

Original Article

© 2025 Budownictwo i Architektura

This is an open-access article distributed under the terms of the CC-BY 4.0

Urban planning protection of the cultural heritage objects in Kozelshchyna town, Poltava region

Halyna Osychenko¹, Oleksandr Khliupin²

¹ Department of Urban Construction and Architecture; Yu.M. Potebny Engineering Educational and Scientific Institute; Zaporizhzhia National University;
University Street 66, Zaporizhzhia, 69600, Ukraine;

osychenko-galyna@ukr.net; ORCID: 0000-0001-5595-220X

² Department of Architecture and Spatial Planning; Faculty of Ground Structures and Airfields;
National Aviation University; Lyubomyra Gudara Street 1, Kyiv, 03058, Ukraine

Oleksandr.Khliupin@npp.nau.edu.ua; ORCID: 0000-0003-3599-2700

Abstract: Ensuring the preservation of historical and cultural heritage has become a significant challenge for small towns in the era of globalisation and urbanisation. Protection zones (buffer zones) of cultural heritage objects (CHOs) are the primary means of urban planning protection, helping to safeguard the authenticity and individuality of small towns while ensuring their sustainable development. This article presents the results of developing measures for the urban planning protection of the town of Kozelshchyna in the Poltava region, Ukraine. The town's historical development was studied, cultural heritage objects were identified, and a comprehensive assessment of the Kozelshchyna territories was conducted. Using an integral methodology, the authors substantiated and defined the boundaries and usage regulations for the historical area and monument protection zones of Kozelshchyna. The proposed usage regulations and requirements for new construction aim to balance new developments with the preservation of historical heritage, integrating both aspects into the town's future urban development. The study serves as a foundation for the development of the town's master plan and the concept for the monastery complex's future development.

Keywords: cultural heritage objects (CHOs), small towns, urban planning protection, historical area, cultural heritage protection areas (buffer zones)

1. Introduction

In the context of rapid urbanisation and globalisation, ensuring the protection of cultural heritage and the sustainable development of historic cities remains a significant challenge for many countries. Unfortunately, small towns have long been overlooked by researchers and governments [1]. Today, the socio-cultural importance of small towns as bearers of national

culture for states, society, and local communities is increasingly recognised. The issue of preserving cultural heritage, relevant to historic settlements worldwide, is particularly pressing for small towns in Ukraine. These towns have a complex history of development, periods of destruction of their monuments, transformation of their historical environment, and currently suffer from military operations. In the face of full-scale military aggression and hybrid warfare, historical and cultural heritage has become a crucial factor in ensuring national security.

The following key principles from global experience in the preservation of historical and cultural heritage form the foundation of this study:

- the concept of the Historic Urban Landscape (HUL) [2], which considers a cultural heritage object as an inseparable part of its urban, natural, socio-cultural, and geographical context (Vienna Memorandum, 2005 [3]; Recommendation on the Historic Urban Landscape, 2011 [4]);
- the concept of integrated protection, which extends cultural heritage protection from individual buildings to their surrounding urban and natural environment [2,5,6];
- the concept of sustainable development in monument protection, which integrates cultural heritage preservation with social and economic development objectives while ensuring modern living standards in cities [7].

In line with these concepts, the primary tool for urban planning protection of cultural heritage in cities is the establishment of buffer zones as protection areas around monuments (Xi'an Declaration, 2005 [8]; Document 25 – World Heritage and Buffer Zones, 2008 [9]). The implementation of buffer zones varies across countries, depending on national and cultural contexts as well as local planning laws, resulting in diverse terminology, methods, and principles for their designation. For example, in Ukraine and Latvia, architectural monuments are designated as protection zones to safeguard the traditional historical environment of cities [10-13]. In France, a 2016 law extended the existing monument protection zones (ZPPAUP) to include the broader concept of heritage sites (SPR) [14]. In China, a three-tiered protection system is applied to historical sites, consisting of a core protection zone, a construction control zone, and an environmental approval zone [15,16]. Despite the diversity of interpretations and approaches to protection areas, a consensus has emerged in conservation theory, stating that:

1. protection areas are restrictive in nature, similar to land easements, and regulate land use, design, and new construction within their boundaries;
2. protection areas serve as a legal mechanism for safeguarding heritage values, with their restrictive nature ensured at the national or local level.

Thus, defining the protection areas of cultural heritage objects is a crucial theoretical and practical task that ensures the integrity and preservation of the visual, functional, and structural identity of small towns.

The aim of this study is to determine the boundaries of the historical area and the protection zones of Kozelshchyna's cultural heritage objects to ensure the urban planning protection of monuments. This objective defines the study's key tasks:

- retrospective analysis of the development of Kozelshchyna's urban environment;
- analysis of the landscape and visual structure, as well as the architectural and spatial composition of the town;
- comprehensive assessment of Kozelshchyna's area and determination of the boundaries of the historical area;
- definition of the boundaries and usage regulations of the town's cultural heritage protection zones.

The subject of the study is the town of Kozelshchyna in the Poltava region (Ukraine), known for the miraculous icon of the Mother of God of Kozelshchyna, kept in the Kozelshchyna Monastery of the Nativity of the Virgin Mary (Fig. 1). Since 1937, it has been the district centre of the Poltava region. In 2017, the town's population was 3.7 thousand. Kozelshchyna is located on a slope in the valley of the Ruda River, along the Poltava-Kremenchuk railway line, 68 km from the regional centre and 2 km from the E584 motorway (Poltava-Kremenchuk-Slobozia). The town is included in the List of Historical Settlements of Ukraine due to its valuable cultural heritage [17].



Fig. 1. Location of the town of Kozelshchyna on the map of Ukraine, Kozelshchyna district, and the placement of the Nativity of the Virgin Mary Kozelshchyna Monastery within the town's structure. *Source:* own study

According to Ukrainian conservation legislation, before developing a master plan for historical settlements and deciding on the adaptation of cultural heritage objects, a pre-project stage is conducted. This stage includes the identification and research of cultural heritage objects, as well as the development of scientific and project documentation to determine the boundaries of the historical area and the protection zones of CHOs [10]. This article represents the second part of a study on the delimitation of the historical area and the protection zones of cultural heritage objects in Kozelshchyna. The results of the study on the monastery complex were presented in the authors' previous article [18].

2. Theoretical basis of historical heritage research

The theoretical foundation of this work is based on the following areas of research:

- a) theoretical aspects of preserving the historical heritage of small towns – including publications by N. Leshchenko [19,20], D. Kuśnierz-Krupa [21], L. Klusáková [1], S. Zbierski-Salameh, D. Pazder and B. Kaźmierczak [22], W. Eckert [23], W. Kononowicz and I. Pisera [24] and others;
- b) methods of researching historical heritage and inventorying CHOs – including advancements in comprehensive research by architects and archaeologists in the work of J. Kleszcz and P. Kmiecik [25]; the application of field research with

photographic documentation of visual connections between cultural heritage objects and the landscape in the work of K. Drobek and K. Boguszevska [26]; and the use of modern information technologies in monument protection works by O. Kysil, R. Kosarevska, and O. Levchenko [27], as well as M. Ciski, K. Rzasa, and M. Ogryzek [28], among others [29-31].

- c) development and demarcation of protection zones and buffer zones of CHOs – significant works in this area include research by M.C. Daneshmandian, M. Behzadfar, and S. Jalilisadrabad [32], which employs visual analytical methods to determine the height threshold of new buildings in buffer zones; studies by B. Chetverikov, V. Hlotov, and K. Bakula [33], which explore the use of remote sensing methods (satellite images and aerial photographs) to precisely delineate the boundaries of CHO protection areas; research by R. Lv, Y. Liu, L. Zhang et al. [16], which presents a multi-criteria decision-making (MCDM) method for integrated historical area evaluation; and the work of E. Bykova and I. Dyachkova [34], which proposes a methodology for mathematically justifying the boundaries of protection areas.

