MARINE FACADE, WESTERN HIGH-SPEED DIAMETER AND VASILYEVSKY ISLAND AS A PART OF THE SAINT PETERSBURG HISTORICAL CENTER

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Abstract

Introduction: Using the example of the Maritime Facade project being implemented, a gap is revealed between the strategic installations of the St. Petersburg development, defined by the city planning system and enshrined in the master plan of the city, and the real transformation of the architectural environment of Vasilyevsky Island. **Purpose of the study:** Identify the most significant omissions made during the implementation and repeated adjustments of the original concept. **Methods:** A comparative analysis of the key provisions of the initial concept and indicators of the currently formed urban environment. **Results:** An underestimation of a radical change in the urban development situation in the city center caused by the laying of a high-speed highway on the western part of Vasilyevsky Island was revealed. peripheral territories, does not allow it to solve the problems of the development of a highly urbanized environment arising in this process. The facts are outlined, showing how a consistent adjustment of the original concept created the basis for the formation of a peripheral-type residential living quarters in the unique coastal zone and the laying of a suburban-type autobahn. The list of measures that could reduce the associated negative impact on residential areas is defined. It is noted that the negative experience of the project "Marine Facade" in St. Petersburg should be taken into account in the urban planning practice of other metropolises of our country.

Keywords

Saint Petersburg architecture, urban planning, water areas and coastal territories, city center and transport framework.

Introduction

The Saint Petersburg coat of arms contains images of two anchors – a sea one and a river one. This eloquently reflects the specifics of city development. Although Saint Petersburg is the largest Russian sea port, its development on the banks of Neva, where the most significant historical buildings were erected, continued for centuries. Residential areas approached the shore of Markizova Luzha (Neva Bay of the Gulf of Finland) as late as in the 20th century. In 2011, when the construction of the flood wall with a highway was completed, the Saint Petersburg administrative borders covered the area of 1,403 km^2. Currently, the urban area of various modifications comprises all shores of Neva Bay. The transportation network including a belt highway provides a perimetral bypass around the water area. Markizova Luzha[1] became an inland water body of the city both in terms of hydrology (https://asninfo.ru/interviews/349-yuriy-shevchuk-na-vopros-o-tselesoobraznosti-namyva-otveta-net-ni-u-biznesa-ni-u-vlasti) as well as functional and planning indicators (Figure 1).

The eastern part of the city is the most urbanized. The historical center of Saint Petersburg is located there (the central districts of the city are colored with red in Figure 1). It is clear that the territories are divided by the Neva delta branches. That is why a system of bridges interconnecting the districts is of high importance. The main transportation lines of Saint Petersburg passed through the city center, as shown in Figure 1 (they are highlighted in white). Since such system resulted in overload of the city core and elongation of transportation lines, options to lay additional transport corridors to bypass the historical center were developed. In 1996, the concept of the Western High-Speed Diameter (WHSD) was approved. It suggested to connect the northern and southern parts of Saint Petersburg with a new highway along the western shore of Vasilyevsky Island (https://www.nch-spb.com/o-proekte/istoriya-proekta/). This route is shown in a blue dotted line in Figure 1. In 2002, it was proposed to create a complex for sea cruise ships near the western shore of the island, and the government ordered to start the construction of the port in 2005. Those decisions had a strategic significance for city urban-planning development. They predetermined the current reconstruction of Vasilyevsky Island and will probably affect further evolution of the Saint Petersburg center.

[1] Neva Bay (Markizova Luzha) is the eastern part of the Gulf of Finland. The line of protective structures can be considered its current border. The length of Neva Bay is 21 km, the widest place is 15 km, the average depth is about 3.0 m, the area of the water plane is 380 km^2.

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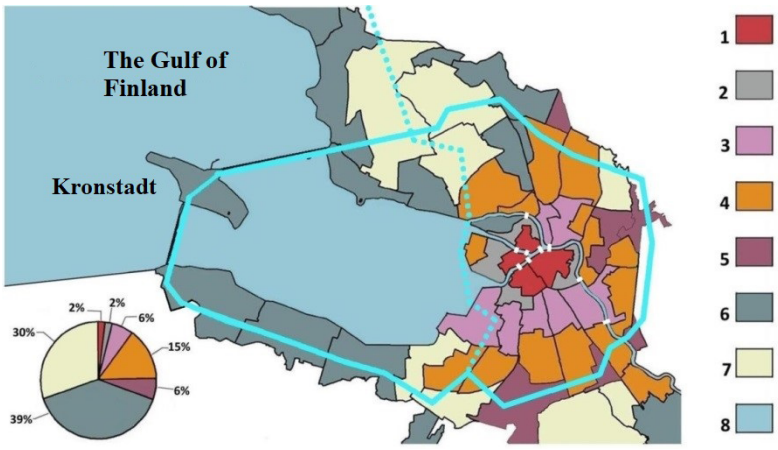

Figure 1. Layout of Saint Petersburg districts around the Neva Bay water area (as of the beginning of the 2000s.
1 — core of the city center, 2 — industrial and residential areas of the central districts, 3 — industrial and residential areas adjacent to the central districts, 4 — belt of large-scale residential development, 5 — external industrial areas, 6 — suburban territories, 7 — undeveloped forests and agricultural territories, 8 — water areas

Marine Facade of the 21st century

In 2007, the Government of Saint Petersburg declared its intentions to construct a hydraulic fill area of more than 400 ha at the western shore of Vasilyevsky Island in order to "develop the territories, build the Marine Facade and increase attractiveness of the city for tourists". It was stated that 33 ha were intended for the marine passenger terminal. The rest of the territories were allocated for offices, hotels, residential houses, exhibitions and shopping malls. A new waterfront of Saint Petersburg including a business center with high dominants was the intended result. As the construction of the Western High-Speed Diameter was underway at the time, it was decided that its central part should be laid through a hydraulic fill area (https://www.spb-guide.ru/page_18965.htm).

Experts thought that buildings with the total area of up to 4 mln m^2 could be built in the hydraulic fill territories, and the total cost of the project would be about USD 13 bln (https://www.novostroy-spb.ru/statyi/namjyvnjye_territorii_chto). In 2007, a project of hydraulic fill area development was approved. It embraced a part of the city with the total area of 476 ha (almost 30 ha of them were water areas, and 36 ha — areas of the passenger port and riverside wharves). 228 ha were intended for the street-and-road network (including the WHSD). 218 ha were supposed to be used for buildings. The share of residential areas (85.4 ha in total) was comparable to the territory of public and business facilities.

