Man In India, 97 (4) : 281-297 © Serials Publications

COMPOSITIONAL ASPECTS OF URBAN ENVIRONMENT ORGANIZATION

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Abstract: This article presents the technique applicable to identifying the urban space free of large architectural objects. The identification of the free (empty) space is realized by constructing a spatial body of emptiness. This paper proposes the construction of a spatial body of the external environment and the free space around architectural buildings, which constitutes the novelty of the research. The practical significance of the work consists in the fact that the constructed spatial body could serve as the basis for determining the development density of the urban environment and the volume of space that can be transformed. The authors identified the types of roads, public and residential buildings, small architectural forms as well as the location and amount of green spaces. As a result, the authors offered a number of proposals for the creation of functional road classification, the reconstruction of building faces, in some cases, the demolition of dilapidated buildings and the construction of new types in their place, and the transformation of yards and public spaces in accordance with the concept of environmental design. With regard to the peculiarities of the geographical location of the city of Almaty, the irrigation system is proposed to be restored.

Keywords: spatial body, environmental design, architectural typology, public image, personal image.

At the present stage in the entire world and in Kazakhstan in particular, there is the process of transforming a compositional solution of the urban space. In most cases, the issues of compositional organization with an urban planning point of view are carried out with the solution of traffic problems that pollute the ecological background of the city. In terms of the space-planning solution of public and residential buildings, this is the construction of new innovative types of buildings or the renovation of existing buildings by using modern materials and technologies. Much attention is paid to environmental design and small architectural forms.

Urban environment and its imaginative solution constitute the relationship of its basic elements – paths, borders, areas, sites, landmarks. A general emotional impact that the city has on people is also inextricably linked with the impressions from its planning structure, the image of buildings and small forms.

Gutnov (1984) wrote in his book *The Evolution of Urban Planning* that there are cities, retained in our memory from the very beginning for the entire life; cities wherein each piece is unmistakably recognizable as belonging to the whole, the

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only thing in the world. The city as a kind of a living organism was often subjected to analysis in the urban planning theory. The essence of the analogy consists in the imaginative disclosure of the thought: the city, as a living organism, is a system which cannot be regarded simply as a set of elements and relations between them.

The temporary nature of the urban space creates a situation of the continuous relevance of studying the image of the environment. However, all the works on the analysis and study of the spatial environment of the city are limited to exploring the compositional interconnectedness of urban objects, and the very notion of "space" remains out of sight. This paper presents the technique of studying the volume and nature of space, which requires an aesthetic transformation and filling. In light of the urgency of the need to transform the spatial environment of Almaty, a course work on the topic "Compositional aspects of urban space organization (based on the example of Almaty)" was carried out by third-year students majoring in Architecture within the walls of the *Kazakh Leading Academy of Architecture and Civil Engineering*.

Currently, the relevance of studying the compositional settlement of Almaty is justified by several factors. First, this is due to the construction of new facilities, the reconstruction of existing objects and the development of requirements for environmental design. The invitation of a Danish architect and urban design consultant Jan Gehl to Almaty by city authorities is also a confirmation of the relevance of this topic. As a result of the analysis of the urban space, Jan Gehl recommended the city to: create a well-balanced transport system; create a unique city center and districts; highlight and emphasize the uniqueness of the location; develop ponds and restore the irrigation system; improve sidewalks; significantly expand the bikeway network and promote this type of transport; improve the visibility by cutting the lower branches of trees. According to media reports, Gehl's study covered the area of 17.8 sq. km in Almaty. The changes, based on the architect's recommendations, should primarily touch Zhibek Zholy St., Panfilova St., Abylai Khana St., Abaya St., Raiymbeka St., Pushkina St., Al-Farabi St., Kunaeva St. as well as Republic Square.

The present research consists of two stages. At the first stage, we study the typological features of planning, artistic and imaginative solutions of a specific district of the city, as far as it is a relatively large area having the unifying objective character. Then, on the basis of the identified problems, we develop new proposals for the transformation of the urban space in order to improve the aesthetic and environmental qualities of the district.

