TUCHKOV PARK OF FULL SAIL ROMANCE
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“My love and desire are bigger than a russian frigate moving at full sail in the winds. The sails are islands of love and desire on the stream when flood arrives’

The Tuchkov Buyan park, one of the largest parks in Petrograd District, has the opportunity to become a worldclass example of a green contemporary park based on a harmonious integration of landscape into the city tissue. A lively park with a vibrant public space of a strong character is needed.

Our design proposal acknowledges all this aspects and envisions the creation of a new landscape that meets the ambition of Saint Petersburg city. A place where native river nature meets with lively urbanity to create a unique liveable environment for its future residents and a new destination for the whole city of Saint Petersburg.

Strong sculpturing landscaping measures need to be taken in order to transform the current foundation plinth into a liveable green park.

The creation of a new topography that can enclose the space and create a buffer from the urban fabric, wind breaking barrier and emphasise city vistas and panoramas, with paths to explore the territory enabling a direct relation with the river, wooden key attractors that relate to the traditional navy industry, and the plantation of a riparian forest of 12 biotops that provides shelter, shadow and seasonality are the main strategies to recover this space.
«My love and desire are bigger than a Russian frigate moving at full sail in the winds. The sails are islands of love desire on the stream when flood arrives»

«Как велики мои желанье и любовь, Наполнил ими парус русского фрегата. И станет этот парус местом вновь, Что всеми чувствами богато»
It is hard to have some alone time in a traditional St. Petersburg park with regular
Classical compositional structure and visually transparent spaces. To a city resident
who is always in a hurry, a romantic park gives a moment
for solitude, contemplation, and self-reflection.
• A romantic park does not do well with clearly outlined boundaries. It strives for
complete penetrability
and integration with the surrounding landscape. It strives to become an inalienable
part of the city landscape and to absorb the city’s best views.
• A romantic landscape park cannot be grasped at a glance and is full of surprises.
When you
first visit, it is impossible to guess which view is going to open up before you
when you turn a corner or walk onto a hill.
• A romantic park is a place of diversity and contrasts. It opens up in the movement
through both space and time: it is not only a park of sunrises and sunsets,
but also a park of different seasons.
• A romantic park draws one’s attention to the change of natural states:
water reflections, moon glades, sunrises, and sunsets.
It is a park of illusions and moods.
• A romantic park seduces all things formal.
It is a park for urban strollers
and informal festivals
THE ARCHITECTURAL LANDSCAPE DESIGN CONCEPT FOR THE TUCHKOV BUYAN PARK

INTRODUCTION

TUCHKOV PARK

PROPOSED MASTERPLAN

01 The great lawn
02 Orangery plaza
03 Orangery
04 Theatre Bridge
05 Bridge Ricard de Montferrand
06 Bridge Parland
07 Bridge Thomas de Thamon
08 Theatre Plaza
09 Colonnade
10 1000 Mets Playground
11 Labyrinth
13 Orchard
14 Skatepark
15 Floating bridge
16 Tunnel
17 Academic Libochovce plaza
18 Neva Kids
19 Tuchkov Balcony
20 Floating Stage
21 The Valley
22 Malay Neva Embankment
23 BMX park
24 Tuchkov Pier
25 Parking entrance
26 Grotto
27 Stone Garden
28 Sport field
29 Bus stop and parking
30 Viewing platforms
SCULPTURING TOPOGRAPHY

The modification of the topography is one of the key aspects of the design proposal. The design envisions the modelling of sculpture crests that embrace the park enhancing the city opening corridors. This crests establishes a view corridors acts as a green curtains to the beautiful Saint Petersburg panorama foothills. Next to the river, the edge is slightly shaped to promote a more soft access to the water by the formation of a new river balconies.

ANCHORING THE CITY

The sculptural topography ensures that the park is well connected with the city. All sightlines are elegantly accentuated and enhanced. The city will fall in love with the park, and the park is open to the city.

