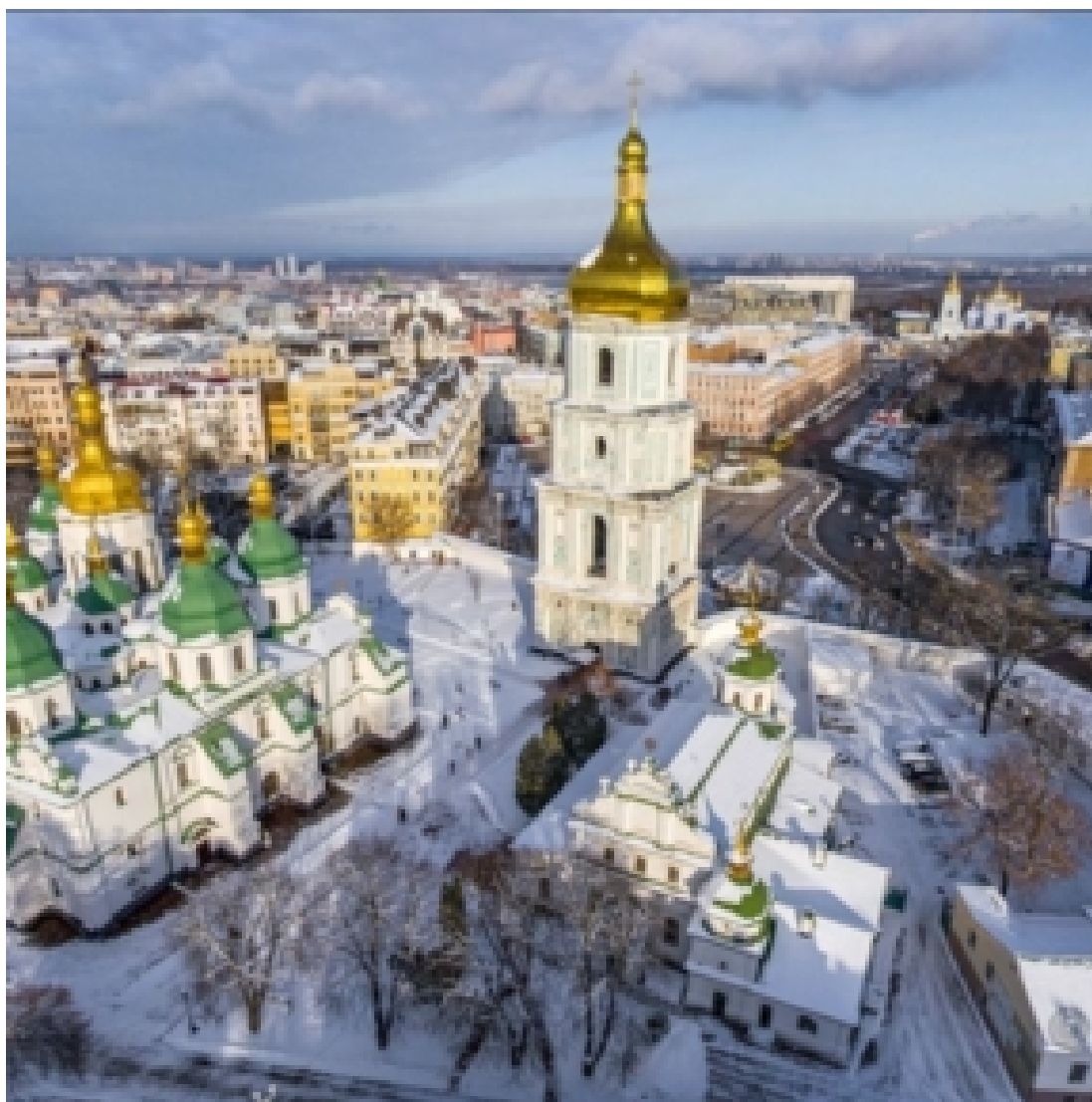


*** PROTECTED (BUFFER) ZONE**

OF THE ENSEMBLE OF BUILDINGS OF ST. SOPHIA CATHEDRAL

an integral part of the World Heritage property «Kyiv: St. Sophia Cathedral and Related Monastic Buildings, Kyiv-Pechersk Lavra»

