

PRESERVATION OF THE HISTORICAL KADETSKYI HAI ECOSYSTEM DURING A MILITARY THREAT USING POLISH EXPERIENCE

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Abstract

The article is devoted to the study of the historical eco-systems preservation problems. The aspect of the negative impact of the Russian-Ukrainian war on natural eco-systems is emphasized separately. Using the example of a unique natural area – the historical Kadetskyi Hai (Cadet grove) in Kyiv, the condition of this area, the problems of its existence and the ways to solve them are evaluated. The history of the Osiedle Oficerskie (Officers' Residential Complex) in Cracow, its condition and problems, and the possibilities of applying Polish experience in arranging the territory of the Kadetskyi Hai are separately analyzed.

Keywords: *Eco-systems; Natural monuments; Military threat; Historical Kadetskyi Hai; Kyiv; Osiedle Oficerskie; Cracow*

Introduction

The events of the Russian-Ukrainian war gave rise to many problems, one of which is the damage caused to natural eco-systems. In March 2023, the Russians seized the Askania-Nova biosphere reserve, which is currently under occupation [1]. The explosion of the Kakhovka hydroelectric power station led to a massive sea of fish, due to the war in the Black Sea dolphins are dying. Two national nature parks and two regional landscape parks, one biosphere reserve, several sanctuaries and natural monuments are located on the territory of only one Odesa region. The territory of the Nyzhnodnistrovskyi National Park was bombarded with rockets, as a result of which the meadows, where many species of birds nested, burned down. The uniqueness of two parts of the Nyzhnodnistrovskyi National Park – the “Dniester-Turunchuk Confluence” and the “Northern part of the Dniester Estuary” have the status of wetlands of international importance according to the Ramsar Convention. The uniqueness of the reserve is that the Azov-Black Sea migratory corridor of birds passes through it, and during the war, birds lose their nesting places and die due to stress, changing their route, fleeing from explosions. The problem is that these migration routes have been built up for centuries and now they are collapsing.

More than two hundred rockets were fired at the national park “Tuzla Eatuaries”, as a result of the shelling, birds that migrated from Africa were dispersed [2]. This national park

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includes 13 estuaries in the confluence of the Danube and Dniester rivers, and its uniqueness is due to the fact that before the war, the flora and fauna of the Black Sea region were represented here: 300 species of birds, 60 species of fish, 37 species of animals.

The problems related to the war do not only affect the reserves in the South and East of Ukraine, since virtually the whole of Ukraine suffers from the shelling of missiles and drones.

The authors investigated part of the territory of the historical Kadetskyi Hai in Kyiv with the presence of natural monuments with a protected status, identified the problems it suffers from and provided proposals for the preservation of this unique eco-system.

The purpose of the research was as follows: to trace the development of the historical Kadetskyi Hai over time and to determine the main problems of the territory within the boundaries of Karela Chapeka – Petra Nishchynskoho streets and provide basic proposals for their solution. This particular area was chosen for the study, taking into account the extent of its greening and the presence of problems characteristic of these areas.

The specifics of the research determined the range of studied scientific sources. Since the historical territory was investigated, the sources related to the memory of the place, its museification and the revival of cultural and natural potential were worked out. These are articles by V. Petrušonis [3], L. Pujia [4], P. Spiridon and I. Sandu [5], and P. Spiridon *et al.* [6]. The next group of studied sources related to the problems faced by megalopolises, such as Kyiv – article by M. Dyomin *et al.* [7]. The natural environment directly affects the perception of architecture, as determined in the article by Y. Ivashko *et al.* [8]. Professional education plays an important role in the implementation of revitalization and protection measures [9]. The paper also analyses Polish examples of the revitalisation of historic green areas [10 - 13], as well as housing estates, including the Officers' Housing Estate in Kraków - as a historic area with large green areas, which has the characteristics of both an Ebenezer Howard garden city and can fulfil most of the requirements of an Eco-city. Sources directly related to the study area were also analysed [14 - 21].

Materials and methods

The purpose of the research determined the choice of general scientific research methods. The method of historical analysis (to analyze the history of the territory of Osiedle Oficerskie), the iconographic method (analysis of historical visual materials and archival sources of Osiedle Oficerskie), the method of comparative analysis (to determine changes in the composition of both territories), the analytical method (to analyze the problems of preserving the eco-system) was chosen as the main historical Kadetskyi Hai, an experimental method (for the analysis of existing conceptual proposals of these areas and the development of proposals for solving existing problems). The method of photo fixation and sociological survey of residents was also used.