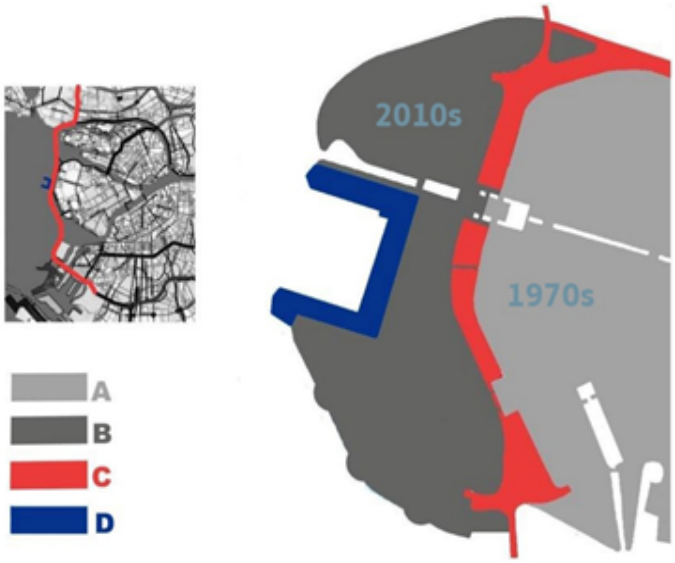

Figure 2. Top left — layout of transportation facilities in the Gulf of Finland water area
A — the territory established by the 1970s, B — the residential area in the hydraulic fill territories constructed in the 2010s, C — the highway with a sanitary protection zone, D — the port territory.

Subsequent adjustments introduced significant changes to the initial designs. However, the basic framework of the layout remained unchanged:

- the port area is prominent due to its size and accurate planning;
- the wide highway with the sanitary protection zone cuts off new territories from the part of the island that existed before;
- the outlines of the residential area remind of a dumbbell (offices in the north, residential buildings in the south, and a rather narrow connecting area between them) (Figure 2).

Since then, a bit more than 10 years passed. Hydraulic filling has been completed by 67% (https://www.dp.ru/a/2018/10/24/Otmitie_gektari), and the design documentation covers the whole area. Some conclusions can be made at this stage. Figures indicate successful development of the sea port and highway, but changes in the residential area became the source of numerous negative comments. They concern both the hydraulic fill territories as well as the development on Vasilyevsky Island that existed before.

Results. Marine Facade and WHSD

1. In 2008, the marine passenger terminal named Marine Facade was commissioned. Since then, the cruise passenger traffic increased here more than twice (https://www.gov.spb.ru/press/governor/127816/). In 2017, 247 cruiser ships and 2 ferry boats berthed there. 562,000

passengers arrived. It is 23% more than in 2016. The Russian Government ordered to use this port for cargo operations (https://regnum.ru/news/2398952.html).

2. In December 2016, traffic in the central part of the Western High-Speed Diameter (WHSD) in the hydraulic fill area on Vasilyevsky Island was started. Separated sections of the highway became a single system, and the traffic of vehicles racing at the speed of more than 100 km/h increased from 120,000 vehicles/day to 200,000 vehicles/day (https://www.fiesta.city/spb/news/tsifra-dnya-200-000-mashin-proezzhaet-po-tsentralnomu-uchastku-zsd/). 250,000–300,000 drivers use the toll road daily. In 2018, the traffic on the WHSD was 88 mln transactions, which is 10% more as compared to the previous year (http://www.spb.aif.ru/society/people/avtomobilisty_oplatili_proezd_po_zsd_v_peterburge_bolee_80_mln_raz_za_god).

Results. Residential area

A significant part of the territory has been hydraulically filled in the residential area. The first residential complex has been built already. Design documentation has been developed and adjusted. It determines the structure of the entire new part of Vasilyevsky Island. However, the ambitious goals of 2005 are often not mentioned.

• Aesthetics and distinctiveness of the buildings. The architectural image of the constructed development lacks individuality and reminds of a typical peripheral dormitory district. There are no expressive dominants. The Chief Architect of the city has to note that not the Marine Facade is built in the hydraulic fill area, "but just residential buildings that can be seen from the seaward". Journalists competing in wittiness predict that another uniform "dormitory district" like "Shushary-2"(https://www.fontanka.ru/2017/11/08/105/) or "Murino-2" can appear here (https://gre4ark.livejournal.com/468623.html).

We can see no prospect of any significant buildings that could become new symbols of the city and make Saint Petersburg more attractive for tourists, like those facilities that are currently built in many reconstructed coastal areas[2]. The concept of development in the hydraulic fill area in Saint Petersburg, modified in 2014, does not feature any "significant, structural, anchor facilities that, according to representatives of the property management company, are not really interesting in a commercial sense, but "can revitalize the whole area" (Arkhipov, 2007). Right now, there are plans in place for a standard set of micro-district infrastructure elements, as well as areas for a children's hospital, substation and boiler house, yacht club with a marina for small ships. City-wide interests have not been taken into account. Only a tree lawn is made in the hydraulic fill area as a magnet for the city folk.

The attractiveness of the new district for tourists also remains doubtful.

• Environment: the commissioning of the central part of the WHSD having a particular impact on the environment (noise, exhaust gases, grogs and dust from tires and asphalt, finely-dispersed particles) came as a shock for the population of the western part of Vasilyevsky Island.

The highway section laid in the hydraulic fill area was commissioned on December 4, 2016. A petition of the locals complaining about the noise was submitted as early as on December 5, 2016 (https://nevnov.ru/511321-zhiteli-namyva-na-vasilevskom-nedovolny-shumom-zsd). The prediction of specialists proved to be true: the area along the former Morskaya Embankment became one of the least favorable parts of the city in terms of environment (https://spbguru.ru/advice/105-samye-shumnye-rajony-sankt-peterburga).

Official information on the changes in the environmental status of this area is unavailable, but the data on the Saint Petersburg belt highway (where the "noise pollution" spreads to 320–1,100 meters to the both sides of the traffic way) can be treated as a precedent (https://saint-petersburg.ru/m/society/bespalov/360590/). The situation concerning the WHSD remains stringent, and the protests do not fade away. Both residents of the blocks adjacent to the WHSD from the east and new tenants participate in the protests.

The list of other claims of new tenants, concerning the quality of the living environment, is rather extensive. The issues are related to the lack of local passways and utility facilities (https://moika78.ru/news/2018-10-17/48829-namyv-razdora--goryachiey-tochki-novykh-territoriy-peterburga/). It should be taken into account that the discontent is currently mainly caused by the fact that the works have not been completed yet.

It is hoped that the hardships of the initial stage of development will be resolved: all planned buildings will be completed, local passways will be surfaced, the infrastructure prescribed by regulations will be created, and an extra junction will be made on the WHSD (according to the Government of Saint Petersburg, "someone will have to be squeezed. And they will hardly like that" (https://www.spb.kp.ru/daily/26582.4/3597223/). Will the environment created due to these efforts be flawless? It is clear that there are no grounds for the positive answer. The hydraulic fill areas and the nature of the emerging development resulted in structural changes that affected the entire Vasilyevsky Island.

