

## Pre-project research cycle of the architectural environment of the small town's historical center as an analytical stage of its reconstruction

*Nellya Leshchenko*

Kyiv National University of Construction and Architecture  
Povitroflotskyi prosp., 31, Kyiv, Ukraine, 03037  
ardisconn@ukr.net, orcid.org/0000-0002-3198-4554

**Summary.** To create a competent reconstruction projects in the historical environment it's necessary to carry out pre-project research cycle. It's goal - to produce detailed baseline data. Pre-project research should be carried out using the method of graph-analytical analysis of the historical architectural environment and its current state, the method of comparative analysis, synthesis by drawing up the result recommendations schemes. The article marks the stages of pre-project research of the architectural environment of the small town's historic center. It consists of historical-genetic analysis, analysis of the current state of the urban historical architectural environment, implementation the historical-reference plan, project of zones of protection monuments of architecture and urban planning, preparation the historical and urban planning substantiation. These researches are directed to identify characteristics of the formation and development of historic urban environment, to determine its value and the state of preservation, to define the limits of architectural and town-planning constraints and demands during reconstruction or new construction in the historic environment. The article shows the sequence of pre-project researches and their mutual influence. The result schemes of each stage were noted. A scheme-model of reconstruction activities as the result pre-project research and as the implementation of recommendation to the reconstruction project was determined.

**Key words:** pre-project research cycle, historical-genetic analysis, historical-reference plan, the historical and urban planning substantiation.

### INTRODUCTION

The need to ensure the preservation of the existing cultural heritage and the harmonious modern development of the historical centers of small Ukrainian towns is a very topical question today. The urban architectural environment can't be unchanged. With time it constantly receives various changes, adapts to the needs of people throughout its history of existence and development. With the construction of any new building architects at various times made changes in historical urban environment. It was always very important that this new building not only did not broke established traditions, planning, volumetric, spatial and functional features, but also had become a harmonious complement to the existing historic buildings. The main principles of any new construction in the existing historic environment should be tolerance, continuity and harmonious supplement. In this case, the urban environment will retain its historical features and will get a new development that is necessary for him at this time point.

Unfortunately, the existing experience of new construction in the historical center of small Ukrainian towns shows off a completely different picture.

Small historical towns have unique monuments of architecture and urban state and local levels, but many of them are in disrepair as a result of incorrect modern use or disuse in general [7]. Further ignoring the existing problems could lead to their complete destruction, and thus towns lose its authentic buildings, which are urban dominants. Also, today in these towns are very badly preserved ordinary historic buildings which are the background to highlight the dominant monuments [8]. And existing new buildings are, most, or typical buildings that are not suitable for the kind of small town environment, or have not enough quality architectural design.

Therefore, the main task of reconstruction of the historic centers of small towns should preserve their authenticity, historical and architectural value of existing monuments improve the quality of existing architectural environment and create a new quality environment with considering all the historic features [9].

The quality of the reconstruction projects of the historical architectural environment greatly depends on from the carried out scientific research work to the creation of detailed baseline data. That it requires pre-project research cycle.

#### PURPOSE OF WORK

The purpose of the pre-project research cycle is to create, as much as possible, the original database for the new design in historic environment and for drafting the reconstruction of the historical architectural environment. In the article is proposed consistently to consider the stages of the pre-project research cycle and their connections.

#### MATERIALS AND METHODS

Research to create the baseline data should be carried out with using the method of graph-analytical analysis of the historical architectural monuments and environment, the method of graph-analytical analysis of the current state historical architectural environment, the method of comparative analysis; generalization by drawing up the result recommendations schemes.

#### RESULTS AND DISCUSSION

Pre-project research consists of the following steps.

1. Historical-genetic analysis.
2. Analysis of the current state of the urban historical architectural environment (historical center, ensemble, quarter, house).
3. Analysis of the historical-reference plan.
4. Analysis of the project of zones of protection monuments of architecture and urban planning.
5. Drafting of historical and urban planning substantiation.

Historical-genetic analysis is made to determine the characteristics of the formation and development of the studied architectural urban environment at different time stages, to identify the sustainable characteristics of its planning and volumetric-spatial composition and typological structure of buildings.