In the definition of an imaginative formation of the urban space, a great role is played by "individual and public images". An individual image has an individual character and is based on personal views as well as human associations related to the architectural space, the subjective characteristic of which does not allow it to be taken into account during the design of public spaces. This article presents the

research whose methods are based on the formation of a public image. A public image having a collective nature may be used as the basis for real design. On the basis of individual and public images it is possible to determine the quality of urban environment readability, which has a key role in urban planning.

In the course of this work, various methods of analysis of the compositional solution of the urban environment have been studied. One of these methods is described by K. Lynch in the book *The Image of the City*. The aim of the study was to determine the readability of the urban space. With regard to the research objectives, three cities were chosen - Boston, Jersey City, and Los Angeles. By definition, the term of a "readable city" meant a city, in which districts, landmarks and paths were easily determined and grouped into a coherent picture.

Lynch (1960) used the following technique: a selective interview with residents to identify their image of the environment and a systematic study of the environmental image, formed in trained observers during the field survey. The primary office interview contained a request to draw a sketch plan of the city, to give a detailed description of a few trips around the city as well as to list and briefly describe the parts of the city that had been most clearly and vividly retained in the subject's memory. About ten questions of the following character were asked: "What first comes to your mind, what symbolizes the word "Boston" for you?"; "Please give me complete and explicit directions for the trip that you normally take going from home to where you work."; "Do you have any particular emotional feelings about various parts of your trip?" (Lynch, 1960)

> "The interviewees were also "confronted with a stack of photographs of the Boston area, taken to cover the entire district in a systematic way, but given to the subject in random order. Several photographs of other cities were inserted in the collection. First the subjects were asked to classify the photographs in whatever groups seemed natural to them, and then they were requested to identify as many of the pictures as they could, telling what clues they used to make the identification. The photographs recognized were then reassembled, and the subject was asked to lay them out on a large table as if he were placing them in their proper position on a large map of the city.
>
> *Finally, these same volunteers were taken out in the field to go through one of the earlier imaginary trips. […] The subject was asked to lead the way, to discuss why a particular route was chosen, to point out what he saw along the way, and to indicate where he felt either confident or lost."* (Lynch, 1960, p. 142).

According to Lynch (1960), structuring and identifying the environment involves a lot of senses: "the visual sensations of color, shape, motion, or polarization of light, as well as other senses such as smell, sound, touch, kinesthesia, sense of

gravity, and perhaps of electric or magnetic fields" (Lynch, 1960, p. 3). The result of the study showed that the clarity of the environmental image makes it possible to easily and quickly move in order to find the desired object. Such elements of the city image as paths, edges, districts, landmarks and nodes are a solid basis for self-development of the individual.

The matching descriptions of several people form the "public image", which can be the basis for developing a new architectural concept of organization of the environment in the elaboration of space scenario. However, it is important to understand that we should take an active part in this process. Although the clarity and readability of the image is not the only important feature of the beautiful city, it is of particular importance when thinking about the environment, which has the urban scale of magnitudes, time and complexity. In order to understand this, one should understand the city not just as a "thing in itself" but as a city perceived by its inhabitants.

The analysis of compositional solutions is carried out using the procedure described below. On the basis of the district map, the morphological solution of public and residential building types is revealed. Defining the areas amenable to transformation is realized by constructing a spatial body of the district being studied. "A spatial body" is a body of emptiness around dominant (residential and public buildings) architectural objects without roads, greenery, or small forms (Hill, 2005) (Figure 1). At this stage, architectural objects acquire an image of emptiness, and the empty space – a large shape, the height of which is equal to that of the building. Then the planning structure of the district is analyzed.