ECOLOGY

The Tuchkov Buyan Park features twelve new biotopes. They include a boreal forest, a mixed forest, the waterfront, the park area and the Orangery. They create an all-year-round shelter and nesting opportunities for birds, bees, butterflies and moths. Providing a spectacular floral display of colour and scent, the park features a significant native diversity. This provides valuable resources for education.

RICH PROGRAMING

Inhabitants of the Petrogradsky neighborhood and Saint Petersburg visitors will be able to enjoy the park all year round. In summer, the entire park will be fully occupied from the green lawns to the waterfront and the Orangery area. In the winter, activities will be concentrated near to the Orangery place and hills slopes, with easy access for neighbours and maintenance workers.
The park takes the interests of different visitor groups into account. The visitor streams and scenarios in the parks are separated. Tourists and visitors to Saint Petersburg will find the grotto, greenhouse, and viewing platforms attractive, while local residents of the Petrogradskaya side will find a quiet walk along the embankment and in the three valleys of the park. The park opens to the Neva with two balconies, one of which can become an amphitheater for chamber music performances.

During the winter, the Greenhouse will remain a busy center of programming, while local communities and children continue to enjoy the snowy forest and its rides.
2.1. SOLUTIONS FOR COMFORTABLE PARK VISIT AND EVEN DISTRIBUTION OF A LARGE NUMBER OF USERS

To accommodate a large number of users and evenly distribute the load on the park’s ecosystem, we utilized multiagent modelling software. Based on a variety of behavioural models, we were able to obtain realistic user scenarios. This methodology enables us to model situations with a large number of users long before the park is completed.

2.1.1. USER CATEGORIES

Users have been categorized based on their sociodemographic characteristics: school-age children and teenagers, parents with pre-school children, adults, the elderly, people working nearby, students, Boris Eifman Dance Palace visitors, tourists.

Each user category has its own type of behaviour, preferences and points of attraction. The categories differ in average time spent in the park and at each attraction point. The majority of event attendees are adults and people living in other districts. Parents with pre-school children and the elderly prefer to visit the park in the morning and during the day, while some of them also go to the park in the evening. School-age children and teenagers come in the afternoon, once their classes are over. Students visit the park in the afternoon, after class, but in the summer, they are happy to visit at night. People who work nearby pass through the park on their way to work in the morning and on their way to the subway in the evening. Boris Eifman Dance Palace visitors visit the park during the day or in the evening on the day of the performance. Tourists may visit at any time of the day because they are attracted by the landscapes, atmosphere, peaceful environment or events.

2.1.2. KEY INTERESTED POINTS AND USER PRIORITIES

The following key interest points were determined: the Conservatory, the restaurant facing the square, Theatre Square, Boris Eifman Dance Palace, Conservatory Square, the Amphitheatre on Malaya Neva, children’s playgrounds, ramps towards the water, observation decks, events space, exhibition space, the central meadow, intermediary points on pedestrian routes over the hills.

Each point has been assigned a priority according to its popularity with park visitors. For each interest point, there is an expected time spent there. The total duration of the park visit has been calculated from this time and type of user.

2.1.3. MULTIAGENT MODELLING. HEAT MAPS

Modelling involved continuous tracking of user movement. Every minute of model time, the data on all users currently in the park was recorded. The location of each user at a specific point in time was treated as key information. These records were further used to determine the characteristics of pedestrian routes. These characteristics were used to create heat maps demonstrating the distribution of users throughout the park. For each scenario, there were two maps: the map at a certain point in time with variable user density and the map with aggregated user movements over the whole duration of the model. To visualise the heat maps, an orthogonal 5x5m grid was imposed on the park area.

