

# Residential Planning Units: New Development Trajectories

Irina Fedchenko

*Siberian Federal University, 660041, Krasnoyarsk, prosp. Svobodny 79.  
ifedchenk@inbox.ru*

**Abstract.** The paper summarizes the transformation patterns of functional, morphological, social, and administrative structures of residential planning units –district (Russia, Eastern Europe), neighborhood (USA), community (UK, Europe) as the smallest structural and planning elements of settlements. The article is based on the author's own on-site survey of the existing and new residential planning units, as well as on the analysis of theoretical sources. As shown by the multidisciplinary analysis of the theoretical concepts and on-site surveys, residential planning units formed in the early twentieth century retain their social and planning importance and self-sufficiency, evolve, and acquire new qualities and forms. At the same time, they remain, according to the current regulatory and legal instruments the basic planning elements of urban structure in the early twenty-first century. This article also includes experimental analysis of the theoretical concepts of residential planning units' transformation, conceptual planning model of residential planning units and principles of their formation in the early twenty-first century.

## INTRODUCTION

Formation of the living environment, which meets the requirements of security, comfort and humanity, is one of the most important crosscutting strategies of society's development in the early twenty-first century. During the crisis of urban development activity in the late twentieth century in Russian Federation, the country witnessed suspension of holistic design, construction of new and reconstruction of existing microdistricts – large, self-sufficient residential planning units. Being different in content and structure "Quarter" and "microdistrict" are, in fact, equalized and designated as interchangeable building blocks of a city in the Town Planning Code of the Russian Federation. In the modern times of global conversion of large enterprises, development of small and medium businesses, redistribution of labor employment in different sectors of the economy, destruction of a stepped care system, increased mobility and informatization of the society clear functionalist model of Russian microdistrict was destroyed, as well as its foreign counterparts – Neighborhood (USA) and Community (Europe). Business interests and manufacturing process integrate throughout their environment, ushering unforeseen planning and social change. Physical degradation of architectural and spatial environment provokes scientific criticism and inspires the search for "advanced" residential planning units [11, 12, 13].

The general definition of a "residential planning unit" (microdistrict, community, neighborhood) should be understood as self-sufficient element of city's planning structure, as it can be attributed to the same group of planning objects by morphological, functional and planning principles. The latest versions of residential planning units are objects with a diverse representation of residential development archetypes with secure access to guaranteed facilities of social significance, flexibly developing commercially active area, hierarchically arrayed public and recreational spaces, and recovered fragments of natural landscapes, managed by local authorities [1, 2].

Landscape-ecological principles of fore casting and modeling of residential areas with account of the ecosystem characteristics were studied by E.M. Mikulina, B.T. Tobilevich, V.I. Gutsalenko, and I.V. Kukina. Eco-

planning approach to reconstruction of large cities' residential units is justified in works of A.G. Bolshakov, A.V. Grigoryan, and L.V. Akopova. Socio-ecological base of landscape philosophy in the formation of residential environment is covered in the works of V.A. Nefedova, N.A. Unagaeva, E.E. Krasil'nikova, and others. A.V. Krasheninnikov, L.V. Anisimovaproposed a method of living environment modeling depending on the type of interpersonal relations, taking into account social and psychological characteristics of the environment. K. Stanilova, I. Medvedkov, D. Smidt, B. Engel studied architectural and urban planning heritage of the socialist construction period, adaptation of city's residential development to the new socio-economic conditions. V.A. Shemyakina classified urban structures of new cities in the UK at the beginning of the twenty-first century and defined principles of "multi-functional" residential communities. Methods of involving residents in decision-making process in terms of design and reconstruction of existing residential planning units were considered in the study of K.V. Kiyanenko, G.A. Ptichnikova, E.V. Eshina, and I.V. Kukina. Mechanisms of self-governing in residential planning units viewed as socio-territorial units, studied by T.V. Filanova. Studies of E.S. Shomina generalized Russian experience of territorial self-government and flat-owners cooperation. Socio-demographic mechanisms of "self-organization" of foreign city's living environment in the twentieth century was studied by J. Symonds, J. Jacobs, R. Gratsom, D. Taylor, G. Sannof and others, based on empirical and social research. The works of A.G. Vysokovsky, E.K. Trutnev, Y. Alekseev, and A.V. Krasheninnikov cover methods of urban management of residential development within a market economy in Russia and abroad. A number of studies investigated techniques of borrowing and combining different concepts of residential planning units (Duafan Lu (China), DuanyPlater-Zyberk (USA), and others). V.V. Vladimirov, I.M. Smolyar, and V.V. Anikeeva study urban planning problems of improving the administrative-territorial structure of cities based on continuous development. Upcoming trends in Russian urban planning, which reflect the strategy of sustainable development, including improvement of the quality and safety of the built environment, formation of social comfort in the urban environment embodied in "Urban planning Doctrine of the Russian Federation" under the direction of G. Esaulov, a group of authors: I.G. Lezhava, V.Y. Luybovny, G.S. Yushin, D.Y. Lomakin. Much wider range of works devoted to the study of trends and principles of residential planning units' development at the end of twentieth– beginning of twenty-first century. In this context, it is relevant to study the dynamics of contemporary transformation processes, scientific criticism, latest versions, trends and the development of residential planning units' improving principles in the context of global trends of urban development, with a view to possibly predict and control their development. This article is an attempt to summarize theoretical concepts' laws of residential planning units' transformation based on analysis of theoretical sources and the authors' own on-site survey. Above that, it proposes conceptual planning model and formulates the formation principles of residential planning units at the beginning of the twenty-first century.

