

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

**O. M. BEKETOV NATIONAL UNIVERSITY OF URBAN
ECONOMY IN KHARKIV**



METHODICAL RECOMMENDATIONS

For practical classes, organization of independent work and
implementation of the course project

**«VILLAGE PROJECT FOR 6–8 THOUSAND
INHABITANTS»**

On the subject

**«ARCHITECTURAL DESIGN OF BUILDINGS AND STRUCTURES:
RESIDENTIAL VILLAGE FOR 6–8 THOUSAND INHABITANTS»**

*(For 3-rd year full-time students majoring in
191 – Architecture and Urban Planning)*

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Methodical recommendations for practical classes, organization of independent work and implementation of the course project «Village project for 6–8 thousand inhabitants» in the discipline «Architectural design of buildings and structures: residential village for 6–8 thousand inhabitants» (for students of the 3rd year of full-time study specialty 191 – Architecture and Urban Planning) / O. M. Beketov National University of Urban Economy in Kharkiv ; compilers: O. V. Smirnova, B. I. Bozhynskyi, D. M. Gura. – Kharkiv : O. M. Beketov NUUE, 2021. – 46 p.

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INTRODUCTION

The methodological recommendations provide the material needed to perform practical tasks, develop a course project and organize independent work of students during the study of the discipline «Architectural design of buildings and structures: residential village for 6–8 thousand inhabitants» module № 5 «Village project for 6–8 thousand inhabitants» (Content module 5.1. The project of the village for 6–8 thousand inhabitants; Content module 5.2. Designing of the public center of the village).

These guidelines are designed to ensure that 3rd year students complete a project to plan and build an urban-type village for 6 to 8 thousand residents. In this project it is necessary to solve a complex of architectural-planning, engineering-technical, ecological and aesthetic questions and to develop in detail the public center of the settlement. This project is the first design experience in the field of urban planning.

The purpose of these recommendations is to acquaint students with the peculiarities of the village formation as a modern architectural and urban planning object. Such facilities have not been created in recent years in Eastern Europe and Central Asia; as such, settlements do not meet the proposed social requirements. Today, when we are in the new socio-economic conditions of the village transformation, it is important to identify current approaches to the formation of the rural environment, as well as to determine the areas in which a particular environment will develop. Currently, there are socially and economically oriented changes in agricultural production. These changes determine the need not only for economic, social, but also for urban development.

Students need to analyze the current state of rural settlements and their economic base. This analysis will lead to the creation of new economic complexes. These complexes will help to change the architectural and planning organization, both in the village as a whole, and its structural elements. In addition, these complexes will help change the organization of the public center and housing

complexes, landscaping, and production. The new environment should be more flexible, taking into account the existing system of resettlement, planning and development of settlements. This environment must meet modern conditions, as well as be able to make the necessary changes in the future.

Therefore, it is necessary to analyze the experience of designing such settlements (mostly foreign objects) and develop appropriate recommendations. These methodological recommendations consider the peculiarities of the formation of the functional and aesthetic component in the creation of modern villages, as well as their typological characteristics, set out patterns and requirements for their formation.

1 THE PURPOSE AND OBJECTIVES OF THE COURSE PROJECT

The main goal of the project is to consolidate the knowledge gained by students in lectures on the course "Fundamentals of Urban Planning" during independent work on the project. When developing a project, students must solve the following tasks:

1. Students should take into account and use the natural conditions of the area as an important factor to create the best working conditions and recreation of the population and provide the village with individual qualities.
2. Students must make the correct functional zoning of the territory and offer a rational mutual placement of the main areas of the village (settlement zone, industrial and landscape-recreational zone).
3. Designers must develop a clear architectural and planning organization of the settlement area of the village and take into account the rational system of cultural and household services, recreation and physical development of the population.
4. Students must develop a rational organization of the transport and pedestrian paths system.
5. Students must create a distinct architectural and artistic image of the village in general and its community center in particular.
6. Designers must perform architectural and planning tasks taking into account engineering, sanitary, environmental and economic requirements.

2 THE COMPOSITION OF THE PROJECT

1. Master plan of the village (with the balance of the territory and technical and economic indicators), Scale 1:2 000 (first sheet).
2. Schemes on a scale of 1:5 000 (second sheet):
 - 2.1. Scheme of analysis of the landscape situation of the territory for the village.
 - 2.2. Scheme of functional zoning and cultural and household services.
 - 2.3. Scheme of transport and pedestrian paths.
 - 2.4. Scheme of profiles of settlement streets and projected passages.
3. Master plan of the village center or its fragment with the development of landscaping elements, Scale 1: 500 (third sheet).
4. Perspective from a bird's eye view or axonometry of the village center or fragment of the village center. Perspective sketches of housing and the public center of the village (fourth sheet).
5. Brief explanatory note to the project.