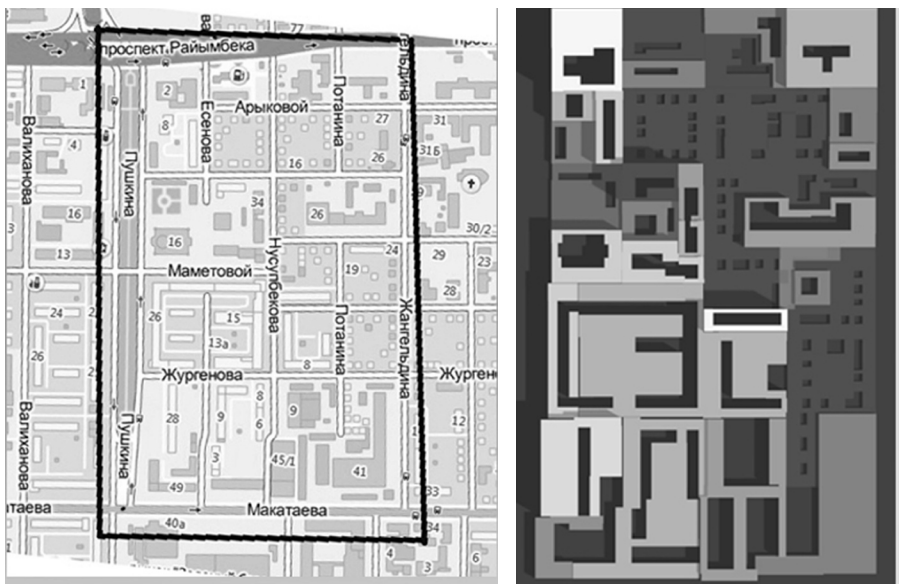
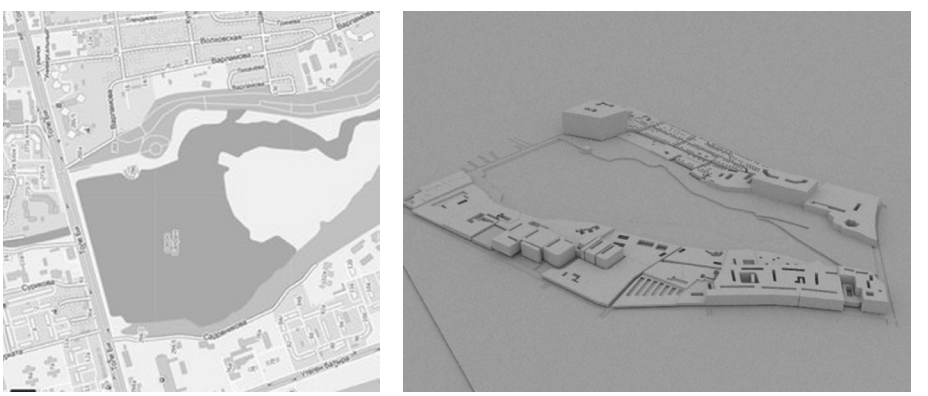


Figure 1: District plan Example 1: A spatial body (the extensional solution of emptiness)

Example 2: A spatial body (the extensional solution of emptiness)



Example 3: A spatial body (the extensional solution of emptiness)

The district image is revealed through the typology of buildings, their quantitative and proportional relationship, the type of material used - glass, concrete,

wood, etc. (Figure 2). Small forms also play an important role in the formation of the district image, which is why the analysis of the typological solutions of small forms is essential. To do this, we should first identify the imaginative design of buildings and of the entire object-spatial environment.

Figure 2: The district image

The second step is to identify the proportional relationship and historical and cultural characteristics of the district (Figure 3).

