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A.M. Yessenbayev[1], A.A. Kornilova[2]
S. Seifullin Kazakh Agrotechnical Research University, Astana, Kazakhstan
*[1]E-mail: yess.arken@gmail.com**
[2]E-mail: 5328864@mail.ru

MODERN ASPECTS OF RESIDENTIAL ENVIRONMENT TRANSFORMATION (ON THE EXAMPLE OF ASTANA)

ТҰРҒЫН ОРТАНЫҢ ЗАМАНАУИ ТРАНСФОРМАЦИЯЛАУ АСПЕКТІЛЕРІ (АСТАНА Қ. МЫСАЛЫ НЕГІЗІНДЕ)

СОВРЕМЕННЫЕ АСПЕКТЫ ТРАНСФОРМАЦИИ ЖИЛОЙ СРЕДЫ (НА ПРИМЕРЕ Г. АСТАНЫ)

Abstract. *The fundamental reason for progress has been the constantly changing lifestyle of man and his search for new solutions to change and improve the quality of life. In addition, dynamically developing scientific and technological progress in society has had a direct influence on architecture, urban planning and the environment of the city as a whole, today is no exception to this. Concurrently, socio-economic and urban planning factors exert a substantial influence on the formation and subsequent evolution of the residential urban environment. In the prevailing circumstances, these environments are compelled to adapt and adjust to the contemporary requirements of society.*

In contemporary urban environments, the residential context is characterized by perpetual transformation, demonstrating a high degree of flexibility and adaptability. This dynamic milieu encompasses a diverse array of typological elements, reflecting the distinct subject-spatial organization of specific urban zones or territories. Issues pertaining to the human living environment are inextricably intertwined with the social dimension, as they are fundamentally grounded in social principles. The social dimension of the living environment encompasses a range of issues at different scales and levels, integrating both local and strategic state-level objectives.

In the context of post soviet cities, the capital of Kazakhstan, Astana, is a notable example of a historically formed city with a diverse urban structure, characterized by a range of morphological types. This urban form has both advantages and disadvantages when assessed against modern standards.

The urban planning structure of Astana has undergone evolutionary-temporal, spatial-territorial, status-role periods, which influenced the nature of development and the formed environment in the future. This study is a continuation of a series of articles on the issues of transformation of the residential environment of Astana, aimed at studying the stages, factors and prognostic trends in the development of urban residential environment.

Keywords:*: living environment, transformation, adaptation.*

Аңдатпа. *Барлық уақытта прогрестің негізгі себебі адамның үнемі өзгеріп отыратын өмір салты және оның өмір сүру сапасын өзгерту мен жақсартудың жаңа шешімдерін іздеуі, сондай-ақ қоғамдағы қарқынды дамып келе жатқан ғылыми-техникалық прогресс болды, нәтижесінде сәулетке, қала құрылысына және жалпы қаланың қоршаған ортасына тікелей әсер етті және бүгінде бұл ерекшелік емес. Сонымен қатар, қазіргі жағдайда қоғамның қазіргі талаптарына бейімделуге мәжбүр болатын әлеуметтік-экономикалық және қала құрылысы факторлары тұрғын үй-қалалық ортаның қалыптасуы мен одан әрі дамуына жеткілікті әсер етеді.*

Бүгінгі күні, қалалық тұрғын орта бұл белгілі бір аймақтың немесе қалалық құрылымның аумағының нысанды-кеңістіктік ұйымдастыруының әртүрлі масштабты типологиялық элементтерін қамтитын үнемі өзгеріп отыратын, икемді және бейімделетін кеңістік. Адамның тіршілік ету ортасына қатысты мәселелер әлеуметтік фактормен тығыз байланысты, себебі олардың әлеуметтік негізі бар. Тұрғын үй ортасының әлеуметтік мазмұны жергілікті атқарушы деңгейде де, стратегиялық мемлекеттік деңгейде де өзекті мақсаттар мен міндеттерді біріктіре отырып, әртүрлі көлемдегі және деңгейдегі мәселелерді қамтиды.

