Evolution of high-rise construction in Leningrad – Saint Petersburg in the middle of the 20th – Early 21st centuries: projects and Implementation

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Abstract. One of the most important issues in national urban planning is arrangement of high-rise buildings in the largest cities of Russia. This issue becomes especially acute in such cities as Saint Petersburg, which has unique architectural and urban-planning heritage preserved to a great extent. In this regard, it seems important to trace the evolution of high-rise construction development and arrangement in Leningrad – Saint Petersburg in the middle of the 20th — early 21st centuries. The goal of the article is to consider high-rise construction development regarding both public and residential buildings in comparison of project ideas and results of their implementation in the 1940s–2000s. Prerequisites and issues of high-rise construction of that period are considered. Particular attention is paid to changes in the official urban-planning policy, regulatory framework and attitude of city authorities to high-rise construction. The study was carried out with the consideration of the following historic periods differing in their urban-planning policy: the late 1940s–1950s; 1960s; 1970–1980s; 1990s; 2000s–2010s. Economical prerequisites of high-rise construction and their influence on the modern urban-planning policy during the post-Soviet period are considered. In conclusion, an attempt is made to determine tendencies of high-rise construction development in Saint Petersburg.

1 Introduction

It is known that at the present time there is no single definition for the “high-rise building”. At different times this concept changed both in Russia and in the USSR according to ideological and economic attitudes. The height of multi-story buildings in the USSR ranged from 9 floors (about 30 m) up to 20 floors (about 70 m).

After the October Revolution, the construction of high-rise public and residential buildings in Petrograd (and after 1924 — in Leningrad) was not envisaged. In the first half of the 20th century, the following dominants remained in Leningrad: the spire of the Peter and Paul Fortress (122 m), the spire of the Admiralty and the dome of the St. Isaac’s

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Cathedral (103 m). Before the Great Patriotic War, the height of residential and public development in Leningrad did not exceed 30 m. Only the tower of the Moskovsko-Narvsky district council and the building of the Leningrad House of the Soviets (architect N. A. Trotsky) built just before the war were exceptions: their height did not exceed 50 m (Figures 1, 2). Their height and dominating in the surrounding development were determined by ideological and urban-planning considerations.

Figures 1, 2. The tower of the Moskovsko-Narvsky district council and the building of the Leningrad House of the Soviets

2 Materials and methods

When considering the evolution of high-rise construction development in the city on the Neva river, it is proposed to use methods which are typical for architectural and urban-planning studies, i.e. analytical methods of comparison, juxtaposition and historical analogies.

In the post-war period, Leningrad architects began to pay attention to high-rise construction and participate in it only in the early 1950s.

Until that time, directions in the designing and construction of low-rise housing in Leningrad were determined by the need for renovation and reconstruction works and the restoration of military destructions.

In 1948, a Master Plan for the renovation and development of Leningrad was approved (Figure 3). In pre-war Master Plans, residential development was mainly represented by large-size city blocks, and according to the Master Plan of 1948 it was to be formed with small-size city blocks of 4–6-story buildings with all types of services. As an exception, it was allowed to increase the height of residential development up to 7 floors on main lines and squares of the city [1, p. 26].