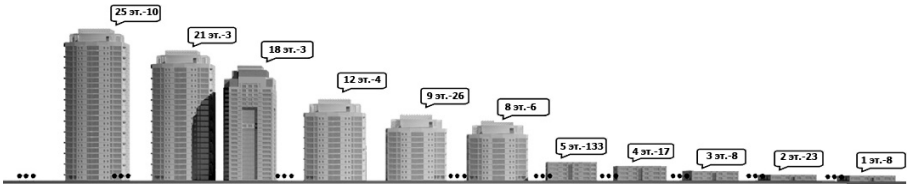


Figure 3: (a) The district analysis: The altitude characteristic of the district

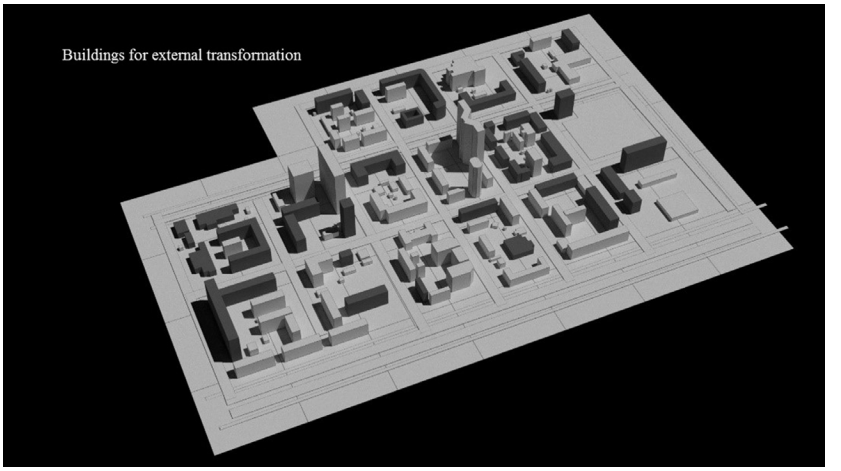


Figure 3: (b) The district analysis: Buildings for the reconstruction of the facade

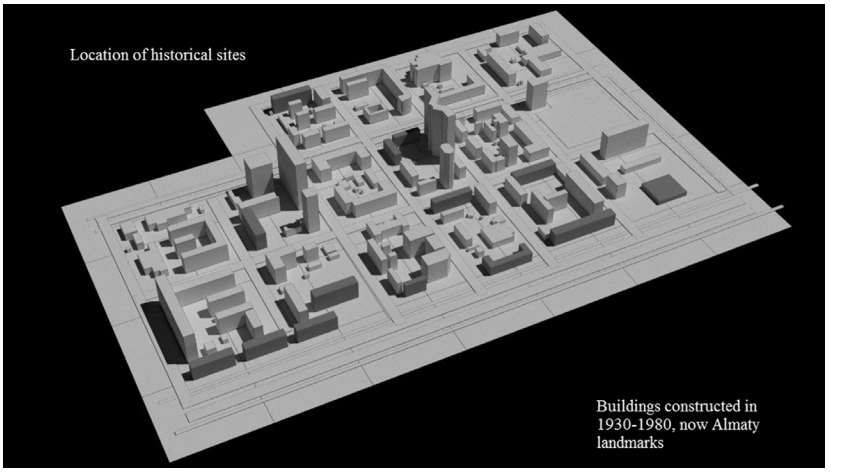


Figure 3: (c) The district analysis: Historical sites

Interviewed:
Teenagers aged 15-20
Adults aged 30-45
Seniors aged 60

Questions:
1) What attracts you to the micro-district Orbita?
2) What are the negative aspects in the micro-district Orbita, in your opinion?
3) What changes would you like to see?

Teenagers aged 15-20 (10 people)
1st question:
1) I like that everything I need is close (6 people)
2) The air here is fresher (2 people)
3) Living here is very convenient, since there are almost no high rises, and entertainment and shopping centers are within easy reach (2 people)
3rd question:
1) More bicycle paths and skate parks
2) One more park of the first President with its own Disneyland

Adults aged 30-45 (5 people)
2nd question:
1) A lot of transport and few parking lots (3 people)
2) Not very clean yards (2 people)
3rd question:
1) More parking lots and kindergartens
2) Business centers – it would be great to work closer to home, and not to go to work to the city center
3) To expand the roadway

Seniors aged 60 (10 people)
3rd question:
1) Respect for the disabled people
2) Fewer cars
3) The region's cleanness is very important

