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DEFINING AND MODELING URBAN SPACE IN RESIDENTIAL AREAS – CAN NUMBERS LIE?

DEFINIOWANIE I MODELOWANIE PRZESTRZENI MIEJSKICH OBSZARÓW MIESZKANIOWYCH – CZY LICZBY MOGĄ KŁAMAĆ?

Abstract

The methods of planning and optimising the residential environment are constantly changing. It is a natural reaction to social transformations, technological development, and environmental conditions. Increasingly, the method of defining space depends on various types of numerical quantities. Is the achievement of optimal sizes tantamount to creating a friendly, attractive and most importantly acceptable space for residents? Do the coefficients and numbers represent its true value or do they lie? The study characterised and compared different concepts. The goal was to present the changes that have occurred in the design of the habitat. Some suggestions raise many doubts. The results of the analysis encourage reflection on the direction of the development and methods of modelling living space in modern cities.

Keywords: urban transformations, design of living space – methods, optimization, parametrization

Streszczenie

Metody planowania i optymalizacji środowiska mieszkalnego ulegają stałym przemianom. To naturalna reakcja na transformacje społeczne, rozwój technologiczny, uwarunkowania środowiskowe. W coraz większym stopniu sposób definiowania przestrzeni zależy od różnego rodzaju wielkości liczbowych. Czy osiągnięcie optymalnych wielkości jest równoznaczne z tworzeniem przyjaznej i atrakcyjnej, a co najważniejsze akceptowanej przez mieszkańców przestrzeni? Czy współczynniki i liczby przedstawiają jej prawdziwą wartość, czy ją zakłamują? W badaniach porównano odmienne koncepcje. Celem było przedstawienie zmian, jakie nastąpiły w zakresie projektowania habitatu. Rezultaty analiz skłaniają do refleksji nad kierunkiem rozwoju i metodami modelowania przestrzeni mieszkalnej we współczesnych miastach.

Słowa kluczowe: transformacje urbanistyczne, projektowanie przestrzeni mieszkalnej – metody, optymalizacja, parametryzacja

1. INTRODUCTION

The subject of modelling and optimization of residential environment is one of the most important design and research issues in urban planning and architecture. Images of an ideal home, flat or housing estate are changeable and are subject to periodic re-evaluation. It is a natural reaction to civilization development, social transformations, and environmental conditions. The emergence of new solutions is accompanied by questions about how the place

where we live shapes us and our consciousness. How it affects our behaviour and social relations. Current problems give rise to new theories, manifestos, postulates and models. We can distinguish many characteristic development trends in the history of housing development. In most of them, figures and indicators played a key role. In the modernism period, the minimum parameters for residential structures, in terms of demand for existential space, were determined. When planning large settlements in the second half of the 20th century, urban norms were used to help optimize urban planning. They concerned, among others, the relationship between building intensity, usable area and the number of inhabitants. They determined appropriate relations between areas with different uses. Their usage led to various results. In Polish conditions, the number and pace of implementation was often more important than the quality of space planning. Despite this, many interesting assumptions have been made in which the idea of “urban parametrization” proved to be working and bringing good results. Changes occurred after 1990. Increase in land prices, lifting formal restrictions on planning, economic transformations contributed to the intensification of development and unfavourable transformations in programming of the residential environment. One of the reasons for the randomness and organisational chaos of current investments is the lack of unambiguous indicators that would force investors and designers to make rational, interdisciplinary actions.

At the same time, new parameters and criteria of assessing the quality and efficiency of designing housing estates and their impact on the environment are emerging. Simulations and comparisons related to building performance over life cycles and resistance to many years of operation are being carried out. Changes in architecture have consequences on an urban scale. Designing new districts or cities is based on previously unknown principles. The present time is characterised by a high rate of technological progress. We observe the consequences of this process in many areas of life. In the process of so-called decentralisation, people become part of the bio-techno-logical reality. We are entering an epoch of post-humanism in which humans cease to be the measure of all things. Our main role in relation to the surrounding environment is questioned. The domination and the increasing share of technology mean that classic theories about our role in the world are redefined. Trends of this type are becoming more and more present in architecture. Symbols of humanism and anthropocentrism, the Vitruvian model, the golden ratio or even the Le Corbusier modulator, are moved aside. Technical aspects are no longer seen merely as a complement to basic creative ideas. They are often key elements, playing a leading role in creation processes. In theoretical considerations, concepts of cities of the future are made in which the main role is primarily played by statistical data. Their structure is defined only by information. Ideology, history or culture are not important in planning, there is no context or composition. There are only numbers and indicators. Transformations resulting from the application of specific parameters are analysed. Simulations are carried out using specific data on, among others, different forms of settlement (in terms of intensity) or the negative impact of urbanisation on the state of the environment. It is data visualisations that have a direct impact on the direction and planning method, not visualisations of space. Solutions based on numbers and interconnection networks are the basis for the increasingly popular smart cities. The principles of operation of Smart Cities assume the use of various types of digital platforms, electronic sensors for data collection and transfer and, consequently, for effective management of created resources. The city functioning as a network is thus prepared to react quickly to the needs of its citizens. In the majority of the introduced “smart” systems, the achieved results are positive, allowing for an optimistic view of the future.