The methodological basis of the study includes the methodology for researching historical cities developed by Ukrainian scholars E. Vodzynskyi, Y. Nelhovskyi, and others [35]; the principles of urban planning protection of cultural heritage as outlined by L. Prybeha [36]; and the principles of architectural regulation for new development in the historical urban environment formulated by H. Osychenko [37]. A common approach to urban planning protection across many countries is the preservation of visual perspectives of monuments, the visual relationships between historical objects, and their connections with the surrounding natural and urban landscape [32,38]. In this context, the primary unit of protection is the visual view (scenery) of the monument as a fundamental element of its perception.

Ukrainian protection theory and legislation define multiple levels of urban planning protection for cultural heritage objects, encompassing five types of protection areas: the monument territory, the protection zone (close protection zone), the development regulation zone, the archaeological cultural layer protection zone, and the protected landscape zone. Within these zones, specific land-use regulations apply (Tab. 1).

Table 1. Types of protection areas for cultural heritage objects in Ukraine. *Source:* own study based on [10,35,39,40]

Name of the protection area and its definition	Brief description of the use defined by the regulations
<p>The Territory of a Monument</p> <p>This refers to the land on which monuments are located, historically, topographically, and functionally connected to them, ensuring their preservation and functioning as cultural heritage objects. These territories are established to maintain the authenticity and integrity of historical objects.</p>	<p>The mode of use includes:</p> <ul style="list-style-type: none"> the preservation of cultural heritage monuments and objects, as well as the protection of the traditional character of the environment (landscape, historically formed layout, parceling, buildings, historical small architectural forms, and elements of historical enhancement); conservation, restoration, rehabilitation, adaptation, and museization of monuments, along with the regeneration of their surroundings; the construction of transport infrastructure and engineering structures that interfere with the monument's hydrogeological regime or do not align with its artistic character is prohibited.

Name of the protection area and its definition	Brief description of the use defined by the regulations
<p>The Protection Zone of a Landmark This is the area adjacent to a landmark, designated to preserve its immediate surroundings and close-range views (close protection zone). The aim is to maintain optimal conditions for the visual perception of the object.</p>	<p>The mode of use includes:</p> <ul style="list-style-type: none"> the preservation of the historical environment of monuments and the possibility of recreating lost valuable elements; ensuring a favorable hydrogeological regime, fire safety, and protection of monuments from pollution and dynamic impacts.
<p>The Complex Protection Zone of Monuments of Architecture and Town Planning This is a shared protection zone established for multiple monuments within a territory where they are highly concentrated. These zones are created in areas where individual protection zones border or partially overlap.</p>	<p>The use within this zone is determined by the original function of the monument or monuments, its architectural design, its modern use, as well as the specific characteristics of the monument's surroundings and its interaction with them. A complex protection zone is established to ensure the comprehensive preservation of the traditional character of the environment.</p>
<p>The Development Regulation Zone This area lies outside the protection zone and is either built-up or designated for future development. It is intended to preserve the role of monuments within the settlement's composition and landscape. These zones also help maintain proportional relationships in planning and development.</p>	<p>The mode of use defines the permissible degree of transformation within the zone (minimal, limited, or active). All historical objects and layouts must be preserved, all valuable views must be maintained, and lost visual connections should be restored. New construction is permitted; however, the functional use of areas and the parameters of new buildings are strictly regulated (architectural regulation).</p>
<p>The Protection Zone of the Archaeological Cultural Layer This zone is located outside an archaeological site and its protection zone, where individual archaeological finds have been discovered, or where the existence of an archaeological cultural layer is suspected. Verification of such findings requires excavation or archaeological research.</p>	<p>A specific protection zone is designated to ensure the conservation and study of archaeological sites. The mode of use is determined by the characteristics of the archaeological site, but archaeological supervision of any earthworks within the zone is mandatory. The boundaries of these zones are independent of those of other protected areas, although they may overlap with other zones.</p>
<p>The Protected Landscape Zone This area consists of a natural (or predominantly natural) landscape located outside the boundaries of a monument's protected area, with which the monument forms a single compositional and landscape entity. It serves a conservation role, preserving the historically characteristic natural environment of monuments and playing an essential part in the visual identity of a settlement or its landscape. Additionally, it ensures the integrity of the settlement's perception and maintains the unity between urban development and its historically established natural surroundings.</p>	<p>The mode of use provides for:</p> <ul style="list-style-type: none"> the preservation and restoration of valuable natural and landscape qualities associated with monuments, as well as the elimination or visual neutralization of structures, buildings, and vegetation that distort the landscape; the protection of landforms, water bodies, and vegetation, as well as the restoration of their historical appearance and the preservation of visual connections between monuments and their historically significant natural or predominantly natural environment; the protection of coastal and meadow areas from landslides and erosion, the reinforcement of slopes and ravines, afforestation, and the implementation of other necessary environmental protection measures.

In addition, a historical city is defined as a historical area, within which all transformations of the urban environment require approval from the Ministry of Culture of Ukraine [10, Article 32]. The historical area is defined as "a part of a settlement where cultural heritage objects have been preserved along with the associated layout and building forms originating from earlier periods of development and characteristic of specific cultures or historical eras" [10, Article 2]. The mode of use and development of the historical area is determined by the protection regimes of the cultural heritage objects located within its boundaries.

Given the diversity of cultural heritage objects in cities, as well as the uniqueness of their spatial development and architectural transformations, defining and justifying the boundaries of CHO protection zones is a crucial research task. It is essential to determine these boundaries objectively and with well-founded reasoning, ensuring both the urban protection of monuments and the preservation of their full cultural value, while also allowing for the potential future development of the surrounding environment.

3. Materials and methods

The research materials include archival, bibliographical, literary, and iconographic sources on the history of the monastery and the town of Kozelshchyna [41-45]; photographic records and materials from field research conducted by architects, surveyors, and archaeologists in 2018-2019 and 2022; assessment materials on the cultural heritage of the monastery complex; a virtual 3D model of the original appearance of the monastery complex; and a digital vector map of the town, both of which were created by the authors in a previous stage of the research [18].

The proposed integrated methodology for determining the boundaries of the historical area and the protected zones of cultural heritage objects consists of four stages.

The first stage involves the identification of the town's cultural heritage objects. At this stage, the authors conducted bibliographical, archival, and iconographic research on the town and the monastery complex; field research of the town, including the discovery, identification, measurement, and recording of historical objects; an assessment of their preservation state; and an evaluation of the identified buildings of the monastery complex based on their historical and architectural value and degree of preservation. The following methods were applied: data separation method for extracting relevant information from bibliographical and archival sources; historical-genetic method, historical and comparative analysis; field geodetic measurements and architectural and archaeological field research; documentation of objects through photography, phototheodolite surveys, and architectural measurements; GIS technologies for creating a vector map of the town; HBIM (Historic Building Information Modeling) methods for developing information models of the preserved and lost buildings of the monastery complex (development level – LoD 200); public discussions on the further use of the identified CHOs. The original appearance of the monastery complex was recreated in Archicad, and its historical boundaries were delineated on a vector map of the town. The results of these studies were presented in the authors' previous publication [18].

At this stage, an information database was established to facilitate the development of accounting documentation for cultural heritage objects and the delimitation of protected areas.

The second stage focuses on the analysis of the landscape and visual structure of the town. The following methods were applied at this stage: field research, visual analysis, and comparative analysis; photographic documentation and graph-analytical methods; expert

assessment of visual perspectives of CHOs; compositional analysis. This stage includes several sequential yet interrelated and complementary procedures (Fig. 2).