It includes the study and comparison of historical urban plans. Its task is to identify the town's genetic code. That is:

1. Identify the patterns of formation and development of this historic town. Under the influence of which factors this town acquired its characteristics, and which ones. It is necessary to analyze:
  - natural factor (geographical location, climate influence, natural environment, orientation on water, relief);
  - historical factor (historical events and personalities that have influenced the formation of the town);

- cultural factor (under the influence of which cultures the urban environment was formed);

- social factor (who inhabited the city by the kind of activity: traders, artisans, farmers, etc.; we can see this by saved to the present historical names of streets, squares, districts, quarters);

- national factor (different mentality - a different way of life, and therefore different housing);

- religious factor (which temples were built in the town, and they became urban dominant and determined the features of ordinary buildings that formed around them, as a rule, they were houses of parishioners);

- urban factor (planning and spatial features of the urban environment, urban dominant and their visual links, urban hierarchy: dominant – accents - ordinary buildings);

- architectural factor (volume, percolation, coloring, regional stylistic features that are formed under the influence of different cultures).

2. Identify steel features of urban planning, volumetric-spatial, functional, architectural and artistic organization, that is:

- what distinguishes this town from others;

- what kept and passed from stage to stage of this town development;

- what remained to this day.

Historical-genetic analysis is carried out on archival research and inspection on location.

Archival research - is the collection and comparing the data from the history and town development (historical plans, iconographer, text materials, photos).

The results of these studies are:

- analytical scheme stages of urban planning;

- scheme of its silhouette;

- volumetric-spatial diagram of major urban ensembles and ordinary urban environment;

- scheme of composition and visual communications dominants, accents and ordinary building;

Inspection on location – is the identification of the historic elements that have survived to the present (remains of defensive walls, forts,

territories of historic squares, streets, districts, historic buildings).

Based on a comparison of archival research and inspection on location:

- stages of planning and spatial organization of urban architectural environment are determined;

- provides an assessment of importance of these stages for citywide composition as a whole;

- distinguish the main historically valuable planning and architectural elements that make up the genetic code, and thus are subjects to preservation [14].

Analysis of the current state is to discover the modern features of historic architectural environment and its role in the present citywide structure [14]. It provides:

1) the evaluation of the modern urban values researched historical architectural environment;

2) determining its current planning and buildings and the correlation of citywide planning and buildings;

3) the definition of the modern typology of buildings that make up the studied architectural environment;

4) the definition of the modern space-planning and constructive resolution of these buildings;

5) determination of its modern functions;

6) determination the disharmonized elements in the historic urban environment which violate its visual complete perception and bring negative changes in its silhouette [14].

The study of the current state historical architectural environment shows how it has kept its urban, architectural and functional characteristics, and how they can meet modern needs.

These analytical analysis of the current state issued a graphical diagram plan - destructive scheme on which we can make a conclusion about the degree of preservation of historic architectural environment as a whole and individual buildings and structures that compose it.

The scheme collected all currently existing buildings. Determined by their architectural and stylistic features, number of storeys and degree of preservation. Also are shown visual

connections between buildings in the study historic architectural environment (dominants, accents and ordinary buildings) and links between dominants and accents the whole historical center. Based on this are determined the disharmonized buildings that destroy the visual communications. The links between the historical center and new modern centers of gravity and cultural centers are established.

Conducted by graph-analytic method the analysis of the current state historical architectural environment will make it possible to conclude:

- how is preserved its original urban value;
- how serious is the change in the planning and volumetric-spatial composition caused by incorrect new building and unreasonable demolition of historic buildings (if any);
- which houses more preserved, in which style, in which the state;
- what changes have occurred in the functional structure, how is architectural environment functionally active and attractive;
- and identify links to modern centers of gravity and cultural centers.

These studies of the current state compared with the historical research data by the method of comparative analysis. The result of the comparison is the plan diagram - the historical-reference plan. This is complex urban conservation document that summarizes the results of research on the historic city [6]. Historical reference plan for each historic town is developed according to «DBN B.2.2-3-2008 Composition, content, procedure of development, coordination and approval of historical-architectural reference plans, the special scientific and design documentation to determine the historical areas of settlements of Ukraine» [2] and «Instructions for compiling the historical-architectural reference plans of cities of Ukraine» [5].