3 THE SEQUENCE OF PROJECT IMPLEMENTATION

Students complete a course project based on a task issued by the project manager. The task consists of text and graphic parts. The text indicates the population of the village; also, it indicates the percentage of the population living in different types of houses (sectional, block, individual). You should also indicate the family ratio (average number of family members) of residents living in different types of houses. Also, designate the name of the enterprise, indicating its hazard class and size of the territory.

The graphic part of the task is a topographic basis of the territory at a scale of 1:5 000

Project implementation sequence:

1. Students should be acquainted with the text part of the task and the topography of the area, study the guidelines and literature on this issue. Execute an abstract on the topic of the project.
2. Perform an analysis of the area landscape selected for construction.

3. Perform the calculation of the main elements of the village (determine the size of the relevant village areas and objects of cultural and household services), to conclude the settlement balance of the village.

4. Develop a scheme of functional zoning of the village on a scale of 1:5 000 (clause). Increase the scale of the territory selected for the village to a scale of 1:2 000.

5. Develop a sketch of the master plan of the village, its architectural, artistic and spatial organization at a scale of 1:2 000. Approve the sketch.

6. Make drawings according to the approved sketch of the general plan of the village completely, using certain computer programs.

7. Perform completely (by means of computer graphics) schemes in the scale of 1:5 000: the scheme of the analysis of the territory landscape, the scheme of functional zoning of the village territory and the scheme of cultural and household services, the scheme of transport and pedestrian paths.

8. Make drawings clearly (on the same sheet) of cross sections of streets, roads and driveways.

9. Develop a sketch of the architectural and planning solution of the public center at a scale of 1:500 with all the elements of landscaping.

10. Approve a sketch of the master plan of the community center. Make a complete drawing of the master plan of the community center of the village with all the elements of landscaping at a scale of 1:500 (by means of computer graphics).

11. Execute perspectives (from a bird's eye view) of the community center of the village and perspective sketches of the residential area of the village and community center. Perform (on the same sheet) a scan on the main street of the village at a scale of 1: 500.

12. Calculate the technical and economic indicators of the village and calculate the project balance of the territory.

13. Finalize and graphically refine the project. Make a presentation of the project in Power Point and make a brief explanatory note to the project. If desired, the student can make a video presentation of his project.

14. Project defense.

3.1 The content of the abstract and methods of its implementation

The main purpose of writing an abstract is that in the process of working on it the student is acquainted with the literary sources and normative literature on the design of villages. Students perform the abstract according to the following plan:

1. Types of urban villages and their functional zoning.
2. The settlement zone of the village and its main elements.
3. Techniques of architectural and planning organization of housing.
4. Architectural and planning organization of the village public center.
5. Technical and economic indicators for the village.
6. References.

Each section of the abstract should have illustrations.

3.2 Analysis of the landscape situation of the village

When starting work, you must first analyze the state and composition of the natural landscape of the territory. As a rule, for the village you should choose the territory on the southern, southeastern and southwestern slopes, if possible near rivers and open water bodies.

Within the territory chosen for the settlement, students perform a compositional analysis of this territory. This is necessary for the development of architectural and planning composition of the village to achieve an organic combination of village planning and natural features of the area.

In the process of analyzing the natural situation, students establish the presence and quality of natural and artificial factors (forests, waters, ravines, hills, and the presence of external roads). Students also determine the main spatial compositional axes, which usually coincide with the axes of watersheds and thalwegs (watershed – the longitudinal axis of the hill, formed by the intersection of its two steep slopes, thalweg or watercourse – the lowest longitudinal axis of the ravine, formed by the

intersection of its two slopes).

Students determine the slopes of the territories and their suitability for development: suitable areas with a slope of up to 10 %, limited suitable – with a slope of up to 20 % and unsuitable – with a slope of more than 30 %.

Students identify areas conducive to the placement of recreation areas and the location of industrial areas. Experts recommend placing industrial areas on the leeward side in relation to the settlement area and downstream. The slope of the industrial area should not exceed 5 %.

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Designers usually choose a place for the public center of the village at the intersection of the main compositional axes of the landscape (composite nodes) and on elevated areas.