Vasilyevsky Island to the east from the WHSD

Western part of Vasilyevsky Island before the second hydraulic filling

The first steps to domesticate the western territory were made as early as during Peter the Great's reign: Galernaya Harbor with a marine settlement on the shore of the Gulf of Finland appeared simultaneously with the Kunstkamera and Twelve Collegia. However, these areas were acknowledged as a part of the city in 1808 at the earliest, when the Stock Exchange colonnade rose above the Neva waters in the eastern part of Vasilyevsky Island. For a long time, the harbor remained a peripheral

[2] High priority is assigned to the individuality and dignified appearance of the new coastal complexes, and significant funds are allocated for landmarks. Such buildings as the Sydney Opera House, Oslo Opera House, Hamburg Elbphilharmonie, Film Institute, Nemo, Music House in Amsterdam, new theaters and the Black Diamond Library in Copenhagen, etc. contribute to a city's renewed image

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Figure 3. Development of the territory of Vasilyevsky Island as a part of the historical center (yellow lines show transportation routes established by the 18th–beginning of the 20th centuries, and blue lines indicate new highways. The letter M designates the sea port).

settlement and was separated from the main part of the island by a large forested swamp — Smolenskoye Field. The harbor also had features of undeveloped suburbs for a good while. At the turn of the 19th–20th centuries, factory facilities and massive tenement buildings started to appear, but many dwellers of the harbor continued to use water from the Shkiperskiy Canal flowing from a dump located nearby. The rate of urbanization was slow. Even as late as in the 1950s, a large littered lowland was situated on the shore. Its reed wasteland was filled with piled-up water from autumn storms. In some places, there were temporary structures built by fishermen, and the wind filled the air with the odors of a feeder pig farm situated nearby on the bank of the Smolenka River. Project designs of the 1930s–1950s were aimed at extensive development of these territories, with subsequent formation of green areas and construction of low-rise buildings.

Urban-planning transformations started in the 1960s, when the era of large-scale low-income housing development dawned in the USSR. In Leningrad, large peripheral areas outside the industrial belt (highlighted in grey in Figure 1) were allocated for "conveyor" housebuilding according to standard designs. Products of local housebuilding factories started to fill the suburbs in Kupchino, Vesely Settlement, Rzhevka–Porokhovye — in total, 15% of the entire area of the modern city (highlighted in brown in Figure 1).

Paradoxically, but in these conditions, when architecture was within the rigid framework of utilitarian practicability, an ambitious idea to "create a waterfront worthy of Leningrad in the north-western and western parts of Vasilyevsky Island" took on. This concept was developed by Leningrad architects in the late 1950s (Naumov, 1960). Architectural processes that started on Vasilyevsky Island during these years are shown in Figure 3. The area of the historical center of the city under UNESCO protection is highlighted in color (http://www.spb.aif.ru/dontknows/1196561). It comprises the Admiralty Part (A), Petrograd Side (P) and the east of Vasilyevsky Island (B). In the late 1950s, the vacant land in the north-west of Vasilyevsky Island (NW) was considered as a site where residential areas could be located. Those areas were intended to solve the housing problem of employees of the nearby shipbuilding facility. Unlike other territories assigned at the time for large-scale construction and located near industrial areas and suburban vegetable gardens, this part of the island was between the shore of the gulf and the historical core of the city. The exclusive potential of that architectural situation did not go unnoticed, and the leading architects of the city (V.A. Kamensky, A.I. Naumov) and even the USSR (N.V. Baranov) took interest in it.

Architecture was financed "by a leftover principle", as it was customary in the conditions of the planned economy. A design and construction method, as per which Lenproyekt architectural bureaus were essentially a part of a housebuilding conveyor that filled peripheral districts with unified buildings based on standard designs, was common for those years. The specifics of the territory in the north-west of Vasilyevsky Island required adequate architectural solutions, and the status of an experimental project was assigned to the new work. This improved funding a bit and, which is more important, allowed shifting away from the principles of large-scale production of residential areas, and aiming the efforts of the architects to a search for original architectural and urban-planning solutions designed to take into account the uniqueness of the environment, use the potential of this place and shape a new impressive city district. An architecture bureau headed by S.I. Evdokimov was assigned to find a comprehensive solution of those tasks. The bureau had to not only create the design, but also coordinate the activities of organizations participating in the development of new territories.

They had to perform hydraulic filling and raise the level of the flooded territory to prepare the required construction site. The canal between Dekabristov Island and Volny

Figure 4. Creation of the Leningrad waterfront in the 1970s: - in the center – a development layout; on the right (a) — a photo of the territory along the Smolenka River; on the left (c) — a model of the marine passenger terminal and an option of a planned hotel.

Island was filled up. The new shore came forward into the gulf for hundreds of meters, which resulted in about 350 ha intended for housebuilding (http://gorod.spb.ru/articles/1699) (these territories are marked as NW in Figure 3).

A concept that fit into the traditions of Saint Petersburg shaping under the conditions of limited funding was accepted. The objective of Chief Architect of Leningrad V.A. Kamensky was taken into account: "...building new districts, we need to consider the principles of compositions in brilliant architectural ensembles of the old Saint Petersburg <...> development and improvement of those traditions is the only proper method of building new districts" (Ovcharenko, 2016). In the city known as the "Northern Venice", great value was placed on interaction of the buildings with the water areas. Along the waterline, a recreational line was suggested, along the red line — a dense front of residential complexes. There were few design accents, and they featured development of an open public space protruding deep into the shoreline (Figure 4). The bed of the Smolenka River was turned to the Gulf of Finland and enframed with granite blocks. The buildings on the embankment formed a wide visual corridor that stretched for almost a kilometer. The marine horizon could be seen from that corridor (Figure 4a). Later on, Marine Cascade and Marine Facade residential areas on the coastline of the Gulf of Finland adjoined the area.

A complex with the Pribaltiyskaya hotel became another landmark (Figure 4b). Here, in the architectural forms of the 1970s, a parallel with a classic complex on the Strelka (Spit) of Vasilyevsky Island was intended to be made. Classic methods of the urban-planning art were applied using modern stylistics(http://novayagazeta.spb.ru/articles/9262/):

- the architectural ensemble connected large open spaces on the main land and the gulf; it had a clear axial symmetry;
- the main facilities were raised on a high granite pedestal, and large stairs led to a vast embankment.