2.2.3. CONCLUSIONS

- For all seasons and types of events, the maximum user density was never higher than 3 people/m², with the average user density a lot lower than that. This clearly demonstrates the potential for comfortable park visit including its most popular attractions.
- According to our models, the maximum number of visitors throughout the park at one time was 1500 people. The speed of pedestrian flows remains high throughout the park.
- The modelling methodology allowed us to identify locations that were of the greatest interest to visitors: observation decks and routes over hills. They were visited equally frequently throughout the year.
SCENARIO 1. SUMMER
The estimated number of visitors is 30000 people per day. The number of visitors is great because of the warm weather, school and university holidays and peak tourist activity during the White Nights season. Most visitors prefer spending time in the open. Drawbridges raised after midnight are a tourist attraction that creates a romantic mood.
Model Results: Out of all scenarios, the summer scenario demonstrated the greatest number of users. At certain points, especially at about 11 pm, user density went as high as 18 people per 5x5m square in some locations. The overall number of visitors at one time was approximately 1500 people.

SCENARIO 2. WINTER
The estimated number of visitors is 12000 people per day. The number of visitors is small due to the cold weather, schoolchildren and students being busy with studies and a typical winter decrease in tourist activity. Most visitors prefer spending time inside buildings. The meadow has been turned into a skating rink.
Model Results: Out of all day scenarios, the winter scenario has the smallest number of users. At approximately 7 pm, user density went as low as 11 people per 5x5m square. The most popular locations were the Conservatory, the event space by Conservatory Square, the exhibition space in the middle hill, the skating rink on the central meadow and observation decks.

SCENARIO 3. FALL/SPRING
The estimated number of visitors is 15000 people per day. The small number of visitors is a result of rather cold weather, schools and colleges being in session and a decrease in tourist activity between the seasons. Users prefer quiet leisure: enjoying the landscape, strolls in the park.
Model Results: In the fall/spring scenario, the number of users is twice as low as in the summer. At approximately 5 pm user density was 12 people per 5x5m square in some locations.

SCENARIO 4. AN EVENT ON THEATER SQUARE
These events happen mainly in the summer and attract an additional inflow of visitors, especially near the theatre and nearby points of interest. The expected number of additional visitors is 2500 people.
Model Results for this scenario are mostly similar to those for the summer day scenario in terms of user density and key attraction points with the exception of Theatre Square, which was more popular in this scenario. The maximum user density in some locations went as high as 18 people per 5x5m square. This peak activity was observed at 1 pm.

SCENARIO 4. AN EVENT ON THE AMPHITHEATER BY THE WATER
These events happen mainly in the summer and attract an additional inflow of visitors, especially near the Amphitheatre by the water. The expected number of additional visitors is 2500 people.
Model Results for this scenario are mostly similar to those for the summer day scenario in terms of user density and key attraction points with the exception of the Amphitheatre by the water, which was more popular in this scenario. The maximum user density in some locations went as high as 18 people per 5x5m square. This peak activity was observed at 1 pm.
The park program is as diverse as possible and meets the needs of different groups of users in different seasons. In autumn, the topography protects visitors from the wind and creates favorable conditions for holding chamber music festivals and celebrations. Different areas within the park area provide independence and versatility for park users.
Orangery multifunctional plaza

The greenhouse will become a warm oasis with a unique indoor atmosphere. The restaurant will attract visitors, and the skating rink in the square is a magnet for children and adults of all ages. In the New Year’s period there will be a New Year’s fair on the square.

The greenhouse and its square in front of it will become a magnet for all visitors to the park. In summer, the atmosphere in the square will attract the guests of the park with its relaxed and unobtrusive atmosphere. Here you can hide from the noise of the city and spend your leisure time among figs, olive trees and oranges. A playful fountain will attract kids of all ages.
The romantic and calm atmosphere of the embankment promenade is emphasized by specially designed elements of cast-iron furniture, referring to the historical landscape heritage of St. Petersburg. Green black trees with Ailuropodidae in planters will protect the park from strong winds and immense visitors with showers of gold in autumn.

The square in front of the greenhouse, open to the city, is equipped with everything for wonderful moments both in the winter and in the summer. To complement the natural atmosphere, it has mobile wooden furniture and integrated natural stone benches with wooden seats.
The relaxed atmosphere of the park is enhanced by elegant and simple solutions. The selected materials are as natural as possible for St. Petersburg.