However, there are also critical voices questioning this direction of development and the methods used. There are allegations that intelligent cities are planned as arrangements that are too theoretical. They are artificial due to the dominance of technology and their structure is devoid of aspects of randomness and spontaneity that is so typical of many cities. A smart city can overwhelm with the level of technical solutions and the ubiquity of technology. People are under surveillance at every turn and do not feel comfortable. Instead, they would prefer cities to be shaped with their greater participation, but in a natural way. Focusing on the positive side of the idea may obscure the negatives associated with the development of the infrastructure itself. Its impact on users' health, including mental state, is not entirely known. In low-income countries, these types of assumptions are marginal and do not affect the vast majority of the population. Focusing on smart cities can further increase social inequalities. There is a concern that popularising this vision of urban development will become too dominant. The pressure of large corporations on participation in urbanisation processes may put aside and, as a consequence, ignore no less valuable alternative solutions. When problems accumulate and new development concepts are being introduced, it is worth paying attention to the general changes that occur in the field of habitat modelling. Is the achievement of optimal parameters tantamount to creating a friendly, attractive and most importantly acceptable space for residents? Do the coefficients and numbers represent its true, real value or do they lie? Are they reliable indicators of the comfort and quality of life? In the pursuit of efficiency, do we not undergo too much illusion of parameterization, forgetting about other aspects that are equally important for the quality of the living environment? Should technical and economic issues really be treated as the overarching determinants of the quality of contemporary urban planning and housing architecture? In the search for universal solutions, it may be helpful to compare past and present planning methods.

2. SELECTED EXAMPLES – COMPARISON OF METHODS AND MODELS

The subject of the analysis are examples of high innovative value and diametrically opposed characteristics. These are solutions that, in many respects, were ahead of the time in which they were created. They illustrate the specificity of approach to issues of designing residential environment against the background of various conditions. They illustrate relationships that occur between the type of space organisation and users' expectations and their ideas of an ideal habitat. The presentation may be a contribution to the discussion on changes that have taken place in the directions and methods of shaping urban housing areas. Various types of parameters and indicators played an important role in the analysed examples. They influenced the final way of shaping space.

The first study was made by a team of architects under the direction of J. Buszkiewicz in 1985 (J. Buszkiewicz, T. Durniewicz, S. Sipiński, E. Skrzypczak). "The model structure of urban housing areas" is theoretical, although it is closely related to the concept of **Zielone Wzgórze** town, which was implemented in the 1980s near Poznań.¹ Zielone Wzgórze, at the time it was created, was a breakthrough in thinking about planning housing areas

¹ J. Buszkiewicz et al., *Modelowa struktura miejskich obszarów mieszkaniowych*, Architektura, 1986 no. 2.

in Poland. The concept broke with applicable standards and was in many respects a unique solution. In this case, one can speak of a kind of an experiment that was not only urban and architectural, but also technological and sociological in character. The period in which the idea was formulated can be called a breakthrough period. The 1980s in Poland was a time of political, economic and social transformation. In urban planning and housing architecture, it is the beginning of organisational changes, the end of the cooperative system, the abandonment of industrialised technologies and the end of large housing estates. Instead of another mega complex, the architects proposed a new urbanisation model. The idea was to create a so-called Federation of Small Towns. The federation, as the name suggests, was to be a structure composed of several small, autonomous and yet inter-connected towns. Each town was to be built on the basis of the already existing centres. Similar spatial composition and size (maximum 5–6 thousand inhabitants) were common features.

The vision of the originators assumed the use of a traditional small-town model, typical of the Wielkopolska region. The heart of the individual centres was to be the market as a crystallising element with representative and integrating features. The clearly defined centre was complemented by public buildings, occupying important places in the urban space. The rule was to use a human scale. Low-rise buildings constituted the main component of the designed quarters, squares and streets. In the adopted system of organisation, the principle of organising space was preferred. Systems of varying degrees of importance and accessibility were created: public, semi-public and private. Due to the special location, an important postulate was to adapt urban structures to the landscape and ecological values of the existing state. The limited size of towns was to promote communication with the inhabitants at the planning stage, followed by operation and management. This aspect was crucial for the creators of the federation. The author of the foundation, J. Buszkiewicz, was convinced that it was one of the basic conditions for the success of the entire undertaking. "If we design a city for 4–5 thousand inhabitants, there is a chance that we will learn their needs and wishes. If we form large complexes of 30 and 50 thousand, then opinions are provided indirectly by representatives. This leads to information corruption and malfunctioning of the whole body."² Residential complexes implemented in the Netherlands, Great Britain and Scandinavia served as models. Close relationships with postmodernism are evident.³ A team of architects cooperated with a specialist in environmental psychology, Prof. A. Bańka. The goal was to create a system optimised also in terms of social reception

