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METHODOLOGY FOR THE ANALYSIS AND ASSESSMENT OF PANORAMIC VIEWS OF URBANISED LANDSCAPE

Dalia Dijokienė, Inesa Alistratovaitė-Kurtinaitienė
Department of Urban Design, Vilnius Gediminas Technical University, Lithuania

Abstract. The article briefly discusses the methodological assumptions of panoramic view and silhouette analysis and assessment, which the authors have summarised by analysing the studies of other researchers and international guidance documents, and supplemented with their own insights. It is concluded that the assessment of a specific valuable view should include a discussion of the viewing conditions of the area in question from specific viewpoints and a definition of the sector of view and the barriers to view. The view should be analysed and then it must be specified what specifically is valuable in that view – the expression of elements visible in the view, domination and obscuring of objects, the existing relationship/proportion of natural and anthropogenic elements, also possibilities and peculiarities of visual links between objects/areas. The paper presents the authors' proposed sequence of research steps and evaluation method, which includes: (1) selection of relevant viewpoints of the territory under study; (2) description and assessment of view sectors; (3) analysis of relevant panoramas; (4) identification of possible changes in the relationship between the natural environment and the built environment in the panoramic views, and presentation of recommendations. The methodology described in the paper is illustrated by the authors' feasibility study for the development of the northern part of Žvėrynas (Vilnius district) in 2021. The research method presented in the paper allows to make reasoned decisions on the integration/non-integration of new development in the existing valuable urbanised landscape.
Keywords: urbanised landscape, panoramic view, relationship between nature and built environment, Vilnius

Introduction

With rare exceptions, cities are established in captivating natural environments. The natural basis and anthropogenic activity formed urbanised landscape characteristic of cities. Until the early 19th century, neither Europeans nor Americans associated their identity with tangible heritage. The physical remnants of the past became important only when it was perceived that the history of each nation or each epoch was unique and does not repeat itself (Čepaitienė, 2005). Heritage protection, like every phenomenon, has its own beginning, development and change. The content of the cultural heritage object to be protected was changing and the contemporary concept includes architectural and urban design heritage, natural environment, monuments of art, history and archaeology.

Charters, conventions, declarations and recommendations adopted by the Council of Europe, UNESCO (United Nations Educational, Scientific and Cultural Organization) and ICOMOS (International Council on Monuments and Sites) in the 70s and 80s of the 20th century actually establish the notion of urban heritage, the concept of urban heritage emerges. Urban heritage is the unity of persons and place, therefore, their protection is not the protection of individual buildings but rather of the area as a whole, its historic identity. On 15 October 1987 in Washington, ICOMOS adopted the Charter for the Conservation of Historic Towns and Urban Areas (the Washington Charter). It says: "This charter concerns historic urban areas, large and small, including cities, towns and historic centres or quarters, together with their natural and man-made environments". The Charter presents urban qualities to be preserved that include the historic character of the town or urban area and all those material and spiritual elements that express this character, especially (Washington charter, 1987):

- the appearance of the city, which depends on its patterns as defined by lots and streets;
- relationships between urban spaces – buildings and green and open spaces;
- the formal appearance, interior and exterior, of buildings as defined by scale, size, style, construction, materials, colour and decoration;
- the relationship between the town or urban area and its surrounding setting, both natural and man-made;
- the various functions that the town or urban area has acquired over time.

It has been almost half a century of perceiving man-made and natural urbanised landscape as a value. This attitude is also reflected in spatial planning documents of most cities. When it comes to the master plans of Lithuanian cities in particular, they contain the following provision: natural elements (such as rivers, slopes, forests, etc.) are objects-symbols forming the identity of the city and must be preserved and integrated into the contemporary townscape being formed (Kauno..., 2023; Klaipėdos..., 2021; Vilniaus..., 2021a; Vilniaus..., 2021b; Vilniaus..., 2021c). Although it is said that urban structure can be developed preserving the existing relationship between nature and built environment, there is no readily worded methodology how this should actually be done, however.

The authors of this article were involved in preparation of urban development feasibility studies in 2019–2024. The areas under development are in the central parts of major Lithuanian cities (Vilnius, Kaunas and Klaipėda), where not only preservation of valuable heritage areas and their relationship with valuable natural elements but also the identification of development opportunities are particularly relevant. In order to provide an objective argumentation of the proposals, the aim of the studies was not only to make a proposal but also to propose a research methodology. Therefore, the authors, using their professional experience, international and Lithuanian sources of science and practice, have developed a methodology for analysing and evaluating panoramic images of the urban landscape. This article presents the assumptions for the methodology, and the application of the methodology is illustrated with a specific research paper – the 2021 feasibility study on the development of Žvėrynas district in Vilnius.

Methodological assumptions for analysing and assessing a panoramic view or silhouette

The relationship between nature and anthropogenic elements in urbanised landscape is perceived in the panoramic views and silhouettes of cities. In this article, a panoramic view or panorama means a multilayer view of an urbanised or natural landscape visible from a certain viewpoint. Meanwhile, a silhouette is a distant contour line of the view of built environment or natural elements against the sky. To assess a specific valuable view, one should discuss conditions of viewing the area in question from specific viewpoints and define the sector observed and describe the visual barriers. The view should be analysed and then it must be specified what specifically is valuable in that view – the expression of elements visible in the view, domination and obscuring of objects, the existing relationship/proportion of natural and anthropogenic elements, also possibilities and peculiarities of visual links between objects/areas. This section will briefly discuss the methodological assumptions for the analysis and assessment of panoramic view and/or silhouette, which the authors have synthesised from studies by other researchers, analysis of international guidance documents and added their own insights.

Sector observed and visual barriers

Conditions for observing an area are created by built environment and natural peculiarities of the area, formed by the terrain terraces or plains, valleys and slopes of water bodies. Panorama and silhouette viewpoints can allow for observing sectors of different breadth. Viewpoints that are higher (on top of hills or top floors of buildings) usually open wide panoramas and 360° view. Examples of such viewpoints can be the Gediminas Hill Castle and St. John's Bell Tower in Vilnius. Viewpoints located in lower terrain spots can allow for narrower sector observations. The width of a sector observed in panoramic views can be limited by various natural (terrain, greenery) and anthropogenic visual barriers (buildings, engineering structures).