BOUNDARIES AND REGIME OF USE of the territory



CONTENTS

The organization principles of the buffer zone of the ensemble of the buildings of St. Sophia Cathedral	2
The limits of the protected (buffer) zone of the ensemble of the buildings of St. Sophia Cathedral	4
The regime of the protected (buffer) zone of the ensemble of the buildings of St. Sophia Cathedral	7
The hydro-geological protected zone of the ensemble of the buildings of St. Sophia Cathedral	13
The reasoning of the hydro-geological protected zone of the ensemble of the buildings of St. Sophia Cathedral	13
The limits of the territory of the hydro-geological protected zone of the ensemble of the buildings of St. Sophia Cathedral	16
The regime of the city-building transformation in the limits of the hydro-geological protected zone	18

Graphic materials

Minor alteration of the boundaries of the protected (buffer) zone of the ensemble of buildings of St. Sophia Cathedral 1:2000

Hydrogeological protected zone of the ensemble of buildings of St. Sophia Cathedral 1: 2000

Historical and town-planning situation analysis within the protected (buffer) zone of the ensemble of buildings of St. Sophia Cathedral 1: 2000

Maximum permissible height of structures within the protected (buffer) zone of the ensemble of buildings of St. Sophia Cathedral 1: 2000

Visual corridors of the perception of the ensemble of buildings of the St. Sophia Cathedral from the landscape viewpoints

Field survey photofixation materials

The organization principles of the buffer zone of the ensemble of the buildings of St. Sophia Cathedral

The protected (buffer) zone of the ensemble of the buildings of St. Sophia Cathedral is an important element of the protection of the immovable cultural heritage and the natural environment of Kyiv. It ensures the preservation and the possibility of effective use of the immovable cultural heritage. It is an integral part of the monument's security planning system of the city, which takes into account its historical and town-planning features, environment and landscape features.

The territory of the protected (buffer) zone of the ensemble of the buildings of St. Sophia Cathedral is located in the limits of the central historical area of the city and covers the most valuable historic and cultural territory:

- a territory of the Upper city, which is included into the architectural protected zone of the city of Yaroslav that was approved by the Executive Committee of the Kyiv City Council number 920 of 16 July 1979 “On clarify the limits of historical and cultural conservation areas and protected zones of historical and cultural monuments in Kyiv”,

- a local importance monument of urban development (Order of the Ministry of Culture of Ukraine of 14.08.2013 №757, Number 927-KB) – Khreshchatyk Street within the limits of Prorizna Street and European Square (including Maidan Nezalezhnosti Square),

- Andrew's Descent – the urban development monument of national significance (Decree of the Cabinet of Ministers of Ukraine of 10.10.2012 № 929, № 260060 – H),

- slopes of the Andrew's hill within the limits of the funicular, Borychiv Tik Street and Andrew's Descent,

- Prorizna Street.

Its territory is so located within the limits of the archaeological protected zone, which extends all Upper city.

The establishment of the protected zone of the ensemble of the buildings of St. Sophia Cathedral as an object included in the World Heritage List meets the

requirements of the UNESCO Convention for the Protection of the World Cultural Heritage (1972), because such zone provides the most favorable external conditions for the preservation and using this outstanding cultural monument.

The coverage by the protected zone the ensemble of the Upper city as an integral historical town-planning formation, where the ensemble of St. Sophia Cathedral's buildings is a semantic and artistic center, takes into account the UNESCO Recommendations on the Protection and Contemporary Role of Historical Ensembles (1976), in which it is said about providing the complexity in the protection of historical, cultural and primarily architectural heritage.

The Expansion of the eastern limit of the buffer zone of the St. Sophia with the inclusion of Khreshchatyk Street and Maidan Nezalezhnosti Square, as an important component of the urban environment, takes into account UNESCO recommendations set forth in decisions 33 COM 7.B125 (p. 7) and 34 COM 7.B.103 (p. 8). Also, in according to Decision 36 COM 8B.41 (p. 2b) on the possibility of including the slopes of the Andrew's Hill, the northern limit of the buffer zone is expanded within the funicular, Borychiv Tik Street and Andrew's Descent. From the south, odd as the even buildings on Prorizna Street is attached to the protected zone of the ensemble of the buildings of the Sophia Cathedral. Prorizna Street is one of the important structural axes forms the historic city center. It is one of an important historical center of the city environment has a significant architectural, historical and cultural impotence that needs to be preserved and regenerated.