Посткеңестік кеңістіктегі әрбір тарихи қалыптасқан қала сияқты, Қазақстанның астанасы Астана да морфологиялық типтері бар, заманауи шаралар бойынша өзінің артықшылықтары мен кемшіліктері бар әртүрлі құрылыстары бар тарихи қалыптасқан қала-құрылыс құрылымына ие.

Астананың қала құрылысы құрылымы эволюциялық-уақытша, кеңістікті-аумақтық, мәртебелік-рөлдік кезеңдерді бастан өткерді, бұл кейіннен құрылыстың сипатына және қалыптасатын ортаға әсер етті. Бұл зерттеу Астана тұрғын үй ортасын трансформациялау мәселелері туралы мақалалар сериясының жалғасы болып табылады және қалалық тұрғын үй ортасының даму кезеңдерін, факторларын және болжамды үрдістерін зерттеуге бағытталған.

Түйін сөздер: *тұрғын орта, трансформация, бейімделу.*

Аннотация. *Во все времена основополагающей причиной прогресса был постоянно изменяющийся образ жизни человека и его поиски новых решений изменения и улучшения качества жизнедеятельности, а также динамично развивающийся научно-технический прогресс в социуме, что в результате непосредственно оказывало влияние на архитектуру, градостроительство и окружающую среду города в целом, и сегодня это не является исключением. Вместе с этим достаточное влияние на формирование и дальнейшее развитие жилой городской среды оказывают социально-экономические и градостроительные факторы, которые в нынешних условиях вынуждены приспосабливаться и адаптироваться под современные требования общества.*

Сегодня, жилая городская среда это постоянно видоизменяющееся, гибкое и адаптируемое пространство, содержащее в себе разномасштабные типологические элементы предметно-пространственной организации определенной зоны или территории городской структуры. Вопросы имеющие отношения к среде обитания человека неразрывно связаны с социальным фактором, так как имеют социальную основу. Социальное содержание жилой среды охватывает вопросы разного масштаба и уровня, объединяя актуальные цели и задачи как на местном исполнительном уровне, так и на стратегически государственном.

Как и каждый исторически сложившийся город на постсоветском пространстве, столица Казахстана Астана имеет исторически сформировавшуюся градостроительную структуру, которая имеет разнообразную застройку с морфологическими типами, со своими преимуществами и недостатками по современным меркам.

Градостроительная структура Астаны перенесла эволюционно-временные, пространственно-территориальные, статусно-ролевые периоды, которые повлияли на характер застройки и формируемой среды в последующем. Данное исследование является продолжением серии статей о вопросах трансформации жилой среды Астаны, направленные на изучение этапов, факторов и прогностических тенденций развития городской жилой среды.

Ключевые слова: *жилая среда, трансформация, адаптация.*

Introduction. Today, the trends of development and transformation of any modern city are continuously connected with the formation of an optimal environment for comfortable living and safe performance of all life processes of the population (Yessenbayev et al., 2024). The primary task of urban planning and architectural and design activity in general, is the formation of the environment of planned organization for its more rational development. The global practice of actual environmental design has changed its approach and now it is distinguished by a special socio-cultural aspect, as modern trends in urban planning and housing design, organization and planning of residential and public spaces take into account the needs of all categories of citizens and strive for their adaptation in new or already formed spaces and territories. However, it should be understood that over time, in the conditions of stable development of socio-economic and scientific-technical potential of society, the concepts of comfort will change in the direction of increasing the requirements of housing consumers, as it is a constantly changing phenomenon (Chaly & Kornilova, 2024).

Astana, as a dynamically developing and open to new solutions, is actively forming comfortable urban spaces both in new and historically established public and residential areas. At the same time, there are urgent tasks that require immediate intervention and solution, as the dynamic pace of development of territories does not always meet design, artistic and expressive and moral and ethical requirements.