Visual barriers can also occur in the panoramas themselves. They do not narrow a sector observed in panoramic views but create visual "shadows", in other words, cover existing or potential objects behind them. Visual "shadows" can have both positive and negative impacts on panoramas and silhouettes. Scientific literature specifies factors that may create preconditions for the emergence of undesirable visual "shadows" (Vyšniūnas, 2003). A couple of such factors can be pointed out:

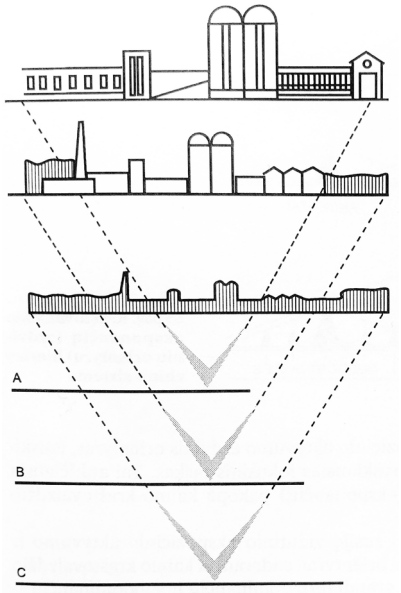
- a large land plot creates preconditions for the emergence of large monofunctional volumes, which can create visual "shadows";
- the long edge of a large land plot oriented perpendicular to the direction of viewing from very important viewpoints creates a precondition for the appearance of long horizontal volumes that have a negative effect on the silhouette.

Distinctness of elements in a visible view

The distance between the observer and the object observed is one of the main factors determining the visual distinctness of the latter. In assessment of the urbanised landscape, one can refer to distances determining the visual perception of landscape, as provided for in documents of the European Landscape Convention (Council of Europe, 2017). (Fig. 1 I):

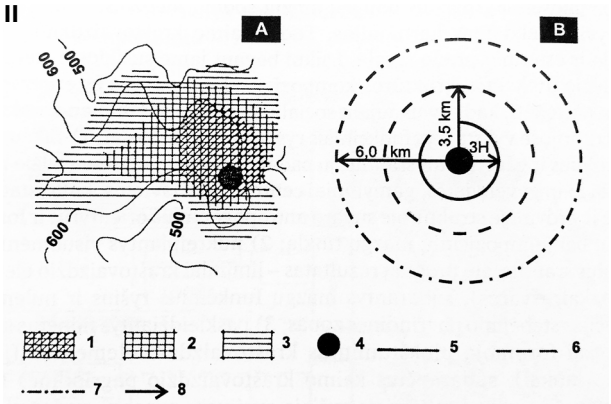
- 0–0.5 km – best perception of a view, its elements, their details;
- 0.5–1.2 km – somewhat good perception of a view, its elements, their details;
- 1.2–2.5 km – a view is perceived as a background, details

I



A – visible details (0–1.2 km);
B – visible silhouette and volumes (1.2–2.5 km);
C – the view is perceived as a background, merges with natural elements (2.5–5.0 km).

II



A – zone as it is; B – graph representing the zone; 1 – scale domination zone; 2 – view domination zone; 3 – zone of psychological effect; 4 – the dominant; 5 – scale domination limit; 6 – view domination limit; 7 – limit of psychological effect; 8 – the radius of the exposure zones.

III

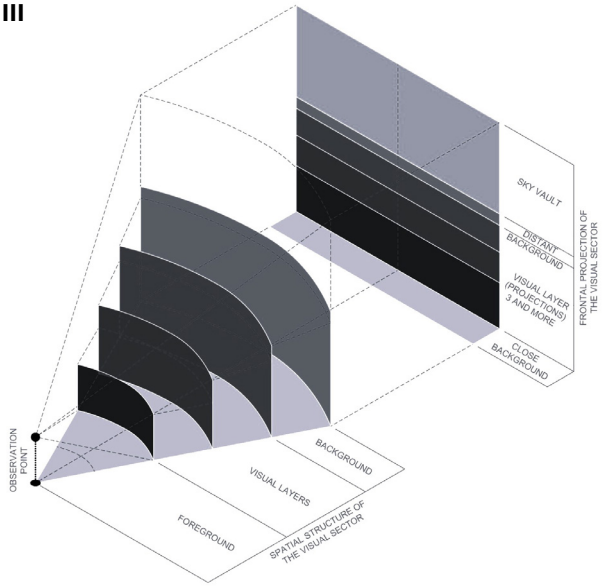


Fig. 1. Graphic illustration of assessment principles: **I** – the dependence of the distinctness of visible objects on the distance to the observer (Šešelgis, 1991); **II** – a visible object exposure zone, according to S. Crowe (Bučas, 2001); **III** – illustration of the principle of multilayer character of the panorama (created by the authors)

of its elements are no longer perceived;
- 2.5–5.0 km – a view is perceived as a background, silhouette.

Based on these distances, it is possible to predict the visual impact of existing and/or potential objects in the area in question in selected main observations.

Domination and obscuring of objects

In the natural and urbanised environment, some objects can be dominant in a view. The dominant can be both horizontal and vertical and is an object that gives an urban or natural structure a semantic character. Those objects that are at least twice as high as the background objects are called a vertical dominant. In the exposure zone, the limits of scale domination, view domination and psychological effect can be identified (Bučas, 2001). The scale domination zone is not more than 3 heights of an object. If objects are spaced at such a distance from each other, they will be perceived as separate/individual dominants. If the distance between dominant objects is less than 3 h (where "h" is the height of an object), the objects will be perceived in groups. The view domination zone is up to 3.5 km. Beyond this limit, objects lose visual clarity, merge with the background. The psychological effect zone is up to 6.0 km. An object beyond this limit, though visible, becomes an impersonal part of the background (Fig. 1 II).

Obscuring of objects in panoramas can be of various extent – from their partial covering to full hiding. Different parameters to evaluate obscuring apply in different countries. The possible coverability of an object ranges from 50% to 80%.

Relationship of nature and built environment in panoramas and silhouettes

A visible panoramic view can be very diverse – it may include only natural elements or only anthropogenic elements or both. Urban panoramas can simply be called urbanised landscape views. Natural elements (terrain, greenery) are often one of the elements that determine and shape the spatial structure of the city. The rich natural diversity of the city is the foundation of a unique and multi-dimensional townscape (Daunora et al., 2004). The natural background can be a finite element, i.e. as the panorama background or as one of the layers among other elements of the spatial structure of the city. In the silhouette, however, it can contrast with anthropogenic elements and at the same time create a harmonious relationship in terms of proportions of different elements.

The relationship that formed between natural elements and built environment and other anthropogenic elements, especially in city panoramas, is often unique. Prof. J. Bučas uses the term "visual anthropogenic saturation threshold", which he considers to be a dividing line between two types of culture-affected landscape: rural (partially affected by anthropogenic activity) and urban (anthropogenic). The visual anthropogenic saturation threshold is defined by covering of the area with view domination zones (3.5 km) (Bučas, 2001). In the urbanised environment, the zones of view domination of a number of anthropogenic elements overlap.