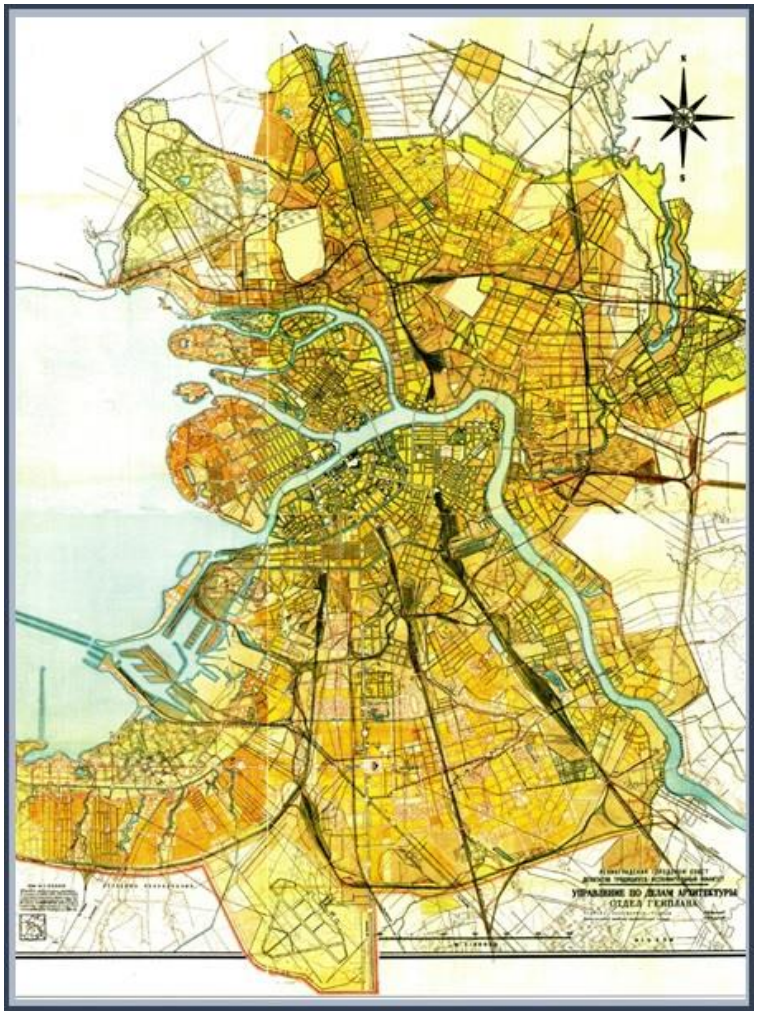

Figure 3. Master Plan of 1948 for Leningrad renovation

In accordance with this Master Plan, in the early 1950s, it was proposed to build 6–7-story residential buildings along the main lines running from the center to new residential districts: Stalin prospect (later — Moskovsky prospect) and Stachek prospect. During this period, only buildings in the southern part of the present Moskovsky prospect (architect S. B. Speransky) and several multi-story buildings on Stachek prospect at the entrance to Leningrad from Petrodvorets and Tallinn (architect V. A. Kamensky) were constructed (Figures 4 and 5).

During Soviet times, the height control of new high-rise buildings was performed in layout designs of residential blocks and determined by urban-planning considerations: location in new districts, location of city blocks in the system of main lines, natural conditions.

Since the late 1950s and until the early 1960s, unofficial prohibition against the construction of multi-story residential buildings existed due to the large-scale construction of panel five-story buildings and development of the micro-district service system in Leningrad and other cities of the USSR (except Moscow).

Figures 4, 5. High-rise development in the southern part of Moskovsky prospect (1950s) and high-rise development in the southern part of Stachek prospect (early 1950s)

However, since the beginning of the 1960s, this prohibition had been gradually lifted in connection with the determined need for the construction of new, increasing housing volumes, and then the switch to large-scale nine-story residential development based on industrial series occurred (Figure 6).

Figure 6. Large-scale nine-story residential development (1960s)

In June 1966, a Master Plan for the development of Leningrad was approved, according to which in subsequent years significant territories were developed not only in the southern and south-western parts of Leningrad, but also in its northern and eastern parts (Kalininsky and Vyborgsky districts) (Figure 7).

Figure 7. Master Plan of 1966 for the development of Leningrad

The development regulations included in the Master Plan of 1966 provided for the fixed ratio with regard to the arrangement of new residential housing in various districts of the city. About 45% of new housing was to be located in northern districts of Leningrad, 50% — in southern districts, including the right bank of the Neva river, 5% — in island areas. During the implementation of the Master Plan, those ratios were generally maintained [1, p. 28].

In 1969–1970s, it was planned to construct 60% of nine-story and 14% of twelve- and sixteen-story residential buildings of the total volume of housing construction in Leningrad [2, p. 7]. The average number of floors in residential buildings increased up to 10 floors in 1969–1970, according to the detailed urban-planning project for the Right Bank of the Neva river.