## **METHODS AND DATA FOR STUDY**

This study is aimed at a search for general transformation laws of functional, morphological, social and administrative structures of residential planning units – microdistrict (Russia, Eastern Europe), neighborhood (USA), community (UK, Europe), as well as elaboration of conceptual planning model and newest principles of residential planning units' formation at the beginning of the twenty-first century. Thus, the study is based on the following methodology: a comparative analysis of residential planning units' concepts formation. Secondly, identification of multidisciplinary trends of morphological, social and administrative structures of residential planning units' transformation; conducting on-site and remote sensing surveys of residential planning units. Finally, study of design and regulatory documents, as well as materials of creative design competitions of residential planning units.

## **EXPERIMENT**

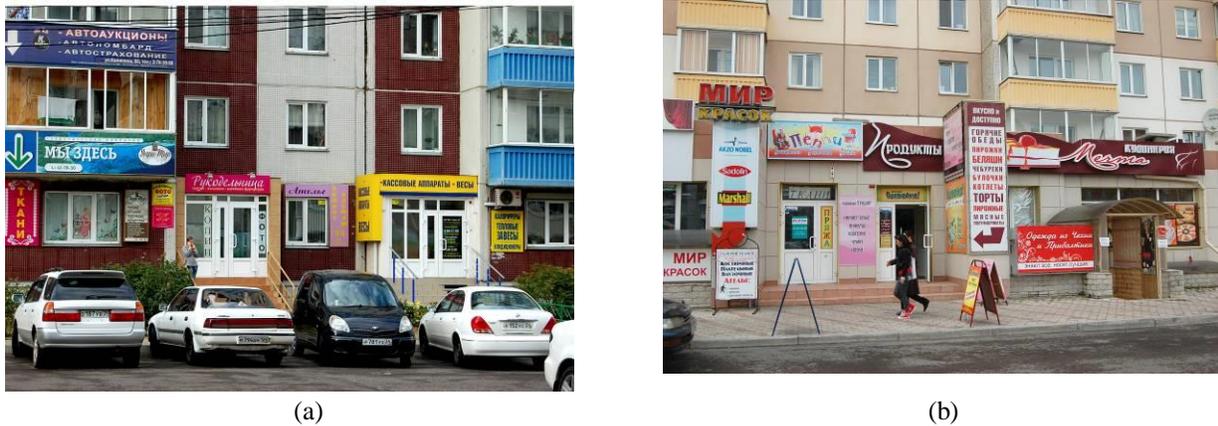
### **Residential Planning Units Theoretical Concepts Transformation**

As shown by the analysis of existing residential planning units, as well as their latest projects at the end of XX - beginning of XXI centuries certain main trends in the development of residential planning units were formed. *Firstly, a shift from the functionalist modernism. Secondly, complication of morphological structure and redefinition*

of nature and content of public spaces. Finally, development of residential planning units as a socio-administrative and micro-economic element of a city.