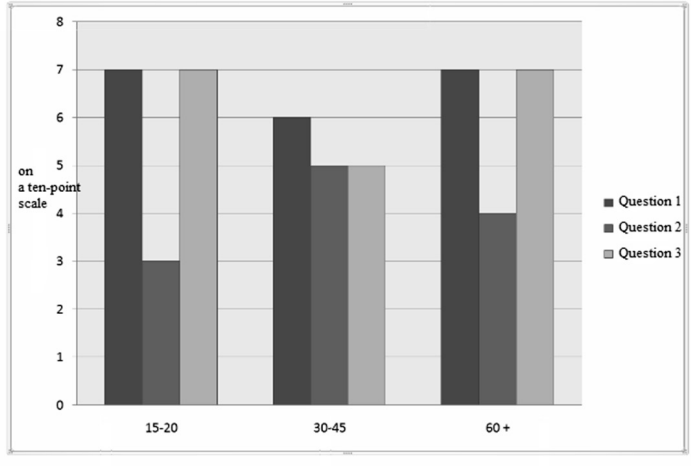


Figure 4: A sociological survey of residents and guests of the district

To identify the existing problems in the district, it is necessary to learn the history of the district's development as well as such concepts as "individual image" and "public image". To complete this stage, we conducted a sociological survey of residents and guests of the district and filmed a set of videos for determining their psycho-emotional behavior (Figure 4).

Architectural space is a term used in the professional activity of architects in relation to the open urban space (Gutnov, 1984). The material and spatial environment was created by man with the help of the following components: mass, space, state of the environment, illumination, acoustics, air movement, spatial forms, fence planes and equipment items. Visually, architectural space is limited to a specific form.

Micro-district is an architectural space which has a shape and boundaries. The architectural and spatial organization of the residential city area is the architectural and space-planning solution of the micro-district. The main idea is to develop a common architectural system, to implement a compositional link with the architecture of the neighboring areas, to establish the integrity of architectural composition, which could cover and separate buildings, and to combine several groups of buildings and yard space, creating a harmony between the inner and outer space.

One of the examples of the analysis of compositional solution is the study of the micro-district Samal-1, which began to be designed in the mid-1970s. The location of this district, its close proximity to the main square, the core of the national center, gave meaning to creating an example of the new architecture of residential complexes and landscaped courtyards.

Delving into the history of this district, one could see that in 1979 bronze ritual objects were found in its territory. At the same time, a number of studies were carried out, led by archaeologist M. Kadyrbayev. At the investigation site, a temple complex dating back to 3-2 centuries BC was discovered. It was round, covered an area of 130 sq. m. and had a base buried under the ground by 0.4 m with a clay podium-altar and a campfire with the bones of sacrificial animals. There were also some fragments of pots and ceramics as well as a bronze lamp, which was of particular value. The lamp was a flat-bottomed round dish on the openwork stand at the center of which there were two sculptures of archers on horseback, and on the edge of it there were 14 single-humped "zeboid" calves, moving one by one in a clockwise direction. Such facts give reason to study and analyze this district.

The first in the micro-district Samal was Building №6, constructed in 1985 and located at the intersection of Dostyk St. and Zholdasbekova St. Then the rest of the buildings down the street Dostyk were erected with the last building being No. 1.

In 1986, a number of houses in the inner part of the micro-district were built – No. 10, No. 13, No. 14, No. 16 and No. 17. The construction of Samal-1 began in 1983 in the former antenna fields (Figure 5). It took an important place in shaping the planning structure and architectural appearance of the central part of the city. The construction of Samal-1 was supervised by D.A. Kunayev. Located in the city center, this district has become the place of permanent residence of many artists and government workers: Building No. 9 was inhabited by law enforcement officials; No. 10 - by the Central Committee officials; No. 13-14 – by artists and sportsmen such as Gafu Kairbekov, Meruert Utekeshova, Kulan Tastanbekov, Tagir Ibragimov, Valeriy Tikhonov. There was also a private sector in the territory of this district, which continued to exist until the 2000s. During the construction of the micro-district, people lived in makeshift huts and then settled in new buildings.

