

POST-INDUSTRIAL TERRITORY DEVELOPMENT UNDER AN ARCHITECTURAL AND URBAN DEVELOPMENT PROJECT AS ILLUSTRATED BY THE VOLGOGRAD TRACTOR PLANT

DOI: https://doi.org/10.18485/arh_pt.2024.8.ch9

_ Dmitrii Klimov

Ph.D. in Economics, Director of Research Institute of Urban Planning,
Corresponding member of Russian Academy of Architecture and
Construction Sciences (RAASC), Moscow, Russia, dmcompass@mail.ru

ABSTRACT

This paper describes the architectural and urban planning concept for redevelopment of the territory of former tractor factory in Volgograd. In the concept, a historical residential “cluster” with new social infrastructure facilities and a park area is organically included in the planned structure of the city, where instead of factory buildings there are business and scientific centers, as well as a complex of farming agro-clusters along the coastline.

The planned park areas along the embankment with agro-clusters inscribed in the landscape make it possible to create a natural buffer between residential development and the transport corridor adjacent to the coastline. Terraces and bridges are thrown from the park areas across the planned highway to the shore, providing unhindered connection with water. On the open sections of the highway, translucent protective screens with designer decoration and gardening serve as a buffer.

The dominant element of the territory is the public and hotel center with adjoining agricultural food-court. The spatial connection of the center with the river is provided by system of terraces, as well as the creation of a local marina for mooring yachts and houseboats. Near the yacht harbor it is proposed to organize semi-closed reservoirs, limited by the existing foreshore and pedestrian crossings on point supports, which can be used for sports, recreation, swimming, and as skating rinks.

The main form of public transport is an eco-friendly high-speed tram that passes through the sightings of the city and provides comfortable and reliable connection to the northern and southern parts of the city.

Maintaining the existing structure of streets and driveways of the factory and improving it, a functional synergy of the developing territory with urban environment is achieved.

KEYWORDS _ *ecological redevelopment, industrial area, architectural and urban planning concept*

INTRODUCTION

Modern society has aspired to certain dynamic transformation of unused industrial zones into new urbanized spaces, including public or residential areas. The transformation of post-industrial territories goes hand in hand with the development of urban spaces and has an impact on the formation of environmental quality, since a competent approach to post-industrial territory development solves a great number of economic, social, infrastructural and environmental problems.¹ Within the framework of this course of development of urban infrastructure, let us distinguish the term “redevelopment” or “renovations.” Renovation, or redevelopment, is the improvement of individual pieces of real estate, building complexes (factories, plants), districts or individual territories (quarters) in order to use them in the most efficient way.² Redevelopment is the most effective way to convert abandoned pieces of real estate or unreasonably used territories. Redevelopment refers to the renovation of old commercial and industrial facilities, in many cases with a change of their intended purpose.³ Redevelopment enables to rearrange abandoned areas of the former factory complexes and industrial enterprises which affect the image and environmental setting of the city. Redevelopment contributes to the improvement in living standards, the development of new activities, the solution of transport and environmental problems.⁴ Comprehensive redevelopment of industrial zones is aimed at creation of new jobs, new living spaces, scientific parks and development of infrastructure and transport. It is shown that competent environmental planning and territory management increases the comfort of living and working.⁵

The goal of research is to study the specifics of the project proposed as part of the territory redevelopment of the Volgograd Tractor Plant.

MAIN PART

Renovation projects for area improvement are being implemented in many Russian cities. As part of the study, let us consider the project that was presented at the XI International Architecture Festival “Eco-Shore,” which was held in Volgograd on August 25, 2022. At the festival, as part of the Russian National Open Contest for the Design of an Architectural and Urban Planning Concept for the Development of the Former Tractor Plant Territory, the applications of conceptual proposals for the architectural and spatial planning of the territory for its development as a new residential area of Volgograd were proposed.

Volgograd is a city in Russia, located 1,000 km southeast of Moscow. Volgograd is an important industrial city. The administrative center of Volgograd is located on the western bank of the Volga River and covers an area of 859 square kilometers with a population of 1.011 million.

¹ I.A. Kayumova Analysis of foreign and domestic experience in environmental rehabilitation of post-industrial territories // Master’s Bulletin. 2022. No. 5-1 (128). URL: <https://cyberleninka.ru/article/n/analiz-zarubezhnogo-i-otechestvennogo-opyta-ekologicheskoy-reabilitatsii-postpromyshlennyh-territoriy> (accessed on: 21.08.2023).