A congress and exhibition center started to develop dynamically near the historical Galernaya Harbor, at the outlet of Bolshoy Prospekt to the sea. Small shopping

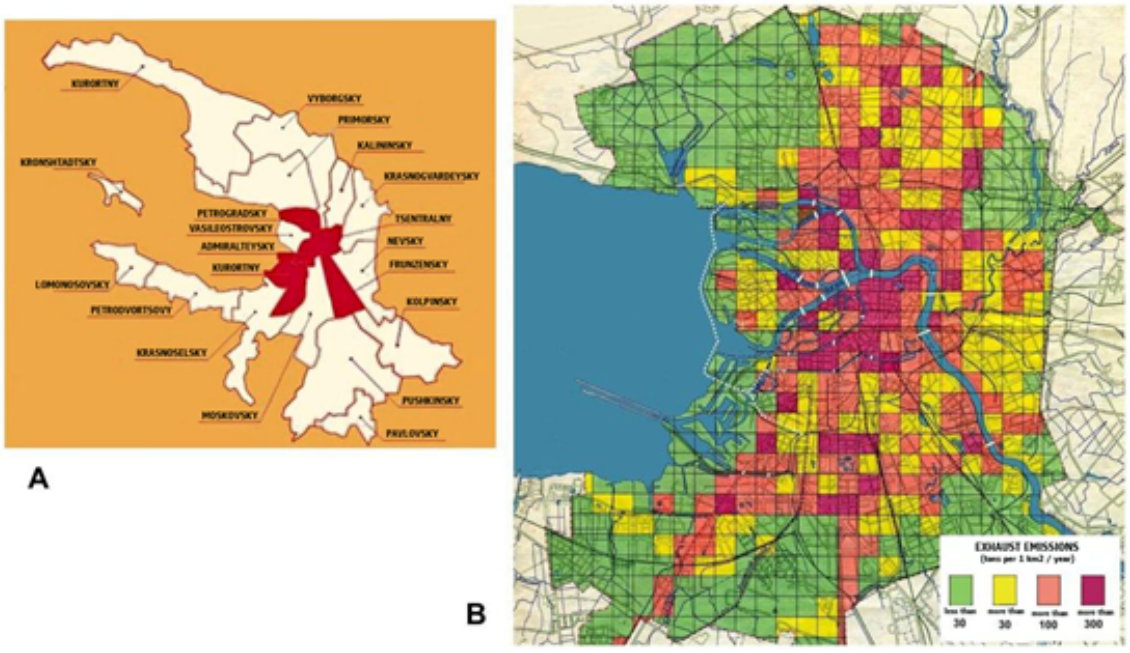

Figure 5. Environmental condition of Vasilyevsky Island in the 2000s: A — districts with the maximum noise levels (highlighted in red) in the city; B — distribution of exhaust emissions in Saint Petersburg, the planned WHSD is shown as a dashed line, the existing bridges — as white lines.

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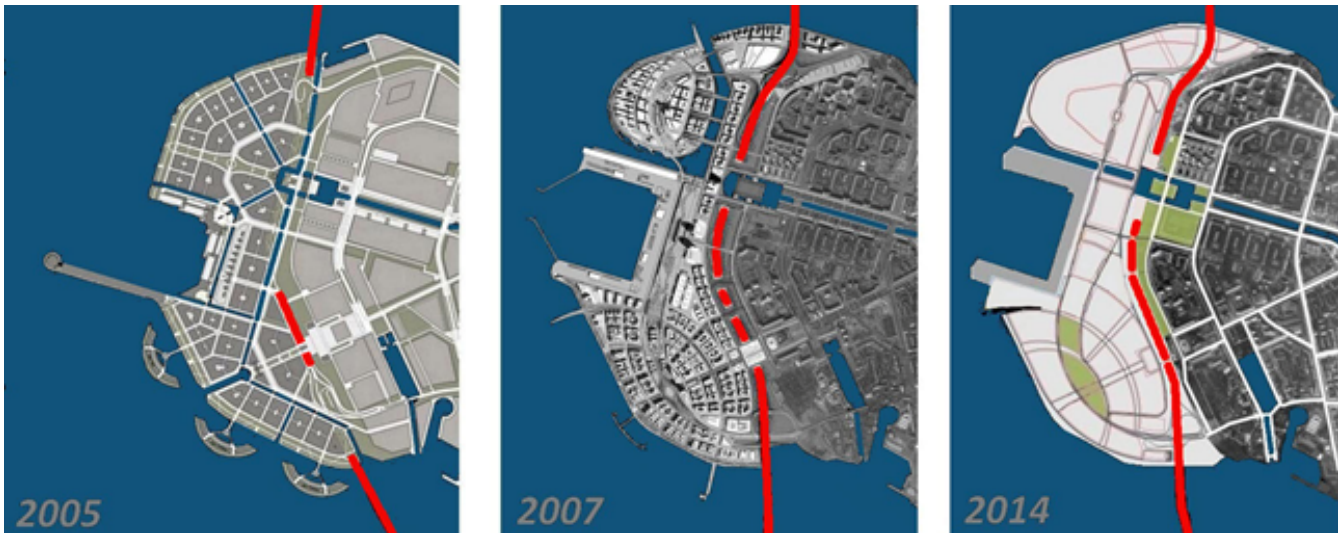

Figure 6. Concept of the development in the hydraulic fill area. On the left — one of the bid designs, on the right — approved versions as of 2007 and 2014.

units of the temporary Inrybprom exhibition soon became an international conference center. The building of the marine passenger terminal became a landmark. A multi-story hotel was planned to be built nearby (Figure 4c).

By the late 1990s, a subway station was built on the bank of the Smolenka River. Although improvement of the Morskaya Embankment was fragmental, the shoreline was used for promenades and picnics. A spontaneous beach appeared in the area. Apartments in elite complexes overlooking the water area of the Gulf of Finland were in demand. The residential area was enriched with facilities of city-wide and even international importance. Celebrities of national show business, looking for a place to build a signature amusement center, found the west of Vasilyevsky Island very attractive. It could compete with prestigious Moscow sites in Moscow City, on the Luzhnetskaya Embankment and Krasnye Kholmy. Photos of local landscapes were demonstrated as the evidence of Soviet (and later on — Russian) architecture achievements. A significant multi-functional complex was created and developed in the north-west of Vasilyevsky Island. It was noted in the 2000s that, in terms of demand for apartments and prices for residential property, Vasilyevsky Island was second only to the Tsentralny District and competed with the Petrogradsky District. Experts stated that Vasilyevsky Island could "take on the function of the center"(http://expert.ru/northwest/2015/09/transportnyij-triller-piterburhskago-manhettena/).

At the time, the Vasileostrovsky District was connected with other parts of the city only through the bridges located in its eastern part. They were always overloaded with cars, and they are raised at nighttime, cutting off the island from the rest of the city for several hours. Figure 2, where they are highlighted in yellow, demonstrates their role as transit routes between the southern and the northern parts of Saint Petersburg. The bridges are located at a distance from new coastal districts, and several dead-end district highways head to the west (Beacco, 2018). The specifics of this transport network impacted the environmental situation. In the early 2000s, Vasilyevsky Island was considered a relatively favorable district in the center of the city populated by 5 million people in terms of sanitary and hygienic indicators. The north-western part of the district also positively stood out in terms of traffic noise and exhaust emissions (Figure 5).

Western part of Vasilyevsky Island after the second hydraulic filling

The list of decisions that determined the development of Vasilyevsky Island at the beginning of the 21st century:

- 2000 — the governor of the city approved the Western High-Speed Diameter (WHSD) route. It was assumed that the road along the shore of Vasilyevsky Island would be hidden in a tunnel at a distance of 100 m from the water's edge or would stretch along the existing embankment (partially in an underground tunnel);
- 2004 — the Government of Russia approved the design of the marine passenger terminal at the western end of Vasilyevsky Island (https://regnum.ru/news/529857.html);
- 2005 — the Government of Saint Petersburg decided to perform another hydraulic filling in order to "develop the territories, build the Marine Facade and increase attractiveness of the city for tourists" (https://www.fontanka.ru/2005/06/21/144530/). The master plan provided for further development of the city urban-planning framework "with the formation of new public and business areas on the shore of the Gulf of Finland, on Vasilyevsky Island in the mouth of the Smolenka River, and in the area of the Shkiperskiy Canal".