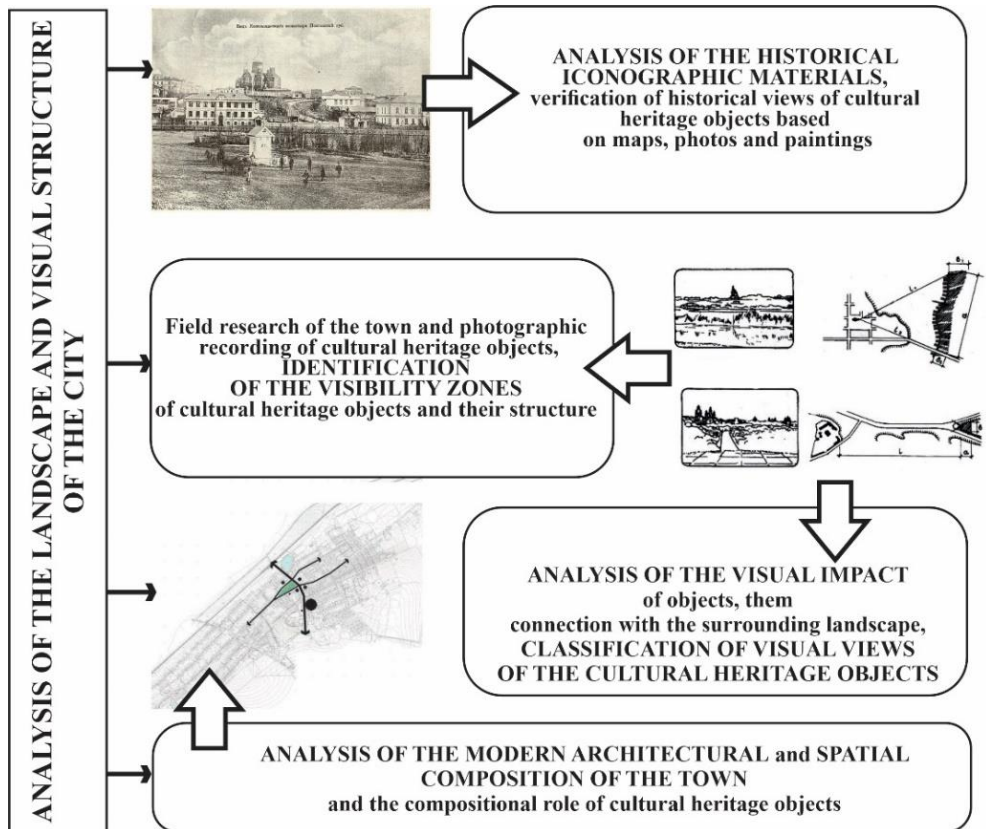


Fig. 2. Methodology for analysing the landscape and visual structure of the town. *Source:* own study

The field research includes a visual analysis of the area, identification, mapping, and classification of locations from which heritage objects can be perceived. It also involves verifying the preservation of visual views of historical objects recorded in historical cartography and descriptions, as well as photographic documentation and evaluation of these views. The authors conducted an analysis of the visibility of objects and their relationship with the surrounding environment, taking into account the distance from the observation point, categorised into close (up to 200 m), medium (200-500 m), and distant (more than 500 m) views.

The characteristics of the contemporary town composition were identified, and lost historical elements of the composition were recorded. A comparative analysis of the collected data was performed to determine the modern compositional and visual impact of cultural heritage objects within the town's structure.

The results of this stage include:

- identification of visibility zones and viewpoints of CHOs (areas from which cultural heritage objects can be observed);

- identification of view formation zones (areas of the town perceived in views). These two findings are fundamental for the next stage of the study, as they define the boundaries of protection areas for cultural heritage objects;
- inventory and classification of visual views based on their degree of value;
- identification of existing disharmonious construction, referring to buildings that negatively impact the visual perception of monuments by obstructing views or being discordant with historical buildings in terms of parameters and characteristics.

The evaluation of the views of CHOs was conducted by a group of experts, including architects, historians, art historians, local historians, and residents of the town. The evaluation was based on: historical and cultural value; references to the view in historical documents; presence of the view in historical iconography; degree of preservation and completeness of the view; the dominance of the monument in the view.

The third stage involves a comprehensive assessment of the town's territory and the determination of the boundaries of the historical area. The methods used include: comparative analysis; data synthesis; systematisation; expert evaluation; data mapping. The proposed methodology for analysis and evaluation considers the integrity of the perception of all components of the historical landscape and is applied at multiple scales, ranging from individual buildings to the monastery complex [18] and the town's entire territory. The objects of analysis and evaluation include: components of the historical urban landscape (planning, development, natural landscape, urban public spaces); the historical landscape of the town as a whole, as perceived through a sequence of different visual views. The comprehensive assessment integrates evaluations of all components of the town's historical landscape based on various values. The historical area includes the most significant parts of the town with the highest concentration of preserved cultural heritage elements, including historical buildings, natural landscapes, urban planning elements, public spaces, historical and archaeological monuments, and memorial sites.

The fourth stage involves determining the boundaries of cultural heritage protection areas and establishing their modes of use. The methods applied include graph-analytical analysis, mapping, 3D computer modelling, and the 'visual shadow' method.

In defining the boundaries of monument protection areas, the authors consider several factors, including: the value of the CHOs; their compositional impact; visual perception zones; the category of the value of the view of the object; zones of view formation. Taking into account the characteristics of human vision, close-range views of objects are particularly significant. At a distance of two times the maximum height of a building (or two maximum dimensions in plan for horizontally extended structures), the building is perceived in full detail and dominates the observer's view. Consequently, this defines the protection zone (close protection zone) of the object. As the distance increases, the building is perceived in relation to its surroundings, with the environment occupying a greater portion of the visual field. Medium and long-range views, together with view formation zones, determine the boundaries of development regulation zones and protected landscape zones. The boundaries of protection areas are delineated simultaneously with the geodetic coordinates on a vector map, following streets, natural features, and individual land plots as defined in the Public Cadastral Map of the town. Information mapping and boundary delimitation were conducted using a vector map of the town created in Delta/Digitals software.

The modes of use of the protected areas include the legal regime, the regulation of land use, the functional use of territories, and the requirements for new development and building renovation. The graphical analysis of monument visibility – the 'visual shadow' method – was used to determine the permissible height of new development. The Delta/Digitals software was used to create cross-sections of the area. These cross-sections were generated

for key points and visibility zones, allowing the height of shielding, flanking, and background buildings around the monument to be adjusted (Fig. 3). In the presence of multiple monuments and various key perception points, the permissible heights of new buildings obtained for each object and observation point are determined within the study city block according to the principle of the ‘defining minimum’ [35].

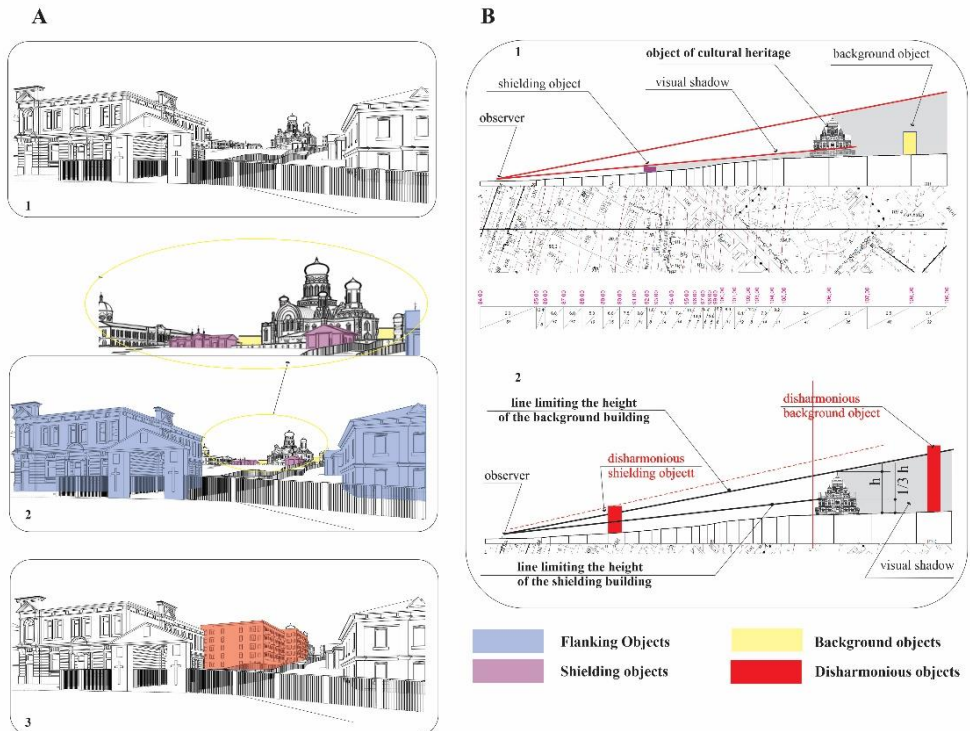


Fig. 3. A) Types of visual interaction between the monument and surrounding objects: 1 – View of the protected cathedral alongside other valuable cultural heritage objects; 2 – Objects interacting with the monument (shielding, background, and flanking); 3 – Disharmonious new buildings obstructing the view of the monument. B) The ‘visual shadow’ method for determining the heights of new buildings: 1 – Visual interaction of the monument with shielding and background buildings (intersection); 2 – Lines defining the height limits of shielding and background buildings and the identification of disharmonious structures. *Source:* own study

4. Research results

Comprehensive historical and architectural studies of Kozelshchyna’s heritage were conducted for the first time. For the first time:

- different types of CHO in the town were identified, classified, and subjected to a comprehensive historical and cultural assessment of the settlement’s territory;
- the boundaries of the historical area and protection zones of the town’s cultural heritage objects were justified and defined;
- modes of use for the protection areas of Kozelshchyna were developed, ensuring urban planning protection of cultural heritage objects;

- an electronic information database of the town's cultural heritage objects and their protection areas was created.