At the historical-architectural reference plan are shown and systemized by the degree of values all objects of city planning, architectural, historical and cultural heritage of the city. Also are marked the lost dominants and modern buildings that break the links between historical dominants. Historical planning (historical streets, squares, quarters, neighborhoods,

defensive walls, forts, border of settlements, monasteries, etc.) applied to modern planning. Also are shown:

- the main historical urban dominants and accents;
- visual connections between historical dominants;
- view points and angles of opening historical urban perspectives and panoramas;
- streets that form view directions to dominant.

After comparing are made the conclusions about the degree of preservation of historic architectural environment.

All historical urban and architectural objects systemized by the degree of value, that is:

- architectural monuments (world, national, local);
- monuments of town planning;
- historical monuments;
- monuments of landscape architecture;
- monuments of archeology;
- historically valuable natural landscapes;
- dry channels of rivers, underground reservoirs, the channels of small rivers enclosed in tunnels.

At the historical-reference plan also are shown:

- valuable historical and modern buildings;
- low-value buildings;
- disharmonized buildings.

So, based on comparative analysis and historical-reference plan it concludes:

- 1) about the urban environment preservation;
- 2) about the preservation of individual buildings and their degree of value;
- 3) about the functional preservation of the historic architectural environment.

Detailed analysis of the historical-reference plan will provide an opportunity to make a correct conclusion:

- the further modern development of historical architectural environment with current requirements;
- choose the best planning and volumetric-spatial composition;
- determine how to modify and supplement the street network, square, buildings to maximize preserve or restore typical historical image

of the environment and at the same time adapt it for modern requirements.

Based on the comparison of the historical-architectural reference plan that determines the degree of values of the historic buildings and architectural environment in general and destructive schemes on which is determined the degree of their preservation, can be drawn the conclusions about the need and the measure of the reconstruction. The choice of methods of restoration or reconstruction of the buildings and the historic environment as a whole depends on its values and modern conservation.

The project of zones of protection monuments of architecture and urban planning is another urban obligatory document which is necessary in developing reconstruction projects in the historic environment.

The project of zones of protection is a town-planning document that defines the boundaries of special areas in the historic city, which have limitations and the special regime of architecture and urban planning [6] (a special regime of reconstruction). It is developed based on the historical-architectural reference plan under the «DBN B.2.2-2-2008 Composition, content, procedure of development, coordination and approval of scientific and design documentation to determine the limits and regimes of usage, zones of protection the monuments of architecture and urban planning» [1].

The aim of this project is to protect monuments and to preserve the traditional character of the environment in which these monuments are located (the character of the ordinary buildings, which are the background for the monuments).

Protected area of the historic town includes:

- 1) the territory of the monument.
- 2) the complex protected zone.

Located in the historical center. Composed of protected zones of monuments and urban planning, which are located in the historic center.

- 3) protected zones of separate monuments located outside the historic center.
- 4) buildings regulation zones.
- 5) areas of protected landscape.

6) areas of the archaeological cultural layer [11].

The territory of the monument is a plot where the monument was located historically and which is necessary for its preservation as cultural heritage [1].

The protected zone of the monument is the area which is necessary to preserve the dominant in its immediate environment, historical architectural environment and to ensure its optimal visual perception.

Buildings regulation zone is a territory that surrounds or is adjacent to the complex protected zones or protected zone of separate monument designed to preserve the traditional character of buildings of the historic architectural environment. This means preserving the right size and shape for ordinary buildings which are the background of the architectural monuments, which have always been the city dominants and accents. This is the «buffer zone», which should provide a harmonious transition from the buildings of the historic core to the modern buildings.

Area of protected landscape is a territory outside the complex protected zone or protected zone of separate monument designed to preserve the historical landscape surrounding the monument, city building unity with nature and visual disclosure monument from distant points.

The areas of archaeological cultural layer set in the cities that were founded to 14-16 centuries [11]. This is the area where excavations are conducted, or where have been found the remains of the cultural layer.

Zones of protection are allocated specifically to protect the traditional character of environment, monuments and the ensemble of historical center as a whole and for the regulation of new construction and reconstruction of the historical architectural environment. According to the state building codes those zones have limitations and special regime of their usage that must be performed during the reconstruction projects and the introduction of new buildings in the historic city center.