The dynamics and types of labor activity, functional use of public spaces and the ground floors of residential buildings, forms and methods of public participation in the process of their residential planning unit development, as well as the experience of landscape and ecological reconstruction of residential are as were analyzed. The analysis identified the following trends in the development of residential planning units:

By the end of twentieth – the beginning of the twenty-first century there was a *shift from the functionalist modernism in town planning of the mid-twentieth century, based on a rigid "work-household-leisure" model* [4]. The reason being that almost every residential area becomes subject to unexpected processes: the destruction of the stepped service system and the formation of professional, social activities and land use, unusual for the living environment. (Fig.1);



**FIGURE 1.** Microdistrict "Airport" in Krasnoyarsk. The introduction of multi-functional commercial core in the structure of a planning unit (photo by author). A) External commercially active microdistrict boundaries. B) Residential business pedestrian street.

Processes of architectural and spatial transformation *lead to a complication of residential planning units' morphological structure* in connection with the development of a commercially active area formed by the market. Mounts the problem of different functionality areas connectedness; correlation of public open spaces and closed, isolated small residential groups, permeability of internal structure of living spaces in residential planning unit [7]; – Analysis of international experience in planning and reconstruction of residential units suggests that the latter *are considered as microeconomic structural elements of a city*. The system of commercial area objects has economic potential, which leads to the emergence of new forms of business partnership between business, companies and residents, and the administrations of settlements. In this regard, the systems and principles of taxation, and the formation of a city's budget are being reviewed, the rights and responsibilities of citizens in the field of residence area development extend, budget of a planning unit is being formed, the expenditures of which are under residents own control [4,5,6]. (Fig.2);



**FIGURE 2.** Formation of the local economy in Gorbitz microdistrict in Dresden (photo by author). Local business objects in the central part of the microdistrict - the concept of "central axis".

The technology of residential environment urban design formed the landscape- ecological philosophy in the study, design and planning of reconstruction of residential planning units, as well as adaptive planning techniques.

– Among experts there *develops a landscape-ecological philosophy* in the study, design, and reconstruction of residential planning units based on a balanced and harmonious coexistence of human and natural environments. Landscape-ecological philosophy is based on the assumption that any ecosystem covers a unique area, which should be taken into account and preserved in the design of living environment [3]. All the complex processes of coexistence of different species should be also considered (Fig.3);



(a)



(b)

**FIGURE 3.** Examples of the landscape-ecological approach regulations implementation in the design of residential planning units (photo by author). A) Establishment of continuous planting system through a radical reconstruction in the Gorbitz microdistrict in Dresden, Germany (for the purpose of green corridors construction, the houses were demolished, inefficient economic territories vacated, and public open spaces reorganized). B) Establishment of continuous planting structure in Noisette neighborhood in Charleston, South Carolina, USA.

– The development of *residential planning units as social and administrative structural elements of a city* is aimed at integration and interaction of different social groups on the same territory. Thus, a hierarchy of self-government institutions is developing, creating the opportunity to coordinate the plurality of subjects' activities and adaptive control of simultaneous processes, in order to harmonize divergent development interests of public spaces and functions in the residential environment;

– *The technology of residential environment design is subject to a change in the contents of the activity.* As a replacement of a design subject' objective description comes an analysis and description of the social forms of action, expressed in three-dimensional works [8];

The technology of living environment design witnesses a replacement of a design subject objective description by an analysis and description of social forms of action, expressed in three-dimensional works, and formation of the landscape-ecological philosophy in study, design and reconstruction of residential planning units, as well as adaptive planning techniques.

– In the design environment forms a *trend of transparent policy regarding planning and development of residential planning units. Timely public coordination of actions aimed at the development of residential environment plays an important role* [9].

By the end of twenties – beginning of twenty-first centuries the main trends in the development of residential planning units were formed. Firstly, a shift from the functionalist modernism and complication of morphological structure due to the formation of commercially active and municipal economic zones. Secondly, extension of housing typologies, redefining the nature and content of public spaces. Finally, development of residential planning units as a socio-administrative and micro-economic city element.