The regime of the preserved zone corresponds to the Law of Ukraine "On the Protection of Cultural Heritage" (2000) and the requirements of international agreements for the preservation of the immovable cultural heritage.

The archaeological regime within the protected zone as the most valuable archaeologically territory of the city corresponds to the requirements of the "International Charter on the Protection and Using the Archaeological Heritage" (1990).

**The limits of the protected (buffer) zone of the ensemble
of the buildings of St. Sophia Cathedral**

The limits of the protected (buffer) zone of the ensemble of the buildings of St. Sophia Cathedral are on:

In the east:

- along the upper edge of the slope from the alcove in the Volodymyrska Hirka park along its fence to the intersection of Triehsviatytska Street and Kostelna Street;
- further to the southeast on Triehsviatytska Street to the European Square;
- further to the southwest on the border of the sidewalk of the even side of the Khreshchatyk Street to the building on 6, Khreshchatyk Street;
- further to the southeast, across Khreshchatyk Street to limit of the sidewalk of the odd side of Khreshchatyk Street;
- further to the east on the border of sidewalk of the odd side of Khreshchatyk Street and further along Hrushevsky Street rounding the house on 1/2 Khreshchatyk Street to the southwest between buildings № 1/2 and № 4 on Hrushevsky Street along the southeastern edge of the buildings number 5, 5 B, 5 B;
- further to the southeast to the terrace of the building of the Institute of Noble Maidens (October Palace of Culture) and, rounding it, to the terrace staircase;
- further to the south-west along the steps of the terrace;
- further to the south, crossing the Alley of Heroes of the Heavenly Hundreds, along the retaining wall of the “Hlobus” shopping center, between the buildings № 1–3/11 and № 5 to the crossing with Architect Horodetsky Street;
- further to the north-west along Architect Horodetsky Street to the crossing with Khreshchatyk Street;
- further to the south along the border of the sidewalk of the even side of Khreshchatyk Street.

In the south:

- to the west between the building № 32, 32 Б and № 34 on Khreshchatyk Street, along the southern facade of the house 32 Б on Khreshchatyk Street to the southern corner of the building № 1–3/5 on Pushkin Street, between the buildings № 1–3/5 and 5 on Pushkin Street to the crossing with Pushkin Street;
- further to the south along Pushkin street;
- further to the west between the buildings № 2–4/7 on Prorizna Street and № 6 on Pushkin Street;
- further along the back of the buildings № № 2–4/7, 9, 11 А, 15, 17, 19, 21, 23 А, 23, 23 Б, 25, 25 А, 25 Б, 27 27/41 on Prorizna Street to the crossing with Volodymyrska Street;
- further to the south along Volodymyrska Street to the Golden Gate Driveway;
- further along Golden Gate Driveway to the crossing with Lysenko street.

In the West:

- to the north along Lysenko Street to the driveway between the buildings № 2 and № 4 on Lysenko street;
- further to the north-west between Lysenko Street and Ivan Franko street, starting from the driveway between the buildings № 2 and № 4 on Lysenko Street and further along the historical borders of the estates №№ 1, 3, 5, 7, 9, 11 on Yaroslaviv Val Street and the estate № 3 on the Ivan Franco street;
- further to the north-west between Ivan Franko Street and Oles Honchar Street along the southern edge of the buildings № 4 and 4 Б on Ivan Franko Street and along the historical borders of the estates (together with the fliegers) № 13, 15, 17, 19/31 and along the western edge of the building № 33 on Oles Honchar Street;
- further to the north-west between O. Honchar Street and Bulvarno-Kudryavska Street – along the borders of the historical estates (with fliegers) № 21/20, 25, 27, 29, 31, 33, 35, 37/1 and further between the buildings № 3 and № 5 on Bulvarno-Kudriavska Street;

- further to the north-east along the border of the sidewalk of the odd side of Bulvarno-Kudriavska Street to Lviv Square;
- further to the north-west along the border of the sidewalk of the Lviv Square;
- further to the north along the western side of Lviv Square to Velyka Zhytomyrska Street and along the eastern facade of the shopping center to the edge of the slope.