Results and discussion

Historical analysis of the historical Kadetskyi Hai eco-system

The presented grant project was a logical continuation of the research conducted by the Centre for Urban Studies in partnership with the scientific and artistic platform “Ostriv” and the Faculty of Urbanism and Spatial Planning of the Kyiv National University of Civil Engineering and Architecture in May – July 2020 [14]. It was within the framework of the 2020 study that the question of a comprehensive assessment of the historical Chokolivka territory was raised according to several indicators, including the cleaning of abandoned green areas and the Lybid tributary – Vershynka River.

In the article, the main attention is paid to the territory of the so-called Pershotravnevyi residential area, which arose from the settlement of Pershotravneve. The settlement itself was formed in 1925 on part of the territory of the historical Kadetskyi Hai (Fig. 1).



Fig. 1. The green area is a part of the Kadetskyi Hai historical eco-system

In fact, Kadetskyi Hai was a large green area, bounded by the modern Povitroflotskyi Avenue, Chokolivskyi Boulevard and the railway track. The following stages are distinguished in the history of Kadetskyi Hai:

- until 1786 – there is little evidence about the fate of this territory, it is known that the grove itself was an oak grove and, according to some versions, in ancient times performed pagan sacred functions, but there are no chronicles about it. Mykhailo Maksymovych only noted that the grove was “dense and shady”, at the beginning of the 18th century, a dacha of Metropolitan Varlaam Vanatovych, Archbishop of Kyiv and Halych was built here in 1722–1730, and part of the grove became church property and was built up, the grove itself turned into a place of rest first students of the Kyiv-Mohyla Academy, and later the people of Kyiv [14];
- 1786–1846 – name change, the territory is named Shulyavskyi Hai, respect for the grove is maintained;
- 1847–1917 – the transfer of the grove lands to the possession of the Russian Empire, the demolition of the metropolitan dacha and the construction of the Volodymyr Cadet School in its place, the felling of a part of the greenery under the Mykolaiv Artillery School, the development of part of the territory of the grove and its renaming to the Kadetskyi Hai in 1912, as follows, changing the purely recreational purpose of the grove to multifunctional, recreational and military;
- 1918–2023 – phased destruction of most of the green areas, first for heating purposes, then, according to the Bolsheviks’ slogan “To conquer and conquer nature”, the lakes and the Vershynka River were filled in, and in 1960–1970, the construction of a stadium and a swimming pool on the site of the lakes, the construction of the territory with mass-produced residential buildings, the preservation of the military function of the former Cadet School (there were command courses, an infantry school, the headquarters of the Kyiv Military District, now the Ministry of Defense of Ukraine and the General Staff of the Armed Forces of Ukraine).

Only a few old oaks and oak massifs remained from the original grove – along the railway, along Aviakonstruktora Antonova Street, Hennadiia Vorobyova Street. Natural

monuments with the corresponding number are two oaks – the so-called Perun’s oak on the Hennadiia Vorobyova Street, 3–5 (Fig. 2) and the so-called Frolkin’s oak on Aviakonstruktora Antonova Street, 2/32. Thus, we have a unique example of the fragmentary preservation of the historical forest eco-system with the river Vershynka within the limits of a modern residential area.



Fig. 2. Perun’s oak

The authors of the article analyzed the conceptual proposal of Maria Liashchenko, which related to the revitalization of the Lybid tributary – Vershynka River [14]. The author noted the lack of statistical research on the Chokolivka area, as such research was conducted only in 1919 and 1926. The main part of the Vershynka tributary, its so-called upper stream, is hidden in an underground collector, and part of it flows openly in a concrete channel along the railway track and is fenced off from the main residential area and the road by the “Suputnyk” park, the approaches to it are not organized. Maria Liashchenko identified the following signs that Vershynka is an important component of the historical eco-system of Kadetskyi Hai:

- the importance of Vershynka is determined, among other things, by the history of the river into which it flows – the Lybid river, named – according to legend – in honor of the sister of the Kyiv founders, the first mention of this river is found in 968 in “The Tale of Bygone Years” by Nestor the Chronicler, it marked on all historical plans of Kyiv; in the days of Kyivan Rus, Lybid was a wide, navigable river, drinking water was taken from it, and later – a cascade of water mills was built and it ceased to be navigable;

- the image of Vershynka on Ivan Ushakov’s plan of Kyiv in 1695, where the mouth of this river is located 150 fathoms (324m) above the Shulyavskiy viaduct, a wooden bridge is built across it and two mills are marked; at the place of the historical ford, there is now a viaduct near the Karavaievi Dachy station (academician V. Vyshnevskiy suggests that the location of this ford caused the routing of transport communications in this area) (Fig. 3);

- the issue of revitalization and regularization of the Vershynka River territory and adjacent areas was raised at the beginning of the 20th century by Hryhorii Dubelir, a professor, lecturer at the Kyiv Polytechnic Institute, a specialist in urban planning and road construction; his concept was to transform part of the Kadetskyi Hai (where the Pershotravnevyyi residential area is located) into suburb-garden, continuing the concept of E. Howard; Dubelir’s project was awarded a gold medal at the All-Russian Hygienic Exhibition, but was never realized [14].

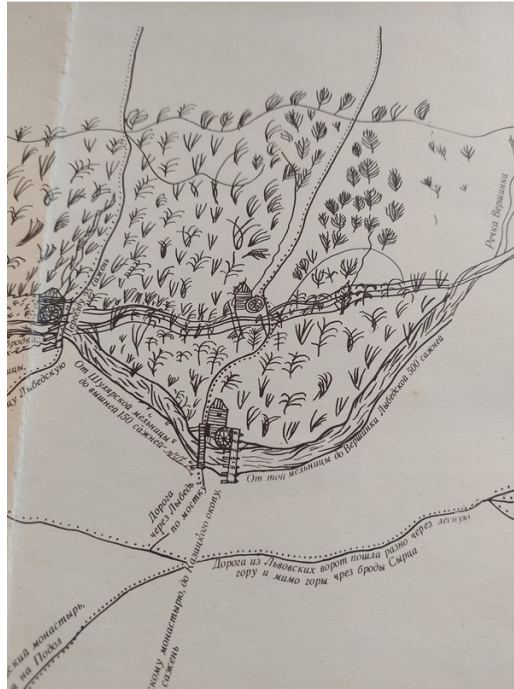


Fig. 3. The Vershynka River with the adjacent territory on the plan of I. Ushakov in 1695

The design proposals of the research conducted by the Centre for Urban Studies in partnership with the scientific and artistic platform “Ostriv” and the Faculty of Urbanism and Spatial Planning of the Kyiv National University of Construction and Architecture in May – July 2020 were as follows:

- do not carry out revitalization of the section of the riverbed in the underground collector, taking into account the location of transport communications and engineering networks above it, instead focus on clearing and organizing the open part of the riverbed within the boundaries of the “Suputnyk” park;
- dismantle the garage cooperative in the park and move the riverbed, arranging a 25-meter sanitary and protective zone away from the railway tracks and erecting natural noise protection screens from embankments with vegetation;
- taking into account the historical significance of the “Suputnyk” park as a preserved part of the Kadetskyi Hai, arrange the territory of the forest park and install a water mill on the Vershynka River;
- to transform the park into a full-fledged public recreational space, to create on its territory urban farms for growing agricultural crops (filtered water from Vershynka can be used for irrigation) and ponds for breeding fish (since there was historically a powerful fishery here).

Thus, according to the proposed concept, it takes into account the historical component (connection with the historical Kadetskyi Hai), the ecological component, the sports and recreation component (sports grounds, skate park). The implementation of the idea of creating an urban farm involves the creation of a system of natural multilayer filters in buffer reservoirs-

ponds to create a stable agrocenosis, and since there is a significant height difference between the outlet and the mouth of the Lybid, this also affects the Vershinka stream, so the filters should be expected to have a good throughput.

As part of the project, the concept of revitalization of the open bed of the Vershinka River was provided.