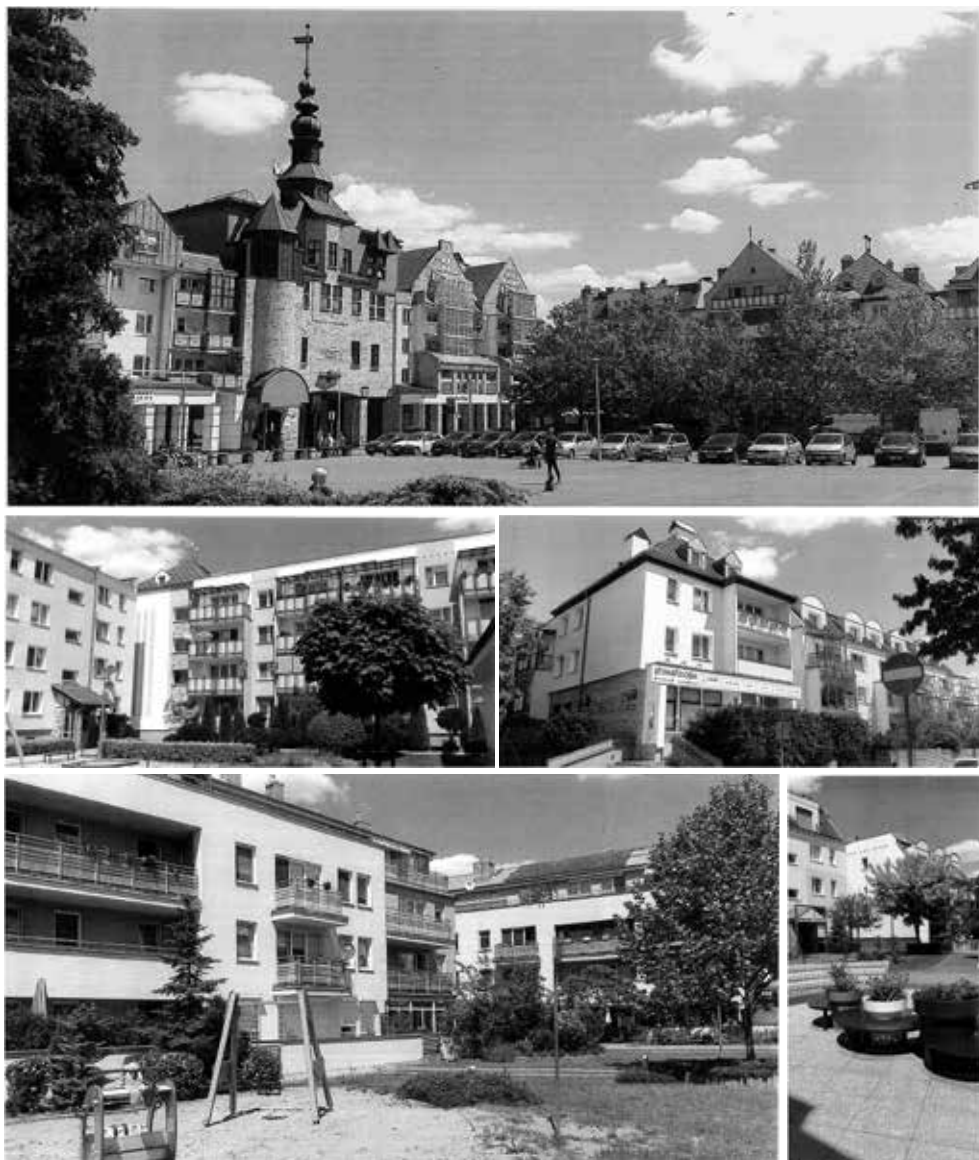
² W.J. Molicki, *Miasteczko Zielone Wzgórza według idei Jerzego Buszkiewicza*, Typoscript, Wrocław 2002.

³ For the needs of their own method, the authors examined global implementations in terms of their most interesting indicators (including population density and building intensity). Settlements and small-scale complexes were taken into account. The analysed examples consisted of buildings not higher than 4 floors with a fragmented low-density and medium-density structure. Research has shown similarities in the area of applied solutions. Since 1930's, the average living space per capita in Europe has been between 25 and 30 m². This amount guarantees fair living conditions. This indicator was considered one of the main parameters of habitat modelling. Greenery per capita was another important finding determining the way the land was shaped. In the analysed complexes, the size oscillated from 6.5 to 11 m². In addition, characteristic indicators for housing density were established. For complexes with a predominant share of two-story buildings, the number of inhabitants per net hectare was about 250. In complexes with an average height of up to 4 floors, this parameter increased to 300 or even 350 inhabitants / ha. However, in the case of higher and more intensive buildings, it was above 500 inhabitants / ha. It was established that the average density reached 430 inhabitants per ha.

and interpersonal relationships. The notions of “place,” “architectural environment” and “living environment” played a central role in the discussion. The author defined the living environment as a living area, subjectively distinguished from the entire city space, with which people identify, in which they fulfil various needs, and for which they have a mental representation in the form of a cognitive map. Particular emphasis was placed on issues regarding the users’ relationship with the place.⁴ What we see here is an attempt to justify one of the most important assumptions of the designers. Their ambition was to create spatial arrangement with which residents would uniquely identify, which they would want to return to, and which would become their real “home.” The authors came to the conclusion that a model of a small city would be a role model to follow. The nature of these assumptions, their composition, scale and density are generally understandable and legible. One of the main priorities was to obtain optimal housing density. Other parameters such as building density, street network density, building height, and intensity were closely related to this concept. Appropriate relations between these elements were to allow the creation of space on a scale acceptable by residents and a diverse form that triggers a sense of satisfaction, contentment and comfort. The density was to translate directly into the nature of space. This relationship is of fundamental importance in the context of building a specific urban climate. It is difficult to get a picture of the city with a population of less than 250 inhabitants per ha. It was established that for rural areas this value is from 52–190 inhabitants / ha (with a building height of approx. 1–3 storey), for a small town 50–230 inhabitants / ha (2–4 storey) and for a city 230–500 inhabitants / ha (1–8 storey). Communication problems were one of the most important issues. In this respect, the conditions and standards differed significantly from those currently encountered. The degree of saturation with cars was much lower.