Residential buildings with the height of 16–18 floors were considered as integral parts of the designed large urban-planning centers of future construction areas (Figure 8). High-rise residential buildings were considered as means for the formation of city main lines. In 1973–1975, it was planned to erect eight 16-story residential buildings along the southern side of Geroyev prospect (nowadays — Leninsky prospect) [3, p. 3]. Those buildings were constructed in subsequent years. At the same time, in the northern part of Leningrad, the formation of Muzhestva square continued with high-rise residential buildings (16–18 floors) flanking the entrance to the square.

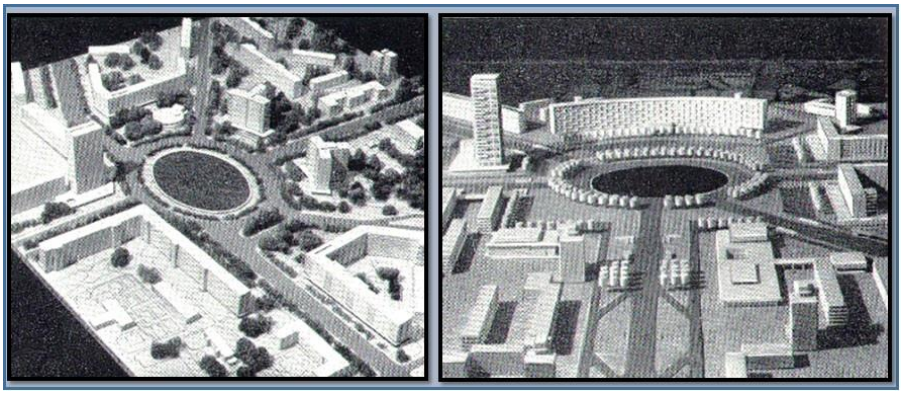

Figure 8. 16–18-story residential houses as parts of urban-planning centers in the beginning of the 1970s (models)

In the early 1970s, Leningrad architects began to consider the ratio between the new multi-story development and the historic silhouette of the city. Gradually it became clear that a significant increase in the number of floors of newly erected buildings should be considered acceptable only in areas of new residential and non-residential development, to avoid any damage to the architectural heritage. It was necessary to resolve a very important issue regarding the selection of area for the arrangement of high-rise dominants in the city. In other words, all new high-rise dominants should be included in the city plan beforehand to form a single system with high-rise compositions of the city center. In this regard, the development of a general compositional development scheme was started, which provided for the arrangement of community centers, including high-rise buildings [3, p. 5]. Unfortunately, this important urban-planning work was not completed.

In 1972, according to a special governmental decree, the size of the population of Leningrad was specified (it was expected to increase from 3.5 million to 4 million persons). Special calculations showed that the expected additional population could be completely settled on the territories stipulated by the Master Plan of 1966, provided the increase in the density of the residential development and development of new plots [4, p. 5]. As a consequence, the number of floors would increase as well. By that time, all operated buildings of standardized series were switch to the module-section basis, where at first a section, and then an apartment represented the type-design unit. Improvements affected such large-panel buildings of mass series as 1 LG-600A, 606M, 504D and others. The 137 series, based on the module-apartment method hold the key position in the list of Leningrad standard projects [5, p. 11]. Buildings of mass series had mainly 9–12 floors. In the middle of the 1970s, unique residential buildings were constructed in Leningrad, which combined 9-, 12- and 15-story module- sections of 1-LG600A series and brick 13–16 story module-inserts [5, p. 12].

Thus, the need to increase the living area in territories limited by the Master Plan, as well as urban-planning considerations with regard to the formation of large areas and main

lines resulted in the increase in the residential development height up to 9–15 floors by 1966–1975. By May 1975, the 30th anniversary of Victory in the Great Patriotic War, the construction of a square with the same name was completed in the southern part of Moskovsky prospect, an ensemble at the entrance from Moscow and Kiev. Two 20-story residential buildings with the height of 70 m became vertical parts of this ensemble. At that time, they were the highest buildings in Leningrad (Figure 9).

Figure 9. Victory Square (1975) (development team under the leadership of S. B. Speransky)

In 1973, the Leningrad Design Institute was offered an assignment for designing a complex of buildings for a large R&D center engaged in advanced space development (Central Research and Development Institute of Robotics and Engineering Cybernetics). A plot in the north of Leningrad, between Polytekhnicheskaya and Akademicheskaya subway stations, was allocated for the construction. A closed tender was held, which was won by a group of architects under the leadership of architect S. V. Savin [6, p. 31]. Their high-rise complex (control and test station, 104 m) became a dominant in this part of the city (Figure 10). In 1986, the erection of this complex represented a particular stage in high-rise construction development in Leningrad. Before 1991, no residential or public buildings of such height were constructed.