Another important document that regulates the possibility of modern construction or reconstruction of the historic city center is his-

torical and urban planning substantiation. This is the type of planning documentation, which is being developed in order to prove a particular object locations in a given area, located in the historically valuable architectural environment or for the allocation of plot within historical areas of cities for the new design or reconstruction. It is necessary to substantiate new design solutions that should be developed taking into account the planning, spatial, architectural and stylistic features of the historical valuable environment.

The task of the historical and urban planning substantiation is to identify the historical and cultural potential architectural environment where planned to place a new object, determine the conditions and limitations on buildings on selected land plot and the limit parameter of object that can be placed on it.

The historical and urban substantiation «clarifies and details the positions of historical-architectural reference plan of historical settlement to preserve the traditional character of the historic environment within the historical area» [10].

It is carried out:

1) by analyzing urban setting within the studied planning (quarter, group of quarters, microdistrict);

2) taking into account the urban value of the object;

3) on the basis of normative documents with the requirements of the current legislation [3, 12] and approved planning documentation.

The historical and urban planning substantiation consists of analytical and graphical parts. The analytical part includes historical research and inspection on location.

First it necessary to study the historical-literary and archival materials of the investigated area and adjacent territories. Based on these materials, it can make a conclusion about the historical features of urban formation of the plot in the urban environment. This makes it possible to correctly identify the territory, surrounding the plot, which should be in the study. The plot formed and developed not in isolation but in a town-planning context. Further, this area is subject to inspection on location.

During the inspection on location the main attention should be given to identify sustainable urban and architectural features of the site and adjacent areas and existing buildings on them. After the investigation we can make a conclusion about the degree of preservation of the historic environment as a whole and its individual components:

- what was preserved, what was lost;
- what is necessary to preserve;
- what it is necessary to upgrade in the process of reconstruction.

This will determine the limits of architecture and urban restrictions and requirements for reconstructing or designing a new building in the historic built environment.

Also is important the prediction about the impact of the new building in historically made up the urban environment. At this stage must be analyzed and taken into account the artificially created architectural environment as well as the primary natural environment and their mutual influence. For harmonious inscribing the new building into the existing historic environment, should be followed its traditionally formed planning, volumetric-spatial, composite and silhouette features; historic parcellation, stylistic, color and texture parameters. Also, the new construction or reconstruction of existing buildings should be given the characteristics of underlying natural terrain (relief, natural water pond, vegetation). From these to a large extent depends on the possibility of add-ins, extensions, creation of underground levels, etc. Difficult relief and hydrography of area require additional special calculations and limits [4, 13], which should be considered in the development of the reconstruction projects and new construction.

Analytical researches are made in the schemes-drawings that make up the graphical part of the historical and urban planning substantiation. That are following.

1. Situational scheme of plot placement. The limits of the selected area are shown on it. This scheme is carry out on the copy of the master plan or on the copy of the reference plan. These plans must show all the objects that were built after the adoption of the docu-

ment. Under this scheme the placement of the site, its limits and its area are determined.

2. Fragments of the historical plans of the town.

With the help of historical plans the main stages of planning and volumetric-spatial structure of the city and the construction area are defined and characterized. If there are historical photos they are also included.

3. Fragment of the historical-architectural reference plan.

This plan is determined the value of the historical architectural environment in which the selected plot for design is situated; view disclosure and view influence of existing monuments. The presence of modern and preservation historical dominants and accents. Availability of the disharmonized buildings.

4. Fragment of the scheme of zones of protection monuments of architecture and urban planning.

The lines of design area are allocated on the scheme. A conclusion is made, to which protection zone the plot gets, which are limitations for design in this area.

On the basis of research and analysis of previous schemes is the conclusion about the possible methods of restoration and reconstruction buildings in selected area.

5. Scheme of storey and density of buildings on the site.

This scheme:

- determines the spatial characteristics of the existing building;
- analyzes the historical and contemporary accents and dominant, valuable ordinary historical and modern buildings;
- determines the valuable visual communications, valuable view points that must be preserved in the new construction or reconstruction.

It's necessary to consider the historically compiled storey and density, and compositional methods of building.