To be able to assess and predict the impact on the relationship of nature and built environment or the change in that relationship in previously captured and currently observed panoramas and silhouettes, it is necessary to define the current situation and specify the proportion or percentage of natural elements and built environment, what dominates in a view and what aim is sought.

Visual links between objects

The possibility of mutual observation of the objects creates visual links. One of the most valuable features is the direction of visual perception. Conditions for the emergence of such links appear due to different heights/altitudes, which depend on the distinctiveness of the terrain and the height of buildings. Visual links are also affected by the proportion of open and built-up spaces.

When integrating new objects falling into the zone of visual links between specific objects in the existing urban environment and in order to maintain the visual links they form, attention should be paid to the ratio of width and height of buildings being designed in the area. Otherwise, the perception of these links in the volumetric-spatial composition of the city can be adversely affected or even completely lost.

Multilayer character of a panoramic view

A view observed in panoramas is most often not homogeneous but rather multilayer. The conditions for the multilayer character are created by the remoteness from the view observed (the distance), the distinctiveness of the terrain and the diversity of the built environment structure, as well as by the boundaries of the urban fabric structure. Panoramas significant for the assessment of the area in question should be split into visual layers. To determine the number of layers and the role of dominant structural elements, the area in the plan is split according to the structural boundaries of the city or the distance of visibility. These boundaries can also be recognised in panoramas from fixed viewpoints. Using this method of plan and view splitting, when watching from each valuable viewpoint, the most important valuable elements of the territory plan and the visible view can be identified, and the newly appearing building-up should not compete with them or otherwise affect them (Figure 1 III).

Valuable features of the urbanised landscape of the Vilnius historic centre specified in documents

The assumptions discussed above allowed the authors to define a methodology for analysing and evaluating panoramic views of urbanised landscapes. The methodology discussed in the article is illustrated with the feasibility study for the development of the northern part of Žvėrynas district prepared in 2021. The feasibility study examines the preconditions for the protection and assessment of valuable views of Vilnius in the broad sense. And in fulfilment of the specific task, the study assesses the impact of potential increase in the height of the shopping centre Panorama (hereinafter referred to as SC Panorama, territory is marked in Fig. 2) on mutual visual links between individual protected areas, valuable panoramic views and silhouettes, the relationship of nature and built environment silhouette, the domination of cultural heritage objects and valuable natural elements in the view. Before presenting the study itself, a brief overview of the urban context of the site will be given.

The Old Town of Vilnius and its visual protection sub-zone

The Old Town of Vilnius was named as an urban heritage site already in the early 20th century, and in 1994 it was added to the list of UNESCO World Heritage Sites. For these reasons, regeneration projects were being prepared for the Old Town of Vilnius (there were even three of them (Dijokiene, 2009)), the statement of determining the valuable features of the Old Town of Vilnius has been prepared and is regularly amended (Kultūros..., 2024a); the master plan of Vilnius city contains a chapter and drawings intended for heritage protection (Vilniaus..., 2021b; Vilniaus,,,, 2021c); the Old Town of Vilnius not only has an area defined as the protected site but also an established visual protection sub-zone (Vilniaus..., 2010). Two more documents started to be drafted in 2023, meant

TABLE 1

Groups of valuable features of the Vilnius Old Town (created by the authors)

A. Exterior townscape of the Old Town	Panoramas; silhouettes; dominants/ensembles
B. Interior townscape of the Old Town	Perspectives; street routes; network of streets and squares; quarters formed by historic streets; boundaries of historic plots
C. Natural elements	Terrain; greenery; hydrographic network; cultural layer
D. Building structures, architectural expression, environmental elements	Building structures and spatial arrangement of the interior; exclusive interior decoration elements, fittings; surfaces of external walls; different decoration of facades, doors, windows, roofs; street and square pavements; elements of engineering structures and transport infrastructure
E. Intangible heritage of the Old Town	Traditions of crafts; lifestyle; culture and art

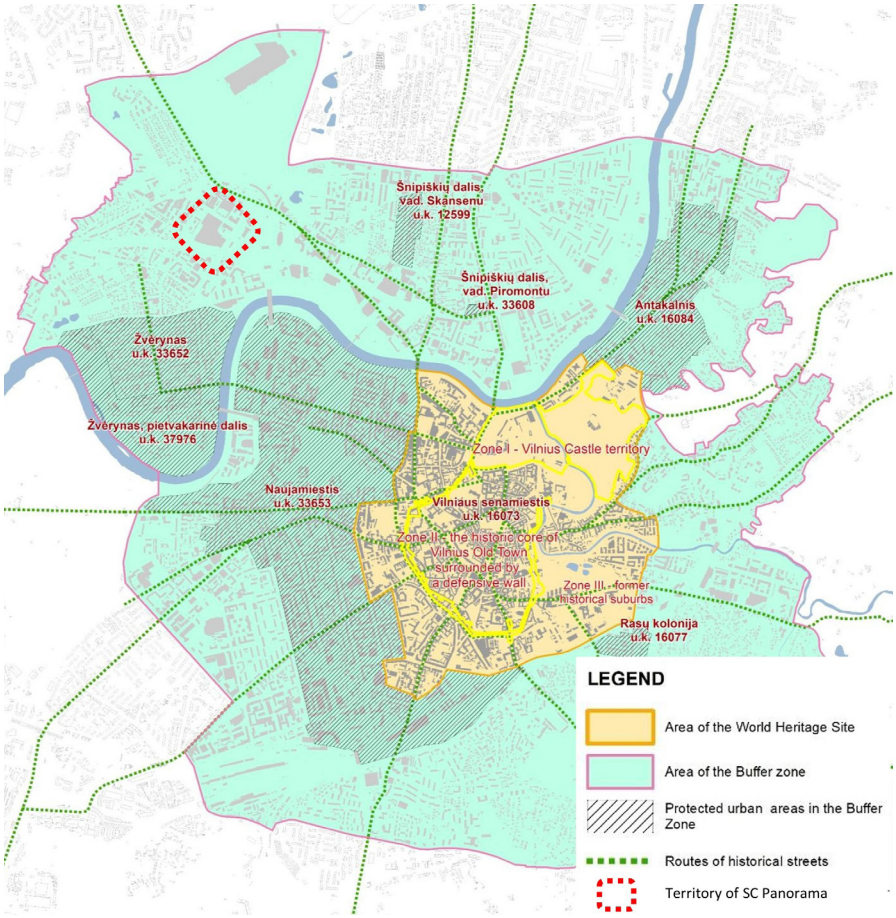


Fig. 2. Vilnius Old Town World Heritage map created using GIS (Draft of management plan, 2024; UNESCO..., 2024)

for preservation of valuable features of the Old Town: the plan for management of the Vilnius historic centre that is a UNESCO World Heritage Site and the Vilnius Old Town and its protection zone management (special) plan. The latter document is expected to be finalised in two years. When ready, this document will become the main spatial planning document for the Vilnius Old Town and its protection zone, which, among other things, will provide what construction, reconstruction, repair, greenery management work can be performed in specific parts of the said area and what the preconditions and heritage protection conditions for such works are (Pradedamas..., 2024; UNESCO..., 2024).