The unique conditions and the selected biotope of the Karelian forest emphasize the contrast of the park with the surrounding clime. The variety of tree varieties is balanced by the simplicity of the shapes and materials used.
EXPLANATION OF THE PARK TOPOGRAPHY
MIDNIGHT LANDSCAPE
5.1. INTEGRATION INTO THE EXISTING URBAN CONTEXT

At the beginning of the 18th century, the southern part of the Gorodskoy (presently known as Petrogradsky) Island was a lowland flooded after the smallest insignificant raise of the Neva River level. For its extreme humidity and wet grounds, the district was aptly nicknamed the Marshlands. The Malaya Neva stretched as far as the Dobrolyubov Avenue of today, with an archipelago of small islands rising above it. Vatny Island was the largest. At the end of the 19th century, Vladimir Kurbatov, a historian of St. Petersburg, called these green islands ‘one of St. Petersburg’s most pleasant spots’. In the 20th century, first the nameless islands and then Vatny Island became part of Petrogradsky Island and the ground was raised high enough not to be flooded. We propose a landscape with wooded hills rising above dells like islands above water. We are not aiming to reconstruct the historic relief, but rather to honour the genius loci. The reference to the original look of the Petrogradskaya Side archipelago promises a striking and intense dialogue between the picturesque natural character of the park and the grandeur of Peter I’s dream, now set in stone, that surrounds it.
5.2. VISUAL LINKS BETWEEN THE PARK AND ITS ENVIRONMENT

The city of St. Petersburg, with its best panoramas and accent buildings, becomes the lead character in the park’s scenography. This effect is achieved by a complex system of visual links that include:

- panoramic views over the main part of the Neva and the opposite riverbank that open from the embankment, amphitheatre, embankment promenade, hill slopes, and the stone bridge (Dyagilev Bridge);
- the view of 'the faraway' – long vistas over the vast visual basin of the city centre and its ‘main water square’ from the top of the hills. (From here, St. Petersburg’s residents will discover the city they seem to know so well all over again);
- ‘spot’ vistas over the key architectural dominant points in the gaps between the hills and from the wooden bridges that span them.
6.1. INTEGRATION INTO THE SURROUNDING URBAN CONTEXT: GREEN AREA AND PUBLIC SPACE SYSTEM

In this Concept, the proposed Tuchkov Buyan Park is interpreted as an integral part of the existing and developing system of green and developed public spaces in the centre of St. Petersburg. Therefore, to improve and develop the pedestrian, cycle and traffic infrastructure and provide links between the elements of this system, the following proposals have been made:

- create an underground crossing near Birzhevoy Bridge in order to provide the shortest possible pedestrian link between the park and Mytninskaya and Kronverkskaya Embankments, Zayachiy Island (Peter and Paul Fortress), the Peter and Paul Fortress crownwork (The Military Historical Museum of Artillery, Engineers and Signal Corps);
- reorganize traffic flow in Speranskogo Street and turn its part into a pedestrian area and a small public square between Malaya Neva Embankment and the Conservatory, thus creating a single barrier-free pedestrian environment comprising the park and the area adjacent to the Yubileiny Complex;
- create an underground pedestrian crossing under Bolshoy Avenue P.S., a floating bridge over the Zhdanovka River and an additional subway exit from Sportivnaya Station, thus stretching the park route into Petrovsky Island.

6.2. PLANNING PRINCIPLES

6.2.1. PERMEABILITY, BOUNDARIES AND LINKS

Tuchkov Buyan Park avoids clearly delimited boundaries and strives for maximum permeability. This general principle allows us to provide different interpretations for the southern front of the park (along Malaya Neva) and the northern front (Dobrolyubova Avenue). In the south, the park is embraced by the Green Wave, a serpentine promenade where the viewpoints change as you move along it and multiply the number of the available views of the water and the opposite bank. The picturesque bends of the Green Wave are a stark opposite to the classical linear boulevard along Dobrolyubova Avenue lined with clipped trees. Due to its visual permeability, the boulevard does not feel like a boundary, either: it is a buffer zone between the city blocks and the landscape garden. The system of passageways between the hills conveniently connects Dobrolyubova Avenue to the central meadow and the embankment. Pedestrian bridges over the dells serve the same purpose.
6.2.3. KEY PUBLIC SPACES. SQUARES
Theatre Square and Conservatory Square are the park’s two key spaces separated by a hill. Theatre Square belongs both to the city and the park, while Conservatory Square belongs to the park only. Conservatory Square gradually flows into a large children’s playground, while the amphitheatre overlooking the river turns it into a force field, the main focal attraction point of the whole park.