² Egor Borisovich Golovanov, Valentina Aleksandrovna Kiseleva Evolverment of redevelopment as a direction for the transformation of urban areas // SUSU Bulletin. Series: Economics and Management. 2013. No. 3. URL: <https://cyberleninka.ru/article/n/razviti-redevelopmenta-kak-napravleniya-po-preobrazovaniyu-gorodskih-territoriy> (accessed on: 21.08.2023).

³ E.D. Lapteva, N.R. Stepanova. On public space planning in cities /E.D. Lapteva, N.R. Stepanova // Proceedings of the International Conference of UrFU Students, Postgraduates and Young Scientists. Yekaterinburg: UrFU, 2017. P. 271–276.

⁴ Svetlana Valentinovna Pupentsova, Natalia Sergeevna Alekseeva EXPERIENCE IN ENVIRONMENTAL PLANNING AND URBAN TERRITORY MANAGEMENT // Construction Economics. 2019. No. 4 (58). URL: <https://cyberleninka.ru/article/n/opyt-ekologicheskogo-planirovaniya-i-upravleniya-territoriyami-gorodov> (accessed on: 21.08.2023).

⁵ Svetlana Valentinovna Pupentsova, Natalia Sergeevna Alekseeva EXPERIENCE IN ENVIRONMENTAL PLANNING AND URBAN TERRITORY MANAGEMENT // Construction Economics. 2019. No. 4 (58). URL: <https://cyberleninka.ru/article/n/opyt-ekologicheskogo-planirovaniya-i-upravleniya-territoriyami-gorodov> (accessed on: 21.08.2023).

The city was founded in the second half of the 16th century from the moment when the first guard detachments of streltsy appeared there in 1555-1556 and the fortress was founded in 1589.⁶ The city has changed several names during its history. Before the Bolsheviks came to power, the city was called Tsaritsyn; on April 10, 1925, it changed its name to Stalingrad, and in 1961 – to Volgograd. Volgograd is a hero city with a rich historical past and, at the same time, a developing industrial center of the region. There are eight administrative districts in the city: Traktorzavodsky, Krasnooktyabrsky, Tsentralny, Dzerzhinsky, Voroshilovsky, Sovetsky, Kirovsky and Krasnoarmeisky. The economy and industrial capacity of Volgograd play a very important role for the Volgograd Region and Russia. The most developed industries are oil refining and metal working, chemical and food industries, mechanical engineering and shipbuilding.

The Stalingrad Tractor Plant is one of the largest giant plants of Soviet industrialization. The site for the construction of the plant was chosen on the Volga bank, 14 km north of the center of Stalingrad. The first work on the construction of the plant and its infrastructure began in 1927. On June 17, 1930, the F.E. Dzerzhinsky Stalingrad Tractor Plant was officially commissioned.⁷ Considering the spatial planning structure of the plant and its settlements as well as the architecture of individual industrial, public and residential buildings, it should be noted that its development embodied advanced ideas in the field of urban planning and architecture of those years. The planning concepts for the quarters of housing estate combined both the traditional principles of ribbon building and the innovative principles of line building typical for the period of the late 20s and early 30s of the 20th century. It should be noted that the settlements of the tractor plant were formed with a developed system of cultural and everyday aspects of social life. Residential buildings featured expediency, simplicity of plastic solutions and, as a rule, low quality of construction work. The situation was different with public buildings, which were distinguished by expression, a variety of plastic solutions, and the design principles of constructivism were most consistently implemented in them.⁸

At present, the territory of the plant with an area of 135 hectares is a huge production zone, where it is almost impossible to find a whole building – they have all been demolished (Fig. 1–3). According to the Rules for Land Use and Development of the Volgograd City District, this territory has the status of integrated and sustainable development.



Figure 1: Modern view of the territory of the former Tractor Plant in Volgograd⁹

⁶ Vasily Valeryevich Tarakanov Continuing the traditions of studying the Time of Troubles // *VoISU Bulletin. Series 4, History. Areas Studies. International Relations*. 2019. No. 2. URL: <https://cyberleninka.ru/article/n/prodolzhaya-traditsii-izucheniya-smutnogo-vremeni> (accessed on: 21.08.2023).