All these ample documents specify the established valuable features of the urbanised landscape of the Vilnius Old Town. The authors of the article present their grouping in Table 1.

The Vilnius district of Žvėrynas, whose territory fragment development feasibility study illustrates the application of the method, is within the Vilnius Old Town visual protection sub-zone (see Fig. 2). Therefore, in this case (as long as the said special plan is not yet ready), the document that regulates construction possibilities namely in the area of the visual protection sub-zone is most relevant.

The main legal act that applies to the visual protection sub-zone of the Vilnius historic centre (the Old Town) is the Temporary Regulation for Protection of the World Heritage Site – Cultural Monument U1P – Vilnius Historic Centre Protection Zone approved by Order No. Į-167 of the Director of the Department of Cultural Heritage dated 19 April 2005 (the "Regulation") (Pasaulinio..., 2005), which establishes the principles of application of the requirements set out in Article 19(2)(2) of the Law of the Republic of Lithuania on the Protection of Immovable Cultural Heritage (Lietuvos..., 2024a) and in Article 19(6) of the Law of the Republic of Lithuania on Protected Areas (Lietuvos..., 2024b) in terms of protecting valuable features of the Vilnius Old Town. The purpose of the World Heritage Site – Cultural Monument U1P – Vilnius Historic Centre Protection Zone is to protect the historically-formed Vilnius Old Town panoramas and

silhouettes, visible from the Vilnius Old Town streets and squares, main routes of entering the Old Town, as well as the Old Town viewpoints specified by the Vilnius master plan and other territory planning documents within the Old Town and in its surroundings.

The temporary protection document defines the construction activities possible in the protection zone:

- In the protection zone, construction of new structures or reconstruction of existing structures, increasing their height or volume, is prohibited, where they, viewing from the Old Town streets and squares, main entrance routes and viewpoints:

- would overshadow, by their height, volume or expression, a protected cultural heritage object or a group of them located in the Old Town or its protection zone, valuable natural elements – hills surrounding the Old Town;
- would interfere with observation of the Old Town or a protected cultural heritage object or a group of them located in its protection zone;
- would block the view of a hill in the Old Town or its protection zone up to at least of a half of its height;
- would alter the Old Town silhouette;
- would be visible from the Old Town streets and squares (this requirement does not apply in case of streets bounding the Old Town).

- A structure to be built is considered to overshadow a protected cultural heritage object or a group of them if, looking from a viewpoint:

- it is elevated above a visible protected cultural heritage object or a group of them;
- it is visible in close proximity to a protected cultural heritage object or a group of them and visually competes, in terms of its volume or height, with or is higher than the protected cultural heritage object or a group of them.

- A structure is deemed visible in close proximity to a protected cultural heritage object or a group of them if, looking from a viewpoint, the distance / viewing angle from the protected cultural heritage object or a group of them to the structure is equal to or less than the visible horizontal part / viewing angle of the protected cultural heritage object or a group of them.
- The visible part of a protected cultural heritage object is that part of it that is not blocked by other structures or terrain. A part of a protected cultural heritage object that is blocked by greenery is treated as visible part of this object.

Characteristic features of the urban structure of the northern part of Žvėrynas

Žvėrynas was a suburb of Vilnius until the 20th century and was officially added to the city only in 1901. The Žvėrynas district development is unique compared to other Vilnius suburbs as Žvėrynas was built up within a very short period of time. It was a recreational out-of-town area, a leisure place for the townspeople for a long time. Until the early 19th century, Žvėrynas, separated from the city by the river and covered with forest, was a private property of Radvila dukes, their hunting grounds.

Žvėrynas is different from other former suburbs by its unique natural situation and proximity to the city centre, the territory planned a century ago and the construction rules adopted at that time, a peculiar stylistic and typological diversity of buildings. It is still dominated by buildings built before 1940. Wooden architecture is particularly valuable in Žvėrynas. Its abundance and concentration, as well as stylistic and typological diversity are unique. Western Europe has almost lost the wooden architecture heritage already in the 19th century due to rapid urbanisation as a result of the industrial revolution. Meanwhile, in Žvėrynas we have a whole spectrum of examples of historicism architecture, which reflect the key trends and influences of architectural fashion in Europe in the early 20th century. In the environment rich with greenery, residential houses were built, the architecture of which has various combinations of Swiss resort, Russian summer house and Polish Zakopane style elements. The abundance of towers, mezzanines, volumetric skylights, balconies and verandas distinguishes Žvėrynas buildings from the built environment of other suburbs of Vilnius of the same period. Due to its undeniable cultural value, Žvėrynas district became a registered cultural heritage area: on 10 May 1994, Žvėrynas, along with other territories surrounding the Vilnius Old Town, was announced an urban heritage site of local significance; on 5 June 2008 the Vilnius City Municipality by its decision No. A121-9897 announced the Žvėrynas territory UV70 as protected by the municipality; in 2010 the valuable features of Žvėrynas were revised and officially recognised as such in statement No. KPD-RM-1582 on Vilnius city historic part under the name of Žvėrynas (unique code of the object in the Register of Cultural Property: 33652) adopted by the Immovable Cultural Heritage Assessment Council on 18 January 2011 (Kultūros..., 2024b).

After WWII, the urban structure of the northern part of Žvėrynas (called Saltoniškės) changed fundamentally: many industrial objects were built; T. Narbuto street, built in the second half of the 20th century, separated this part from the rest of Žvėrynas and the territory between T. Narbuto, Ukmergė and Šeškinė hills lost its functional and structural connections with its adjacent territories; the historically-formed structure of plots and street grid were lost beyond return. From 2000 to the present day, Saltoniškės, especially areas under conversion, face chaotic individual construction, not based on a common urban design concept. The northern part of Žvėrynas is not linked to the city centre either in terms of composition or functionality, failing to take the opportunity to use visual links with the Old Town and capture places for potential viewpoints (Kajackaitė, 2011).