The purpose of this study is to analyse the existing situation of residential environment, to identify its advantages and disadvantages, comparative analysis, as well as the hypothesis of the work is classification, identification of comfort indicators, as well as prognostic trends in the formation and further development of residential environment and residential development with different morphological structure.

This article considers the works of foreign and domestic scientists, views of professional specialists, architects and urban planners. However, despite a significant number of publications, many issues of residential environment formation and its transformation in modern conditions are still insufficiently researched, in particular, the concept of comfort of residential environment and its components, the dependence of residential environment formation on the general plan, changes in the status of the city and its functional organization, changes in socio-economic conditions in a particular territorial unit are not sufficiently disclosed.

Materials and methods. This article considers the current state of the housing environment in the context of the development of the general plan of Astana city. The research methodology applied by the authors is based on the consistent comprehensive consideration of the solution of the problem. In the process of work the complex approach including several methods of research was applied:

1. Method of studying archival data, scientific publications of domestic and foreign researchers, scientific and educational literature, regulatory and technical base. Identification of established theoretical concepts and scientific approaches within the research. At the initial stage of this study, the collection of material was carried out, showing the step-by-step development of the residential environment and the general plan of Astana;

2. Method of statistical analysis. Referring to official data from open sources, the statistical method allowed to collect, analyze and summarize data on the population and housing stock, for the last 5 years.

3. Method of generalization of results. In connection with the scale of this study in the final stage is carried out generalization and clarification of the results obtained.

Results and their discussion. Separate residential buildings, groups of residential buildings and complexes form the main form-forming volumes of the city, being the dominant structure of the residential zone they create compositional unity and integrity of residential development. Groups of residential formations and neighborhoods combine elements of necessary social and domestic services, their environmental content is aimed at optimally favorable conditions for the organization of life activity of the population (Manahasa & Manahasa, 2020).

At all times, the living environment has had a close connection with the way of life of man, as by nature it is an artificially created space by him himself. (Vyrlan, 2016). The human habitat, i.e. the external living environment, is a combination of complex social systems and cultural relations where many processes of social life intersect. The timeline shows the evolutionary stages of residential environment development, where the attitude of designers to the consumer was clearly formed. The modern approach of post-industrial society to the formation of living environment emphasizes the consideration of the basic requirements of the human being, making him a participant of the created dynamic structure (Sonyak, 2020).

Nowadays, the issues of forming a comfortable residential environment are of particular interest not only to architects and urban planners, but also to landscape designers, construction companies, sociologists, psychologists and public figures, as this space has a direct impact on existing and

erected housing, final pricing, the comfort of the population and the surrounding urban environment as a whole (Generalov & Generalova, 2015). In architectural science, the concept of living environment has a wide range, the scope of which starts from the residential cell and ends with the general plan of the city. However, it should be noted that there is still no clear concept and definition of the comfort of the living environment and its forming components, so different specialists understand it in their own way, which is probably one of the reasons for the organization of the living environment at a satisfactory level (Yessenbayev et al., 2024).

In modern domestic and foreign architectural and urban planning theory and practice there is a great experience of urban environment design, which differs absolutely cardinal techniques and methods of design, hypotheses and paradigms in different time periods (Abdrassilova & Danibekova, 2021). The existing experience in the development of territories with objects of different functional purpose, scale and volume, organization of comfortable living conditions for the population allows to create the necessary comfortable living environment, but at the same time a number of significant omissions are allowed, the results of which are formed in unforeseen directions and volumes of development objects that do not correspond to the approved and current urban planning projects, which include the general plan, detailed planning project and project (Yarmosh, 2014).

Currently, according to the official statistical data of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, the area of the territory is 79.5 hectares, and the population of the city in 2024 is about 1.5 million people (Fig. 1).