Figure 10. High-rise complex of the Central Research and Development Institute of Robotics and Engineering Cybernetics (1973–1986)

In the 1990s, several attempts were made to design high-rise buildings in Saint Petersburg. Those included the unimplemented project of Peter the Great high-rise building in the western part of Vasilyevsky island (architect O. A. Kharchenko).

The late 1990s – early 2000s shall be considered as the beginning of the development and large-scale implementation of projects of high-rise buildings in Saint Petersburg (Figure 11).

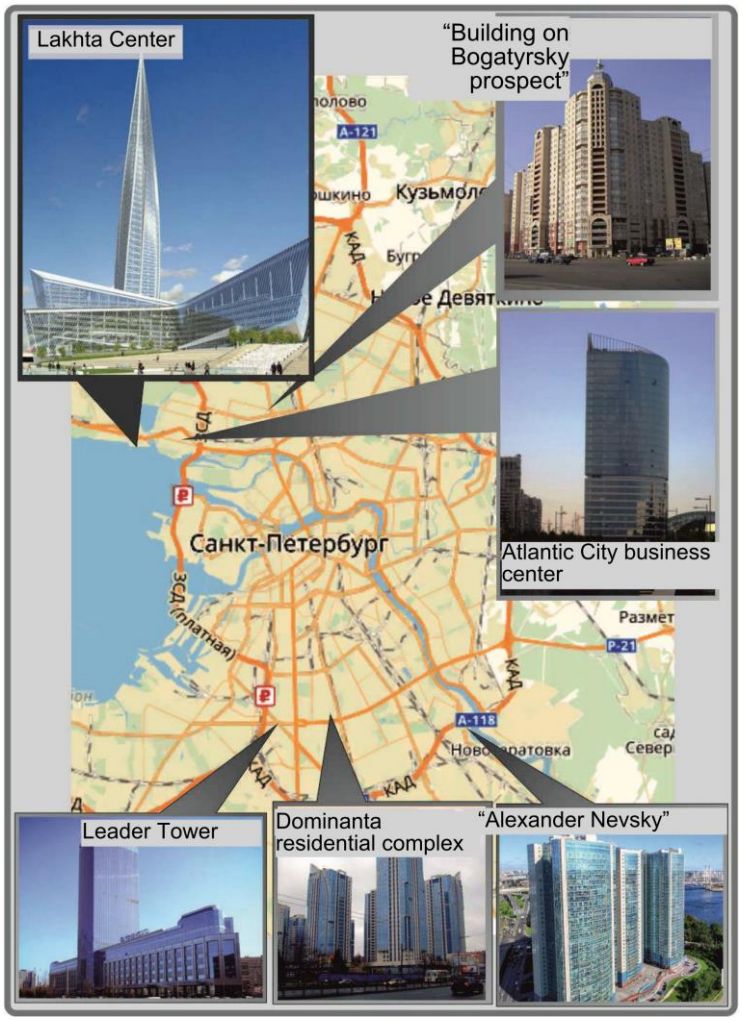

Figure 11. High-rise residential and administrative buildings in Saint Petersburg (early 2000s)

In 2000, the erection of Cloud Nine (Sedmoe Nebo) 27-story residential complex was completed, the height of which reached 101 m. This high-rise complex is located near Moskovsky prospect on Kuznetsovskaya street (Park Pobedy subway station). Another two projects were implemented in 2003: the high-rise residential "Building on Bogatyrsky prospect" (height — 108 m) and the residential complex "Poem by Three Lakes" (height — 100 m). The first building is located on Bogatyrsky prospect near the historical part of the city, the second building is located in the block of houses, limited by Engelsa prospect, Lunacharskogo prospect and Yesenina street. In 2006, a high-rise residential building was constructed on Komendantsky Prospect (height — 105 m); it was made of double multi-

story plates connected with an arch. In the same year, the Mezhdunarodny residential complex (101.5 m high) located on the triangular plot, limited by Bely Kuna street, Bukharestskaya street and Turku Street, was completed. Among the buildings typical for this period, the Atlantic City business center with an extended atrium (architect S. V. Gaykovich) can be noted (Figure 12). The high-rise part of this complex (110 m) became one of dominants of the Primorsky district.