⁷ I.A. Trushin et al. The firstborn of the Soviet tractor industry. – Volgograd: N-Volzh. Book Publisher, 1980. – 366 pages.

⁸ Artur Georgievich Tokarev Stalingrad Tractor Plant: Space of industrialization and constructivism // *TSUAB Bulletin*. 2019. No. 1. URL: <https://cyberleninka.ru/article/n/stalingradskiy-traktorny-zavod-prostranstvo-industrializatsii-i-konstruktivizma> (accessed on: 21.08.2023).

⁹ Contest of development concepts for the territory of the former Tractor Plant in Volgograd – <https://totalarch.com/eco-bereg-2022/stalingrad-tractor-plant> (accessed on: 21.08.2023).

The site for the development of the architectural and urban planning concept of the former plant territory has an area of 295 hectares and in the future should become the center of the northern part of the city, which is a topical issue for prospective development of Volgograd. The territory has an advantageous city-planning location on the bank of the Volga River with partially completed bank stabilization and is provided with all modes of urban public transport.



Figure 2: Territory of the former Tractor Plant in Volgograd¹⁰



Figure 3: Territory of the former Tractor Plant in Volgograd¹¹

Today, in the new realities, the territory of the former Tractor Plant should be reconstructed. Various redevelopment projects were proposed under the competitive selection conditions.

The concept of eco-redevelopment and the conditions of the ongoing competition in 2022 predetermined the goals for the development of architectural renewal of the former production area of the tractor plant. Thus, projects were proposed for the architectural and spatial reorganization of the territory for its future development as a new residential area of Volgograd.

To do this, it was necessary to put forward proposals on the ratio and parameters of various functional zones; on the development of a public transport network to integrate the territory of the new district into the citywide system; on the organization of a transport and pedestrian network within the territory, including a light rail environmentally friendly transport system; on the formation of a green frame of

¹⁰ Contest of development concepts for the territory of the former Tractor Plant in Volgograd – <https://totalarch.com/ecobereg-2022/stalingrad-tractor-plant> (accessed on: 21.08.2023).

¹¹ Contest of development concepts for the territory of the former Tractor Plant in Volgograd – <https://totalarch.com/ecobereg-2022/stalingrad-tractor-plant> (accessed on: 21.08.2023).

the territory, including the development of parks and recreational zones along the Volga River and in the flood plain of the Mokraya Mechytka River, by ensuring the compositional opening of the territory to the Volga; as well as to pay special attention to the preservation of cultural heritage sites (Nizhny Traktorny settlement, the entrances of the Tractor Plant and the Dzerzhinsky Square).

The project had to comply with the requirements of the development concept of the given territory and its functional zoning:

- a residential area with a population density of no more than 400 people per hectare and a building height of no more than 16 stories should occupy at least 40% of the total area;
- a public and business area with a height of no more than 25 stories and a density of no more than 25 thousand sq.m of building footprint per hectare should occupy no more than 25% of the total area;
- landscaped recreational areas, including sports facilities, should occupy at least 25% of the total area.
- an educational area (interuniversity international campus) should occupy no more than 10% of the total area;
- other territories, including public utilities, should occupy 10% of the total area.

When forming the planning structure, it was necessary to preserve and take into account the historical planning structure in the concept as much as possible; provide for the location of a student campus and take into account the location of cultural heritage sites.

Particular attention was paid to the bank line area: the architects had to propose a set of measures for the development of the bank line, taking into account the previous bank stabilization work and the availability of the Zero Longitudinal Highway project, as well as to provide for a system of crossings and pedestrian links between the bank line and the rest of the territory within the design battery limits. An essential role was assigned to the development of a scenario plan for the discovery and perception of the designed territory on the Volga River when driving or walking along the bank line.

One of the renovation projects was developed by a team of architects led by Dmitry Klimov. In their work on the project, the team of architects adhered to the concept of a functional flow city. The essence of this concept lies in the fact that the principle of architectural continuity was adopted as the main spatial idea. The reference of the project to the 30s of the 20th century is connected with the historical location of the plant, its unique location on the bank of the Volga and its scale.

The key urban planning approach is to create a clear system of basic functional “layers”: housing-recreation-service-workplaces. In the solution proposed by the project, the existing historical residential “cluster” with social infrastructure facilities and a park area is seamlessly included in the overall planned structure, where the residential and park areas are scaled up, and office, business and scientific centers as well as a complex of farm agro-clusters located along the bank line appear as workplaces instead of factory buildings.