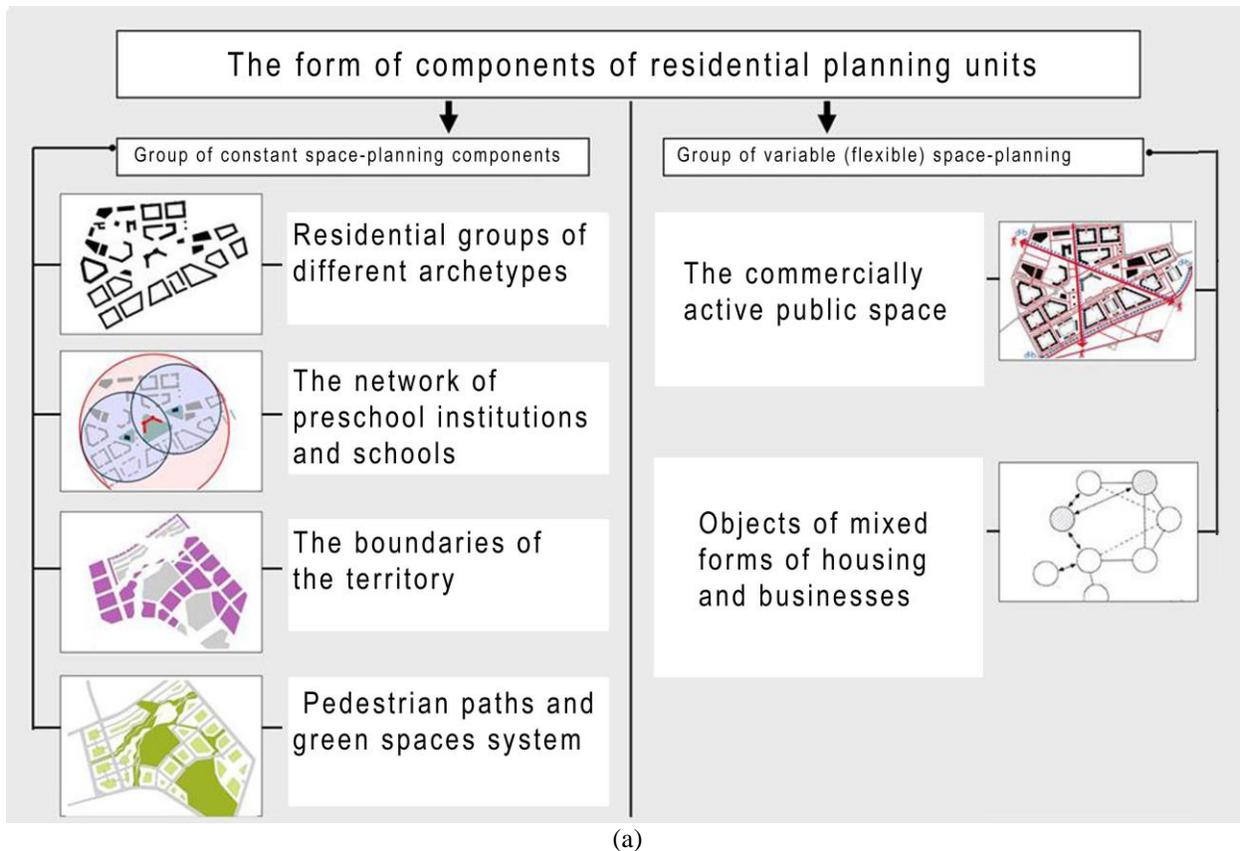
### Conceptual Planning Model Of Residential Planning Unit

Based on the identified structural transformations it can be stated that the spatial structure of residential planning units has constant and variable elements. Thus, currently there *forms a tendency to develop the structure of*

*residential planning units based on the properties of its components: constant (unchanging) and naturally developing (flexible).*

