential complexes have fences, very beautiful landscaping with design elements, places for recreation, sports and leisure (Fig. 4). The Singaporean authorities understood that landscaping and gardening are of great importance in the life and functioning of cities, improving their architectural and artistic appearance, quality and comfort of life.



Fig. 4. The principle of landscaping a residential area in Singapore (top view)

Lee Kuan Yew called the Clean and Green Singapore project the most profitable in his career. He believed that public investment in greening, environmental awareness and beautification is the basis for economic prosperity. Singapore's landmark projects include large-scale greening of the island and the improvement of two rivers, which turned from sewage canals into exemplary oases [19].

Japan. The standards for the improvement of infrastructure facilities in Japan are mandatory and contain requirements that are almost unheard of in other countries.

The standardization process is coordinated by the Japanese Industrial Standards Committee. The JIS set of standards was proposed by the Japanese Standards Association in 1946. The standards have a fixed JIS format, with a Latin letter indicating the code of the field of application (A - construction, architecture).

All types of violations during the improvement of infrastructure facilities in Japan are clearly regulated.

For example, the greening standard regulates the number of green spaces per unit of territory. There is a scale of greening indices, the principle of division is as follows:

- the minimum value of 1 is given to areas with no greenery;
- farms, meadows, grass lawns, fields, gardens have an index from 2 to 4;
- shrubs and bamboo get an index of 5;
- tree planting - 6;
- young secondary (planted) forest - 7;
- old planted forest - 8;
- primary forest - 9;
- especially valuable primary forest - 10.

Upon completion of the construction of the facility, the average territory index should not be lower than 6. This encourages builders to compensate for the presence of concrete and asphalt areas by planting trees.

The standard requires that the total time the new building shades the windows of neighboring houses is no more than 2 hours per day at any time of the year. This requirement prompted architects to design buildings of unusual shapes, such as pyramids.

Japan is a country where tradition and modernity are intertwined. To protect traditions, Japan has a standard for the protection of old protected areas of natural character and historical monuments. Japan also has a procedure for classifying architectural monuments and a whole system of regulations related to their protection, restoration and operation.

Japan has built a system of strict control over compliance with the above standards. Compliance with the standards is monitored using modern high-tech methods through an automated monitoring system. There are more than 10,700 permanent and temporary monitoring services, including those that measure noise and vibration levels in residential areas.

Japan is a country of stability, where regulations are not revised very often, only land use rules are revised. There are a number of eco-friendly cities in Japan, such as Fujisawa, Funabashi Morino, Kitakyushu, Keihanna, and Toyota City. The first project cost \$750 million and was initiated by the electronics manufacturer to celebrate its 100th anniversary at the site of its plant. The green features of the project include: a forest belt across the city, wind direction accounting, electric car charging infrastructure, solar panels, surveillance cameras for public safety, pedestrian infrastructure, etc.

6. Conclusions

The analysis allows us to identify the main problem of maintaining the system of amenities in Ukraine during the reconstruction of the territory, which is the dominance of the compaction method, which does not provide the necessary elements of the amenities system.

In addition, the analysis of foreign experience in the arrangement of the landscaping system during the reconstruction of the territory showed that Ukraine also has a problem of insufficient legal framework in the field of state regulation of urban development and ensuring an adequate level of landscaping for comfortable living.

Thus, the improvement of the organization of open spaces in residential development is conditioned by the need to solve problems arising, on the one hand, at the city level - intensification of the use of urban areas - and, on the other hand, at the level of the residential complex - improvement of the operational qualities of the areas free from development. This requires a comprehensive solution to the problem of increasing the efficiency of residential areas, including the intensity of development, architectural and planning organization and improvement of open spaces.

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