Students also determine the conditions of perception and inspection of individual areas (remoteness of perception, viewpoints, disclosure of panoramas). Students also highlight valuable landscapes on a topographic basis.

The location of the architectural dominants of the village should reflect its natural and landscape basis. On the elevated areas of relief and curbs, students place the most significant dominants of the village, which later form the main compositional axes of the village.

The whole set of landscape, topographic and hydrogeological factors students reflect on the scheme of analysis of the landscape situation (appendix A).

3.3 Scheme of functional zoning of the village

After preliminary calculation of the main elements that make up the territory of the village (appendices B, C, D), students perform the scheme of functional zoning of the village in the form of a closure in the scale of 1: 5 000 (appendix E). The main task of this clause is to finally determine the location of the entire territory of the village and develop a scheme of functional zoning of the village. At the same time, it is necessary to take into account the planning constraints obtained during the analysis of the landscape situation. It is also necessary to take into account the requirements that exist for each zone and their mutual location.

Specialists divide the territories of settlements according to their functional purpose and nature of use into the following zones: residential, industrial (including external transport) and landscape-recreational.

The residential area (settlement zone) includes residential area (section, block and manor buildings), areas of public buildings and structures, including educational and training institutions, research and design institutes without research production, community center, intra-village transport network, as well as public greenery.

The production area includes the territory intended for the location of industrial enterprises and related production facilities, utility and storage zones, enterprises for the production of agricultural products, sanitary protection zones of industrial enterprises, special purpose facilities and external transport facilities.

The landscape and recreational zone includes green and water spaces within the development of the village and its green zone, as well as other elements of the natural landscape.

The settlement zone should be located on the windward side (for summer winds of the predominant direction), as well as upstream (relative to industrial enterprises, which are sources of emissions of harmful substances into the environment).

To locate the living area, experts recommend the areas that are most favorable in the sanitary and hygienic sense. Mostly it should be the southern slopes. In the construction of residential areas, designers must adhere to construction zoning. In this zoning, developers are building the first zone (which is closest to the center) with sectional residential buildings. The second zone developers are building with low-rise block of flats with plots near the apartments. Developers are building a third, outer zone with individual houses with private plots. Designers can use other solutions.

The public trade and administrative center of the village should occupy a leading position in the functional and compositional structure of the village. It is expedient to place the center of the settlement in the places that are most expressive in the architectural and planning sense – on the hills, the banks of reservoirs, etc. However, sometimes it is advisable to bring the public trade and administrative center of the village as close as possible to the production area. This approximation creates additional benefits for the population and increases the architectural and artistic expressiveness of the center by including in its composition large volumes of administrative and laboratory buildings.

You should place **the park of the village** near the center, because the park serves not only as a place for a quiet holiday, but also for traditional summer and winter festivities and meetings of the village population. The sports area should be located near the school site or near the park.

The industrial zone should be located taking into account the organization of convenient transport and pedestrian connections with the settlement zone. It is also necessary to take into account the rational conditions of service of enterprises by external and internal transport, without dividing it by transit roads.

The utility and storage area should be located near the external highway that serves the village.

The zone of external transport includes the territories occupied by constructions of automobile, railway, water or air transport. If the settlement is located near a river or reservoir, these reservoirs should be actively included in the planning structure of the village. Thus, it is expedient to use a coastal strip for a landscape and recreational zone.

Using graphics tools, students must identify the basic planning idea in the scheme of functional zoning. To do this, students must highlight the generalized spots of individual elements of the village structure. In particular, it is necessary to allocate the settlement territory (taking into account building zoning), and also to allocate the public center, park, a sports zone, sites of kindergartens and a school site, industrial and landscape and recreational zones. You also need to draw an external highway

3.4 Development of the sketch of the village master plan

The composition of the master plan of the village can be compact or scattered, stretched, and according to the planning method, the composition can be regular geometric or free. With a compact composition, designers group buildings around a community center or park area; such a composition is typical of small villages. The extended form of the plan will be in the case when the settlement stretches along the coastal strip of the river or along the main street highway.

The students make a sketch of the master plan of the village on the scale of the territory chosen for designing the village increased to a scale of 1:2 000 (appendix F).

The main tasks of this stage:

1. Students must develop the internal planning and spatial structure of each zone.
2. They also need to clarify and supplement the street and road network of the village.
3. In addition, students must analyze the feasibility of decisions and take into account the level of solution of social, functional-planning, architectural-spatial, artistic, engineering, transport, environmental and economic requirements.