Figure 5: Antenna fields, where now Samal is located, 1970 (from Almaty museum collection)

In 1985, the Central State Museum of Kazakhstan was built along Furmanova St. upon the project of architects Yu. Ratushniy, Z. Mustafina and B. Rzagaliyev (Figure 6). It is considered one of the best architectural structures in the entire Central-Kazakhstan region. The total area of the museum building is more than 20,000 sq. m., including the expositional-exhibitional area of 7,000 sq. m. The stock and expositional museum collections include about 300,000 items of historical, archaeological and ethnographic nature. The museum exhibits also include unique artefacts that reflect the cultural tradition and history of Kazakhstan from ancient times to the present.

Figure 6: The Central State Museum of Kazakhstan

Comfortable landscaped courtyards, beautifully decorated buildings, high quality building materials - all this characterized the district. However, in the mid-1980s, when perestroika began, many things had to be abandoned. For cost reasons cheaper building materials were used, and the design was simplified. Nevertheless, even in the 1980s the district was still integral. But in the turbulent 1990s free sites began rashly to be built up by new "elite" residential buildings, which definitively broke the compositional integrity of the district. Architect A.B. Ordabayev argued:

> "When we designed the district "Samal", it was a lengthy process. "Samal", which we designed as an experimental-demonstrative area, was unsuccessful due to perestroika. It was possible to realize about 10%. With the help of my designers, we analyzed all kinds of houses built in Almaty. Not only in terms of layout, but also in terms of design reliability. When people ask me about new monolithic houses, I say this: if they were built in the 1990s, theoretically, they had to endure even 10 points, but these were the years when there was no proper control. How many fixtures were stolen, or how was cement replaced – no one knows. Therefore, the quality of construction will be shown only by an earthquake" (Ovchinnikov, 1988).

After the difficult 1990s, the image of the micro-district went into decline. However, over the last 7-10 years, the image of Samal has been improved, and now we can see landscaped courtyards, playgrounds and cozy streets. Currently, adequate conditions have been created for children of different ages; low fences, which are higher closer to the streets, have been provided for kids. Along Zholdasbekova St. the former empty grounds have been improved by flowerbeds and small architectural forms (Figure 7).

Figure 7: Urban land improvement along Zholdasbekova St.

An important cause of concern for the improvement of public spaces is the fact that residents get the most vivid impressions while going on foot. A prerequisite for creating a more attractive and favorable environment is also finding a balance between road transport and other urban space users.

The concept of the internal and external space determines the position of one space relative to another space. Therefore, if we delve into the interior yard space of the micro-district, the first thing that will catch our eye will be arches. The arches that connect buildings clearly show the time and duration of the construction of the micro-district. According to Andrei Chernikhov (2008): arches must be a passage from one space to another, i.e. transmit a sense of space transfusion from internal to external (Figure 8). Low arches look more like a random mistake in construction.

Figure 8: The arch separating the internal space from the external space

The compositional integrity of the inner space of the micro-district is broken. The reason is the uncoordinated and inharmonious organization of pedestrian and traffic areas. The micro-district, as well as the city as a whole, was not originally prepared for such heavy traffic. Single-lane roads, separating houses, recreation areas are filled with cars, which is why in some places there is a danger for children's playgrounds due to their close proximity to parking lots. Moreover, the integrity of the micro-district is broken because of the emergence of new high-rise residential complexes, hotels, resulting from the emergence of new goals and views of the capitalist system. At the heart of Samal-1 there is Building 29, a sixteen-storey building, Building 9/2, and a sixteen-storey hotel. The appearance of such buildings does not make it possible to create convenient parking lots for micro-district residents, which results in the fact that cars occupy too much space. Children's playgrounds in the inner part of the district are also in need of renovation, as far as the child should have the aesthetic satisfaction of playing games. There are also large empty ground plots in the micro-district, which will also need to be improved.

If we talk about the concepts to solve these problems, it is first necessary to look back to the original architectural and artistic image of Samal-1 and to analyze how the problem of urban land improvement was solved.