As a result of field research conducted in the town, 18 additional preserved historical buildings and structures of varying value were discovered within the monastery complex [18]. In addition to the historical buildings and structures of the monastery, the authors also identified two historical objects of technology, one archaeological site, and twelve historical objects within the town. The latter are associated with the commemoration of those who died during the Second World War (four sites) and the activities of the monastery (eight sites). A comprehensive assessment of the monastery structures was conducted, determining that the most valuable preserved monastery objects are the Cathedral of the Nativity of the Virgin and the Warm Church of the Transfiguration of the Lord, both located in the central enclosed part of the monastery [18].

4.1. Historical evolution of the urban environment of Kozelshchyna

Three stages in the historical evolution of the settlement's urban environment were identified.

The 1st Stage. The town of Kozelshchyna emerged as a landowner village of the Kozelskyi family in the first half of the 18th century. Its foundation coincided with a period of relative peace and stability in the region, as the country's borders gradually expanded southward toward the Black Sea, eliminating the need to establish settlements in areas naturally protected from raids. As a result, settlements from this period were typically established in locations favourable for agriculture. The layout of Kozelshchyna was influenced by topographical features, including the relief lines and slope configuration, as well as its connections with neighbouring settlements and agricultural land. A map from 1867 depicts a simple linear settlement plan, consisting of one main street (1.5 versts long) and four short longitudinal lanes, which also functioned as external links (Fig. 4a, b).

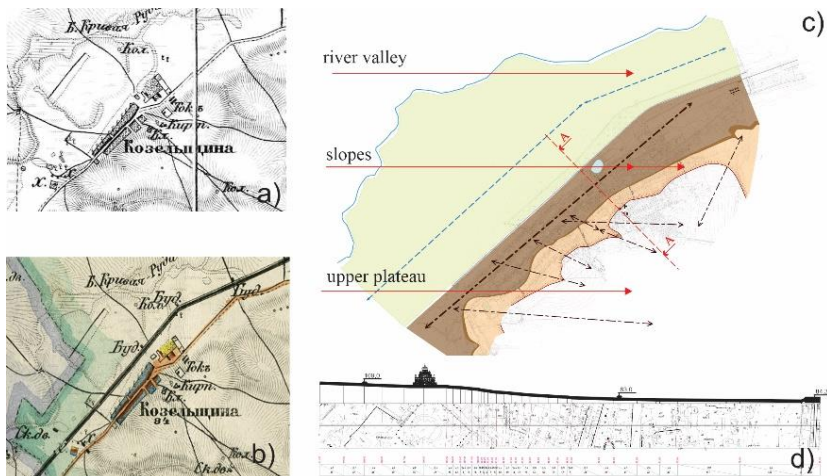


Fig. 4. Kozelshchyna plans and relief features of the studied territory that influenced the development of the village: a) the village plan on the map of the Poltava Province, 1861 (a fragment of the military topographic map of the Russian Empire, the so-called Schubert's three-layout map, row 25, sheet 12); b) the village plan on the map of the Poltava Province, 1881, *Source: [46]*; c) analysis of the natural foundation of the settlement; d) Delta/Digitals A-A section of the territory. *Source: own study*

There was a single row of farmsteads along both sides of the main street. The manor house was located on the north-eastern outskirts along the main street and featured a developed park. Information regarding the layout, architecture, and appearance of the manor house buildings has not been preserved. A brick factory was situated in the northern ravine, while a cemetery was located on the opposite side. The functional structure of the settlement was typical of small landowner villages. No buildings from this period of the settlement's development have been preserved.

The 2nd Stage. In 1863, the well-known and respected Kapnist family became the owners of the village. In 1881, following the miraculous healing of Maria Kapnist (the owners' daughter), a new chapter in the village's history began [43]. As an expression of gratitude, the Kapnists donated part of their land for the construction of a new monastery to honour the miraculous icon through which Maria had been healed. With the construction of the monastery and the increasing pilgrimage to the icon, life in the village became more dynamic. By 1894, the village had 1,018 inhabitants, and the number of pilgrims visiting the icon in a single day could reach up to 5,000 [43]. From 1891, three fairs were held annually in Kozelshchyna, marking its transition from a village to a town. By 1914, the monastery complex had been practically completed, adopting the typical structure of Orthodox monasteries, which included: a closed section with churches, administrative buildings, and monastic cells; an open section for pilgrims, featuring hotels, hospitals, shops, schools, an almshouse, and extensive industrial and agricultural areas [45] (Fig. 5). The monastery buildings formed an impressive urban ensemble along the central street, where the town centre and fair square gradually developed near the Kapnist manor.

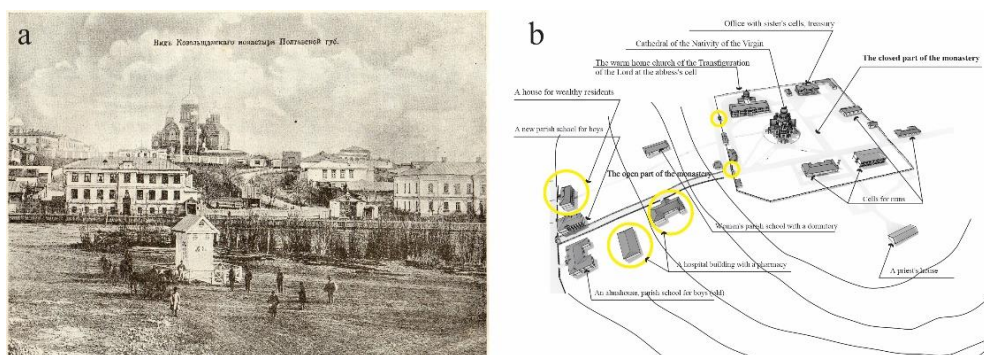


Fig. 5. A) View of the monastery from the railway station. Photograph from the early 20th century. Source: [41]. B) Virtual 3D visualisation of the monastery's original state. The yellow circles indicate the lost buildings of the monastery. Source: own study

The 3rd Stage. During the Soviet occupation (1920–1993), the most significant changes took place in the spatial and planning structure of the settlement. The architectural environment of the town was severely affected by the destruction of the Kapnist estate and parts of the monastery buildings. The settlement expanded territorially, with its linear strip now extending for 5 km along the slope (Fig. 6). New industrial buildings were constructed on the periphery of the settlement. Significant changes occurred in the urban fabric – the traditional Poltava-style hut disappeared from the residential development. It was replaced by new brick houses, with occasional two- or three-storey sectional residential buildings and large-scale public buildings, including a school, a new cultural centre (club), and administrative buildings, gradually integrating into the town's structure.