6. Scheme of style and preservation of buildings.

The scheme analyzes the all buildings on the site and surrounding area for the period of construction and stylistic identity. The historic percolations is determined. Also, the degree of

preservation of buildings by preservation category is determined. A conclusion about the influence of the new object design to the existing the historically compiled buildings is made.

7. Scheme of the functional zoning.

The plot design is allocated on the scheme. Is defined in which functional area of the city it is. Also, the scheme is analyzed the modern functional using of the existing buildings in the plot. After analyzing the conclusions are drawn:

- what function for building will be a priority after the reconstruction or new construction in the plot;
- which function it can complement;
- what function should be deleted.

8. The scheme of transport and pedestrian links.

Under this scheme are described which line, stations and public transport are within or near the plot. The diagram are shown:

- highways;
- city roads;
- local driveways and entrances;
- bike route (if any);
- pedestrian roads, areas;
- pedestrian squares, parks;
- public transport stops;
- car and bicycle parking.

9. The concept scheme of reconstructive measures.

The proposals for restoration or reconstruction planning and spatial structure of the area (urban reconstruction) and architectural and planning structure of the buildings which are located in this area (volumetric reconstruction) are given in this diagram. The scheme is linked to the conclusions the historical and urban planning substantiation and is recommendatory to select methods of restoration or reconstruction.

The conclusion of the historical and urban planning substantiation should determine the possibility or impossibility of new construction or reconstruction in this part of the historical town. Setting conditions, restrictions and limiting options for a new building if it possible its construction.

## CONCLUSIONS

Each stage of pre-project analysis aimed at identifying the specific features of the historical urban environment. Their consistent linkage in one system gives a complete picture of baseline data to design the project of reconstruction of the historical urban environment or new construction in it.

### 1. Historical-genetic analysis.

Identification the genetic code of the town (the historic town center, the historic architectural environment).

2. Analysis of the current state of the urban historical architectural environment (historic town center, ensemble, quarter, house). Drawing the destructive scheme.

3. Analysis of the historical-architectural reference plan of historic town (historic town center). The conclusions about the degree of historical and cultural value of the existing buildings in the construction area.

4. The analysis of zones of protection monuments of architecture and urban planning and regime of their usage. The conclusion is which protection zone gets the plot design, limitations and possible regime of it usage.

5. The historical and urban planning substantiation of new construction (reconstruction buildings) in the sites in the historic town center. The conclusion is about the conditions and restrictions of building on the land plot and limiting parameters of the object that can be placed in the selected area.

The general conclusions and recommendations should be the model scheme of reconstruction of the historic environment with using modern methods of restoration and reconstruction (the historic city center, the historic architectural environment).

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### **Предпроектный цикл исследования архитектурной среды исторического центра малого города как аналитический этап его реконструкции**

*Нелля Лещенко*

Киевский национальный университет  
строительства и архитектуры  
Воздухофлотский просп., 31, Киев,  
Украина, 03037, [ardisconn@ukr.net](mailto:ardisconn@ukr.net)  
[orcid.org/0000-0002-3198-4554](http://orcid.org/0000-0002-3198-4554)

**Аннотация.** Для создания грамотных проектов реконструкции исторической среды необходимо проведение предпроектного цикла исследований. Его цель – создание детальной базы исходных данных. Предпроектные исследования следует проводить с использованием метода графоаналитического историко-архитектурного анализа и анализа современного состояния, метода сравнительного анализа, обобщения путем составления выводных и рекомендательных схем.

В статье выделены этапы предпроектного цикла исследования архитектурной среды исторического центра малого города. Он состоит из историко-генетического анализа, анализа современного состояния архитектурной среды исторического города, выполнения историко-опорного плана, проекта зон охраны памятников архитектуры и градостроительства, составления историко-градостроительного обоснования. Эти исследования направлены на выявление особенностей формирования и развития исторической городской среды, определение ее ценности и степени сохранности, определение границ архитектурно-градостроительных ограничений и требований при проведении реконструкции или новом проектировании в исторической среде. В статье показана последовательность предпроектных исследований и их взаимное влияние. Отмечены выводные схемы каждого этапа. Определена схема-модель реконструктивных мероприятий как результирующая предпроектных исследований и рекомендация к выполнению проекта реконструкции.

**Ключевые слова:** предпроектный цикл исследования, историко-генетический анализ, историко-опорный план, историко-градостроительное обоснование.