The situation is unfolding: the hydraulic fill area and development in the west of Vasilyevsky Island are becoming the center of the architectural activities. Various options of the design concept are being formed and modified. The nature of the evolution is described in Figure 6:

- the water area in the hydraulic fill territory was reduced to the minimum, the canals disappeared. It is probable that the Smolenka River will be filled up like the Admiralteysky and Ligovsky canals (https://www.dp.ru/a/2018/10/24/

Otmitie_gektari). In 2014, it was decided that the road network should be reduced by half. All of this allowed increasing the areas intended for buildings.

- functional zoning in the hydraulic fill area was radically changed, since residential space was in high demand on the real estate market. In 2014, a new layout was approved. In this project, "all attention was drawn to residential areas, while the number of public and business facilities was reduced". Modification of the street network also contributed to the enlargement of the residential area (five blocks were joined with the neighboring ones, while only one block was divided). The number of residential buildings exceeded the number of non-residential buildings. In 2017, the project was modified once again. It resulted in urban densification in the southern part of the hydraulic fill area. Infrastructure and public order enforcement facilities were built instead of the green areas proposed before (https://www.dp.ru/a/2018/10/24/Otmitie_gektari).

- isolation of the WHSD route in a tunnel was considered needless, therefore, only the traffic way was deepened into a "half-tunnel". It was also proposed to arrange green spaces in the buffer sanitary protection zone and make a "linear park" there.

The WHSD route came to be considered as a part of the project for a bypass of the Saint Petersburg center, and it was decided to connect it in the southern part of the city with the passways along the Obvodny Canal and the renewed Makarov Embankment along the northern bank of Vasilyevsky Island (http://expert.ru/northwest/2012/33/poehat-byistree/, http://spbauto.org/news/transportnyy-obhod-centra-peterburga-kakim-on-budet). Figure 3 shows a new highway on the Makarov Embankment in a blue line. The same color is used for the WHSD exit on the southern bank of the island, near the Galernaya Harbor and Shkiperskiy Canal (https://www.fontanka.ru/2018/03/07/111/).

"The moment of truth" came on December 5, 2016. After commissioning of the WHSD central section, it turned out that the highway did not only provide a bypass of the city center, but also directed the traffic to the historical core using the shortest route, through the street-and-road network of Vasilyevsky Island. On December 5, a critical situation arose in the territory adjacent to the WHSD from the west: cars exiting the highway did not only jammed the local streets, but also moved through residential blocks. That came as a surprise. The authorities had to urgently start works to make an extra exit — that same exit that was found to be excessive during the project review in 2007 and was removed from the project to reduce the costs.

The strategic change of the transport situation and traffic redistribution on Vasilyevsky Island strongly affected the nature of its residential environment and conditions of commercial activities. The Administration of Saint Petersburg finds it important for the "construction to mean (both for the citizens of already developed areas and new tenants) comfort and harmonious development" (Albin, 2016). Such attitude towards the reconstruction of the city matches the "mutual benefit" program implemented in the Netherlands where renewal of the existing environment is used as a tool to improve the quality of life in adjacent territories (https://www.e-reading.club/chapter.php/104260/9/Glazychev_-_Urbanistika._chast%27_2.html). Unfortunately, these considerations did not affect the development in the Marine Facade area.

Environment and sociological issues in the west of Vasilyevsky Island. After the commissioning of the WHSD, the traffic increased significantly, and now, experts classify the entire district as one of the city center territories characterized by the maximum noise levels (https://nch-spb.com/). The optimistic layouts given in Figure 4 are now gone. Before the commissioning of the central part of the WHSD, the following districts of Saint Petersburg had the maximum noise level: Tsentralny; Admiralteysky; Frunzensky; Kirovsky; Petrogradsky. At the time, it was emphasized that the Morskaya Embankment in the Vasileostrovsky District could become one the disadvantaged (in terms of noise pollution) districts because of the Western High-Speed Diameter that was built in this part of the city (https://spbguru.ru/advice/105-samye-shumnye-rajony-sankt-peterburga). The predictions proved right, and now, the Tsentralny, Admiralteysky, Vasileostrovsky and Frunzensky Districts are included in a list of districts characterized by the maximum noise levels in the city (https://www.spb.kp.ru/daily/26756.7/3785916/).

The situation changed most noticeably in the residential blocks adjacent to the highway. The wide WHSD divided the residents of Vasilyevsky Island into two conflicting groups: those living in the "mainland" part of the island and new tenants in the hydraulic fill area. However, the controversies recede into the background when it comes to the assessment of the influence the highway has on the quality of apartments. Real estate experts state that "the hydraulic fill area troubles residents of the neighboring houses; residents of the buildings on Vasilyevsky Island facing the Morskaya Embankment will hardly be delighted with the new project" (https://www.novostroy-spb.ru/statyi/namjyvnjye_territorii_chto). The opinion of the sociologist is confirmed by those living in new buildings in the hydraulic fill area: according to them, they cannot withstand the noise from transport. They say that "one of the peculiarities of living in the area is the hatred of all the other residents of Vasilyevsky Island. They use offensive words for us and our houses. It is understandable: they have been deprived of the embankment and the view of the gulf" (https://www.the-village.ru/village/city/places/284792-vo-alluvion). Appearance of new residential blocks turned into serious financial problems for dwellers of the blocks adjacent to the highway from the east: the panoramic view of the water area disappeared, and the cost of hundreds of apartments dropped by 10–20% (http://www.metrium.ru/news/detail/skolko-stoit-elitnyy-vid-iz-okna/). The worsened environmental situation threatens even more losses3. Total losses of the owners of elite apartments in

[3] For instance, it is known that because of noise and contamination with exhaust gases, "apartments facing the Obvodny Canal are 30% cheaper than similar apartments at a distance from the embankment"

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the Marine Facade or Marine Cascade residential blocks can cost a fortune. Experts of Knight Frank St. Petersburg analytics company point out that "the highway just outside comfort-class buildings has already backfired on the cost of their apartments, and what is more important, on the liquidity" (Baranova, Kegeyan, 2018). It is unknown if this was taken into account in the economics of the project or what to expect in future.

However, significant changes in the transport infrastructure of the island gave a start to active urban-planning development of the district and triggered major investment projects in its western part. It became possible to gainfully use the view of the Gulf of Finland and closeness to the city center, which increased the demand for the real estate (http://www.proestate.pro/news-new/item/234-news-1-6). According to the experts' predictions, a "real construction boom" started in the Vasileostrovsky District (https://ktostroit.ru/news/269775/). The rate and nature of the territories' transformation in the western part of the island can be compared to the active reconstruction of the Strelka (Spit) in its eastern part in the 1990s[4].