Common underground parking lots were not designed at that time. The main task was to ensure a sufficient number of parking spaces for the assumed population density in the area. A principle was adopted that they should be entirely located on access streets, around building blocks. The street grid has become denser. This in turn contributed to the division of space into quarters. Significant shortening of access routes from buildings to street parking lots was considered beneficial. It was assumed that their number in the immediate vicinity of the buildings should be equal to the number of apartments. The calculation was based on the assumption that each apartment was inhabited by 3.5 people. For a specific density of 430 inhabitants per ha, 123 parking spaces were needed. With a width of 2.5 m per space, the total length of the street necessary for parking, in the peripheral zone of the quarter, was 307.5 m. Providing parking along the blocks eliminated the need to create access routes to collective square car parks. Large spaces filled with cars were to disappear from the city landscape. This gave rise to the so-called multi-purpose streets. An important element of modelling was determining the optimal dimensions of the courtyards of individual quarters. The reception of this type of space depends on the proportions and absolute dimensions. A central angle is often a suitable measure. For an urban interior, it should be between 25 and 30 degrees. Given the above arrangement, a backyard in a single-storey building should be approx. 12 m wide, 21 m wide for 3 storeys, 30 m wide for 4 storeys and 43 m for 5 storeys.

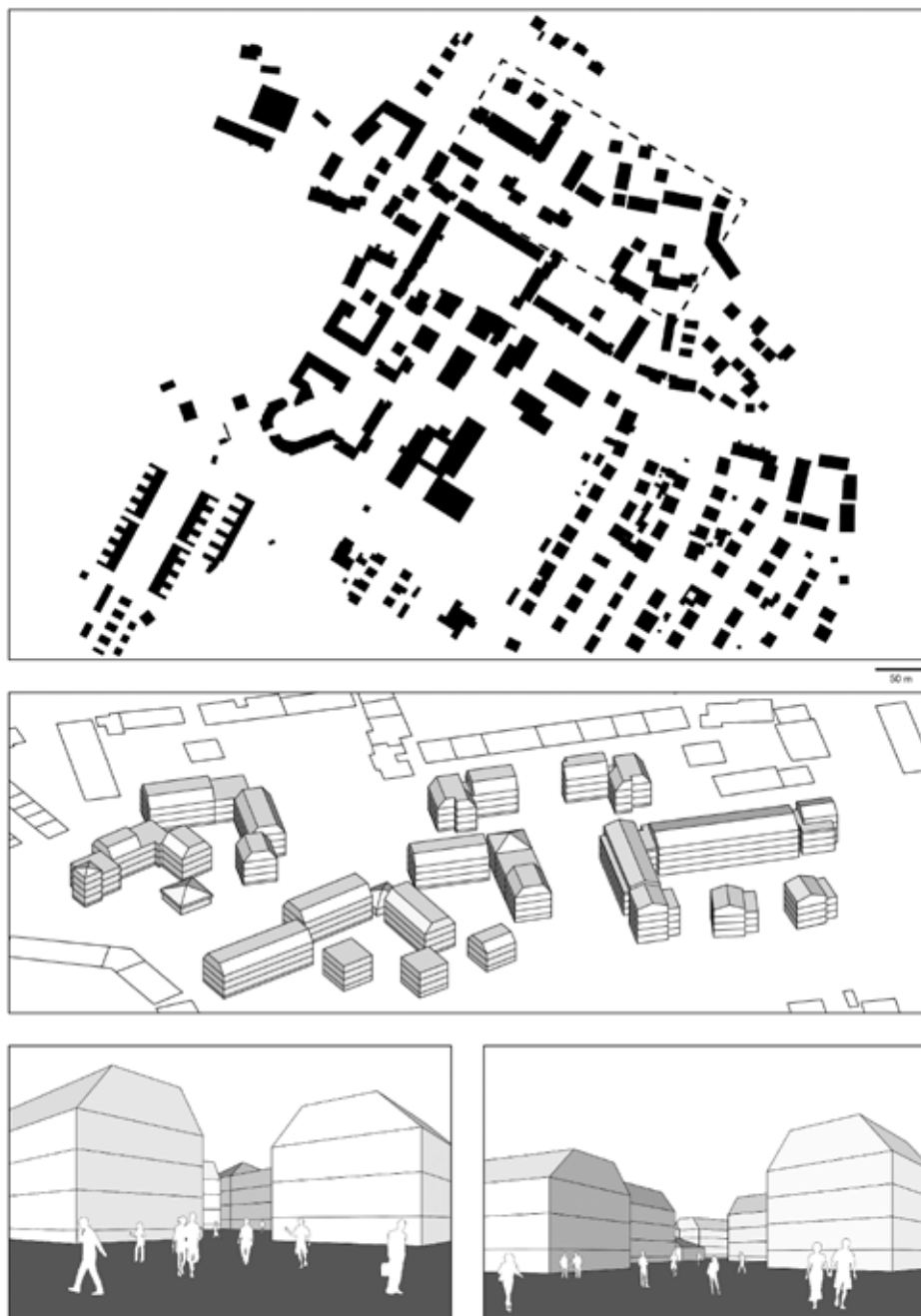
⁴ A. Bańka, *Architektura psychologicznej przestrzeni życia. Behawioralne podstawy projektowania*, Gemini, Poznań 1997.