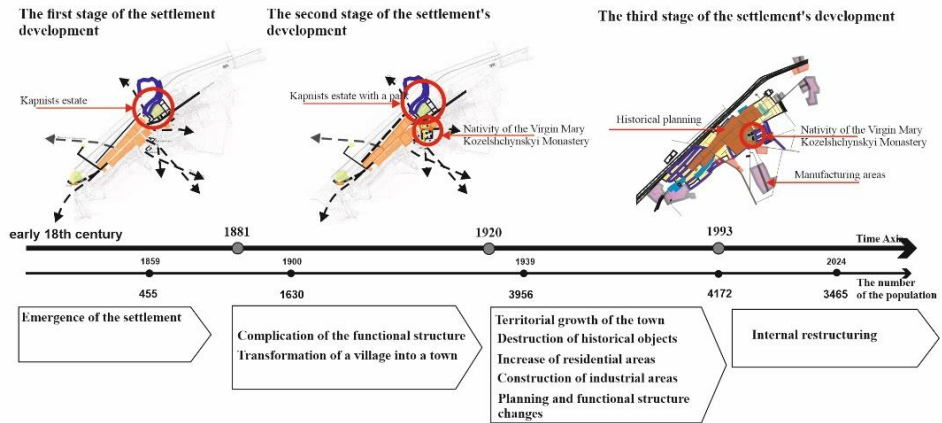


Fig. 6. Stages of the spatial development of the town of Kozelshchyna. *Source:* own study

New buildings, squares, and boulevards were constructed along Ostrogradskyi Street, reinforcing the role of the historical public centre of the town. However, these new buildings were designed according to standardised projects, resulting in a lack of originality and architectural expressiveness. At present, the architectural environment of the settlement is heterogeneous, both in terms of style and composition.

4.2. Analysis of the landscape, visual structure, and composition of the town

The analysis of the landscape and visual structure of Kozelshchyna focused on the visual perception of the cathedral, church, historical buildings, and natural landscape. The identified views of CHOs are classified into the following categories: first category – The most valuable views, offering the fullest representation of the town's historical past from the outside. These views shape the silhouette and panoramas of the town, showcasing multiple cultural heritage objects within a single composition and illustrating their relationship with the surrounding natural environment; second category – valuable views that highlight the role of monuments within the internal composition of the town, where cultural heritage objects serve as key focal points; third category – secondary views of isolated cultural heritage objects, which do not dominate the scenery but contribute to the understanding of the historical district's structure; fourth category – random views without artistic value, displaying fragments of individual historical objects mixed with modern buildings of low aesthetic quality (Fig. 7a). The first-category views include panoramas of the town centre, as seen from the railway and the entrance to the town from the Poltava-Kremenchuk highway. These views are documented in historical descriptions and memoirs of pilgrims and have partially retained their original appearance. The second-category views include perspectives from a distance of up to 300 metres and close-range viewpoints within the existing monastery walls. The square in front of the cathedral is particularly valuable for the perception of the surrounding natural landscape, as its elevated topography allows panoramic views of the river valley extending 3–4 km into the distance. Views classified under categories I–III are subject to preservation.

The largest area of visual perception is occupied by the main cathedral of the monastery, followed by the Church of the Transfiguration. The former alms house with a pharmacy and the new parish school for boys have smaller areas of perception within their territories,

including fragments of the main street and the park. These buildings form the historical background for the perception of the monastery and the ensemble of the town centre. Other historical buildings identified during the study create local perception zones only in their immediate vicinity. Accordingly, the compositional influence of historical structures is determined by their visual perception zones. The Cathedral of the Nativity of the Virgin has the greatest compositional influence and serves as the main vertical landmark of the town, not only due to its height but also because of its location on a high slope. The cathedral's influence extends for 1–1.5 km within the town and, in good weather, for 3–4 km into the river valley (Fig. 7b). The cathedral has become a historical and cultural symbol of the town, defining its identity within the entire region. In light of this, two visual fronts of the monastery ensemble's perception, six observation points, and four visual zones were selected and identified as crucial for managing the future development of Kozelshchyna's urban environment. Together with the perception zones of these landscapes, they will form the protection areas of the CHOs.

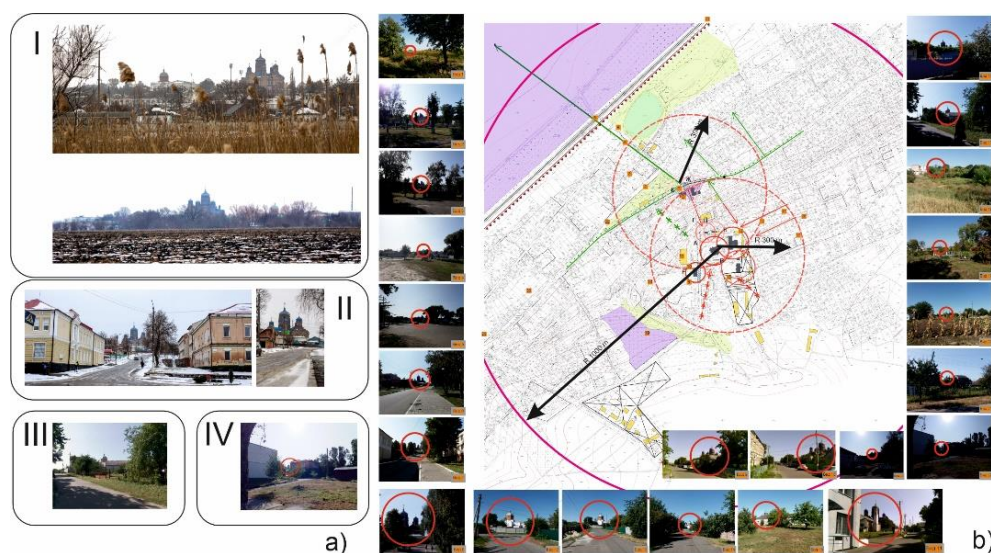


Fig. 7. Analysis of the town's landscape and visual structure: a) views of the historical objects according to their value categories (I–IV); b) analysis of the views of the objects and the locations of the observation points with photographic documentation. *Source:* own study

4.3. Comprehensive assessment of the territory of the town of Kozelshchyna and determination of the boundaries of the historical area

The following modern spatial organisation features of Kozelshchyna were identified:

- the partially preserved historical territory of the monastery and some of its buildings, which continue to dominate the town's space;
- the Cathedral of the Nativity of the Virgin remains the main compositional landmark of the town;
- the location of the modern public centre of the town largely corresponds to the historical one;
- the existing planning system of Kozelshchyna retains the main characteristics of historical planning and remains linear;

- the town is predominantly characterised by a dispersed, low-density urban fabric with free-standing buildings on large land plots, affecting both residential and public structures;
- the public centre of the town is highlighted by a transverse compositional axis: railway station – market – centre – monastery;
- the central square and the park with the pond, located on the site of the former Kapnist estate park, serve as natural landmarks that enhance the composition of the urban environment.

Based on the analysis of value categories and the preservation of historical buildings, planning, historical landscaping, monument density, and the retention of the functional structure, the authors conducted a comprehensive assessment of the town's territory. This assessment enabled the determination of the boundaries of the central historical area of Kozelshchyna (Fig. 8).