In the north:

- along the upper edge of the slope to the east to the Peizazhna Walkway;
- further along the Peizazhna Walkway to the Desiatynny Lane;
- further along the steps to the terrace at the foot of Desiatynna Hill and along the edge of the terrace;
- further to the north between the buildings № 58 and № 60 on Voznesenska Street to the building № 22 on the Andrew's Descent;
- further in the rear of the houses № 22, 22 A, 22 Б, 20 Б, 20, 18 of the building of the even side of Andrew's Descent;
- further to the northeast to the retaining wall;
- further to the southeast along the retaining wall;
- further to the north-east along the southeastern facade of the building № 33/6 A on Borichev Tik Street to the crossing with Borichev Tik Street;
- further to the east along Borichev Tik Street to the retaining wall of the Funicular;
- further to the south along the retaining wall to the upper station of the Funicular;
- further to the east along the fence, which is along the edge of the upper part of Volodymyrska Hirka Park, to the alcove on the corner of the plateau;

Area protected zone is **147.55 hectares. P = 6784.81 m.**

The regime of the protected (buffer) zone of the ensemble of the buildings of St. Sophia Cathedral

The main thrust of the regime of the buffer zone of the ensemble of the buildings of St. Sophia Cathedral is to preserve the historical environment, the organic part of which is the Cathedral, to preserve its compositional role in this environment and prevention of transformation in this environment, which adversely affect the monument and the historical urban whole, which is completed by the Cathedral with the environment.

The traditional character of the urban environment has to remain the leading on the all territory of the protected (buffer) zone of the ensemble. New elements of building to be organically connected with it. It is necessary to preserve the historic planning and the buildings, its scale, style characteristics, architectural and spatial composition, natural terrain, landscaping. The planning, visual, compositional and content-figurative connection of St. Sophia Cathedral with the Golden Gate, St. Michael's Golden-Domed Monastery, St. Sophia and Vololodymyrs Streets should be considered as the most important for preserving the unity of the ensemble with the historical environment and for the structure and image of the Upper City as a whole. The ensembles of the buildings of St. Sophia Cathedral and St. Michael's Golden-Domed Monastery with St. Sophia and St. Michael's Squares and Volodymyr Driveway are should considered as an outstanding historical, architectural and town-planning complex, which must be carefully preserved in the unity of its component parts.

These monuments and architectural and spatial formation that united by St. Sophia ensemble make a core of the historical center of the city and are decisive for the architectural character of Kyiv as an ancient city. They are subject to careful protection. This regime of the particularly strict protection should be carried out within the territory defined around them.

The height and the scale of new buildings and superstructures of buildings that are not architectural monuments should be commensurate with existing historical buildings on the territory of the immediate surroundings of the ensembles of the

buildings of St. Sophia Cathedral and St. Michael's Golden-domed Monastery and on the territory of the protected zone.

Some transformations are permissible in the protected zone of the ensemble of buildings of St. Sophia Cathedral. Their main focus is the regeneration and architectural and composition completion of historically insufficiently developed plots and creation of optimal circumstance for viewing the ensemble and its traditional environment. On free plots, new building is permitted only on individual projects with appropriate scientific justifications. New buildings must be compositionally and architecturally connected to the historical urban environment of the ensemble and the silhouette of the Upper City, not to exceed the height of the adjacent historical buildings and not to change the facade division and their coloring. It is necessary to create optimal conditions for viewing the ensemble and its buildings, to preserve the historical and architectural environment and the recreation the historical planning and development on the territory of the protected zone.

In the protected zone it is allowed transformations that aren't contrary the requirements for the protection of the rich cultural heritage of the historical center of the city and the outstanding role of the ensemble of St. Sophia in Kyiv, to contribute the regeneration of the best qualities of the historical environment of the ensemble, as well as to improving the quality of the urban environment, that are:

- transformations, which are related to the functioning of the Upper City as a part of the nucleus of the city center and the formation of which as a residential, public and cultural center in compliance with the reasonable restrictions of height and density of the building;
- limited housing and public building, including objects of socio-cultural, consumer services and tourism infrastructure that don't violate the character of the traditional environment and don't exceed the height of the adjacent historical buildings;
- reconstruction of lost valuable historical buildings on individual projects with appropriate scientific justifications and with reliable archival materials, full-scale architectural measurements of these objects, etc.