6.2.2. MUTUALLY PERMEABLE PLANNING SYSTEMS
The park’s activity and relaxation zones are delineated due being part of different planning systems. Thus, Boris Eifman Dance Palace was originally planned as part of the city’s orthogonal grid. In our proposal, this planning system also comprises transparent Conservatory, Info Point and other buildings, as well as the hidden hill grottoes that are, in a way, ‘Malévich’s negative architectons’. As they penetrate the irregular layout of the landscape park, the elements of the orthogonal system begin to divide, get pixelized, become smaller in size. The zenith lantern cubes cut through the hill slopes and look like shards of the orthogonal system. This planning device clearly shows the park’s dichotomy: all buildings and structures are part of the orthogonal system, while the manmade landscape repeats the irregularity of nature.
7.1. PEDESTRIAN INFRASTRUCTURE

Goal: to create a viable system of pedestrian routes with account for focal points where pedestrian flows emerge and are further absorbed: Kronverkskaya Embankment, Birzhevaya Square, Dvortsovaya Square.

Proposal:

7.1.1. CREATE AN UNDERGROUND PEDESTRIAN CROSSING NEAR BIRZHEVOY BRIDGE

During the construction of the underground pedestrian crossing by the entrance to Birzhevoy Bridge, all existing road markings are retained. The layout of the crossing takes into account the city sewer line protection area. The new pedestrian link makes the park more accessible, ensures the safety of pedestrian and traffic flow juncture, and prevents chaotic movement in a variety of scenarios (city events, transit movement, park visits, tour routes), thus reducing the probability of road accidents.

7.1.2. CREATE AN UNDERGROUND PEDESTRIAN CROSSING UNDER BOLSHOY AVENUE P.S. AND A FLOATING BRIDGE OVER THE ZHDANOVA K RIVER

Convenient access to the park from the north can be provided for by a newly constructed underground pedestrian crossing under Bolshoy Avenue P.S. A new floating bridge over the Zhanovka River can stretch the walking route into Petrovsky Island and connect the two green areas disjointed by roads into a single ensemble. This is also a possible spot for an additional exit from Sportivnaya Subway Station.

7.1.3. REDUCE THE NUMBER OF VEHICLE LANES ON BIRZHEVOY BRIDGE

Tuchkov Buyan Park becomes a new focal point of the area, thus causing pedestrian links between the park, the Spit of Vasilievsky Island, and Dvortsovaya Square to intensify. We propose to remove one road lane on Birzhevoy Bridge and, thus, widen the pedestrian sidewalk. This proposal takes into account the existing city plans to elongate Makarova Embankment, which is expected to result in less traffic load on Tuchkov and Birzhevoy Bridges.

7.1.4. SHORTEN THE TRAFFIC AREA IN SPERANSKO PO STREET

Only a half of the length of Speranskogo Street remains accessible to traffic: the stretch between Dobrolyubova Avenue to the proposed Conservatory, providing for private and service vehicle movement, traffic access to the existing and proposed buildings, and an open-air 40-vehicle parking lot. The stretch between Malaya Neva Embankment to the Conservatory is reserved solely for pedestrian use. It forms a small public square in front of the north-western façade of the building. This move will contribute to the barrier-free pedestrian environment and, therefore, the integration of Yubileiny Complex into the park area.
7.2. TRAFFIC INFRASTRUCTURE

Goal: to improve the traffic infrastructure in the area adjacent to the park; to provide convenient traffic access to the park and visitor parking lots.