An important component of the research is the analysis of natural stands. The territory of the Pershotravnevyi residential area, chosen for the study, is located on the Kyiv plateau with a system of ravines, on an elevation between the Lybid River and the Sovska Balka. The territory is characterized by the alternation of flat areas and wide-sloping beams, gray and dark gray light loamy forest soils, such deciduous species as hornbeams, oaks, maples, chestnuts, and birches prevail [14]. During the period of massive construction in the 1960s, a large number of fruit trees (apple, pear, plum, cherry, apricot, plum) and flower gardens were planted within the boundaries of the residential areas.

Perun's and Frolkin's oaks, the only such old trees that remained from the oak massif felled in 1918–1919, are found a little far from the Pershotravnevyi residential area. Perun's oak is 500 years old, Frolkin's oak is named after a Kyivan who ensured its preservation (in 2010, by decision of the Kyiv City Council, it was granted the status of a natural monument).

The studied territory of the Pershotravnevyi residential area is characterized by the same problems as Chokolivka as a whole. There are six park zones within Chokolivka (Donetsk Square at Volynska Street, Ochakivskyi Park, Martyrosian Park, Sevastopol Park, park at Vinnytska Street, Aviakonstruktora Antonova Street, Park on Povitroflotskyi Avenue) with a total area of 13.0 hectares, almost 153 hectares are the area of near-house and street landscaping, but about 16 hectares are occupied by unorganized green spaces [14]. As a result, with good greening of the residential area (36%), only 8% of the greenery is used for recreational purposes. Therefore, the district has a great potential for recreational development, but this requires a comprehensive concept of organizing green areas, saturating them with appropriate infrastructure, providing access routes, etc.

Comparison of the Pershotravnevyi residential area ecosystem with the concept of “garden city” by E. Howard

The territory of the Pershotravnevyi residential area within the limits of Karela Chapeka Street to Petra Nishchynskoho Street is a district built up with 5-story brick buildings of a mass series, so-called “Khrushchevkas”. If we trace how Dubelir's utopian concept of Howard's “garden suburb” of the early 20th century fits into it, it is worth noting that despite the abundance of greenery, this area cannot be considered a literal embodiment of Howard's concept, just as it was not possible to implement the Howard's proposal of the beginning of the 20th century. It is significant that the information about Dubelir's proposals was transformed over time and the authors of the article had to hear the opinions of old residents who believed that the supporters of the “garden city” theory were the architects who were engaged in the development of the Pershotravnevyi residential area by the “Khrushchevkas” and therefore took care of a large amount of greenery and in particular fruit trees near the houses, so that the residents actually had their own gardens within the city limits (Fig. 4).



Fig. 4. A forest park in the midst of mass residential development is the remains of the historic Kadetskyi Hai

We conducted a comparative analysis of the very concept of Howard with the development system of the Pershotravnevyi residential area according to the main indicators:

1. The form of the plan. Howard's garden city is circular in plan, it is crossed by 6 boulevards that divide the city into equal sectors, a central square-garden stands out, around which public buildings are located, a glass gallery is located around the central sector – an indoor public park, on the outer circle there are industrial facilities objects, the construction of plots is regulated, schools, playgrounds, churches are oriented to the green belt. The Pershotravnevyi residential area has the contours of a curvilinear plot located in several levels, the building is terraced with typical residential buildings, and there are sliding green slopes between the rows of buildings.

2. Functional set. In theory, Howard's garden city is a self-sufficient entity with all the necessary components, instead, the Pershotravnevyi residential area is a part of the Chokolivka district, integrated into its structure, there is a lack of parking, primary services, leisure facilities, that is, in fact, it is a landscaped sleeping community.

3. The reality of implementation. The "garden city" theory of is essentially utopian, even despite the implementation of these ideas in Letchworth Garden City (1903) and Welwyn Garden City, we can rather talk about the implementation of the ideas of the "garden city" – in the development project of the city of Canberra with a large number green, in the Le Logis district in the Brussels commune of Watermal-Boisfort, in the garden districts of Wandsbek-Gartenstadt in Hamburg, Essen-Margarethenhöhe in Essen, etc. In fact, Park Güell was also an attempt to create a garden district in Barcelona, but there were no people willing to build housing there. The general trend proved that the classic concept of the garden city was unsustainable and some suburban garden areas eventually turned into sleeping areas, but urban planning concepts from the second half of the 20th century to the present have used many of the ideas of Howard's concept. Such an example is the development of Pershotravnevyi residential area, where there is a much larger amount of greenery compared to Kyiv as a whole, and the unique historical eco-system of Kadetskyi Hai with a large number of wild animals and birds (hedgehogs, squirrels, field mice) has been preserved, at least in some areas. in the immediate vicinity of houses. Animals and birds are attracted by a large number of fruit trees, and numerous flower gardens attract insects.