The area in question is adjacent to the Šeškinė slopes geomorphological reserve and the Neris river ox-bow. These natural elements limit the outward expansion of the territory, leaving only the possibility of increasing the building intensity inside the territory. The main element of urban structure to be protected in the area in question is the remaining fragments of the Šeškinė slopes. They are important not only as part of the unique visual identity of Vilnius city, but also as a background in panoramas for urban cores that have emerged in the valley of Vilnius. But a chaotic urbanisation process is already taking place at the foot of the slopes bounding the area in question, therefore, whatever the building-up of the area, it finds itself in the background not only of green slopes but also in the background of built-up. The assessment of view domination zones of Vilnius urban cores is becoming more and more relevant in our days as the Neris river valley witnesses the ongoing formation of a number of such complexes that affect the integrity of both built environment and natural structures.

Application of the method for the assessment of valuable views of the north-western part of Vilnius

Upon reviewing methodological assumptions for the analysis and assessment of a panoramic view and upon assessing the documented valuable features of the urbanised landscape of the north-western part of Vilnius historic centre, the authors developed the assessment method and the sequence of steps and carried out the research: (1) viewpoints relevant

for the area in question were selected; (2) sectors observed were described and evaluated; (3) relevant panoramas were analysed; (4) the potential change in the relationship of nature and built environment in panoramic views was assessed and recommendations were made.

Viewpoint selection

The visual identity of the Vilnius Old Town townscape is perceived from the Old Town external viewpoints and its internal characteristic viewpoints. The master plan of the Vilnius city municipality territory and the statement of determining the valuable features of the Old Town of Vilnius underline the uniqueness and value of the city silhouette and panoramas, specifying points, the views opening from which should not undergo radical changes. Such a method is quite widely applied to cities with clear points of viewing the silhouette. When a city has a prominent terrain and the historic dominants are dispersed (as it is in the case of Vilnius), then the application of the so-called "viewpoints" method may be insufficient. Then the viewing conditions must be evaluated with greater precision, grouping them as points of panoramic overview and points of mass observation (located in low terrain, where people tend to gather – streets, bridges, squares, recreational zones and the like).

The ability to observe the territory in question in the north-western part of the Vilnius historic centre was assessed from 22 viewpoints. Points of observing the territory of SC Panorama in visible panoramas or silhouettes are divided into two categories:

- Distant viewpoints, relevant for the relationship of nature and built environment in panoramas and silhouettes and for the assessment of mutual visual links between individual protected areas. These viewpoints are in the top parts of the terrain and allow for observation towards the centre (with the Old Town and green slopes dominating) and for observation from the centre towards the slopes (with the green slopes and the centre built-up dominating). The distance between these points, located on the opposite sides in terms of cardinal directions, ranges between 2.5 and 3.0 km.
- Close viewpoints, relevant for assessing the relationship of nature and built environment in panoramas and silhouettes. These viewpoints are located on the lower terrace of the valley and are about 1.0–1.7 km away from SC Panorama.

Out of these 22 viewpoints, 7 most relevant panoramic viewpoints were later selected and sectors observed from them were evaluated. Upon assessment of sectors visible from 7 viewpoints, only 4 viewpoints were finally selected, which allowed for best observation of SC Panorama territory, with resulting views marked by visual links from/to the Old Town and from/to the hills. The viewpoints also allow for good exposure of the relationship between nature and built environment and assessment of the predicted impact on the domination of visible cultural heritage objects and valuable natural elements.

The following 4 viewpoints were selected for the analysis of the panoramic view:

- Three distant viewpoints: the Upper Castle (Gediminas) Hill, Žvėrynas Hill (by Paribio street), M.K. Čiurlionio St. 27 (Vilnius University parking lot);
- One close viewpoint: the White Bridge.

Description of the panoramic view sectors

In discussing the conditions for observing the views visible from 7 viewpoints, graphical schemes were made (using the Geographic Information System (GIS) software) and the following aspects were taken into consideration: the distance