Initially, students carry out the structural division of the residential area in accordance with the construction zoning. Designers usually place the sectional building area near the community center. They outline the main street and residential streets of the village and outline the driveways according to their profile (appendix G).

The network of streets and driveways should have a simple outline and provide a minimum amount of time for the movement of the population between housing groups, cultural and household services, recreation areas and industrial complexes. When we design the street and road network of the village, we must accurately differentiate it by functional purpose.

In the system of streets and roads on the scheme of transport and pedestrian connections (appendix H, I), students must identify:

The main street of the village, which connects the community center, residential areas, production area and recreation area.

We also need to highlight *the residential streets* that connect the parts of the settlement.

It is also necessary to allocate *passages* (internal yard passages and passages in blocked and manor buildings).

We should allocate *roads of economic purpose of a production zone*.

Students should also identify *pedestrian paths* (these pathways organize the connection between certain groups of residential buildings, cultural and household services, recreation area and places of work)

Students must also identify an *external road* that connects the village with the outside world (Table 7.3 of the State Building Regulations 360–92 **).

Students also need to determine the planning scheme of the community center. In project practice, there are several basic planning schemes of community centers.

Linear scheme – with development along the main street on one or two sides.

Corner scheme – with the development at the turn of the street.

Pocket area, or cour d'honneur (courtyard) at the end of the entrance (this scheme is very common in the practice of design and construction).

Nodal scheme – at the intersection, with the intersection of streets in one or more places.

Free scheme – in the form of a park, garden, promenade.

Due to the variety of functions of the community center, the functional zoning of its territory is of great importance. Usually within the center, there are zones:

administrative and economic, trade and household, cultural and educational.

Students should design the transportation service of the center, providing a convenient connection to the main street. At the same time, the norms do not allow the passage of transit transport through the central square.

Inside the village, it is advisable for students to separate transport and pedestrian paths, as well as to isolate the space of the main square from traffic.

After calculating the number of sections in the section building, students need to place section houses, forming these houses in the form of housing groups. Given the small number of floors of sectional buildings (3–5 floors), students should form houses no longer than five sections. In this case, the distance between the long sides of buildings 4 floors high students must choose at least 20 m. The distance between the long side and the ends with windows from the living rooms of these buildings students must choose at least 15 m (paragraph 3.13 of State Building Regulations 360–92 **). Students must place apartment buildings on the ground floors, deviating from the red lines of the streets. On the main street, the deviation from the red line should be 6–10 m, on the residential street the deviation should be – 6 m.

To access groups of residential buildings, students must design the main (with two lanes) and secondary (with one lane) passages with a width of 5,5 m and 3,5 m, respectively. On secondary passages (with one lane), students must design travel platforms 6 m wide and 15 m long. The distance between travel sites should be no more than 75 m from each other (paragraph 3.11 of the State Building Regulations 360–92 **). Dead-end passages should be no longer, than 150 m. Dead-end passages should end with turning platforms measuring 12 m × 12 m. This will ensure the reversal of garbage trucks, fire trucks and other trucks. Students must place intra-quarter passages in sectional buildings at a distance of 6 m from the walls of buildings.

The area of plots at the apartments of the blocked houses designers choose on 0.03 hectares. The width of such areas is equal to the width of the block of flats. Students must divide the area of the blocked building into sections, providing access to each house (appendix J).

Designers choose the area of plots for individual houses equal to 0,06 hectares.

When the shape of the site is rectangular, the most convenient dimensions of the site are 20 m (front) \times 30 m (depth). In the area of manor buildings, students must form a network of intra-quarter passages. Students must choose the width of the carriageway of these passages to be 3,5 m (when there is one lane). Moreover, when there are two lanes, the width will be 5,5 or 6 m. The length of dead-end passages should not exceed 150 m. The carriageway of dead-end passages should end in roundabouts. The radius of these detours along the axis of the carriageway must be not less than 10 m. The carriageway of dead-end passages may also end with turning platforms measuring 12 m \times 12 m each (paragraph 3.22 of the State Building Regulations 360–92 **).

Students should specify on the master plan the area where they will place sites of high school and sites of children's preschool institutions (kindergartens). Students must also consider the maximum allowable service radii. For preschool institutions, the service radius is 500 m, for schools – 750 m (appendix K, Table 1 of the State Building Regulations 360–92 **).

The hospital-polyclinic complex (hospital) belongs to the settlement territory and is located on the outskirts of the village in a picturesque area. This hospital should be located at a distance from reservoirs and at a distance of not less than 50 m from residential buildings.