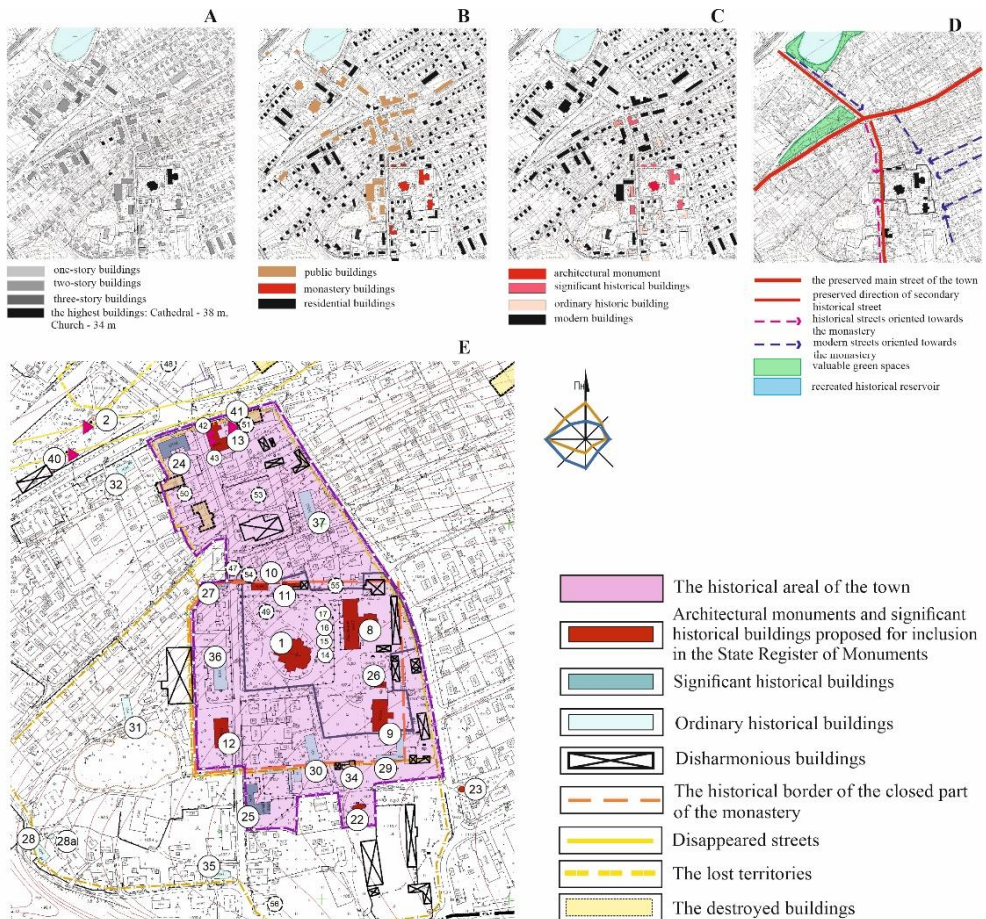


Fig. 8. Comprehensive Assessment of the Town of Kozelshchyna: a)–c) Assessment of buildings by number of storeys, function, and historical and architectural value; d) Assessment of the town's planning and landscaping; e) Determination of the boundaries of the historical area of the town of Kozelshchyna. Fragment of The Historical and Architectural Reference Plan of the Town of Kozelshchyna. *Source:* own study

The historical area covers 8.43 hectares in the city centre and plays an organising role in its modern spatial structure. Within this area, the functions of the town's public centre are carried out, and it accommodates the existing monastery as well as cultural and consumer service facilities for the population. The historical area contains one architectural monument, six significant historical buildings, and one engineering structure – an underground reservoir – proposed for inclusion in the State Register of Monuments of Ukraine. Additionally, it includes nine ordinary historical buildings, the remains of historical monastery walls, and six historical objects.

4.4. Establishing the boundaries of the protection areas of the town's cultural heritage and determining the modes of use of their territory

The proposed protection zoning of Kozelshchyna is based on the following principles: the preservation of landscapes containing cultural heritage objects; the differentiation of monument protection areas and corresponding land-use regulations based on the object's value, distance, and visual significance; the maximum conservation of the town's landscape layout and green spaces; and ensuring compositional harmony between new and historical buildings.

The project identifies the territories of the CHOs, including the Cathedral of the Nativity of the Virgin, the Warm House Church of the Transfiguration of the Lord at the Abbess's Cell, the Chancellery with nuns' cells, the candle-making and icon-painting workshops, the Holy Gate, nuns' cells, and the parish school for boys. The boundaries of the comprehensive protection zone surrounding the Cathedral of the Nativity of the Virgin and the buildings within the monastery's enclosed section have been justified, considering the optimal near-perception zone of these structures and integrating territories within a radius double the maximum dimensions of these buildings. For cultural heritage objects within the town's administrative boundaries, the authors have delineated 11 sections of development regulation zones (categories I and II), four sections of archaeological cultural layer protection zones, and eight sections of protected landscape zones (Fig. 9). These zones vary in the level of permissible interference with the existing environment and in their requirements for new developments, including the determination of maximum building dimensions in both plan and height.

Based on the existing administrative boundaries of Kozelshchyna, researchers have identified one section of the development regulation zone and two sections of protected landscape zones, which are crucial for shaping the town's external panoramas, defining its silhouette, and maintaining its visibility from key locations, including the main Poltava–Kremenchuk highway, the river valley beyond the railway, and the town's main entrance from the highway. To restore the lost view of the monastery from the town's entrance, it is proposed to construct a new street that will create a visual axis leading to the cathedral. The total area of protection zones within the town is 89.9 hectares, constituting 15.26% of its total territory.



Fig. 9. Project of the Protection Areas of the Architectural Monuments in the Town of Kozelshchyna.
Source: own study

The delimitation of the boundaries of the protection areas was carried out using the Delta/Digitals program. Each designated section of the protection areas is placed on a separate layer, assigned a unique identification code, and associated with various types of parameters – database fields where object characteristics are stored, including related information in files. This system enables the linkage of any map object with a large volume of diverse data, providing comprehensive information on each object and the land-use regulations of each zone within the electronic map (Fig. 10).

The electronic map includes the following information on cultural heritage objects: the status of the object, its modern name, contemporary functional use, historical name, year of construction, floor area, wall material, and technical condition.

Additionally, the electronic map contains information on the parameters of protection zones, including the name of the zone, zone code, boundaries, and land-use regulations. These regulations define the degree of permissible modifications within the zone, requirements for new construction and renovation projects, and the functional use of the area.

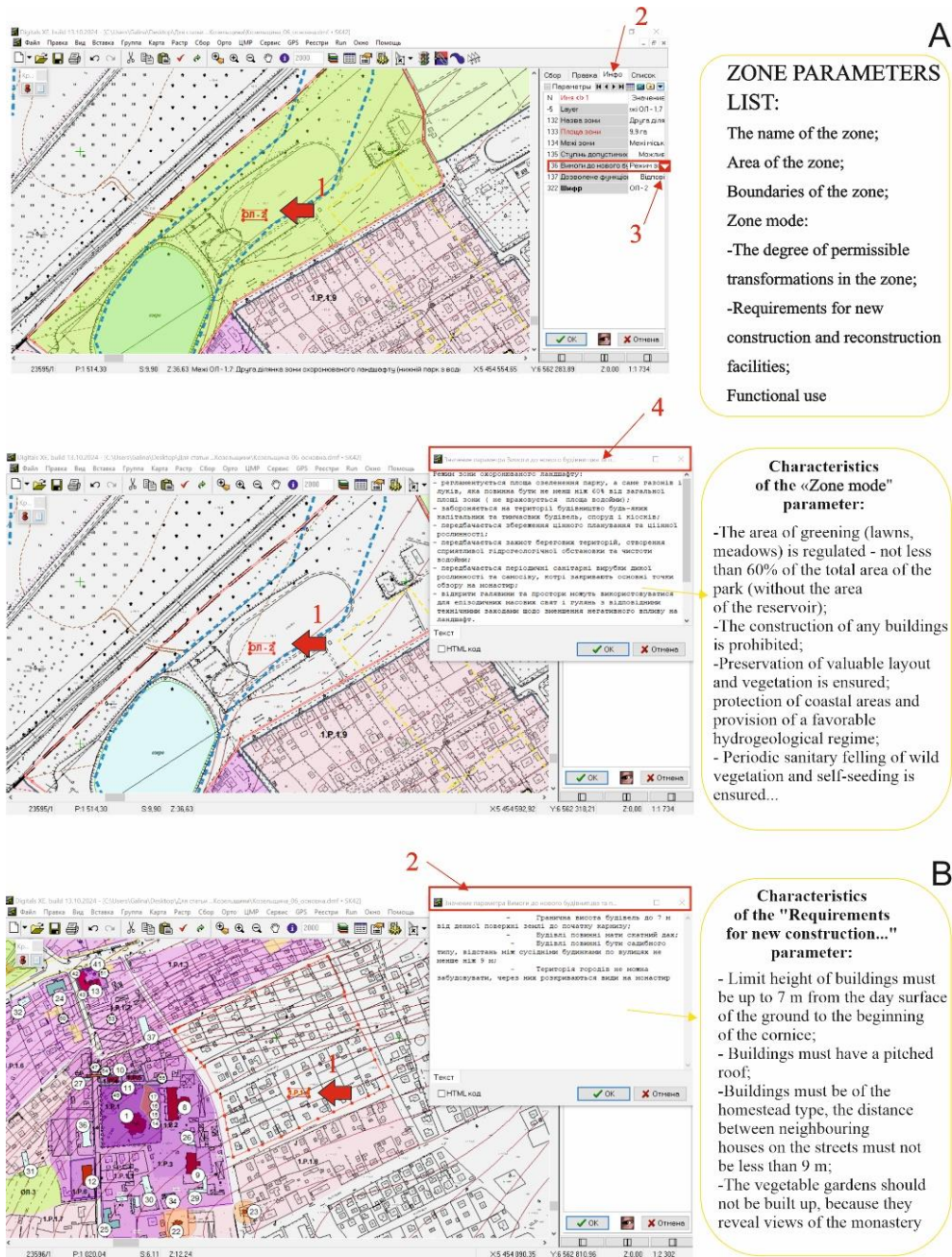


Fig. 10. Electronic Map "The Protection Areas of the Cultural Heritage Objects of Kozelshchyna". Available information in the electronic database regarding the characteristics of the zones and their protection regimes: a) Information on the map regarding 1.P.1.4 – the third section of the development regulation zone; b) Modes of use of OL2 – the second section of the protected landscape zone. Screenshots. Translations of zone parameters and their characteristics into English are highlighted in yellow frames. *Source:* own study