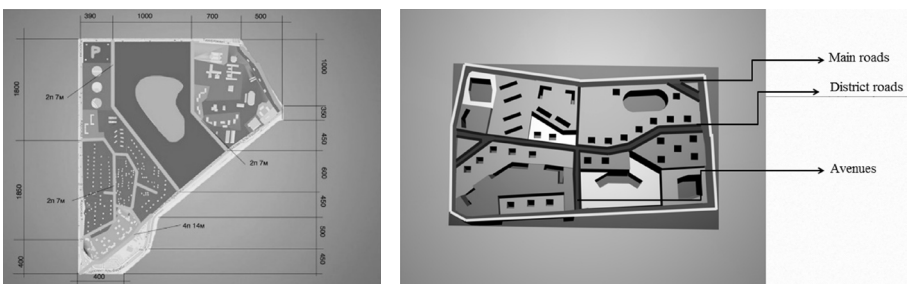
In many yards there are huge boulders and stones used for decoration. Many residents have preserved the tradition of urban land improvement using their own resources through the creation of small gardens. The branches of long-growing plants can be seen on the facades of buildings. All this may suggest what can be improved in the micro-district.

With regard to the historical value of the place, taking into account why the micro-district was named Samal and what kind of people live there, one can see that the foundation for the concept of its urban land improvement was the creation of the "micro-district garden". Wind – "Samal" – which is particularly well felt under above-mentioned arches can serve for the installation of small wind turbines. The purpose of their installation is the collection of wind energy for the system of garden automatic watering, which will be created in the long term.

The solution of architectural and artistic planning tasks as well as the development of residential areas must take into account social, functional, urban planning, construction and technological requirements.

Residential areas occupy a large part of the territory of settlements. Their construction creates an architectural environment, and in conjunction with the architecture of public complexes it determines the overall architectural image of the city. The structure of the environment is largely determined by historically formed socio-economic relations and cultural norms, and the human perception itself is socially determined, and, of course, changes over time.

As it was mentioned above, the main purpose of the second stage is to develop proposals for the transformation of the district. First, it is necessary to determine the existing types of roads and the distance between them (Figure 9). There is also a need for constructing the spatial body of the district, but with regard to roads along with residential and public buildings.