Proposal:

7.2.1. RECONSTRUCT THE VEHICLE JUNCTURE AT BIRZHEVOY BRIDGE EXIT
At present, this traffic node includes a large number of areas that lack a specific purpose and, therefore, become spontaneous parking lots. They create additional traffic blockage and increase the likelihood of road accidents. Our Concept includes proposals for complex reconstruction introducing an orderly structure of the node and new noise protection areas planted with tall trees.

7.2.2. ORGANIZE PARKING SPACE FOR PRIVATE VEHICLES
A newly constructed underground parking lot for 340 vehicles will carry the main part of the load. A new 100-vehicle open-air parking lot will be constructed near Yubileiny Complex. Additional 40 parking spaces will be provided along Speranskogo Street. The overall number of parking spaces is consistent with standard requirements and sufficient to provide spare parking space for maximum load events.

All Concept proposals to organize and develop pedestrian and traffic links are based on preliminary calculations and positive expert assessment. They are fully consistent with the current status of the area and can be confidently recommended for implementation.
CONSTRUCTION ENGINEERING SOLUTIONS

8.1. STRUCTURAL SOLUTIONS, UTILIZATION OF THE EXISTING CONCRETE FOUNDATIONS. WATER DISPOSAL AND DRAINAGE

8.1.1. PRESENT SITUATION ANALYSIS
At present, there are structures from the previous unfinished projects on the site, namely reinforced concrete structures of the 540-vehicle parking and a foundation raft of the Court District buildings. Preliminary analysis of the existing structures has demonstrated that they can be effectively and feasibly used. The bearing capacity of the Court District foundation raft has been estimated at a minimum of 11.0 t/m², which is sufficient for almost all newly erected structures – both buildings and landscape forms – without the need for reinforcement, since the average load from these components does not exceed 8.0÷9.0 t/m². According to preliminary estimates, in some areas, mainly above the parking structures, the loads from the newly constructed landscape elements exceed the bearing capacity of the exceeding structures by 1.2÷1.3 times. In these cases, technical measures to reinforce the existing structures will be undertaken:

• reinforcement of the pile foundation with bored piles;
• reinforcement of vertical components (columns, pylons, wall piers) with metal casing;
• reducing the load on the slab by introducing additional upstand beams.

In addition, materials with the lowest unit weight values will be selected to model the artificial relief.

8.1.2. UTILIZATION OF THE EXISTING SHEET-PILE WALL (SPW)
In isolated low parts of the relief where the surface level mark is lower than the groundwater level, it is deemed feasible to preserve the existing SPW as groundwater cutoff. This will require welding the seams between the sheet piles to the existing foundation raft and plugging the assembly holes in the sheet piles. Once the cross-tie at the level of the foundation raft and the waterproofing at the juncture of the raft and the sheet pile wall are in place, the existing cross-tie may be dismantled. The cross-tie into the existing raft and ground installation of sheet piles will ensure the strength of the sheet-pile wall.

8.1.3. EMBANKMENT RECONSTRUCTION
Embankment structures are not listed cultural heritage monuments and may, therefore, undergo alteration. In our Concept, we propose to modify the geometry of the embankment in three places to create two ramps and one amphitheatre leading to the water.

• To provide access to the river at a mark of 1.2 m lower, the following measures will be required: a temporary cutoff SPW to pump water out of the area of the embankment structure prior to dismantling. To prevent the collapse of the existing wooden SPW, at the juncture between the SPW and the embankment, the SPW depth is reduced and the juncture is sealed by mats with sand cement screed.
• To provide SPW stability after water has been pumped by fixing the SPW in the ground and providing metal ribbon strips;
• To lower planning marks of the embankment and then dismantle part of the embankment raft. The embankment piles and sheet piles are preserved, if in good working condition, and brought together by a new foundation raft connected to the new combined pile-raft foundation of the amphitheatre. This foundation will allow for ice and wave loads if the water level rises above 1.5 m (Baltic System).