5. Conclusions

The cultural heritage object is an integral part of the surrounding urban, natural, social, and cultural context. Protection areas, as adjacent territories surrounding the monument, play a crucial role in preserving a city's cultural heritage by ensuring the conservation and reinforcement of the monument's urban planning and compositional significance. They also contribute to the authenticity and identity of historical towns.

This study focused on developing urban planning protection measures for the town of Kozelshchyna in the Poltava region. The historical development of the town was examined, and three stages of its urban evolution were identified: the emergence and development of the landowner village of Kozelshchyna; the construction of the monastery and the transformation of the village into a town; the partial destruction of historical heritage, territorial expansion of the town, and increased complexity of its functional and planning structure.

Cultural heritage objects were identified, and a comprehensive assessment of Kozelshchyna's territory was conducted. The boundaries and land-use regulations for the historical area and protection zones of the Kozelshchyna CHOs were justified and determined based on a thorough historical and cultural assessment of the territory. The visual criterion, which plays a key role in establishing the monastery complex as the town's dominant element in perception and composition, was also considered.

The scientific contribution of this study lies in refining an integrated methodology for determining the boundaries of the historical area and the protection zones of cultural heritage objects.

The proposed methodology considers the holistic perception of all elements of the historical landscape in shaping the town's identity and includes:

- the integrated analysis and evaluation of cultural heritage on multiple scales, ranging from individual buildings to the monastery complex and the town as a whole;
- the analysis of the town's landscape and visual structure;
- the gradation of protection within cultural heritage protection areas based on their distance from the monument;
- the primary criteria for defining the boundaries of the historical area are historical and cultural value and the preservation of territories;
- the main criterion for determining the boundaries of protection areas is the preservation of significant views of the cultural heritage object, which includes observation points and zones for view formation.

The methodology for researching the cultural heritage of historical towns using GIS and HBIM technologies was enhanced. This methodology integrates GIS-based modelling of the existing urban environment with comprehensive research on the historical town, urban development planning, architectural and urban design, and cultural heritage management.

Practical implications of the study. The developed scientific and design documentation for defining the boundaries of the historical area and protection zones of Kozelshchyna's architectural monuments provides the local community with a legal tool to regulate economic activities, new construction, and the extent of reconstruction within protection areas. This is a crucial aspect of cultural heritage preservation. The scientific and project documentation was reviewed by the local community and approved by the Department of Culture of the Poltava Regional Council and the Ministry of Culture of Ukraine.

Social implications of the study. The historical heritage of the town had long remained unexplored and underappreciated. Currently, Kozelshchyna is experiencing socio-economic

decline, partly due to the lack of a strategic development position. Under these conditions, cultural heritage objects represent a hidden resource that can be mobilised to transform the town's image and strengthen its economy. Utilising local identity and the historical and cultural potential of the area can contribute to its development.

The prospects for further work and exploration in the town are:

- the development of a strategic plan for the town of Kozelshchyna with active involvement from the local community;
- the formulation of a master plan for the town;
- the development of a concept for the monastery's expansion and the organisation plan for its territory.

To ensure the sustainable development of Kozelshchyna, it is also necessary to integrate the town's identified cultural heritage into the existing tourism industry of the Poltava region and the country. This includes planning tourist and pilgrimage routes to the miraculous icon of the Kozelshchyna Mother of God, which is a subject for further research by the authors.

Funding

The archival, bibliographical, and archaeological research, the digital map of the city, the definition of the boundaries of the protected areas of cultural heritage objects, and their modes of use were commissioned and funded by the Municipality of Kozelshchyna in the Poltava Region. Measurements, information models of cultural heritage objects (CHOs), and the 3D reconstruction of the original state of the monastery complex were carried out by the authors on their own initiative and free of charge.

Acknowledgments

The authors express their gratitude to Oleksandr Trotskyi, the village head of the Kozelshchyna community in the Poltava Region; Valentyna Buka, the head of the architecture and urban planning department of the Kozelshchyna District State Administration; and Barsanuphia, the abbess of the Kozelshchyna Nativity of the Virgin Mary Convent, for their support and provision of materials.

References

- [1] Klusáková L., Del Espino Hidalgo B. (Eds.), *Small towns resilience and heritage commodification*. Peter Lang B, 2021. Available: <https://www.peterlang.com/view/title/71764https://doi.org/10.3726/b18527>
- [2] *New life for historic cities: The historic urban landscape approach explained*, UNESCO, World Heritage Centre, 02-Jul-2013.
- [3] *Vienna Memorandum on 'World Heritage and Contemporary Architecture – Managing the Historic Urban Landscape'*, UNESCO, 2005.
- [4] *Recommendation on the Historic Urban Landscape, including a glossary of definitions*, Paris, France, UNESCO, 2011.
- [5] Liang W., Ahmad Y., Mohidin H. H. B., "The development of the concept of architectural heritage conservation and its inspiration", *Built Heritage*, vol. 7(1), (2023), 21. <https://doi.org/10.1186/s43238-023-00103-2>