- regeneration of the historical environment with the preservation of the traditional scale of the buildings: the height (number of floors) of buildings and structures, the proportionality of architectural details;
- restoration and rehabilitation of architectural monuments of national and local significance;
- repair and restoration works on all historic buildings to be preserved;
- reconstruction of large and ordinary historical buildings with their possible superstructure and annexes that don't violate the architectural features of these buildings and the character of the traditional environment associated with it and don't exceed the height of the adjacent historical buildings;
- building new objects in places of lost low-value buildings and historically undeveloped sites on individual projects with appropriate scientific justifications. The main principle of the regulation is the correspondence of the new buildings with the typological characteristics of the traditional environment (density, number of floors and the character of the facade front of the adjacent historical development) with the orientation on preservation the views along the streets;
- demolition of emergency historical buildings with subsequent reproduction of the appearance of lost valuable historical buildings, with the aim of preserving the traditional historical environment;
- demolition of buildings and structures disharmonized the historical environment, as well as violating the valuable historical planning and spatial organization;
- demolition of low-value economic and technical buildings;
- streamlining and improvement of the territory;
- streamlining green plantations that prevent to view the architectural monuments and historical town-planning complexes;
- functional reorientation of buildings in accordance to the needs of the public and tourist center of Kyiv;

- the maximum permissible height of new buildings and superstructures shouldn't be higher than the height of the adjacent historical building, which is 12–25 m. (see diagram);
- archaeological exploration of the territory.

In the protected zone it is prohibited the transformations that lead to a violation of the traditional environment and a decrease in its historical, cultural and compositional – artistic potential, that are:

- changes in the historical planning;
- the overrun of new buildings and superstructures of the height of the adjacent historical building;
- violation the historical silhouette of the panoramas;
- violation the valuable views that determine the originality of the historical center of the city;
- violation the scale relationships in buildings;
- building of industrial and municipal objects, enterprises and institutions;
- violation the visual perception of the ensemble and its historical surroundings by high new buildings and superstructures around them;
- destruction the historic green spaces;
- advertisement placement;
- placement the temporary structures (booths, pavilions, shopping tents, etc.) that violate the traditional character of the historical environment and obscure to view the cultural heritage monuments.

Throughout the protected area, which is also an archaeological protected zone, any excavation work can be only carried out in consultation with the Institute of Archeology of the National Academy of Sciences of Ukraine and the Ministry of Culture of Ukraine and on condition of preliminary archaeological research with the museufication of founded archaeological monuments.

The stability of the geological and hydro-geological conditions of the ensemble's existence should be ensured within the surrounding neighborhoods and

St. Sophia Square (see the drawings of the hydro-geological protected zone) by preventing the building the underground recessed structures (parking lots, fitness centers, swimming pools, toilets, etc.) in this zone.

Protection of the monuments of the ensemble, especially St. Sophia Cathedral of the 11th century, from vibration loads should be ensured by maximum takeaways of transport and minimization of sound loads from activities that take place on St. Sophia Square.

The regimes of the buffer zone should be taken into account in the preparation of the initial permissive documentation for the reconstruction of the objects, the regeneration of the historical environment and new building. The limits and the regimes of the buffer zone are included in the town planning and land management documentations of the Kyiv city.

All planned town-planning transformations in the buffer zone should be coordinated with the Ministry of Culture of Ukraine (the central authority for the protection of cultural heritage).

According to p. 172 of the Operational Guidelines for the Implementation of the World Heritage Convention it is necessary to inform the World Heritage Center through the Ministry of Culture of Ukraine and the National Commission of Ukraine for UNESCO about planned large-scale restoration projects, new buildings or architectural and town-planning transformations within the protected (buffer) zone, which can affect the Outstanding Universal Value of the World Heritage property.

Conditions of execution and implementation of the regime

For saving the dominant role of the World Heritage monument of the ensemble of the buildings of St. Sophia Cathedral and its historical environment, and thereby consistent and full implementation of the regime its protected (buffer) zone it was made:

- Analysis of viewing disclosure of the monument from characteristic points of view;

- Historical and architectural inventory of the buildings within the protected (buffer) zone.