Bringing the planning mark down to 1.2 m on the side of the embankment will not require any additional measures and allow to preserve the existing embankment structures.
8.1.4. WATER DISPOSAL AND DRAINAGE

Preserving the existing SPW and constructing a waterproofing node at the juncture of the existing foundation rafts and the SPW will result in limiting the water inflow into the designed drainage system to rainwater and in preserving the natural groundwater level outside of the park. This will prevent potential negative impact on the surrounding historic buildings.

To remove rainwater from the park, a green roof drainage system with drainage capture elements and a composite drainage layer. Pumping stations in the body of the hills will pump rainwater into the city sewage.

8.1.5. STRUCTURAL SOLUTIONS FOR THE NEWLY ERECTED PARK COMPONENTS

To ensure efficient and cost-effective use of the existing structures, in our Concept, we propose to finish the construction of the underground parking and the earthworks for the Court District, while taking into account the new solutions and loads from the park.

The newly erected park components are as follows:

- The conservatory glasshouses: Translucent bearing structures (laminated tempered glass panels) will be used. It is possible to use glued wood or LVL elements.

- Artificial relief, elevation difference of up to 10m: Materials with the lowest possible unit weight (aerated concrete, haydite etc.) will be used to minimize the need for existing structure reinforcement. The single-level spaces inside the hills (grottoes, halls, etc.) will be waterproofed at the top and covered by a 2-meter-thick soil-plant layer. Vertical bearing structures of in-built spaces will be designed to account for the existing columns of the parking. The lower parts between the hills are also covered by a 2-meter-thick soil-plant layer laid over waterproofing on top of the park’s underground volumes.

- Footbridges, pathways, mini amphitheatres, hardscape elements.

- An underground crossing under Academic Likhachev Square: The crossing is a reinforced concrete tunnel under the road pavement at the entrance to Birzhevoy Bridge. Open cut (zone-by-zone) or trenchless (Metrostroy tunnelling technology) methods can be used. Closely located engineering networks and sewage protection area may prove an impediment for the construction of the tunnel. An alternative solution may be found in lightweight metal structures leading down to the level under the bridge or within the volume of the bridge, along a walkway and rising on the opposite side of the bridge. Another solution is a crossing on a floating structure.
8.2. ENGINEERING NETWORKS

8.2.1. ELECTRIC POWER SUPPLY
The concept for Tuchkov Buyan Park electric power supply comprises both conventional and alternative power sources, up-to-date switchboard equipment and energy-saving LED lights.

As the main power source, we propose using a free-standing transformer substation, CCTS 10(6)/0.4 kV, 1000 kVA. According to preliminary calculations, the estimated power load is 890 kW. During the time of high sunlight activity, some of the load will be taken over by solar panels (PV) with the approximate capacity of 100 kW located on roofs. The power generated by solar equipment will be used most during the working hours, when it is used for operational and technological processes, and reduce the consumption of power incoming from supply centres.

For the convenience of park visitors, a cell phone charger (flush mount USB plug outlet, 2.1 A, IP66) will be installed next to every bench.

Park and landscape lighting is supplied by a separate switchboard with control equipment and a light management system in accordance with the TS supplied by Lensvet, the power supplier. The concept of park and landscape lighting is fully consistent with the architectural look of the location and accounts for its historic value and listed cultural heritage environment. As a result, the choice of lighting equipment and fixtures is fully compliant with the regulations mentioned above.

8.2.2. HEAT SUPPLY; HEATING, VENTILATION AND AIR CONDITIONING
The conservatory glasshouse is connected to the city heat supply network via a utility vault. The heating pipeline from the vault to the individual heating plant is made up of polyurethane-insulated steel pipes laid in trays. The building also has an additional heating source to supply the heating and air conditioning system: geothermal heating pumps.

Heating is implemented as a hot air system combined with ventilation. Air ducts are located in the walls, 0.3–0.5 m above the floor. The hot air from the lower level of the building flows upwards, resulting in fast mixture of air and faster space heating. This heating scheme is effective and energy-efficient. During the hot seasons, the system is used for air conditioning. Cold air is supplied to the air ducts instead of the hot air to cool the rooms.