You must divide the production area into its structural elements (industrial area, utility warehouse, sanitary protection area, and external transport area). You must divide this area so that part of the industrial area is at least 60–65 % of the total area of the production territory (paragraph 4.2 of the State Building Regulations 360-92 **).

In this project, you have to choose the fourth or fifth hazard class for industrial production. According to these hazard classes, the width of the sanitary protection zones is 100 and 50 m. In the sanitary protection zones you must place a fire station (the area of the site is 0,25–0,5 ha). You must also place a bath and laundry plant (the area of the site is 0,5 hectares), a dry cleaning factory (the area of the site is 0,5 hectares). Students must also place garages in these areas for individual cars of

residents living in sectional houses. These garages can be both above ground and underground.

In the sketch, you need to specify the location of the sports zone with a small stadium. This stadium can be located adjacent to the community center, park or near the school site (appendix K).

In the sketch, you need to divide the landscape and recreational area into its component parts: the beach area, the area near the beach, the water area and the forest park.

You should place the outdoor transport area near the industrial plant at the entrance to the village. In this project, you place only the bus station.

The territory of the cemetery should be located outside the village at a distance of not less than 300 m from the building line (table 6.2 of the State Building Regulations 360–92 **).

When designing new villages, you must choose the width of water protection zones. For reservoirs, the width of the water protection zone will be not less than 500 m. For small rivers (up to 50 km long), the width of the water protection zone will be not less than 100 m. For rivers 50–100 km long the width of the water protection zone will be not less than 200 m (paragraph 10.17 of the State Building Regulations 360-92 **).

You should design a windbreak around the village (if the village is located in a forestless or sparsely forested area). The width of this forest strip must be not less than 50 m (paragraph 10.7 of the State Building Regulations 360–92 **).

3.5 Architectural and planning organization of the village public center

INSTITUTIONS AND SERVICE ENTERPRISES

You must make a sketch of the master plan of the village center at a scale of 1: 500. You make this master plan based on the village center as a part of the master plan of your village, which you developed earlier in scale 1: 2 000.

The main tasks of this stage.

1. You must *specify the selected planning* and spatial structure of the community center and its functional zoning.
2. You need to *create a clear architectural and artistic image* of the community center.
3. Students should also *develop a detailed improvement* of the community center.

The community center of the village is a set of square (or squares), surrounding buildings, areas of public buildings of the center, garden square, sections of adjacent streets, boulevards, pedestrian alleys, landscaping elements and parking lots. The main structural element of the community center is the square for various public events (Appendix L). You need to choose the size of the free area of the square for mass celebrations at the rate of 700–750 m² per 1,000 inhabitants. This square should lie next to the building of the village administration. Large-scale ratios of spaces and architectural volumes are of great importance in creating a holistic look of the community center of the village.

In order to create a good visual perception of the buildings of the community center and to correlate the height of the buildings and the length of the square, which is equal to 1:6–1:8, we must organize a suitable open space. This open space should not exceed 0,15 ha in small populated towns (paragraph 2.20 of the State Building Regulations 360–92 **).

The architectural and planning organization of the public center is the basis for its spatial solution. The center's spatial planning solution allows for several options.

1. You can create an *enclosed space*.
2. You can create a *system of interconnected spaces* that interpenetrate each other.
3. You can organize the center *in an «island» way*.
4. You can create a *panoramic construction* of the center.
5. You can organize the center in a *closed (centric) composition*.

In the case of a closed (centric) composition, people do not perceive the volumes of the individual houses that organize the center. People perceive the space and surfaces that limit this space. There are no large gaps between the houses.

The composition of interconnected spaces is multifaceted. This versatility is revealed gradually. People cannot perceive this diversity from a single point of view. The individual buildings of the community center are connected by covered passages and elements of small architectural forms. Between the houses, there are small landscaped areas. Reservoirs and greenery are also involved in the composition; these elements are interconnected.

The «island» composition of the center is a favorite technique in religious architecture, when the church or monastery was the central element of the composition. Such a compositional center could be clearly seen from all sides, and the space freely flowed around the volume of buildings. In modern practice, the island composition of the center allows to place three groups of institutions in one blocked building. These are administrative and economic, cultural, educational, trade, and household institutions.

The designers use the **open panoramic planning composition** of the center in the presence of landscape elements. These elements are able to take an active part in creating the architecture of the center. This is a landscape on rugged terrain, near reservoirs, on the slopes of valleys and so on. Architects build open compositions usually on the principle of panorama of the buildings. Therefore, in open compositions, designers use long houses with a frontal plan, placing them at different levels vertically.