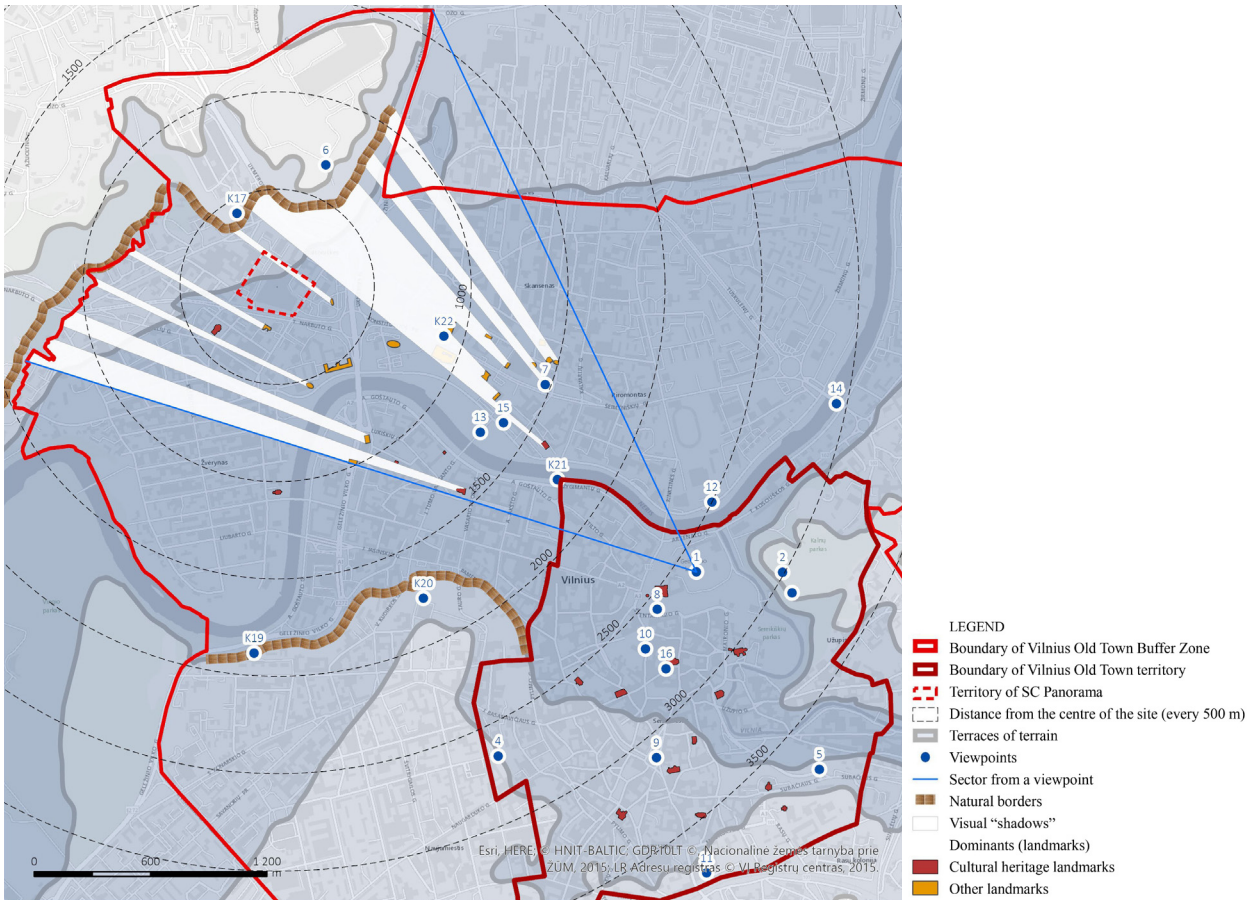


Fig. 3. Description of the panoramic view sector visible from the viewpoint on the Upper Castle (Gediminas) Hill (created by the authors using GIS)

of SC Panorama territory from the viewpoint; visual barriers that obstruct the view and objects creating visual "shadows"; visible valuable and other dominants. By way of example, in this article the authors present the graphical scheme of the panoramic view sector visible from the viewpoint on the Upper Castle (Gediminas) Hill (see Fig. 3) and the relevant description:

- the viewpoint is 2.5 km away from SC Panorama territory;
- visual barriers are created by Šeškinė, Karoliniškės hills and Pamėnkalnis plateau;
- visual "shadows" are cast by high-rise buildings located in the Architectural Hill (the Architectural Hill in Vilnius means the high-rise buildings concentration zone in the central part of the city, on the right bank of the Neris), churches located outside the Old Town;
- valuable dominants of the centre outside the Old Town territory are visible;
- the entire SC Panorama territory is well observable

Analysis of relevant panoramas

The selected 4 most characteristic panoramas were assessed following the above-described view analysis and assessment methodology. Graphic material was prepared and the following was discussed: distinctness of the foreground and background of the visible view and their elements, the scale of the natural element background that is dominant in the panorama, the relationship between the natural element and urbanised structure in the panoramic fragment of the territory in question, mutual visual links and the impact of the object in question on them. The analysis of the panoramas revealed that all the 4 points allow for good observation of valuable territories and the distance often turns their valuable elements into the background surrounded with green body in the most distant part of the visible panorama. The existing volume of SC Panorama does not have any effect on these elements whatsoever. The viewpoint on the Žvėrynas Hill is a potential Vilnius Old Town observation point, exposing a wide view of the entire Old Town with its dominants. The most distinctive dominant valuable cultural heritage objects are, therefore, visible from the Žvėrynas Hill (by Paribio street), whereas the panoramic view from the Gediminas Hill and M.K. Čiurlionio St. 27 exposes somewhat less of them, and the view visible from the White Bridge is influenced by the architectural objects that emerged in the 20th and 21st centuries. Assessing the panoramic fragment view only by SC Panorama territory in question in terms of the relationship between the natural element and urbanised structure, the urbanised structure dominates in 3 views and it is only from the Gediminas Hill that the domination of the natural element is more significant. All these viewpoints have a direct visual link, the background of which is dominated by green body, whereas the territory in question as such has no impact on these links.

The schemes of the analysis of the panorama from the Upper Castle (Gediminas) Hill are again provided as an example (see Fig. 4) and the following peculiarities of this view are pointed out:

- several valuable dominants are visible (Vilnius Church of Apostles St. Philip and St. Jacob and Church of St. Archangel Raphael) as elements and their details (as the distance to them is 1.0–1.2 km), whereas the northern part of Žvėrynas, including SC Panorama and the buildings in the approaches to it, turn into the background that merges with the natural massif of Šeškinė hills behind it (as the distance to them is 2.5–3.5 km);
- cultural heritage objects and valuable natural elements in the panoramic view are visible and dominant. The entire territory of SC Panorama becomes a part of the continuous uninterrupted natural line of the massif of Šeškinė and Karoliniškės hills;
- the relationship between natural elements and built environment is 59% and 41% and the proportion is 1.4 to 1, the natural elements being dominant;
- there is a direct visual link between the Paribio street hill and the Gediminas Hill; SC Panorama territory is in the background of the Paribio street hill and in the background of the northern part of Žvėrynas and does not obstruct the existing mutual visual link between the two hills.

Predicted change in the relationship between nature and built environment

The evaluation of the conditions for observation from the selected viewpoints and the analysis of the existing views of the relevant panoramas led to the formulation of criteria that may help to assess the impact on the identified groups of valuable features of Vilnius views to be protected: I) mutual visual links between individual protected territories, II) the relationship between nature and built environment in panoramas and silhouettes, III) domination of cultural heritage objects and valuable natural elements in the view.

The research paper produces the following assessment criteria, which should ensure the conditions for preservation of the specified groups of valuable features:

A. Presence/absence and preservation of visual links (group I of valuable features).

B. Preservation of characteristic features / peculiarities of the view:

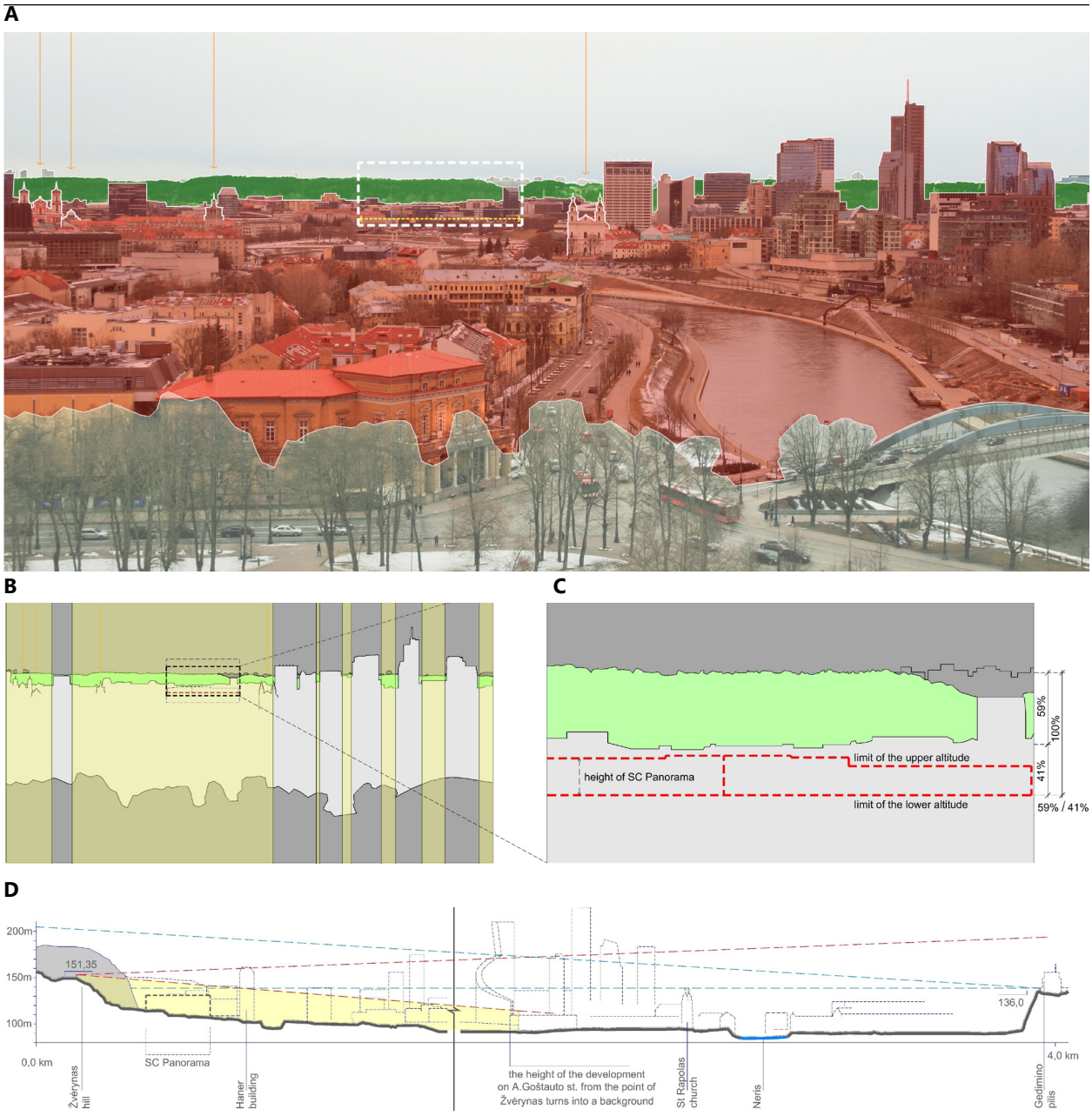
B.1. Impact on the relationship between nature and built environment (group II of valuable features);

B.2. Impact on the domination of heritage objects and valuable natural elements (group III of valuable features).

To specify the scope of the impact, one can refer to the 2011 Guidance on Heritage Impact Assessment for Cultural World Heritage Properties of the International Council on Monuments and Sites (ICOMOS) (hereinafter referred to as the Guidance). According to the Guidance, scale or severity of impacts or changes can be judged taking into account their direct and indirect effects and whether they are temporary or permanent, reversible or irreversible. The cumulative effect of separate impacts should also be considered. The scale or severity of impact can be ranked, without regard to the affected element of the object and the value of the element, as: (1) no change; (2) negligible change; (3) minor change; (4) moderate change; (5) major change (ICOMOS, 2011).

According to the Guidance, the general impact on an attribute of an object is determined by comparing the scale of the impact and what element of the object is affected, as well as the purpose and importance of that element. This can be summarized for each attribute described using the following descriptors. As change or impacts may be adverse or beneficial, there is a nine-point scale with "neutral" as its centre point: (1) major beneficial; (2) moderate beneficial; (3) minor beneficial; (4) negligible beneficial; (5) neutral; (6) negligible adverse; (7) minor adverse; (8) moderate adverse; (9) major adverse (ICOMOS, 2011).

In the assessment stage, the impact of the intended increase of SC Panorama building maximum height (35 m) and of the arrangement of additional parts of the building on the listed valuable features was assessed. If the maximum height had no adverse impact, nor would any lower height. If the maximum height had an adverse impact, two more alternatives of lower height were further assessed. The predicted change in the proportion of nature and built environment is



Marking:
In figures A, B, C:
- The yellow arrow by a dominant is for cultural heritage objects.
- The yellow dotted line marks A. Goštauto street building cornices, which are deemed to be the limit of visible valuable territory.
- The pink background is for visible valuable territory.
- The greenish background is for green body and the last visible background in the captured panorama.
- The white dashed line is for SC Panorama fragment, near which the valuable territory is visible.
- The red dashed line for SC Panorama roof contour.

In figure D:
- The red and blue dashed lines mark visual links.
- The yellow background marks the zone, in the territory of which the height of the built environment may increase.

Fig. 4. Panorama from the Upper Castle (Gediminas) Hill: A – distinctness of the foreground and (last) background of the visible view and their elements; B – the scale of the natural element background that is dominant in the panorama; C – the relationship between the natural element and urbanised structure in the fragment of the territory in question; D – mutual visual links between the Gediminas Hill and the Žvėrynas Hill (by Paribio street) and the impact of the object in question on them (source: created by the authors)

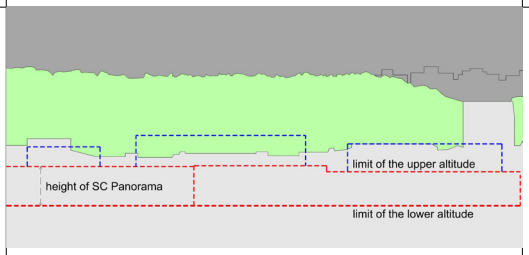
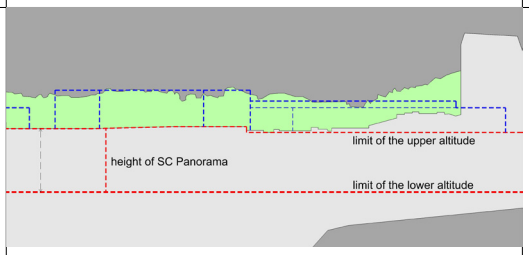
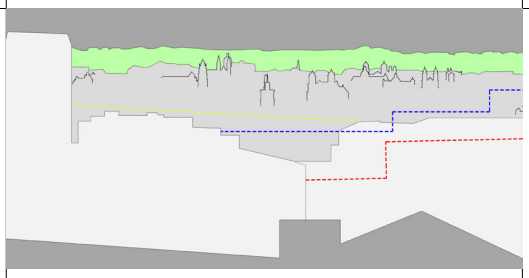
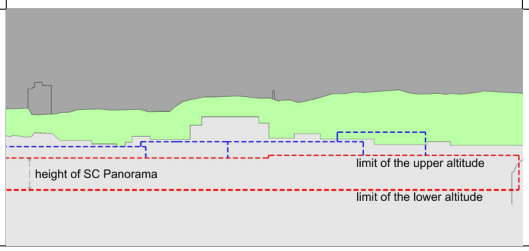
illustrated in Table 2.