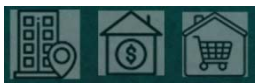






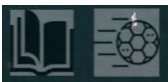
The project developed by a team of architects led by D. Klimov is shown in the sketches (Fig. 4).



Figure 4: Master plan for the development of the former territory of the Tractor Plant¹²

Fig. 4 shows a master plan for the development of the former territory of the Tractor Plant, which includes the following facilities (Table 1).

Table 1: Development facilities in the former territory of the Tractor Plant

Symbol	Designation
	Utilities and technical services of the residential area
	"Gate to the city" office and commercial buildings
	"Agro-park" eco-cluster system – greenhouses, scientific laboratories and farm start-ups
	"City villas" – low-rise residential development
	VgTP entrance landmarked building
	"Residential Marina" boathouses for yachts, parking places for houseboats
	Historical residential development
	Multistory residential development
	Student campus

¹² Eco-Shore official website. V.N. Logvinov International Architectural Festival – <https://ecobereg.ru/works/2022/#> (accessed on: 21.08.2023).

The spatial structure of the territory proposed by D. Klimov's project provides for the creation of a functional "buffer layer" in the form of a public and business zone on the side of the existing urban development and V.I. Lenin avenue, with the most effective connection of the existing urban fabric with the planned residential and public development, and further – with the river.

The planned park areas along the embankment and the pronounced relief, with agro-clusters fit in it, make it possible to create a natural buffer between residential development and the powerful "zero highway" transport corridor adjacent directly to the bank line, provided for in the city development master plan. The park areas and squares have terraces and bridges thrown across the planned highway, which allow for unhindered communication with water. Translucent protective screens with designer's decoration and landscaping act as a buffer on open sections of the highway.

Transport and utilities. The transport frame of the city has a pronounced rectangular structure due to its location along the right bank of the Volga River. The main mode of public transport is an environmentally friendly express tram that passes the main beauties of the city and provides a comfortable and reliable connection between the northern and southern parts of the city. The development of the transport frame of the city of Volgograd is planned due to a new traffic artery known as "0 Highway," which, in addition to a transportation function, also performs a panoramic and view function due to its passage along the bank of the Volga River. Activities for the transport service of the territory of the planned residential development support the established principles of urban development of the city as well as the concept of the tractor plant "functional flow city."

By maintaining the existing structure of streets and driveways of the former tractor plant and by improving it through the construction of a system of streets of regional significance adjacent to V.I. Lenin Avenue, with arrangement of parking spaces, modern and functional stops for public transport, a network of bicycle paths and pedestrian ways and water transport, a functional and planning synergy of the developing territory with the external urban environment is achieved. To serve public transport, it is proposed to extend the express tram along the territory of the planned residential development with the arrangement of stopping points tied to attraction foci.

The compositional and functional center, the dominant element of the planned territory is a public and hotel center with an agro-foodcourt adjacent to it. The center is located in close proximity to the water on the axis of the planned pedestrian boulevard leading from the historic Zavodskaya checkpoint towards the river. Spatial connection with the river is provided by a system of terraces as well as the creation of a local marina and water area for mooring yachts and houseboats.

To expand certain sections of the embankment, it is proposed to use the existing concrete bank stabilization structure, with the necessary support elements for horizontal decking placed on it. In small sections of the river near the marina, it is proposed to organize semi-enclosed reservoirs limited by the existing coastal strip on one side and pedestrian crossings on point supports on the other. These water areas can be used in summer for sports, recreation, safe swimming (creation of special water filters in the water along footbridges), and in winter – as city skating rinks.

One of the specific features of the Project is the refusal to locate industrial enterprises and comprehensive development of the territory, which enables not only to give a new look to the location in a quality manner, but also to improve the environmental situation. Environmental redevelopment of industrial territories is a huge internal resource of all cities, especially large ones, it is an important reserve for new urban development.

CONCLUSIONS

Redevelopment of industrial zones involves comprehensive development of territories with the creation of leisure facilities, the provision of social infrastructure, workplaces, and good transport services. Development of abandoned territories, their transformation into new urban areas is beneficial

from all points of view – both for the preservation of traditional local environment, environmental well-being and for satisfying cultural, sports and aesthetic interests of local residents. Such facilities often become centers of attraction for tourists. A comprehensive solution for the implementation of projects aimed at development of unused territories allows for significant savings on the construction of utility lines, the organization of public transport, the creation of road and logistics infrastructure.