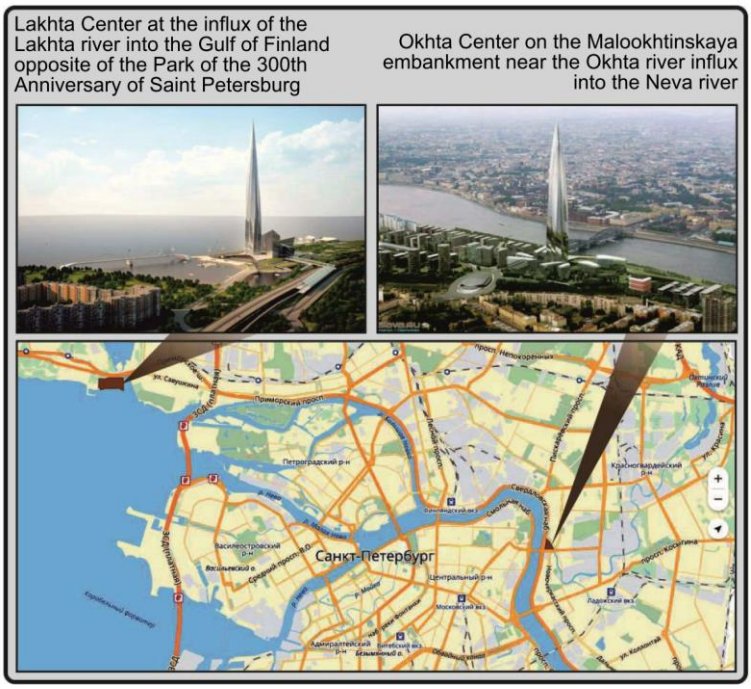

Figure 12. Okhta Center (architectural model, 2006, RMJM) and Lakhta Center (approved project, 2012)

Analysis of the results of high-rise construction in Saint Petersburg in the 2000s allowed to classify the following factors as prerequisites of its development:

- significant excess of the demand over the supply of land plots and premises (residential and administrative) near city main lines;
- development of modern technologies of frame construction;
- development of modern elevator technologies;
- development of modern engineering ventilation systems for environmental control.

In the early 2000s, the competitive designing of the Okhta Center (customer: OJSC Gazprom) became a separate area of concern. The City Administration selected the Right Bank of the Neva river for the arrangement of this complex. According to the results of the 2006 contest, RMJM London Limited was determined as the winner (Figure 13). Commissioning of the architectural dominant was expected in 2012. However, those results evoked negative responses in both specialists and the city community, and the project was denied. In 2011, OJSC Gazprom acquired the plot in another part of the city — on the bank of the Lakhta River, at a distance from the historical center. The selection of this plot was also determined by administrative decisions.

The construction of the public and business complex with the total area of more than 400,000 m2 began in 2012 (Figure 13). It was intended to house the headquarters of OJSC Gazprom. The new complex has undergone some changes in comparison with the Okhta

Center. Its extended part is divided by the atrium in the northern and southern parts; and its high-rise part (together with the spire) will be 462 m high. It is expected to complete its construction in the Q3 2018. The tower spire will be viewed from all points of the historical part of the city, as well as from the water area of the Gulf of Finland. Moreover, it will be the highest building in Europe.

The Leader-Tower business center, situated on Konstitutsii square, at the end of Novoizmaylovsky prospect, became a high-rise dominant of the southern part of the Moskovsky district (Figure 11). LLC Fregat, the initiator of this construction, acquired the corresponding land plot in 2007, obtained a site development plan and a permission for construction in 2009, and started the construction. The location for high-rise facility construction was selected well: a similar object was intended to be constructed in this territory according to the urban-planning documentation of the 1980s. However, the designed height (145 m) caused serious objections of the Committee for City Planning and Architecture of Saint Petersburg, and the plan was canceled. The customer managed to win the case in the Arbitration Court and the construction was not suspended. Eventually, the construction of this complex, which includes 52.7 thousand m2 of commercial spaces and a 5-level underground parking lot for 250 lots, was completed in 2013.