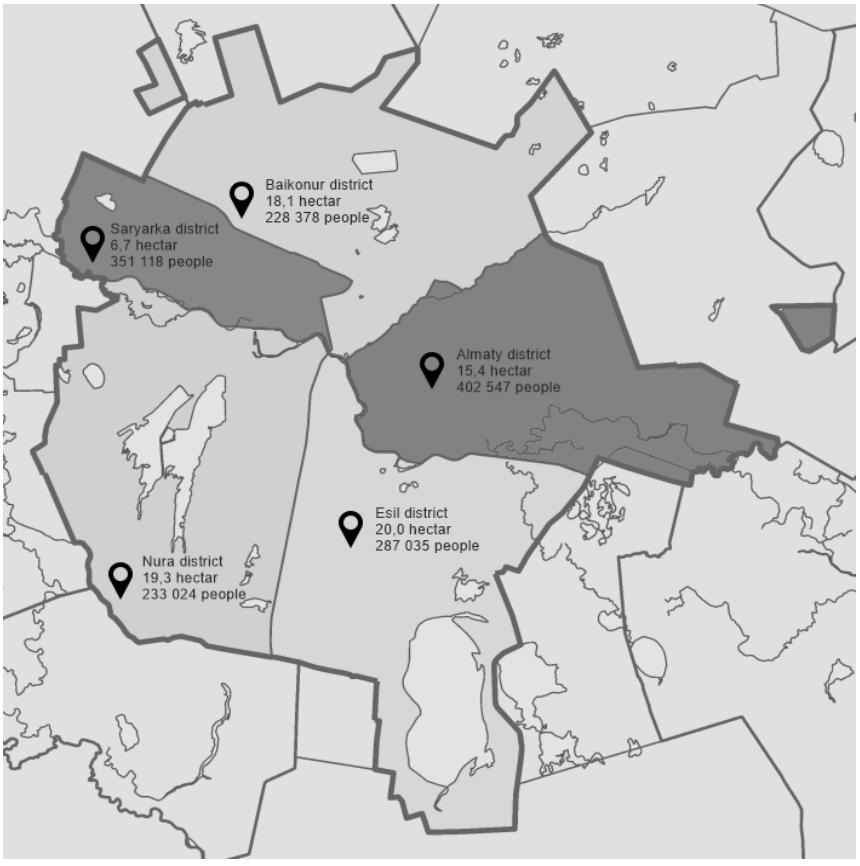

Figure 1. Map of Astana

Note – compiled by the authors (Yessenbayev, 2024)

Spatial and territorial development of the city is regulated by a number of normative documents in the field of architecture and urban planning, as well as by local executive bodies (Schreyer et al., 1981). Prospective development of the capital is carried out in accordance with the general plan, which is the main document for planning the urban development of Astana in order to create a favorable living environment and sustainable development of the city, ensuring environmental safety, preservation of nature and cultural heritage (Makhmetova et al., 2022).

Today Astana is a promising and dynamically developing city with a progressive level of urbanization. Geopolitical status of the capital, global and state economic instability is a significant cause of external and internal labor, educational and regional migration, outflow of population from rural areas and their concentration in the city, as a result of which all this has led to a high demand for housing. Today, the housing stock of the capital city is progressively growing and is built up as a rule with multi-storey residential buildings and complexes, forming a high-density development (Fig. 2). The population density of the city in 2024 is 1839.63 people/km^2.