Ill. 1. Zielone Wzgórza 1984–1997, project: arch's. J. Buszkiewicz, T. Durniewicz, S. Sipiński, E. Skrzypczak (photo: author)

The issue of shaping the appropriate parameters is not a purely mathematical operation. In this case, the authors also cited sociological research, according to which 40 m gives a sense of optical discretion. Such distance is preferred and accepted by residents and determines high comfort of use. An important aspect of the analyses were the determinants of human territorial behaviour. Courtyards as so-called semi-private space, should allow freedom of choice of behaviour. At the same time, too many opportunities in this area may cause neighbourly conflicts. The proposed model regulated the general nature of the proposed

Zielone Wzgórza



III. 2. Zielone Wzgórza 1984–1997, project: arch's. J. Buszkiewicz. T. Durniewicz, S. Sipiński, E. Skrzypczak (drawing by the author)

assumption. The analyses allowed to determine the most important features of the living environment – the atmosphere and the scale of space, building, population and street network density, the height of buildings, the ratio of the commercial to residential part, the way public and semi-private zones are organised. Basic building parameters were established. The buildings were to have from 3 to 5 floors, net intensity was set at 1.0–1.5, average net density of residents at 430 inhabitants/ha and the total residential area per 1 inhabitant at 30 m². In addition to general quantitative data, the designers drew attention to the need to take into account cultural patterns, typical for the conditions in Poland. In this case, it was important to refer to the characteristics of native small-town spaces. The importance of diversity of urban structure created from streets, squares, and avenues, as well as quarters surrounded by streets was emphasised. All these elements were to be helpful in creating the so-called mind maps of the city.

Based on the completed analyses, three basic types of urban development were defined: central, transitional and peripheral. They were in line with the accepted idea of a city with a growing and variable height, depending on location. They differed, among others, in terms of building density and population, as well as the size of quarters. For example, for the “centre” variant, the following parameters were adopted: 5-storey buildings, a quarter with external dimensions of 75 x 75 m, terrain with two-sided street parking lots 120 x 120 m, net intensity 1.7, net population intensity 1.36, area 0.83 ha and a living area of 11.280 m². The authors emphasised that the model remains only a model – a measure of correctness based on selected indicators. In any case, it should be adapted to the place of development and the specific program. It can be used to analyse housing complexes of a similar nature, e.g. in the field of space shaping and drawing conclusions regarding the economics of the solutions used. The results of the analyses were not meant to create a rigid canon of rules and recipes for an ideal habitat.⁵ Parameters and numerical quantities were used creatively, and most importantly with a visible benefit for the quality of space and comfort of living. They have become a useful programming and optimisation tool. It can be stated that the authors managed to implement the assumed project postulates. It is worth noting the innovative nature of the investment project in the context of current trends at that time. The assumptions of the entire federation and the town of Zielone Wzgórze, created almost half a century ago, are in many respects convergent with the ideas of sustainable development in modern urban planning.