In 2022, during the active shelling of Kyiv, the number of animals and birds decreased, in addition, the green massifs on the slopes took on a cluttered appearance and essentially turned into forest parks.

Osiedle Oficerskie (Officers' Residential Complex) in Cracow

Osiedle Oficerskie is located in the northern part of Cracow, in the II Grzegórzki district (Fig. 5) The name comes from the village of Grzegórzki, included in the city limits in 1910.



Fig. 5. Location of Osiedle Oficerskie on the map of Krakow relative to Market Square [22]

History of Osiedle Oficerskie

The Officers' Residential Complex appeared in Cracow in the interwar period. It can be argued that this is one of the most interesting urban formations in Cracow as a whole. Now it is located in the very centre of the city, but at the time of its creation it was located on the then northeastern outskirts of Cracow, in the foreground of Lubicz Fort. The name of the complex is not accidental, as it was designed and built for the officers and officials of the Polish Army, which was connected, in particular, with the close proximity to both the military barracks and the fort, as well as the Rakovice military airport. The Officers' Housing Cooperative (Oficerska Spółdzielnia Mieszkaniowa), founded in 1922, was responsible for the implementation of this project [16-18].

It should be noted that the area where Osiedle Oficerskie was built was previously almost completely undeveloped. In 1924–1926, the Office of Urban Regulation developed three regulatory plans for this area, which marked several existing elements of the area's development. These plans were drawn up by Andrzej Kleczek, Kazimierz Teleśnicki and Marian Lenk. Originally, Osiedle Oficerskie consisted, among other objects, of low-rise residential buildings with a variety of architecture, evenly spaced along the streets. Organized landscaping was planned between the houses, and the streets created a well-thought-out layout. It is dominated by one wide Beliny-Prażmowskiego Avenue, with a green strip between the roads (Fig. 6). The housing estate was created as a defined system, based on a plan prepared in advance. The entire area was divided into plots and resold to future owners who built houses themselves, but had to do so according to established guidelines and parameters in order to maintain a high level of construction (Fig. 7). About 600 building plots were planned, on which about 300 residential buildings were built by 1939 [16-18].

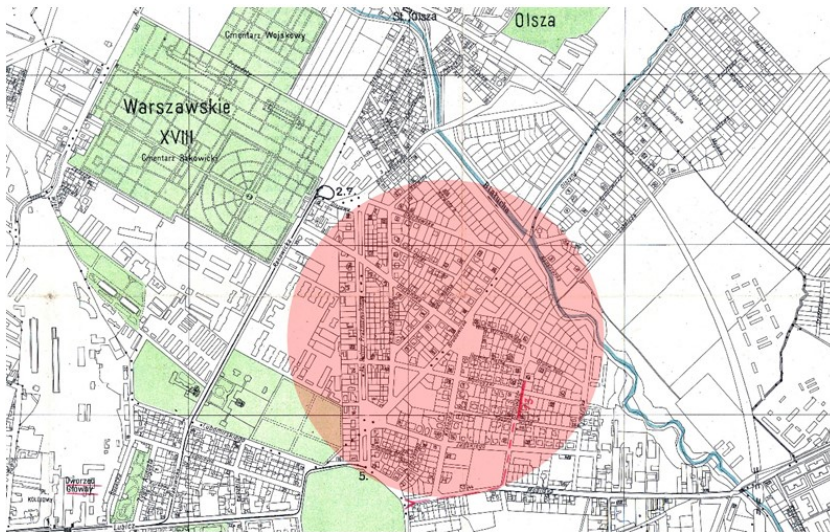


Fig. 6. Osiedle Oficerskie on a detailed 1:10000 scale plan of Cracow in 1947. The territory of the residential complex is indicated in red. Source: Archive Map WIG [23].



Fig. 7. View of Osiedle Oficerskie during its construction. [Archive of Faculty of Architecture, CUT, s.v.]

The construction of Osiedle Oficerskie lasted quite a long time. The first projects of houses appeared in the 1920s, but their construction continued until the Second World War.