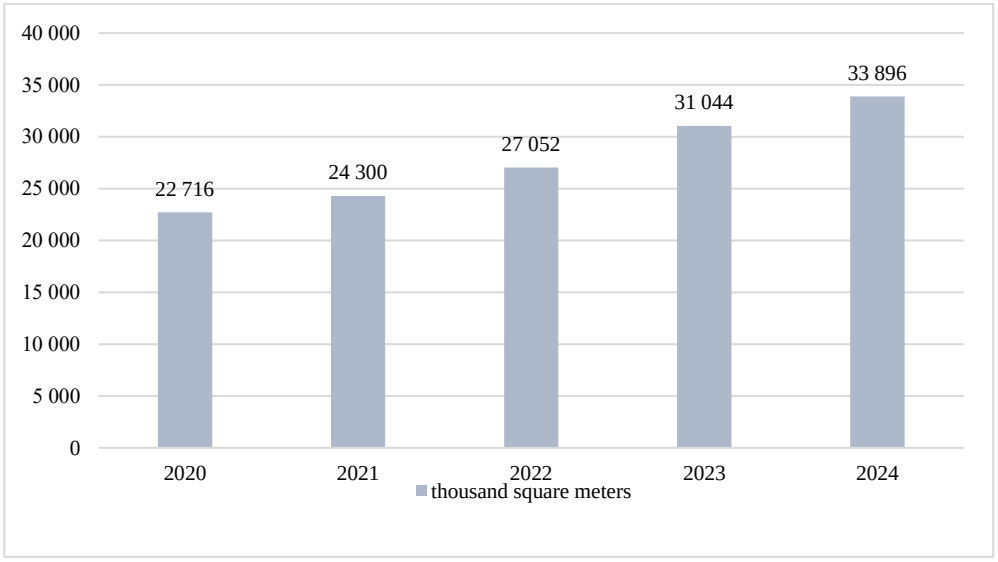

Figure 2. Total area of Astana's housing stock

Note – compiled by the authors

One of the main goals of the development and transformation of the city is to eliminate the disproportion in the comfort of living, in particular, in terms of housing stock. Thus, the capital has adopted the indicator of housing stock provision of 30 m2 per person, and to achieve this level of comfort of living it is planned to increase the housing stock to 68250 thousand m2, which accordingly implies to follow the process of formation and improve the quality of the future residential environment.

The main task of urban planning is the formation of volumetric and spatial organization of the territorial development of the settlement, the spatial content of which has a medium diversity, that is, the development of territories with elements of different morphological type (Jóźwik, 2024). Astana has a tendency to develop the development of high-density multi-storey residential buildings, without taking into account a number of features, such as the gradation of storeys depending on the location in the structure of the city, morphological types of development of residential neighborhoods, which predetermine the density of the area, the increase in recreational

and leisure areas, developed social infrastructure. Also important is the development of individual territories, which are built according to the established classification of housing comfort, which in consequence will lead to negative consequences, such as disunity and social stratification of society, the tendency to form territories with more detailed development and infrastructure.

Today, the dynamic processes of urbanization and active development give rise to the following problems, which are relevant not only for Astana, but also for other major cities of the Republic of Kazakhstan as a whole:

– point development, as well as development not corresponding to the established urban planning projects of the city;

– non-compliance with the principles of established urban planning regulations and design code of the city;

– insufficiently developed level of social, engineering and transportation infrastructure in the new territories;

Conditioned by the regulatory restrictions of approved and existing urban planning documents, the urban territories of Astana have only two main spatial-territorial development – horizontal and vertical development (Kornilova et al., 2022). Thus, the demand for vacant inner-city territories is increasing, where dense high-rise point development takes place. Naturally, there are currently a number of regulatory documents to regulate the density limits, but the reality does not always correspond to them.

Point multi-storey development is the most popularly practiced type of development, most often in the form of single-section tower-type houses. Nowadays, on the one hand, it has positive solutions in the form of development of vacant free territories; the possibility of project realization in conditions of a small land plot; construction on the partially demolished territory of emergency housing or garden societies, forming a new image of modern architecture and residential formations. A separate advantage is a rare but successful integration into the existing development, which does not violate the established compositional and artistic unity and integrity of the construction area.

However, it should be noted about the presence of negative (negative) consequences of point development, which include the following indicators:

1) violation of compositional integrity and visual connection of the established development. Development of the territory with an object that does not correspond to the surrounding environment in terms of number of storeys, scale, architectural appearance and so on, which violate the visual unity of the existing environment.