Urban densification started on the eastern side of the WHSD. It appeared that the city needed public and business facilities that had been abandoned during the revision of the concept for development of hydraulic fill areas in 2014: a huge business center is under construction on the Shkiperskiy Canal (http://kanoner.com/2017/10/02/157077/, https://nsp.ru/news/8887-morskaya-rezidenciya-gazproma), and it is planned to build an elite hotel for 300 rooms (approximately in the area where it was planned in the 1980s – see Figure 4C) (https://www.dp.ru/a/2018/06/20/JElitnaja_zhizn_Lenjekspo). A culture and leisure center is rapidly developing in the vicinity: so far it occupies 4 ha of the coastal area of the former factory, but it is planned to use 15 ha (https://daily.afisha.ru/cities/8796-port-sevkabel-kakim-budet-novoe-mesto-na-kulturnoy-karte-peterburga/). The Song Theater, a project of a Moscow celebrity, us struggling for a construction permit (https://www.fontanka.ru/2019/02/22/049/). Housing demand in the habitable urban environment is stable, and new elite residential blocks are being built at all available sites (https://www.kommersant.ru/doc/3628672).

Prospects of the hydraulic fill area

Additional urbanization pressure on the west of Vasilyevsky Island is conditioned by the fact that it became a part of a chain of those super-projects that have appeared recently, are considered symbols of Saint Petersburg and determine the new image of the eastern coast of the Neva Bay: a 462 meter high tower of the Lakhta Center, a flying saucer of the Gazprom Arena stadium, cable-braced bridges of the WHSD with 125 meter tilted towers (https://mir24.tv/articles/16306594/novye-simvoly-sankt-peterburga). Development of this territory makes it possible to locate here additional city-wide facilities, which matches the strategy of the Saint Petersburg master plan, means broadened borders of the city center and corresponds to the objective of the Marine Facade project set in 2005 (https://whsd.ru/tzeli-i-zadachi-projecta.html). Since local territorial reserves are not limitless, investors will soon turn to the water areas of the Marine Facade beyond the hydraulic fill territories and the water area of Markizova Luzha. It is reported that even environmentalists think that it is necessary to control the development of the Neva hydrostructure (https://news.rambler.ru/other/41314381/?utm_content=rnews&utm_medium=read_more&utm_source=copylink). There are many grounds for city expansion through new hydraulic fill areas:

- economic: just like in the beginning of the 20th century, hydraulic filling is cheaper than purchasing land in the city. It is known that projects that were initially implemented in hydraulic fill areas were approximately 30% cheaper than similar facilities in the island part of the district (https://www.dp.ru/a/2018/05/30/Namiv_ne_huzhe_gollandskogo). The cost of land plots in Saint Petersburg currently reaches RUB 600 mln per 1 ha, while 1 ha in a hydraulic fill area costs approximately RUB 100 mln. It is assumed that expenses for hydraulic filling can be less (about RUB 74 mln per 1 ha without expenses for utilities) at the depth of 5 m (https://www.kommersant.ru/doc/3628672).

- commercial: Apartments with a water view are in demand in Saint Petersburg, despite being more expensive. "Location on a shoreline increases the cost of apartments. Actually, the cost of an apartment with a water view is on average 30–40% higher than the cost of neighboring premises of a similar area, but without such view. In individual premium projects, the extra cost for a water view reaches 45%". The prices for apartments with a panoramic view are 15–20% higher (https://www.portspb.ru/Arhiv/news30/postid/own_news/5826?tempage=vis_index,vis_index). This reminds us of 2007, when German Gref, who was the Minister of Economic Development and Trade, pointed out that a "water view" was the main factor that had an impact on housing prices in Saint Petersburg (http://www.rosbalt.ru/piter/2014/04/12/1256036.html).

- technological: new technologies currently used reduce the period of compacting the soil hydraulically filled in the shallows (https://www.mfspb.ru/proekt-morskoj-fasad/tekhnologiya.html). At the present time, soil compaction takes 9 months, and then underground utility systems can be laid and construction can be started (https://www.svoboda.org/a/132544.html).

- legal: development of empty plots in the existing built-up area is often associated with complex ownership rights and legal assignment of the new status, and a new hydraulic fill area resolves those problems fast and easy.

Unfortunately, in development of the hydraulic fill areas, another important factor is ignored: coastal districts are highly valuable territories attracting city

[4] This territory became a magnet for solid investments when the Birzhevoy Bridge and the new highway were built. Two administrative buildings were erected here in a short time, as well as a large clinic complex. A shocking proposal to construct a huge concert and exhibition center near the Stock Exchange and Rostral Columns was made. New facilities made such a radical change to the image of the architectural ensemble (a monument of the Russian Empire style) that they are called manifestations of "architectural vandalism of the late 19th century" (Lisovsky, 2004)

residents, that is why multi-functionality is typical for the area development. Experts emphasize that "coastal areas are in high demand and used not only for parks, but also for museums, tourist attractions, leisure areas, commercial and residential development" (Rybczynski, 2014). Currently, the Vasileostrovsky hydraulic fill area has no public or business functions. The new areas are filled only with multi-story residential buildings and micro-district public facilities, which does not correspond to the objectives of the Marine Facade project (Feng et al., 2018).

This results in fair criticism and shows that the city design and construction complex does not guarantee success in solving non-standard urban-planning tasks. For three quarters of a century, it was oriented to issues of large-scale residential construction, and large residential areas in peripheral districts of the city were its objects, since there was no room in the city center for such facilities (Fraser, 2019). An approach well-honed in Kudrovo or Parnas became instrumental in the development of the coastal part of the city center on Vasilyevsky Island. We can list main indicators of the fact that a set of conventional organizational and urban-planning solutions well-honed in the development of dormitory districts in the peripheral part of the city was used in unique coastal territories adjacent to the historical center:

- the city assigned the rights to the water area that was reserved for the development (476 ha of shallow waters) to an investment company, and that drastically restricted its opportunities to influence the implementation of the plans. In foreign countries, complex development projects are implemented under strict control and with participation of authorities (https://www.fontanka.ru/2013/11/26/175/). In Hamburg, the city allocated EUR 2.5 bln for the implementation of the HafenCity project, counting on private investments of EUR 8.5 bln. Nevertheless, the city authorities have a decisive influence on the situation by means of land allocation for new buildings (http://www.berlogos.ru/article/iskusstvo-gradostroitelstva-gamburg/). It should be noted that relative success of the "waterfront" was achieved in the 1970s–1980s through the use of proper organizational forms and assignment of the status of an "experimental project".