It should be noted that prominent architects of the first half of the 20th century, Józef Pokutyński, Adolf Siódmak, Władysław Warczewski, Alfred Kramarski, Samuel Manber, Samuel Nebenzahl, and Edward Skawiński were involved in the design of the Osiedle Oficerskie development [16-18].

Current state

Due to the development of Cracow over the past few decades, Osiedle Oficerskie has transformed from a neighborhood located on the outskirts of the city to a residential area located in its centre. Its territory is bounded to the north by the Białucha River, to the east by the buildings of the Pliva factory, and to the south by Mogilska Street, and from the west – Beliny-Prażmowski Avenue (Fig. 8).

However, it has not lost its “green” character thanks to the gardens around the private villas, the trees and bushes growing along the Białucha River, as well as in the squares, along the streets and in the green strip between the two carriageways of Beliny-Prażmowski Avenue.



Fig. 8. The territory of Osiedle Oficerskie on the photo map of Cracow [24].
The territory of the residential complex is indicated in red

The development of estates has been transformed to some extent due to the increase in density, the introduction of multi-apartment development that took place in the 20th century, as well as numerous adaptations, reconstructions and extensions of existing buildings. However, it should be noted that the most valuable objects, as well as those created during the construction of the residential area, are under conservation protection, which guarantees the preservation of their original appearance.

On the territory of the housing estate, residents have access to a number of services and, apart from the insufficient number of jobs, it can be said that they are self-sufficient here. There is a secondary school, a school sports complex with a high school and an elementary school, two kindergartens, a sports complex with a swimming pool, a nursery school, health care facilities, a pharmacy, numerous shops and service establishments.

Osiedle Oficerskie is also well connected to other areas of Cracow. Public transport is provided by trams and city buses. Cracow’s main railway and bus stations are relatively close. This makes Osiedle Oficerskie, as it was 100 years ago, a desirable place to live in Cracow (Figs. 9-11).



Fig. 9. The territory of Osiedle Oficerskie: Grochowska Street and respectively Kielecka Street



Fig. 10. The territory of Osiedle Oficerskie: Bandurskiego Street and Kielecka Street



Fig. 11. The territory of Osiedle Oficerskie: green areas

Conclusions

The study of the territory of the Pershotravnevyi residential area made it possible to analyze the significance and potential of this territory. The analysis of the history of the Kadetskyi Hai and the Chokolivskyi residential area proved that only isolated fragments of the historical Kadetskyi Hai were preserved in the structure of Chokolivka, which was a unique eco-system with its own biodiversity: this is the territory of the “Suputnyk” park near the railway track, individual oak trees and the territory of the Pershotravnevyi residential area. The main problems of the Pershotravnevyi residential area are related to the fact that it is essentially a greened sleeping area with its own eco-system. Until the 1990s, some buildings had separate service facilities, but then they ceased to exist. The lack of parking is also a problem, so residents spontaneously park their cars on lawns and driveways. Another problem is related to the disorganization of green spaces, where many trees are in distress.

If we talk about the implementation of Howard’s ideas in the concept of the Pershotravnevyi residential area, the authors did not find similarities in planning or functional zoning, but there is a similarity in a large amount of green planting, in fact, a forest park and flower gardens and orchards in front of the houses.

A comparative analysis of two districts – the interwar Osiedle Oficerskie in Cracow and the Pershotravnevyi residential area in Kyiv demonstrates two distinct approaches to the use of Howard’s ideas. In the case of Osiedle Oficerskie, these ideas are embodied more fully, taking into account a larger territory, which made it possible to create a virtually self-sufficient entity with the required level of service. In the case of the green area Pershotravnevyi residential area, it was impossible to create it in full, in particular, there is a lack of primary service facilities and leisure facilities. Another difference is that part of the green spaces in Osiedle Oficerskie are private gardens, while in Pershotravnevyi residential area they are common green spaces between houses.

Compared to the Pershotravnevyi residential area, the Osiedle Oficerskie area is more orderly. The following advantages of self-sufficiency of Osiedle Oficerskie can be used when organizing the green massifs of Pershotravnevyi residential area:

- saturation of primary service facilities, in particular, shops;
- organization of the transport network;
- improvement of transport accessibility within the city;
- arrangement of green spaces.

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