It is also necessary to develop a program for the regeneration of the protected (buffer) zone with the definition of reproducible buildings and objects, the needs for restoration, rehabilitation, streamlining and development opportunities for the development of this territory on the basis of DPT and Zoning. The program should be considered at the relevant councils of the Ministry of Culture, the Department of Culture of the KCSA, as well as UTOPIC, to take into account the opinions of professionals and the public. When developing the project documentation for any building works within the protected (buffer) zone, it is obligated to develop a chapter: “Assessment of the impact on the outstanding universal value of the World Heritage monument”.

The hydro-geological protected zone of the ensemble of the buildings of St. Sophia Cathedral

The hydro-geological protected zone of the ensemble of the buildings of St. Sophia Cathedral is the area around the ensemble of the buildings of St. Sophia Cathedral, within which it is necessary to monitor groundwater and prohibit building of new objects (including underground ones) that pose a threat to the change in the hydro-geological regime.

The Institute of Geological Sciences of the National Academy of Sciences of Ukraine has calculated the limits of the hydro-geological protected zone on the basis of mathematical modeling of filtration problems with preliminary schematization of hydro-geological conditions of the territory.

The reasoning of the hydro-geological protected zone of the ensemble of the buildings of St. Sophia Cathedral

The Institute of Geological Sciences of the NAS of Ukraine has begun to conduct hydro-geological monitoring with the use of a net of wells on the territory of the ensemble of the buildings of St. Sophia Cathedral since 2001.

At present, the hydro-geological monitoring system has the net of 12 observation wells and 5 observation hydro-physical points that cover the entire territory of the ensemble and they are optimal for monitoring the territory of the ensemble. Some wells and posts are equipped with automatic sensors to get information.

Long-term hydro-geological monitoring shows a gradual increase in groundwater table (IGT). Over the past 100 years, it has risen 5–7 m and is located at a depth of 14–16 m. The fastest growth of levels (up to 2.0 m) had been observed from 2005 to 2010. In 2010, the IGT was very close (1.5–3.5 m) to the bottom of the layer of loess-like sandy loam, which are directly below the base of the foundations of all buildings in the territory of the ensemble and have the ability to sink when it is moistened. Moistening of the loess-like sandy loam can lead to deterioration of deformation properties of soils and subsidence of the base, and

consequently to uneven sediments and deformations of buildings, the supporting structures of which aren't designed for work under conditions of uneven deformations. Therefore, the rise of IGT is very dangerous.

**The rise and fluctuation of IGT in the territory of the ensemble
are due to the following reasons:**

1. *The fluctuations of IGT due to natural factors* (seasonal, solar active, climate warming, soil freezing, sequence of dry and rainy periods, etc.) are typical for all wells and can be 0.8–1.5 m per year.
2. *The fluctuation of IGT from industrial causes* is quite sharp and may be high. For example, in 2002, there was a significant increase in IGT (0.5–0.75 m) during the excavation of a pit and construction of a fitness center on Rytsky Lane, next to the walls. At the same time, the wall of the 20th century collapsed and the eastern facade of Bursa got a lot of cracks. During 2005–2006 years there was a sharp rise in IGT (an average of 0.86 m.). It is due primarily to two industrial outflows that occurred on the territory of the ensemble (near the underground toilet) and beyond (George Lane). The sharp rise of IGT were recorded in 2009 – up to 1.4 m, in 2010 – up to 1.0 m and in 2015 – up to 1.06 m.
3. *The rise of IGT under the influence of new underground construction* occurs, as a rule, gradually and with the imposition of other factors. To calculate and predict it can only be done by modeling. It can be computed and predicted only when building a model.

Modeling is the most effective and essential method for studying hydro-geological conditions in difficult geotechnical conditions. It is widely used both abroad and in our country (Chernobyl).

The main purpose of the modeling is to refine the hydro-geological parameters and approximate predictions of the impact of individual newly

constructed objects or objects being built in the ensemble's protected zone on the hydro-geological situation of its territory.

The hydro-geological model had been built by the Institute of Geological Sciences of the NAS of Ukraine in 2005 and was updated as new data were received in 2008 and 2011.