For the formation of recreational areas, a green frame structure was developed, proposals were made on the comprehensive improvement and development of leisure territories of the floodplain of the Mokraya Mechyotka River and the Nizhny Traktorny Park on the bank of the Volga and on watering of the floodplain of the Mokraya Mechyotka River with "blue-green architecture" elements; on the organization and use of the slopes of the floodplain of the Mokraya Mechyotka River as well as on the provision of links between the said leisure facilities and the coastal strip, taking into account the availability of the carriageway of the Zero Longitudinal Highway in the future.

When developing the architectural and urban planning concept, the following tasks were solved:

- taking into account the available places of tourist attraction and cultural heritage sites, it is proposed to reorganize the urban space and buildings in the territories adjacent to them;
- adherence to the historical context of the development of the former territory of the Tractor Plant (borders of industrial districts, street routing) is envisaged;
- the combination of residential and public and business functions is ensured;
- the organization of pedestrian and road traffic from the territory to the student campus area is proposed;
- the organization of a cycling network and the integration of this network into the existing transport infrastructure of Volgograd are proposed, taking into account the availability of a zone oriented toward a youth audience (student campus) as well as large leisure facilities within the boundaries of the designed territory;
- the design and planning concept links together the territory of the former Tractor Plant with the existing system of streets and the planning structure of the entire Traktorozavodsky District; the direction of the axis of Dzerzhinskogo street, the connection with the House of Culture of the Aluminum Plant and the sports cluster of the Traktor stadium have been taken into account.

REFERENCES

- **Article:** E.D. Lapteva, N.R. Stepanova. On public space planning in cities /E.D. Lapteva, N.R. Stepanova // Proceedings of the International Conference of UrFU Students, Postgraduates and Young Scientists. Yekaterinburg: UrFU, 2017. P. 271–276.
- **Book:** I.A. Trushin et al. The firstborn of the Soviet tractor industry. – Volgograd: N-Volzh. Book Publisher, 1980. – 366 pages.
- **Internet source:** E. B. Golovanov, V. A. Kiseleva. Evolvement of redevelopment as a direction for the transformation of urban areas // SUSU Bulletin. Series: Economics and Management. 2013. No. 3. URL: <https://cyberleninka.ru/article/n/razvitie-redevelopmenta-kak-napravleniya-po-preobrazovaniyu-gorodskih-territoriy> (accessed on: 21.08.2023).
- **Internet source:** I.A. Kayumova Analysis of foreign and domestic experience in environmental rehabilitation of post-industrial territories // Master's Bulletin. 2022. No. 5-1 (128). URL: <https://cyberleninka.ru/article/n/analiz-zarubezhnogo-i-otechestvennogo-opyta-ekologicheskoy-reabilitatsii-postpromyshlennyh-territoriy> (accessed on: 21.08.2023).
- **Internet source:** Contest of development concepts for the territory of the former Tractor Plant in Volgograd – <https://totalarch.com/ecobereg-2022/stalingrad-tractor-plant> (accessed on: 21.08.2023).
- **Internet source:** Eco-Shore official website. V.N. Logvinov International Architectural Festival – <https://ecobereg.ru/works/2022/#> (accessed on: 21.08.2023).
- **Internet source:** S.V. Pupentsova, N.S. Alekseeva. Experience in environmental planning and urban territory management // Construction Economics. 2019. No. 4 (58). URL: <https://cyberleninka.ru/article/n/opyt-ekologicheskogo-planirovaniya-i-upravleniya-territoriyami-gorodov> (accessed on: 21.08.2023).

- **Internet source:** V. V. Tarakanov. Continuing the traditions of studying the Time of Troubles // VolSU Bulletin. Series 4, History. Areas Studies. International Relations. 2019. No. 2. URL: <https://cyberleninka.ru/article/n/prodolzhaya-traditsii-izucheniya-smutnogo-vremeni> (accessed on: 21.08.2023).
- **Internet source:** A. G. Tokarev. Stalingrad Tractor Plant: Space of industrialization and constructivism // TSUAB Bulletin. 2019. No. 1. URL: <https://cyberleninka.ru/article/n/stalingradskiy-traktorny-zavod-prostranstvo-industrializatsii-i-konstruktivizma> (accessed on: 21.08.2023).