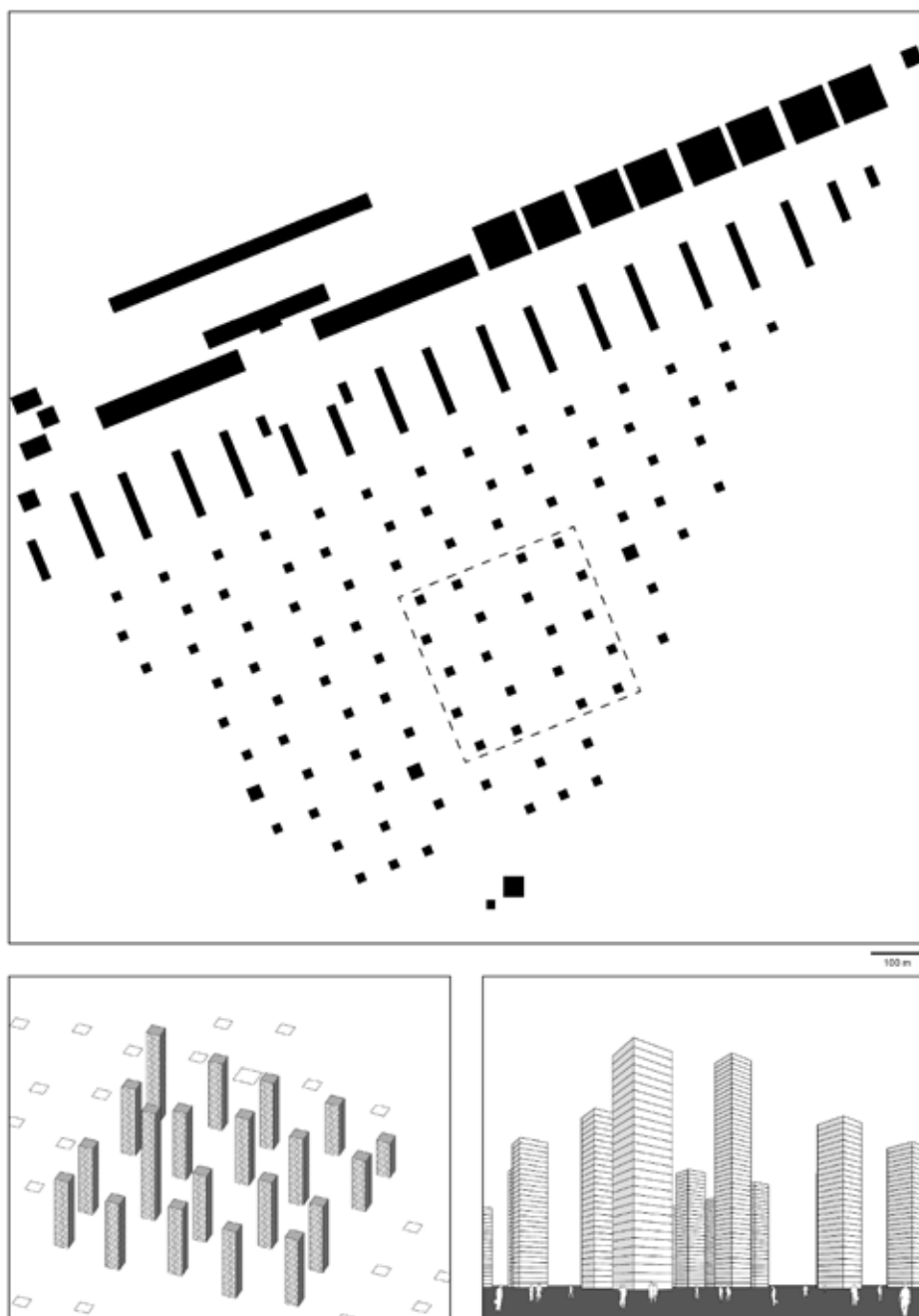
They assume, among others, compactness and density of buildings, the advantage of “low-dense” models, shaping hierarchical systems, harmoniously combined with the natural environment, as well as the use of traditional spatial typologies, e.g. quarterly buildings and urban interior systems. Of key importance are multifunctionality, comprehensiveness and program complementarity, as well as flexibility of the structure, allowing for transformations and changes in its functions, and proximity to supplementary functions (minimising distances, renouncement of segregation). The priority is striving to maintain social balance, creating complexes with a diverse structure in terms of status, age and worldview of the inhabitants. Most of these demands were successfully implemented in a small town near Poznań.

⁵ According to the authors, normative postulates – parameters and indicators related to architecture and urban planning should leave a margin of freedom, enabling creative action and even, in extreme cases, negating the normative itself.

The concept of the so-called **Tower Island** (Wyspa Wież) was developed in 2019 (authors: S. Rosolski, R. Barełkowski). The project is at a preliminary stage but already arouses interest due to its large scale, as well as specific and unconventional assumptions. A new housing estate or maybe a small town is to be built at the former airport in Ligowiec near Poznań. The place of the investment project is located on the outskirts of the city. The town has about 1.5 thousand inhabitants. The spatial context is a landscape typical for this type of location, dominated by low, single-family housing and commercial and industrial facilities. The architects' vision is bold and innovative for many reasons. The project involves the construction of a residential complex consisting of medium-high buildings and nearly 100 high-rise buildings on an area of approximately 10 ha. According to estimates, up to eight thousand people could live in the buildings. The investment is to be built, as previously mentioned, in a lowly urbanised area, in the vicinity of small enclaves of single-family and industrial buildings. The first problem seems to be the location itself, which for many is quite random and devoid of any "attachment points". The way the space is organised and the composition of the whole system raises big doubts. The project uses solutions related to modernist urban planning. A clear spatial and functional segregation was introduced. In the north there is a transport zone (railway line with a station and national road Poznań-Gniezno). The service and trade zone is planned below. Next, there will be lower buildings situated in a row and residential "towers" that will be directly adjacent to the existing forest. It is the towers that are to be the characteristic element of the entire undertaking. According to the plan, 133 buildings are to be built, including 98 with a height of 50 to 160 meters. The area will also include four-storey residential buildings, service, educational facilities, small production plants and a church. The designers note that the distances between the high buildings will be from 40 to 70 m. In their opinion, this is enough to obtain interesting spatial effects and at the same time provide adequate comfort to users (no obscuring, privacy).