To build the model, the territory was considered. This territory is considerably exceeds the territory of the ensemble. It roughly corresponds to the area of Ancient Kyiv, including the slopes of the Honchary-Kozhumiaky Tract, Mikhailivska Hill and the Khreshchatyk Den, Trehsviatytelska Street and Yaroslaviv Val Street. Its length is up to 2.0 km from the west to the east and up to 1.8 km from the south to the north (64 ha).

For this area, there were collected and summarized the data on geological sections and groundwater levels of about 100 reference geological wells with a depth of 10–40 m. These wells were drilled by the Kyivproject, the Geolproject, the Energoprojekt and other organizations on the different times.

The results of the modeling established that the rise of IGT after the construction of the fitness center on Rylsky Lane was up to 0.35 m in the northeastern part of the territory of the ensemble, after the construction of the Hyatt Hotel – up to 0.1 m in the southeast section. The calculated data were consistent with the data obtained in situ.

**The limits of the territory of the hydro-geological protected zone
of the ensemble of the buildings of St. Sophia Cathedral**

The Institute of Geological Sciences of the NAS of Ukraine made a calculation of the hydro-geological protection zone of the ensemble of the buildings of St. Sophia Cathedral on the basis of mathematical modeling of filtration problems with preliminary schematization of hydro-geological conditions of the territory.

Two zones of possible increase of IGT on the territory of the ensemble were developed based on the results of the modeling.

1. 145–155 m – the area is behind the walls of the ensemble, during a possible large long-term outflow in the zone IGT can rise by 1 m and more on the territory of the ensemble.
2. 200–230 m – it is zone, during outflow IGT can rise by 0,5 m and more.

***The limits of the territory of the hydro-geological protected zone
of the ensemble of the buildings of St. Sophia Cathedral***

- from the crossing of Prorizna Street and Patorzhinsky Street to the west along Prorizna Street, crossing Volodymyrska Street, before crossing with Yaroslaviv Val Street and further to the north-west along Yaroslaviv Val Street to Lviv Square;
- further, bypassing Lviv Square, along its western border to the crossing with Velyka Zhytomyrska Street;
- further to the north between the houses № 34 and № 38 on V. Zhytomyrska Street to the edge of the slope and further to the east along the Peizazhna Walkway, to its turn to the north;
- further to the east between the houses № 10 and № 12 on Volodymyrska Street to the crossing with Volodymyrska Street;
- further to the south along axial Volodymyrska Street to the crossing with Velyka Zhytomyrska Street;
- further to the east along V. Zhytomyrska Street to St. Michael Square;

- further to the south-east to the St. Michael Street to the prior of the buildings;
- further to the south-west along the rear of the squares along Volodymyr Driveway to A. Tarasova Street;
- further to the south-east along A. Tarasova Street to the crossing with St. Michael Lane;
- further to the north-east along St. Michael Street to the site between the houses № 7 and № 9;
- further to the south-east along the rear of the building, and to the south-west in the direction of St. Sophia Street between the houses № 10 and № 12;
- further to the south-west, crossing St. Sophia Street between the houses № 9 and № 11, bypassing the territory of Prominvestbank until crossing with T. Shevchenko Lane;
- further to the south-west between the houses № 11 and № 13 on T. Shevchenko Lane and further to the west to the crossing with Irinynska Street and Patorzhinsky Street;
- further to the south-west along Patorzhinsky Street until the crossing with Prorizna Street to closure;

**The regime of the city-building transformation
in the limits of the hydro-geological protected zone:**

1. The prohibition of building of new buildings and structures with underground parts (underground parking lots, large water-containing objects, structures with the use of pile foundations), which can contribute to changing the hydro-geological regime of the territory
2. Creation a net of control wells to monitor the hydro-geological situation (this is done by the city's services under control of the Conservation Area) in the buffer zone of the monument.
3. Regulating and constant monitoring of the operation and condition of water-bearing communications (this is done by the city's services under control of the Conservation Area).
4. The provision to the customer of building of the duty to connect the profile organizations to the pre-project and design works in the part of hydro-geological conditions.
5. Calculations of the influence of future building on the engineering and geological conditions (IGT, etc.) within the protected (buffer) zone should be coordinated with the Institute of Geological Sciences of the NAS of Ukraine.