*Group of constant space-planning components* of the structure consists of residential groups of different archetypes that are integrated into the structure of residential planning units and considered primary social loci, where the contacts of everyday people happen, especially among people with limited mobility. Representation of various archetypes is determined by the need to overcome the social and economic segregation and ensure the availability of housing, its visual and spatial identification in the structure of residential planning unit (microdistrict). The network of preschool institutions and schools bonded with public spaces within safe walking distance, especially for the younger generation, is one of the undeniable social and planning factors testifying in favor of preserving, for example, microdistrict as a complete structural residential unit of a city. The boundaries of the territory: transport arteries of district and city values, and fragments of the natural environment traditionally define outside boundaries. Internal borders, having properties of protection and control of private, public and partially accessible areas, are formed mainly by landscape architecture means along with the development of variable components of residential planning units' structure. Pedestrian paths and green spaces system hierarchically built from a personal (possibly) garden in surrounding grounds to the garden (park) of residential planning unit continues into the green system of a city and is well integrated into natural environment. In addition, it becomes possible to include or restore natural complex fragments in a high-density residential area into the developed part of the city. Open public spaces take a purpose of ensuring the availability of all functional areas and territories and objects of residential planning units, including recreation. The hierarchy of spaces by the degree of privacy leads to the availability of different types of activity, interaction of different groups of people, thus preventing social stratification and contributes to the development of public control. Objects and storage area for cars and other technical purposes in residential planning units are considered municipal elements. Garages and parking, up to the present time in the Russian Federation attributable to temporary structures or temporary method of territory use require regulatory developments.

*Group of variable (flexible) space-planning components* of residential planning units' structure. It consists of commercially active public space, forming mainly pedestrian streets by inbuilt-attached service facilities for small and medium-sized businesses; objects of mixed forms of housing and businesses, which are formed in connection with the development of remote working and freelance activities, introduction of office spaces in the house, and loss of residential spaces on the ground floors of buildings. Functional contents of commercially active area is currently regulated solely by the services market, total socialization of ground floors can lead to the loss of yard spaces and their characteristic uses. It requires regulatory and standard developments (Fig.4)



**FIGURE 4.** Conceptual planning model of residential planning unit (photo by author).

### Principles of Residential Planning Units Formation

Based on the conducted analysis, the following principles of residential planning units design at the beginning of the twenty-first century can be set forth:

- Principle of *material and spatial environment accessibility* of a microdistrict. It is determined by the legislative, standard and regulatory framework of spatial planning elements of city's planning structure, which defines planning parameters of a dwelling unit, guarantees pedestrian accessibility, including for people with limited mobility, to housing, socially significant facilities, recreational spaces, advantages of engineering and technical equipment, and by the ease of environment perception and understanding. Socio-economic accessibility is the ability to select various home pricing and form of ownership, as well as the organization of professional activities within the boundaries of residential planning unit (microdistrict);

- *Principle of mobility* should be perceived in the following categories: spatial, socio-economic and virtual-network mobility within the boundaries of residential planning units. It is aimed at creating conditions for the formation of temporary and permanent communities by the nature of professional, social, leisure activities – autonomous in public spaces of residential planning unit and local in residential groups;

- *The principle of differentiation* consists in providing a complex of conflict-free functioning of different areas within residential planning units (districts) and the processes they share; social localization and architectural diversity of residential groups (planning cells); determination of the planning hierarchy of public spaces, service structure;

- *The principle of multi-functionality* consists in creating a town-planning prerequisites for the functioning of many processes within the boundaries of residential planning units: for the development of commercially active areas of small and medium-sized businesses, recreational areas, educational facilities, as well as communication facilities and leisure activities for different social and age groups;

- *The identification principle* consists in creating conditions for the individual identification with the objective-and-material and socio-cultural living environment;
- *The principle of cooperation* consists in creating conditions for the formation and management of business partner relationships within residential planning unit (microdistrict), as well as the development of social and economic activity institutions and self-government to higher levels;
- *The principle of landscape-ecological philosophy* consists in the formation of a joint human environment and habitat of native species of flora and fauna, people's awareness of the importance of respect for the natural environment and the preservation of a continuous network of landscape elements in the residential environment;
- *The principle of adaptability* is determined by the procedural nature of residential planning units development, requiring consideration of living environment local characteristics' formation and rapid response to emerging changes, the introduction of public participation methods at all stages of urban planning process, as well as transparent planning policy;

Thus, identified during the research trends, principles of residential planning units' development, properties and characteristics of their structures' components suggest that the process of design and construction of a city's living environment structural elements (microdistricts) should include the following steps:

- Design and construction of residential planning units (microdistrict) based on strategy and comprehensive plan of a city. The project plan should include constant components of residential planning unit structure and projects of zoning and building regulations, that define the area of social action and adaptive planning of its structure's flexible components;
- Adaptive planning and construction – the process of gradual integration and tolerant change in flexible components' structure of residential planning unit based on strategic planning that takes place during the public hearings and professional design activities in order to harmonize the divergent goals and actions of solving social problems.