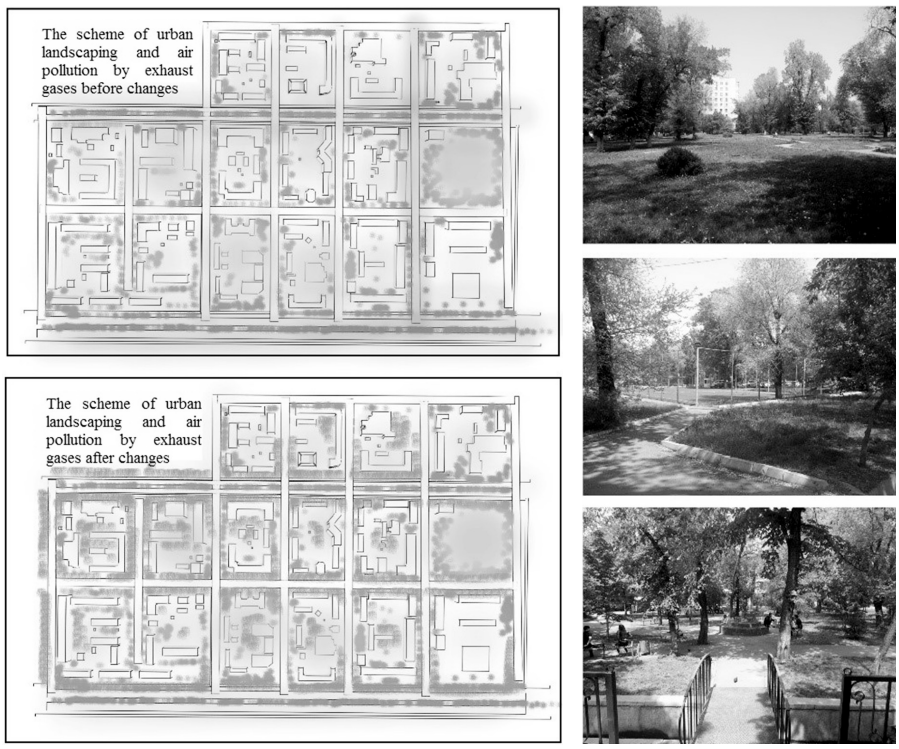


Figure 9: Types of roads in the micro-district

The main objective is to solve the environmental problems of the city of Almaty by introducing various types of streets. Following the idea of Le Corbusier in the construction of Chandigarh, traffic and pedestrian flows are separated, and the traditional scheme of the "road - paving" city is abandoned. Secondary streets divide the city area into standard blocks (micro-districts) with the sides of 800 × 1200 m and wide 'ribbons of greenery' through the whole territory of the city. Corbusier, "*wanting to create favorable hygienic conditions in micro-districts, placed dispensaries, schools and other institutions among these divergent and tapering ribbon parks. Dwelling houses, as envisioned by Corbusier, turned their entrances to the ribbon parks, while the opposite facades, devoid of doors, faced the highways*" (Ovchinnikov, 1988). Seven types of roads functioned in this city.

The transformation of the district space also involves changing the yard space, the coloristic palette, etc.

In general, given social and other differences in residents, especially the nature of their lifestyle and tastes, it is necessary to add originality to each neighborhood and district. Young architects also need to understand that the city is not only the object perceived by millions of people who have different social position and character.

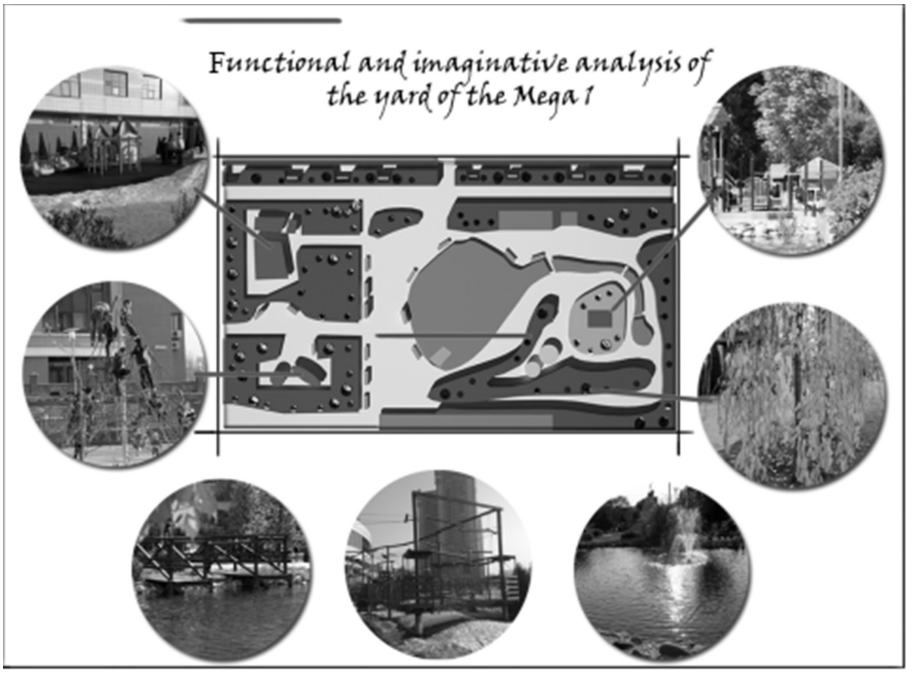


Figure 10: Functional and imaginative analysis of the yard of Mega-1

Figure 11: District problems

It is also a product of the activity of dozens of builders, constantly changing its structure, based on their own considerations. Being stable in the general outline for a while, this structure ever changes in details, and its growth and shape can only be partially controlled. There is no such thing as the final result, only a continuous sequence. It is not surprising because the art of city construction is a specific art, separate from architecture, music or literature. It can learn a lot from these arts, but cannot imitate them.

Figure 12: Design problem solution proposals

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