- [6] Ginzarly M., Houbart C., Teller J., “The historic urban landscape approach to urban management: a systematic review”, *International Journal of Heritage Studies*, vol. 25(10), (2019), 999–1019. <https://doi.org/10.1080/13527258.2018.1552615>
- [7] *Sustainable Development Goals 2030 (SDGs)*, Transforming our world: the 2030 Agenda for Sustainable Development, in United nations. Available: <https://sdgs.un.org/2030agenda> [Accessed: 16 September 2024].
- [8] *Xi'an declaration on the conservation of the setting of heritage structures, sites and areas*, UNESCO, 2005.
- [9] *World Heritage and Buffer Zones: International Experts Meeting on World Heritage and Buffer Zones, Davos, Switzerland, 11-14 March 2008*”, UNESCO, 2008.
- [10] *Law of Ukraine "On Protection of Cultural Heritage"*, information of the Verkhovna Rada of Ukraine (VVR), 2000, No. 39, Article 333. Available: <https://zakon.rada.gov.ua/laws/show/1805-14#Text> [Accessed: 12 September 2024].
- [11] *Kultūras pieminekļu aizsargjoslas (aizsardzības zonas) noteikšanas metodika*, Ministru kabineta noteikumi Nr.392, Rīgā 2003.gada 15.jūlijā, 2003. Available: <https://likumi.lv/ta/id/77333-kulturas-piemineklu-aizsargjoslas-aizsardzibas-zonas-noteikšanas-metodika>
- [12] *Par kultūras pieminekļu aizsardzību*, 1992. Available: <https://likumi.lv/doc.php?id=72551>
- [13] *Aizsargjoslu likums*, 1997. Available: <https://likumi.lv/doc.php?id=42348>
- [14] *Relative à la liberté de la création, à l'architecture et au patrimoine*, 2016. Available: <https://www.legifrance.gouv.fr/loda/id/JORFTEXT000032854341>
- [15] *Regulation on the protection of famous historical and cultural cities, towns and villages*, Zhonghua Renmin Gongheguo Guowuyuan Gongbao. 2017, Revision-2017.
- [16] Lv R. Liu Y., Zhang L., Kong D., “Urban historic heritage buffer zone delineation: the case of Shedian”, *Heritage Science*, vol. 10(1), (2022), 64. <https://doi.org/10.1186/s40494-022-00702-9>
- [17] *Spysok istorychnykh naselenykh mist Ukrainy*, Postanova KabMinu Ukrainy vid 26 lypnia 2001 roku № 878. Available: <https://zakon.rada.gov.ua/laws/show/878-2001-%D0%BF#Text>
- [18] Osychenko H., Khliupin O., “Nativity of the Virgin Mary Kozelshchynskyi Monastery in the Poltava Region: an assessment of architectural heritage and contemporary challenges”, *Budownictwo i Architektura*, vol. 23(3), (2024), 5–25. <https://doi.org/10.35784/bud-arch.6310>
- [19] Leshchenko N., “Methodology of determining the genetic code of the city: a basis for restorative and reconstructive transformations in its historical center”, *Wiadości Konserwatorskie – Journal of Heritage Conservation*, vol. 69, (2022), 7–14. <https://doi.org/10.48234/WK69GENETIC>
- [20] Leshchenko N., “Methodology of determining the degree of damage to a historical city center for its comprehensive restoration, reconstruction and transformation”, *Wiadości Konserwatorskie – Journal of Heritage Conservation*, vol. 76, (2023), 23–31. <https://doi.org/10.48234/WK76DAMAGE>
- [21] Kuśnierz K., Kuśnierz-Krupa D., Budziakowski M., “Historic town protection issues on the example of Wolbrom”, *Wiadości Konserwatorskie – Journal of Heritage Conservation*, vol. 62, (2020), 55–65. <https://doi.org/10.48234/WK62WOLBROM>
- [22] Zbierski-Salameh S., Pazder D., Kaźmierczak B., “In care of local identity – managing unconscious heritage: research on the example of Tarnowo Podgórne County and Village in Greater Poland”, *Wiadości Konserwatorskie – Journal of Heritage Conservation*, vol. 68, (2021), 87–100. <https://doi.org/10.48234/WK68TARNOWO>
- [23] Eckert W., “Kozuchów – historyczne miasto z przyszłością”, *Budownictwo i Architektura*, vol. 17(2), (2018), 65–80. https://doi.org/10.24358/Bud-Arch_18_172_06
- [24] Kononowicz W., Pisera I., “Problemy rewitalizacji małych miast na przykładzie Międzyrzecza”, *Budownictwo i Architektura*, vol. 17(1), (2018), 13–20. https://doi.org/10.24358/Bud-Arch_18_171_02

- [25] Kleszcz J., Kmiecik P., “Sposób prowadzenia badań archeologiczno-architektonicznych, a możliwości wykorzystania ich wyników w procesie projektowym na przykładzie byłego Szpitala im. Babińskiego we Wrocławiu.”, *Budownictwo i Architektura*, vol. 17(1), (2018), 169–175 (in polish). https://doi.org/10.24358/Bud-Arch_18_171_20
- [26] Drobek K., Boguszewska K., “Planning protection of Ciechanow castle versus contemporary exposition in the landscape”, *Budownictwo i Architektura*, vol. 21(4), (2022), 79–88. <https://doi.org/10.35784/bud-arch.3318>
- [27] Kysil O., Kosarevska R., Levchenko O., “The innovation of accounting and certification of historic architectural monuments using BIM technology”, *Budownictwo i Architektura*, vol. 19(2), (2020), 5–18. <https://doi.org/10.35784/bud-arch.888>
- [28] Ciski M., Rząsa K., Ogryzek M., “Use of GIS tools in sustainable heritage management—the importance of data generalization in spatial modeling”, *Sustainability*, vol. 11(20), (2019), 5616. <https://doi.org/10.3390/su11205616>
- [29] Liu B., Wu C., Xu W., Shen Y., Tang F., “Emerging trends in GIS application on cultural heritage conservation: a review”, *Heritage Science*, vol. 12(1), (2024), 139. <https://doi.org/10.1186/s40494-024-01265-7>
- [30] García-Esparza J. A., Altaba Tena P., “A GIS-based methodology for the appraisal of historical, architectural, and social values in historic urban cores”, *Frontiers of Architectural Research*, vol. 9(4), (2020), 900–913. <https://doi.org/10.1016/j.foar.2020.04.004>
- [31] Moreno M., Ortiz R., Cagigas-Muñoz D., Becerra J., Martín J. M., Prieto A. J., Garrido-Vizuet M. A., Macías-Bernal J. M., Chávez M. J., Ortiz P., “ART-RISK 3.0 a fuzzy– based platform that combine GIS and expert assessments for conservation strategies in cultural heritage”, *Journal of Cultural Heritage*, vol. 55, (2022), 263–276. <https://doi.org/10.1016/j.culher.2022.03.012>
- [32] Chizfahm Daneshmandian M., Behzadfar M., Jalilisdarabad S., “The efficiency of visual buffer zone to preserve historical open spaces in Iran”, *Sustainable Cities and Society*, vol. 52, (2020), 101856. <https://doi.org/10.1016/j.scs.2019.101856>
- [33] Chetverikov B., Hlotov V., Bakula K., “Clarification of the boundaries of lands of historical and cultural heritage and determination of their protection zones by remote sensing methods”, *Land*, vol. 13(7), (2024), 923. <https://doi.org/10.3390/land13070923>
- [34] Bykova E., Dyachkova I., “Modeling the size of protection zones of cultural heritage sites based on factors of the historical and cultural assessment of lands”, *Land*, vol. 10(11), (2021), 1201. <https://doi.org/10.3390/land10111201>
- [35] Vodzinskii E., *Metodicheskie rekomendatsii po issledovaniyu istoriko-arkhitekturnogo naslediya v gorodakh Ukrainskoi SSR*, Kiev, NIIP gradostroitelstva, Kiev, 1982.
- [36] Pribëga L., *Arhitekturna spadshina Ukraïni: pamâtkoohoronnij aspekt*, Kiïv, Ìnstitut kulturologii NAM Ukraïni, 2016.
- [37] Osychenko H., *Rekonstruktsiia istorichnykh mist: Kompozytsiyni aspekt*, Kharkiv, KhNUMH im. O. M. Beketova, 2021.
- [38] *London View Management Framework. Supplementary planning guide*, Major of London, 2012.
- [39] *DBN B.2.2-3:2012. Sklad ta zmist istoriko-arkhitekturnoho opornoho planu naselenoho punktu*, Kyiv, Minrehion Ukrainy, 2012.
- [40] *DSTU B B.2.2-10:2016 Sklad ta zmist naukovoproektnoi dokumentatsii shchodo vyznachennia mezh i rezhymiv vykorystannia zon okhorony pamiatok arkhitektury ta mistobuduvannia*, 2016.
- [41] *Robochii arkhiv Rizdva Bohorodytsi Kozelshchynskoho monastyria*. Dopomizhnyi fond.
- [42] *Sobor Rozhdestva Bogoroditsyi 1900 g. v pg. Kozelschina Poltavskoy oblasti. Obsledovanie*, Ukrainskoe spetsializirovannoe nauchno-restavratsionnoe proizvodstvennoe upravlenie Gosstroya Ukrainyi, Kiev: 1978. Robochii arkhiv Viddilu mistobuduvannia, arkhitektury, zhytlovo-komunalnoho hospodarstva ta z pytan nadzvychainykh sytuatsii Kozelshchynskoi raionnoi derzhavnoi administratsii (RAVMA, Kozelshchyna).

- [43] Gavrilkov S., *Obraz Kozelschinskoy bozhey materi*, 5-e izd. Poltava: Tipografiya N. Pigurenko, 1882, s. 61–62.
- [44] Zhuk V., *Perlyna Kozelshchyny: Storinky z istorii Kozelshchynskoho Rizdva Bohorodytsi zhinochoho monastyria*, 3rd-e vyd., Poltava, ASMI, 2007.
- [45] Osychenko H.(red.), *Kozelshchyna: istoryko-arkhitekturnyi narys*, Kherson, Oldi+, 2022.
- [46] *Poltavska huberniia*, karta 1881 roku, Atlas Rosiiskoi imperii. Instytut rukopysu Natsionalnoi biblioteky Ukrainy imeni V.I. Vernadskoho, arkhivnyi no. 15020.