The building's extensiveness is perceived as one of the biggest advantages of the solution. It will free the area, introduce large areas of greenery and optimal sunlight. These are the classic dogmas of modernism formulated almost a hundred years ago. Nevertheless, high, point-like buildings raise great doubts. The proposal is surprising and causes many objections. A question arises whether this type of solution complies with the principles of a sustainable and compact city. How will the shaped space affect users? Will height contrasts and distances between buildings foster neighbourly contacts? Will they have a positive impact on building a sustainable, social structure of the estate? Will they not generate attitudes known from other mega estates – anonymity, indifference and disintegration? Are we not in danger of returning to the period of large housing complexes from the '70s of the last century? This and no other way of organisation is closely related to the concept of an ecological housing estate. All buildings are to be almost zero-energy or passive. Their operating costs should be minimal, as should emissions of harmful substances (maximum reduction of the carbon footprint). The use of energy sources that are, to a large extent, renewable is expected. To achieve the assumed effects, it was necessary to introduce such a specific system. Only if appropriate spatial and program regime is maintained, is it possible to provide all customers with comparable operating conditions. In this case, the simplicity of solids, modularity and repeatability, as well as the appropriate location in relation to the sides of the world are important. It is not about creating systems that are formally attractive.

Wyspa Wież



III. 3. Wyspa Wież 2019, project: arch's. R. Barełkowski, S. Rosolski (drawing by the author)

The diversity of space referring to historical urban systems is not important. There is simply no room for compromise here. It seems that the authors came to the conclusion that most of the previously used schemes should be ignored. The housing estate is to be primarily self-sufficient, almost autonomous and, what is important, neutral towards the environment. The justification for the formulated guidelines is, among others, a comparison with an alternative solution in the form of free-standing, single-family housing. According to the designers, we are currently dealing with a kind of “oversupply” of this way of spatial development. That is why they propose a different building model, which will be much better in many respects. At the same time, they present equivalent variants, showing differences between individual types. The parameter sets for the selected examples were to prove the correctness of the decisions taken. The valorisation includes demographic forecasts for the entire commune. Based on the available data, it was assumed that in the next 30 years the population is going to increase by 16–28 thousand inhabitants. Therefore, one can speak of a relatively large development potential. The compared versions were referred to the basic surface-size indicators (building areas, building and population intensity, surfaces of biologically active areas). The subject of analyses were also various aspects of the functioning of both structures, their urbanisation potential and impact on the natural environment. Among other things, account was taken of the ability to produce various types of basic and higher-level services, educational programs, public green space, and communication infrastructure.

The comparison showed that the continuation of the extensive single-family housing model is a mistake and a stand for randomness, spatial chaos and devastation of nature. The adoption of this solution will prevent coordination of comprehensive investment activities. The proposed accumulation of multi-family housing and its extensiveness will allow for rational development of green areas and maximisation of their participation in land arrangement. There will be a chance to improve the quality of space and take care of recreation and sports areas. There will be space for large parks, squares and playgrounds. It will be possible to create a huge public park accessible to all, with attractive composition and high integration potential. Such solutions will not be possible if the land is divided into small plots and detached single-family houses are built. The compactness and simplicity of the architecture of residential buildings will allow them to be implemented in an energy-saving formula. High intensity will allow to save large areas of the commune’s agricultural and nature-active areas. Minimising environmental consumption is one of the most important ideological assumptions of the project. The compilation of specific data related to terrain, energy intensity, development potential, etc. showed a significant advantage of the Tower Island variant over the single-family housing variant.

The concept has been subjected to public consultation. The project arouses great interest and gives rise to a lot of emotions. The scale of the assumption is unacceptable for most assessors. The height of the buildings is shocking. It is difficult to accept this type of building in this location. It breaks with commonly encountered principles of landscaping structures located on the edge between the city and the village. The architects propose an “island” with morphology that is typical of the centres of large metropolises. The construction of such tall buildings is a utopia that has no logical explanation. The problem may be not only the economic calculation of the implementation itself, but above all the preferences of buyers. According to the concept, the skyscrapers will have dimensions of 16 x 16 m in plan and there will be only one apartment on each floor. This version may be difficult to accept and unfavourable for sales reasons. The energy-saving performance parameters are convincing.

In terms of reducing energy consumption, the variant is definitely more favourable than the single-family housing model. The buildings are expected to be very compact with S/V ratio at 0.27 to 1.2. As a part of the investment project, it is planned to implement solar installations on roofs, with a total capacity of 24 MW. Operating costs can be significantly reduced in this way. If the project is to be an example of responsible urbanisation, the above-mentioned solutions will be a deciding factor. In this case, responsibility is understood broadly. It is not limited to the present, but rather a far-reaching action, taking into account the needs of future generations. Despite the critical remarks, the innovative aspects and the visionary nature of the whole idea are noticed and appreciated. In many cases, the project is ahead of its time when it comes to the standard of Polish housing investments. The authors do not hide the fact that the estate constitutes a different kind of offer than the extensive single-family housing. It is a proposal of a multifunctional urban environment that provides support for the full metabolic cycle of the habitat. The proposal includes postulates regarding the diversification of the program offer and high-level service. It is planned to settle approx. 8,000 inhabitants. For single-family homes, this figure would be only 2,700. At the same time, interference in the environment is to be incomparably smaller. Other advantages of the solution are indicated. The proposed model is characterised by a high degree of discipline. It is capable of creating service facilities not only in the basic system, but also in the field of higher-order services, including educational and healthcare facilities. The adopted variant creates an opportunity to organise and supplement the communication infrastructure. Reducing the typology of buildings and their technological repeatability will have a positive impact on reducing implementation costs. The Tower Island is to be a self-contained enclave, equipped with modern, ecological solutions. High buildings will free space for greenery and recreation, allow the vision of the modernism the classics dreamed of, with Le Corbusier at the forefront. However, are these appropriate, tested and acceptable patterns? Although, at first glance, the project is very surprising and disbelieving, as you read into its ideas, the assessment gradually changes. Individual entries complement and theoretically form a coherent whole. However, it is difficult to reject reservations regarding e.g. travel, service, infrastructure, scale of development, impact on the environment. Questions also arise – who is the project for, who is it dedicated to, who should live here? If it is assumed that the towers are to have apartments with an area of over 100 square meters, you can have doubts about obtaining a diverse social structure. This is a simple way to the elite system, inaccessible to a diverse group of recipients. The issue of assessing aesthetic and spatial solutions in the context of the proposed quantitative and qualitative parameters remains a problem. Considering the experience of many other implementations with a similar program and urbanisation type, it is worth considering the final decisions in this regard. Is the idea of building a new housing estate in such a peripheral location with such a specific formula not a surreal vision? Or on the contrary, is it an extremely rationalist, interesting and worth considering alternative to what is currently and widely implemented?