In the 2010s, the development of multi-story residential complexes in Saint Petersburg determined the silhouette of peripheral parts of the city. The selection of plots for these complexes was mainly random in nature. The lack of the necessary social infrastructure (kindergartens, schools and shops) became the main drawback of this construction.

An attempt to overcome those shortcomings can be noted in the structure of the Peter the Great and Catherine the Great (Petr Velikiy I Ekaterina Velikaya) double-tower residential complex, erected by the RosStroyInvest design and construction association near the bend of the Neva river and Rybatskoye district (Figure 14). Buildings of this complex have 32 floors (110 m) and 24 floors (80 m). A kindergarten, fitness center, cultural and educational center and cafe (much needed public infrastructure for future residents of 1,683 apartments) are designed for the construction at the site of the complex. The total residential area is 62,392 m2. RosStroyInvest company is one of the leaders in the field of high-rise residential construction in Saint Petersburg. City of Masters (Gorod Masterov), House with Chiming Clock (Dom s Kurantami), Prince Alexander Nevsky (Knyaz Aleksandr Nevsky), Two Angels (Dva Angela) and other high-rise residential complexes were also built in various parts of the city according to projects of this company.

Figure 13. Peter the Great and Catherine the Great residential complex

3 Results

As a result of the consideration of implemented projects of high-rise residential and public-business complexes, it may be concluded that the location of high-rise dominants in Saint Petersburg has random nature. Occasional arrangement of high-rise buildings within limited unoccupied areas, well-established by the early 2000s, contravenes the requirements for the integrated development of urban territories. Using the imperfection of legal mechanisms for regulating urban-planning activities (and often in violation of such mechanisms), investors and owners of land plots implemented projects of high-rise buildings with disregard for the urban-planning conditions, exceeding permissible values of density and number of floors. Under such conditions, an excessive burden on the engineering and transport infrastructure occurs, while the necessary social infrastructure — schools, kindergartens, shops — is either insufficient with regard to the number of residents, or absent. Further development of these processes will lead to serious issued related to the development of Saint Petersburg, including the operation of already constructed facilities, shortage in engineering capacities and, finally, increase in social tension.

It becomes obvious that the city is still not ready for emerging changes in terms of its urban-planning development, and, in particular, for the need to develop high-rise construction. Extremely limited high-rise regulations, which are mainly adopted by fiat and without sufficient scientific substantiations, and conditioned by the compositional silhouette of the historical city and borders of protected areas of cultural heritage objects, are typical for the majority of Saint Petersburg territories.

It seems that a special approach to the formation of the modern silhouette of the city is needed, with account for the potential emergence of new high-rise dominants not violating the historical urban-planning environment. Special attention should be paid to the scientifically grounded selection of territories for the future arrangement of high-rise residential and public-business buildings. Those can be public and business centers and high-rise residential complexes. Urban-planning documentation for the arrangement of the system of high-rise dominants without violating the historical silhouette of the city is needed to be developed. Several attempts to develop such documents were already made in the urban-planning practice of Saint Petersburg. Such documentation will provide an opportunity to identify territories for future high-rise construction, suitable by their engineering and geological conditions, which are especially complicated in Saint Petersburg. For this purpose, upon the adjustment of the modern Master Plan of the city, it is necessary to determine special areas with special urban-planning regulations aimed at the altitude, density and functionality of high-rise facilities to be erected in the future.

Such approach already applied in the world practice. According to this approach, it is expedient to allocate such territories near large transport and transfer hubs, in points of the intersection of ring roads with city main lines or at a distance from historical parts of cities. Besides, direct transport connection with the historical center and all city districts shall be ensured.

The construction of the La Défense public and business center in Paris, located on a single axis with Charles de Gaulle square and having direct connection with the historical center of Paris can be considered as the best example in this field. National and international experience in designing in terms of determining and selecting territories for high-rise construction shall be considered, used and developed to achieve the sustainable development of any large city.

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