## CONCLUSION

This study allows us to formulate the main trends in the development of residential planning units. The trends are following: a shift from the functionalist modernism; complication of morphological structure; redefining the nature and content of public spaces; the development of residential planning units as a socio-administrative and microeconomic element of a city, forming the planning development policy, both for residential planning units and settlements in general. The latest trend is typical of foreign countries' urban planning traditions. Technologies of urban living environment design was formed based on landscape-ecological philosophy in the study, design and reconstruction of residential planning units, as well as adaptive planning methods. The study provides reason to believe that the structure of residential planning units has constant space-planning and naturally developing components. Constant components of the planning structure are residential groups of different archetypes, border areas, preschools and schools (and their territories), a unified system of pedestrian paths and recreational areas, public open spaces, and municipal facilities. Group of naturally developing components is comprised of commercially active area on the ground floor of houses, as well as objects of mixed forms of housing and business. The article sets out the basic formation principles of residential planning units at the beginning of the twenty-first century: the physical, social and economic accessibility; spatial, socio-economic and virtual mobility; differentiation and versatility of spaces; Identification of the objective-and-material, and socio-cultural living environment; interaction of professional and social civil groups; landscape-ecological philosophy; adaptability of the design decisions; transparent planning policy.

In conclusion, it is worth noting that the proposed conceptual planning model and formation principles of residential planning units have been tested on the pilot course and degree design projects of "Urban planning" department students in Architecture and Design Institute, Siberian Federal University.

## REFERENCE

1. I.V. Kukina, "Elementary Planning Residential Formations", *Housing Construction* **8**, 26-29 (2005).
2. I.V. Kukina and I.G. Posdniakova, "Development of Scientific Conceptions of Elementary Residential Forms at the End of the XX Century and Beginning of the XXI Century", *Housing Construction* **11**, 42-48 (2010).
3. N.A. Unagaeva, "Ecologo-orientirovanoe proektirovanie landshafta", *Vestnik Orenburgskogo gosudarstvennogo universiteta* **5 (166)**, 143–148 (2013).
4. I.G. Fedchenko, "Microrajon na postsovetskom prostranstve: socialno-planirovochnye izmeneniya i tendencii razvitiya", *Izvestiya vuzov. Stroitelstvo* **1**, 108 – 115 (2012).
5. Landeshauptstadt Dresden, Stadtplanungsamt. Dresden - Gorbitz. Integriertes Handlungskonzept, (2009).
6. Landeshauptstadt Dresden, Stadtplanungsamt. Dresden - Prollis. Integriertes Handlungskonzept (2009).
7. Lu Duanfang, *Remaking Chinese Urban Form: Modernity, Scarcity and Space*, 1949-2005, (Routledge) (2005).
8. N.P. Krainyaya, 'To the Search of Sociality in Urban Building Formation', *Academia* **2**, 73-76 (2009).
9. K.V. Kiyanenka "Entering the Industrialization River 2: Search for Alternatives to Mass Houses Building", *Architectural Bulletin* **1 (106)**, 45-49 (2009).
10. L.L. Lawhon, "The Neighborhood Unit: Physical Design or Physical Determinism?" *Journal of planning history* **8**, 111-132 (2008).
11. N.N. Patricios, "Urban design principles of the original neighborhood concepts", *Urban Morphology* **6 (1)**, 21-32 (2002).
12. P.M. Condon, *Seven Rules for sustainable communities: design strategies for the post – carbon world* (Washington, DC: Island Press) (2000).
13. Brody, J. 'Constructing professional knowledge: the neighborhood unit concept in the community builders handbook: dissertation for the degree of Doctor of philosophy in Regional Planning in the Graduate College of the University of Illinois at Urbana- Champaign' Ph.D. thesis, Urbana, Illinois, 2014.