- the WHSD has a unique position in the structure of the territory in the hydraulic fill area. In terms of the most crucial parameters, it matches the model projects adopted in the international practice for suburban territories with loose low-rise development: speed of 110 km/h, 8 traffic lanes, noise protection through embedment with slight slopes on the edges;

- the architectural and urban-planning solutions that contradicted the focus on the maximum volume of residential areas were consistently dismissed from the project. The balance of the territories implies the reduction of the water areas, green spaces and the street-and-road network. In 2014, when the project was adjusted, "all attention was drawn to residential areas, while the number of public and business facilities was reduced" (http://kanoner.com/2014/12/31/142780/). All possible efforts were made to increase the number of floors in buildings and development density (for example, reportedly, it was permitted to the NTVO company to erect residential buildings in the hydraulic fill area instead of commercial buildings and increase the height of buildings in the area of 15 ha (https://m.fontanka.ru/2016/12/24/093/). The architect's scope of activities reduced, and there was less and less space left for artistic and aesthetic ambitions: "An architect could only make ornamentals without changing the form determined by the dominating conditions" (Ostrowski, 1979). Saint Petersburg architects lament: "Whatever you do, you will get another Kupchino" (http://novayagazeta.spb.ru/articles/10277/).

To conclude, we can use the words spoken during a meeting of the Saint Petersburg City-Planning Council: "The level of architecture in the hydraulic fill area is kind of a "mirror" of the society and the city... We have what we deserve" (http://luna-info.ru/discourse/sealess-spb/). in 2005, an option to transform the new coastal territory into the "second Venice" was considered, and in ten years, all the efforts were in fact limited to preparation of sites for rental housing construction (Tasan-Kok et al., 2019).

Conclusion

The Saint Petersburg Marine Facade project might get second wind. The city authorities are concerned with the fact that the contract for the hydraulic filling and development of the territories has been completed by 67% only, but it is close to the expiry date. It is assumed that the project implementation may be extended till 2026, and the Government of Saint Petersburg Government may stipulate for "changes in the purpose of the northern part of the hydraulic fill area" (https://ktostroit.ru/news/287543/).

Prospects of the WHSD on Vasilyevsky Island. N.I. Yaveyn predicts further active urbanization of the territory in the east of the Neva Bay. He thinks that in time, the "Western High-Speed Diameter (WHSD) will really become a diameter and will cross the center of the new city district" (https://piter.tv/event/Zasluzhennij_arhitektor_podderzhal_proekt_namivnih_ostrovov_v_Peterburge/). The reference to the WHSD attracts attention to its future since:

- the highway has a strategic importance not only for the Saint Petersburg urban-planning complex, but also for a significant territory in the north-west of the Russian Federation;

- the WHSD in the hydraulic fill areas of Vasilyevsky Island definitely determines the image, functions and functional utility characteristics of this part of the district. In spite of the initial concept, the WHSD is not only a bypass of the city center. Like the ring road, it has become a part of the street-and-road network of the city (http://expert.ru/northwest/2012/33/poehat-byistree/).

The WHSD solution implemented in the hydraulic fill area does not match the idea of a highway passing through the center of a highly urbanized district. We can state with a high degree of accuracy that the consequences of the choice made for Vasilyevsky Island will have their impact for a long time, and the related issues will aggravate when the houses in the hydraulic fill area are inhabited and the

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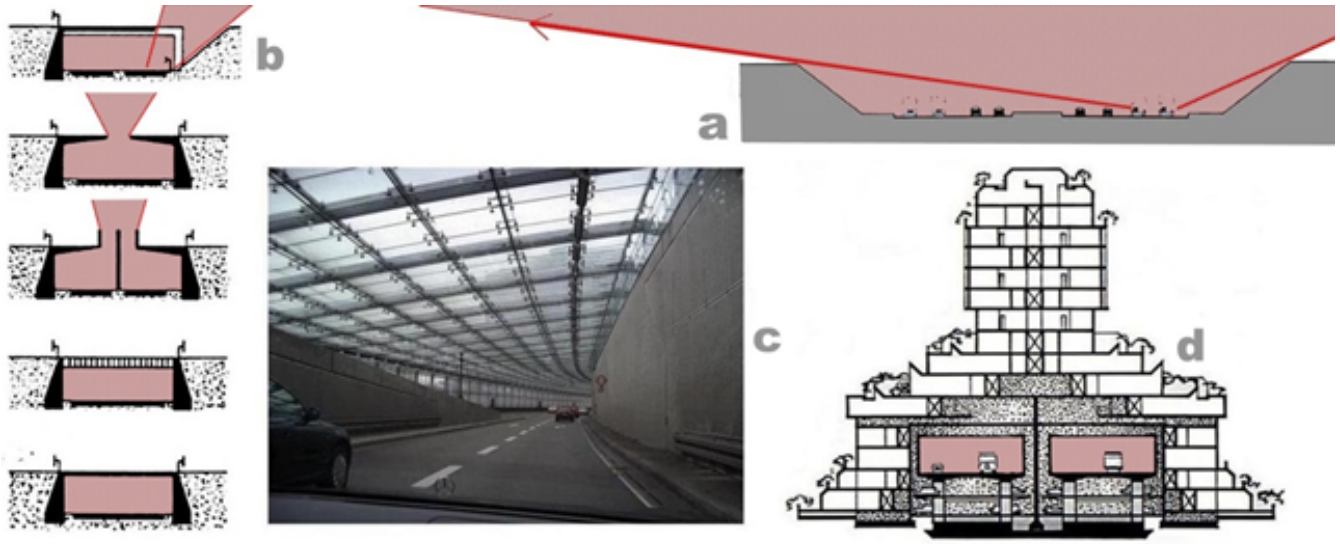

Figure 7. Noise protection of highways in urbanized zones (sound pollution areas are highlighted): a — cross-section of the WHSD on Vasilyevsky Island, b — options of noise insulation in Germany, c — a tunnel of the ring road in Munich, d — an option for enclosure in the Schlangenbader Straße residential area, Berlin.

predicted traffic increase proves true (https://www.fiesta.city/spb/news/tsifra-dnya-200-000-mashin-proezzhaet-po-tsentralnomu-uchastku-zsd/). Such laying of a multi-lane highway through a residential area in the city center has no analogues in the world. There is a good chance that the central section of the WHSD has become a unique landmark that will be remembered by city guests as a symbol of modern Saint Petersburg. Cities that have accumulated significant experience in laying highways prefer to avoid such solutions and minimize contacts between highways and residential areas, since it is associated with technical difficulties, additional expenses, lawsuits and social tension (https://de.wikipedia.org/wiki/Bundesautobahn_100).

The city folk in the west of Vasilyevsky Island think that they find themselves "on the sidelines of the highway" (https://www.ntv.ru/novosti/1729209/). But we should make it clear: it is a suburban highway. As early as during the construction of the highway, experts pointed out that the Morskaya Embankment in the Vasileostrovsky District could become one of the disadvantaged districts due to the noise from transport (https://spbguru.ru/advice/105-samye-shumnye-rajony-sankt-peterburga). The developers took into account the data of the Saint Petersburg ring road, where the "noise pollution" spreads to 320–1,100 meters from the traffic way (https://saint-petersburg.ru/m/society/bespalov/360590/), and arranged for noise protection. However, they used a solution that is efficient only in low-density territories with low-rise buildings, where the price for land and construction costs are relatively low. Although, noise protection walls provided by the design were never installed on Vasilyevsky Island (https://ok-inform.ru/stroitelstvo/regional/91263-kak-proveryayut-zsd-bez-shuma-i-pyli.html): there was a reason for their rejection as they could become a two-row fence across the island.