To reduce heat loss during the cold season and lessen air-conditioning costs during the warm season, infrared heating window systems (thermo-glass or similar) may be used.
8.2.3. IRRIGATION

To reduce consumption of drinking water, for landscape irrigation purposes, we propose using a rainwater management system that collects, transports and cleans rainwater and meltwater through a system of open and closed pipelines.

The relief is arranged to ensure the free flow of the runoff from non-polluted surfaces (lawns, driveways) into the cleaning facilities.

8.2.4. IT AND TELECOMMUNICATIONS INFRASTRUCTURE

The park will be fully covered by a public Wi-Fi network geared for seasonal and event-related load changes. Instead of large-scale stationary multimedia systems, mobile equipment complexes built to purpose will be preferred, e.g. sound and lighting for the skating rink, sound and light installations, cultural events and festivals.

At some locations, information booths and screens with dynamic information (rare and exotic plants in the conservatory, on-site events program, etc.) will be installed.

The engineering networks are managed by a single control system. In addition to equipment control, it will provide automatic control over the systems used to create the mood based on time of day, time of year, special programs, and others: to launch fountains, installations, to switch on and select the mode for landscape lighting.

The engineering infrastructure includes a comprehensive set of fire and antiterror security systems. An analytical CCTV system integrated into the Safe City Complex will be installed along the park perimeter, within buildings and on public squares.
The Tuchkov Buiyan Park will transform the area from its current emptiness into an idyllic park, whose charm will fascinate locals and visitors throughout the seasons. The bold yet elegant design, with its botanical thoughtful heart and robust high-quality materials, balances notions of ephemeral nature, seasonality and romance with careful attention to programme, functionality and flexibility. Tuchkov Buiyan Park will be brought to life with colour, fragrance, educational programmes and seasonal botanical displays.

The park introduces 12 biotopes. It will increase the diversity of the trees in the district and benefit the overall resilience of the existing tree species by reducing their sensitivity to the spread of pests and diseases. The new trees comprise 42 different species in the park and 52 different species in the Orangery. Each is carefully selected to complement the site’s unique profile and position close to the river. The net effect of their addition will increase the canopy against the future impacts of climate changes.

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10.1. Lighting
In accordance with LEED or BREEAM standards, for outdoor lighting, we use energy-efficient LED lights with a greater light output than that of incandescent or fluorescent lights.

10.2. Materials and Surfaces
Details are very important both in landscape and building architecture. The thoughtfully constructed junctures of different surfaces of consistent height and ergonomic design elements encourage user trust, make them perfect for everyday use, and ensure longevity and comfort. Surface materials are natural: granite slabs in a variety of sizes and granite blocks—a traditional St. Petersburg pavement. Pathway surfaces are made of permeable materials that minimize the soil sealing effect.

10.3. Accessibility for Limited Mobility Visitors
To provide obstacle-free access and a comfortable park visit experience for limited mobility visitors, in our Concept, we propose the following measures:
• for motor impaired visitors, vehicle access from the street to the park area and from parking spaces to the Conservatory entrance;
• barrier-free routes throughout the park;
• the longitudinal slope for wheelchair movement should not exceed 5%; the transverse slope should be between 1-2%;
• a minimum sidewalk width of 2 meters;
• sidewalk ramps with a 10% slope and an elevation of 100 mm;
• anti-slip outdoor ramps;
• ground floor entrance to all buildings and structures for all limited mobility visitors;
• measures to ensure safe movement inside the buildings, including a tactile surface for visually impaired visitors.
AUTUMN

WINTER

SPRING

ENTRANCE FROM THE AVENUE AT SUNRISE

VIEW FROM THOMAS DE THOMON BRIDGE

FIRST DATE ON THE HILL

DE 100 MASTS PLAYGROUND

CENTRAL LAWN

GROTTO

ORANGERY PLAZA

SUMMER

ROMANTIC BALCONY AT SUNSET