3. CONCLUSION

The analysis of the selected examples illustrates the differences in the approach to the modelling of residential structures. They result from different contexts. Specific economic, political, social, program or technical conditions are directly related to the time of implementation. With

the passage of time, the priorities and quality criteria have gradually changed. The architects' attitude to design issues is also diverse. It seems that in the case of Zielone Wzgórze we were dealing with a procedure strongly focused on the needs of potential users in the field of social relations. The designers tried to fulfil their ideas of an ideal place of existence. A place that they could describe as "their own." It was all about shaping a space that residents fully accept and with which they can identify. The combination of architecture and elements of environmental psychology had a great impact on the designers' decisions and the methodology of the entire study. Issues regarding the human-space and human-human relations were among the most important ideological issues. The authors referred to the idea of a friendly, attractive and logically constructed city. They decided that a model worth following may be the model of small towns that have existed in Wielkopolska for centuries. The applied spatial arrangements were to be legible and competitive for the mega settlements of large-scale housing that were commonly implemented at that time. Their typology, referring to traditional conventions, was to provoke positive social relations. The project was to be a compromise between the ambitions of architects and the expectations of future users. The parameterization, adopted values and human scale of the assumption were to serve the achievement of the assumed goals.

The second example is an arbitrary attitude. The creators propose their vision of organising the habitat and are convinced of its superiority over the "traditional" model of urbanisation. They introduce many innovative ideas that are still rare in Polish realities. They assume comprehensive actions using, among others, the principles of integrated design. It is important to take a broad approach to the subject, take into account as many factors as possible and notice their interdependencies. In modelling and optimisation of the residential structure, parameters related to energy consumption and energy efficiency, as well as solutions for environmental protection were used. A comparative analysis was presented. It compared the proposed concept with an alternative version with a traditional formula (low, detached single-family buildings). At the same time, partial use of codes typical of modernist urban planning was assumed. Functional segregation, high, extensive and standardised buildings in connection with pro-ecological ideas can, according to the creators, bring many benefits. However, due to the large scale and composition, the spatial model is questionable. Specific numbers are to speak in favour of the project. However, are they the most important and decisive quality criterion? Public consultations have shown that people are open to contemporary solutions, but do not accept excessively radical visions, even if they are founded on legitimate ideas and economic calculations. Not all parameters have been accepted and their reliability is questioned.

The examples presented are for analogous situations. They are comparable in size and program. The differences between them are closely related to the time in which they arose. The analysis illustrates the evolution of the approach to habitat modelling, change of priorities and design methods. In the current planning practice, issues related to compositional solutions on an urban and architectural scale are losing some importance. Thus, problems related to the process of shaping the form, the perception of space and the psychological conditions of this type of relationship become less relevant. Issues that were not so strongly emphasised have become important. These include, above all, the need for balance between the natural environment and the built-up environment, broadly understood minimisation of the negative impact of man-made assumptions on nature. The consequence of this philosophy is the search for optimal technical solutions. Their increasing impact on architecture is visible. It is worth noting that the assessment criteria themselves are also subject to change. Some elements of the valorisation remain unchanged, although their content and scope of meaning is evolving. The comparative analysis

is a voice in the discussion about the transformations that took place in the habitat modelling process. The research may be helpful in formulating and updating design paradigms. The effectiveness and legitimacy of the proposed solutions are verified by the stage of implementation and operation, actual parameters of use, the manner of impact on the environment and, above all, the assessment of the residents themselves. Urban planning and residential architecture are unique in many ways. It is worth remembering that the primary value in this case is not the originality and creativity of solutions. The main goal of architects' activities should be to shape the space that will guarantee the highest possible quality of life. On the other hand, creating urban layouts and therefore modelling of residential structures should be a creative act. Cities cannot be built solely on the basis of rationalism or functionality. Parameterization and segregation should not be excessively promoted. Continuity of ideas, humility and respect for the achievements of previous generations are also necessary. Only then can there be hope for the implementation of unique and timeless compositions.

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