Experts point out that Russia has one of the strictest standards for noise protection in the world, but no due attention is given to compliance with those standards (https://nch-spb.com/). As for Saint Petersburg, the "syndrome of a historical city" also shows: in the assessment of the WHSD design review results, attention is drawn to those facilities that have historical and cultural significance and will be "affected" by the construction works. It is also noted that installation of noise protection screens will be required in some places.

Currently, the area with environmental problems covers the whole hydraulic fill territory as well as the residential blocks adjacent to the WHSD from the east. Noise and exhaust emissions make it impossible to ensure luxury in the expensive quarters that are currently built for wealthy clients from the neighboring Lakhta Center and High Court (http://www.rbcplus.ru/news/5ad86d597a8aa91bd267846e?ruid=NaN).

The administration of the highway argues that "the central section of the WHSD has been built in full compliance with the design documentation that passed all required reviews and was approved by the General Board of State Expert Review", and promises to install noise protection screens. Probably, during the review, the specific nature of the hydraulic fill area was not taken into account: high-rise residential buildings dominate there. According to the residents of a new house in the hydraulic fill area, "it is really noisy... starting from the fifth floor (but there is no noise in the apartments below). The noise level is clearly too high, but we have not conducted a review yet. However, we are going to do that" (https://www.the-village.ru/village/city/places/284792-vo-alluvion). The reason for that is explained in a diagram in Figure 7a: the technical solution used in the hydraulic fill area reduces the noise by the highway near the ground, but it screens off the sound and directs it to the higher floors of high-rise buildings. We can only hope that the review planned by the residents and specified in the construction standards will be conducted. It states that "in case of high-rise buildings, measurement points should be also chosen at the level of the highest floor of a building" (State Standard GOST 23337-2014). In any case, the city will have to make

a choice: either the WHSD on Vasilyevsky Island stays as it is or its parameters are brought into compliance with the European indicators.

For European cities with the population of more than 100,000 people, compulsory monitoring of the motor transport impact on the urban environment is prescribed, and measures for protection against transport noise become stricter with the transition of highways from peripheral territories to the center:

- the allowable speed decreases;
- protective screening of the traffic way with side shields and roofs is strengthened.

At a section where the autobahn crosses the existing residential area, the highways are hidden in tunnels or even laid at the basement level of city buildings (Figure 7). Open public spaces frequently appear above underground highways. The speed on a coastal overpass in Genoa is 60 km/h. In Berlin, the speed on federal highways crossing the city is 60–80 km/h, and the speed on some of them at nighttime is only 50 km/h. In the center of Berlin, the TTS tunnel with the length of 2.4 km, designed for 50,000 cars per day was built in 2006. There are 13 transport tunnels in the Middle Ring in Munich. In Hamburg, three tunnels with the total length of 3,753 m are being constructed at a renewed section of the A-7 Autobahn.

Proposals to use ideas that were unusual and seemed eccentric 15–20 years ago are made, and they are considered as possible prototypes of modern facilities. In 1962, a bus terminal and a residential complex of four 32-storey buildings were built in New York above the 12-lane highway near the George Washington Bridge. In 1980, a 14-storey residential building with the length of 600 m with almost 1,800 apartments was built in Berlin above the A-100 Autobahn (Figure 7d). At the time, it was perceived negatively, but in 2017, it became protected as a historical site, and in 2018, it was proposed to use it as a standard for another similar structure above the same autobahn (https://www.morgenpost.de/berlin/article214748501/Neue-Wohnhaeuser-ueber-der-Autobahn-A-100.html).

The history of the development in the hydraulic fill areas on Vasilyevsky Island shows that the rate of buildings' reconstruction in these territories continuously declines:

- the "service life" of a classic ensemble on the Strelka (Spit) was 70 years;
- the "access to the sea" planned in 1966 survived for about 50 years.

It is evident that in the new century, the rate of urban development grows, and the facilities built in the hydraulic fill area will soon have to change their image drastically. The Marine Facade project is still under development. The territory is built-up only partially, but "changes in the purpose of the northern part of the hydraulic fill area are already considered" (https://www.restate.ru/material/smolnyy-nameren-prodlit-dogovor-na-namyv-territoriy-v-o-168436.html).

Vasilyevsky Island has expressive evidences of dramatic and drastic transformations of famous architectural complexes both on the Strelka (Spit) in the east, and on the western coast. Currently, some features of the new stage of waterfront transformations, that cause concern, manifest.

However, the process is underway, and some adjustments may be made. We hope that this chance will be used wisely, and the new waterfront will not become a reflection of the state of the real estate market in the beginning of the 21st century, but will acquire impressive architectural objects that will symbolize the multifaceted image of the "Northern Capital of Russia".

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«МОРСКОЙ ФАСАД», ЗСД-АВТОБАН И ВАСИЛЬЕВСКИЙ ОСТРОВ КАК ЧАСТЬ ИСТОРИЧЕСКОГО ЦЕНТРА САНКТ-ПЕТЕРБУРГА

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Аннотация

Введение: На примере реализуемого проекта «Морской фасад» выявляется разрыв между стратегическими установками развития Санкт-Петербурга, определенными системой городского планирования и закрепленными в генеральном плане города, и реальным преобразованием архитектурной среды Васильевского острова. **Цель исследования:** Выявить наиболее значительные упущения, допущенные в ходе реализации и многократных корректировок первоначальной концепции. **Методы:** Сопоставительный анализ ключевых положений исходной концепции и показателей формируемой в настоящее время городской среды. **Результаты:** Выявлена недооценка радикального изменения градостроительной ситуации в центре города, вызванной прокладкой скоростной автомобильной магистрали по западной части Васильевского острова. Показано, что инерционность сложившейся в Санкт-Петербурге проектно-строительная системы, которая на протяжениии многих десятилетий была ориентирована на массовую жилую застройку обширных периферийных территорий, не позволяет ей решать возникающие при этом проблемы развития высокоурбанизированной среды. Излагаются факты, показывающие, как последовательная корректировка исходной концепции создала базу для формирования в уникальной береговой зоне центра спальных жилых кварталов периферийного типа и прокладки автобана пригородного образца. Определен перечень мер, которые могли бы уменьшить связанное с этим негативное воздействие на селитебные территории. Отмечается, что негативный опыт реализации проекта «Морской фасад» в Санкт-Петербурге должен быть учтен в градостроительной практике других метрополий России.

Ключевые слова

Архитектура Санкт-Петербурга, городское планирование, акватории и береговые территории, центр и транспортный каркас.