The assessment revealed that all the 4 viewpoints had visual links from/to the Old Town and from/to the hills (assessment criterion A). The increase in the height of SC Panorama buildings has no adverse impact on the preservation of these links looking from distant viewpoints. As distant viewpoints are significant for the city as a whole and expose views to protected cultural heritage sites and objects, their assessment is prioritised. The increase in the height of SC Panorama buildings has an adverse impact on the preservation of visual links looking from close viewpoints. Although viewpoints of this category are less significant, they are located in public places where people tend to gather and they provide exposure for local observation.

The increase in the height of SC Panorama buildings changes the proportion between nature and built environment visible in panoramas (assessment criterion B1), which is clearly illustrated by Table 2. However, in the views from distant viewpoints this proportion changes just slightly and the impact on it could be called insignificant as it ranges from

TABLE 2

Expected change in the proportion of nature and built environment (created by the authors)

Viewpoint	Panoramic view fragment*	Existing and predicted proportion of nature and built environment
Upper Castle (Gediminas) Hill		Proportion of nature and built environment: ▪ existing: 59% and 41% (1.4:1) ▪ predicted: 46% and 54% (1:1.2)
From the White Bridge		Proportion of nature and built environment: ▪ existing: 31% and 69% (1:2.2); ▪ the predicted 35 m building-up will block natural elements and will exceed the present background by 14%; the predicted 28 m building-up will result in the proportion of 9% and 91% (1:10)
Žvėrynas Hill (by Paribio street)		Proportion of nature and built environment: ▪ existing: 29% and 71% (1:2.5); ▪ predicted: 29% and 71% (1:2.5)
M. K. Čiurlionio St. 27 (Vilnius University parking lot)		Proportion of nature and built environment: ▪ existing: 43% and 57% (1:1.3); ▪ predicted: 41% and 59% (1:1.4)

*Note: the blue dashed line – intended increase of SC Panorama building height (35 m); the red dashed line – existing height.

2 to 13%. The panorama from a close viewpoint on the White Bridge is dominated by the built environment already now and the proportion of nature and built environment is 29% and 71%. The predicted 35 m building-up will block natural elements and will exceed the present background by 14%, the predicted 28 m building-up will result in the proportion of 9% and 91%.

In terms of the impact on the domination of heritage objects and valuable natural elements (assessment criterion B2), it should be noted that there is no adverse impact on the domination of cultural heritage objects. The impact on the domination of valuable natural elements ranges from no impact to significant adverse impact. But here again it should be noted that there is no adverse impact or it is insignificant on views from prioritised distant viewpoints significant for the city as a whole – the adverse impact is felt on views visible from close viewpoints.

Discussions and Conclusions

As said at the beginning of the article, with rare exceptions, cities are established in captivating natural environments and it was the natural basis and anthropogenic activity that formed the urbanised landscape characteristic of the cities. There is no more doubt in the 21st century that the urbanised landscape of cities is our identity and considered valuable. The relationship between nature and anthropogenic elements in urbanised landscape is probably most clearly perceived in the panoramic views and silhouettes of cities. For the existing views not to change in essence, it is not only necessary to announce them as valuable and protected, but also to develop methodology which would allow for modelling possible changes in panoramic views. This article illustrates the assumptions for such methodology and its practical application.

Upon using Vilnius as an example and specifying the key features of valuable views in observation of the Vilnius Old Town and the legal basis for protection of these views, upon overview of methodologies of analysis and assessment of a view, it was possible to formulate key assertions that came up as the result of the study and could be used as methodological guidelines for similar research in other cities:

- The valuable panoramas and silhouettes of the historic centre of the city of Vilnius are created by the natural and anthropogenic environment. The elements of the natural structure, forming boundaries of the city centre, are closely interrelated, forming a single visual pool of the Neris valley, whereas the expressive terrain creates favourable conditions for wide observation of the Old Town and its views are projected not as silhouettes against the sky but as panoramas in the background of

green hills. Any changes in the spatial structure will affect the entire visual space of the valley. Newly emerging structures should not be destructive in this complex natural-urban system and should not radically change the visual volumetric and spatial structure of the Vilnius centre urbanscape.

- The valuable viewpoints for the observation of the Vilnius Old Town (panoramas, silhouettes) are specified in the statement of determining the valuable features of the Old Town of Vilnius and their protection is legally stipulated in territory planning documents and protection regulations applicable both to the Old Town as such and to its closest environment – its visual protection sub-zone. Provisions of documents relevant for the implementation of the heritage protection are aimed at legal stipulation of the protection of cultural landscape as the main manifestation of the urban identity of Vilnius city. The following groups of valuable features are identified: mutual visual links between individual protected territories, valuable panoramic views and silhouettes, the relationship between nature and built environment silhouette, domination of cultural heritage objects and valuable natural elements in the view.
- To assess the predicted change in a valuable view, the view should, first of all, be analysed and it should be stated what specifically is valuable in that view. One, therefore, should discuss conditions of viewing the area in question from specific viewpoints and define the sector observed and describe the visual barriers. The distinctness of elements visible in the view, domination and obscuring of objects, the existing relationship/proportion between natural and anthropogenic elements, also possibilities and peculiarities of visual links between objects/areas should also be discussed.
- Upon evaluation of conditions for observation from the selected viewpoints and the analysis of the existing views of the relevant panoramas, criteria must be developed to assist in the assessment of the impact of a planned new building-up on the valuable features of panoramic views to be protected.
- Finally, reasoned decisions can be made on the integration/non-integration of a new building-up in the already established valuable urbanised landscape.

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Authors
Dalia Dijokienė. Architect and urban designer. Doctor of Science (Humanities, Art Criticism, Architecture), Professor, Dean of Faculty of Architecture, Vilnius Gediminas Technical University, Trakų str. 1, LT-01132 Vilnius, Lithuania.
E-mail: dalia.dijokiene@vilniustech.lt

Inesa Alistratovaitė-Kurtinaitienė. Architect and urban designer. Doctor of Science (Humanities, Art Criticism, Architecture), Assoc. Professor, Head of the Department of Urban Design, Faculty of Architecture, Vilnius Gediminas Technical University, Trakų str. 1, LT-01132 Vilnius, Lithuania.
E-mail: inesa.alistratovaite-kurtinaitiene@vilniustech.lt

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