2) displacement of socially vulnerable strata of the population to the outskirts of the city, which is caused by the demolition of obsolete and emergency housing, as well as garden societies, which were the only dwellings of citizens. The resulting unfair and not corresponding to the real estate market compensation amount does not provide an opportunity to purchase decent housing in a favorable area of the city. As a result, citizens are forced to consider less comfortable conditions, buying housing on the outskirts of the city, where most often the level of comfort, improvement and safety is at an unsatisfactory level. This also includes inexpensive rental housing, which attracts migrant workers. The lack of proper, first of all, social and infrastructure in the emerging peripheral areas creates social tension, forcing residents to travel long distances on a daily basis.

3) As a result of all of the above, there is a high risk of environmental degradation, where zones with unregulated chaotic development, decline of all types of infrastructure, increase in the level of criminalization are formed, which together have a negative impact on the level of comfort and livelihood of the population of the territory and the city as a whole.

The opposite of point development is neighborhood development, which is now widely practiced in many countries and is increasingly attracting the interest of construction companies and consumers. Unlike point development, neighborhood development has the following

volumetric and spatial characteristics:

1) feelings of comfort and security of residents, due to the perimeter and enclosed development. Delimitation of private and common gives an opportunity to develop internal yard recreation, minimize the formation of through pedestrian and carriageways;

2) clear definition of the boundary of residential and public zones. Residents visually determine the boundaries of public and residential zones;

3) development of social infrastructure on the outer perimeter, which gives the opportunity to conduct commercial activities without prejudice to the residents of residential buildings;

4) placement within certain boundaries or streets, makes it possible to carry out gradation of development, as each quarter will be perceived as an integral residential formation.

It should also be understood that the modern transformation of the residential environment is a complex system of architectural and urban planning tasks, which combine multi-scale and multi-dimensional goals. Transformation processes at the modern stage should start with a reasonable functional planning and organizational structure, take into account the natural scale, proportions, coloristic solutions of forms, developed landscaping and infrastructure, which as a result should meet the requirements of all categories of the population (Olczak et al., 2022). The development of a comfortable living environment, as well as in its design, is constantly influenced by the following set of factors, ignoring which in modern practice is inadmissible:

– urban planning;
– natural-climatic;
– socio-economic;
– cultural-historical;
– ecological;
– functional-planning;
– psychological.

Integration of the residential environment with the existing or emerging space, taking into account landscape, inclusive, engineering and technical means, as well as discussion of topical issues with the population, making it a co-participant in the design process, should become a new and natural method of design (Belmahdi & Djemili,2022).

Conclusions. Based on the above, the study has established the following conclusions:

1. In order to form a multi-scale environment, it is necessary to use a building with variable storeys, which would not create the effect of confinement.

2. The expressiveness of facade solutions, their coloristic solution and materials used should be different and not create a monotonous volume. Exclusion of visual interference, compliance with the principles of the design code of the city.

3. Detailed and qualitative development of recreational and green areas. Variability landscape organization and landscaping, small forms, lighting.

4. Development should be carried out taking into account the psychological and visual aspects of human perception.

5. The urban structure has indicators of density in each specific area, and taking into account the individual indicators of a particular area, the city should be zoned and establish regulations on morphological types of development, which will create variability of design solutions.

Summarizing the above, it is worth noting the scale of the residential environment, which should take into account a number of local features when forming in certain areas. This study considers the task in the urban planning aspect on the example of a specific urban planning unit. In the future, the authors aim to continue the series of articles devoted to the study of residential environment, its current trends and transformations, focusing on specific and limited areas.

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"Notification of the use of generative AI and technologies using it during the writing of the manuscript". These technologies were not used in the preparation of this paper.

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Information about authors

Yessenbayev Arken – PhD candidate, S.Seifullin Kazakh Agrotechnical Research University, Astana, Kazakhstan, E-mail: yess.arken@gmail.com ORCID: 0009-0002-5822-2602, +7 702 929 97 25

Kornilova Alla – Doctor of Architecture, Professor, S.Seifullin Kazakh Agrotechnical Research University, Astana, Kazakhstan, E-mail: 5328864@mail.ru ORCID: 0000-0002-1852-0712