The school building is often involved in the formation of the community center ensemble; the school area is adjacent to the center.

Nowadays, the tradition of constructing a religious building in populated areas is being revived. A small church in the village can stand in one of the most picturesque places. As a rule, the church stands on a hill or near a reservoir, or near a green space. Alternatively, the church can be directly adjacent to the community center. In the architectural and planning structure of the village, the church, as a rule,

closes the perspective of one of the streets. Most often, the church closes the perspective of the main street.

After making the architectural and planning decision of the public center, you need to select the projects of the necessary public buildings according to the catalog of existing projects. However, you can also use promising construction projects published in architectural magazines. At the same time, you need to compare them with typical projects (appendix K) so that you can follow approximately the same volumes of houses and their building areas. After that, on the scale of the master plan of the center, you place and specify the locations of the plans of the necessary public buildings (administrative, commercial, cultural, and educational).

The planning structure of the community center is directly related to the nature of the building. In one case, designers build the center as separate public buildings, in other cases – houses that contain several institutions or enterprises. These establishments may be housed in a block of flats or consist of separate adjacent blocks, or these establishments may be housed in a single volume of a cooperative building.

You should form the community center of the village according to the laws of architectural composition, which allow not just to build a complex of buildings of the community center, but also to create an architectural ensemble. The formation of the ensemble begins with the definition of the main and secondary elements of the composition. Usually, the main building in the ensemble of the community center is an administrative building or a leisure center building (appendix M).

To create an architecturally expressive ensemble of the center, architects use the techniques of contrasting interaction of individual parts of this ensemble. Among them is the method of comparison of vertical and horizontal elements. The spatial environment of the public centers of most settlements is characterized by the «flatness» of the composition, because their public buildings are mainly two- or three-story. To give the community center its central role in the spatial environment, architects introduce active vertical elements – single-section tower buildings or engineering structures such as water towers, which become spatial landmarks and

provide a visual connection between the community center and housing and landscape.

In design practice, it is also common to highlight the main element of the ensemble with a developed silhouette.

Community centers should have a variety of perspectives. The effect of «surprise», change of angles – is also a means that accompanies the architectural composition. However, this tool is acceptable in cases where it is a consequence of the natural construction of the composition. The task of the external improvement of the public center is to complete its architectural and spatial organization, to create conditions for holding public events.

When placing small architectural forms, students should take into account the functional division of the community center into the following areas:

- the area of mass celebrations;
- pedestrian and recreational area;
- transport and economic area;
- the area of public green zones;
- the area of green plantations of limited use.

The area for ceremonial mass events should be an open area with a decorative paving. We can place monuments and memorials on the square. The location of the monument or memorial can be central or asymmetrical in relation to the entire space of the square. The location of the monument depends on the architectural and planning organization of the square. Experts recommend composing the monument in combination with elements of landscaping and floral decoration. These are parterre lawns, flowerbeds or decorative small architectural forms.

The decorative covering of the square for mass celebrations (celebrations, events) can be made of decorative concrete slabs of different shapes and colors, stone slabs, clinker bricks, etc.

In the community center, you need to provide a small square with areas for short-term recreation or with a parterre lawn with footpaths and tree-shrub groups.

Recreational area – a platform in front of the entrances to public buildings. In

these areas, you can install information elements in pedestrian communication hubs to ensure convenient access to them.

Areas for short-term recreation in front of the entrances to public buildings should be separated from the crowded places and the main flow of visitors. You can separate these areas by a low hedge or parterre lawn with decorative tree and shrub groups or flower arrangements. To protect against excessive insolation and strong winds, as well as to create cozy seating areas, such areas are equipped with light pergolas, trellises and decorative walls with twisted plants. You must install these elements so as not to cover the facades of houses.

We recommend using the recreation areas located in the courtyard of the leisure center as a summer cafe for visitors. Here you can place a decorative pool. Landscaping of such areas should be interior. Specialists use decorative concrete tiles, stone slabs, breccia, and brick crumbs to cover recreation areas.

If you have designed a section of the main street in the public center in the form of a boulevard, then along it we recommend to place small recreation areas equipped with lamps, benches, urns.

At the entrance to the community center, you must arrange an outdoor car park with asphalt pavement and car markings. You must arrange parking for special vehicles in the farmyards and near the administration building.

Utility yards near public buildings in the center should have asphalt or asphalt pavement. Along the perimeter of these courtyards, you should make a hedge or decorative wall to insulate the yard from the main square or the main street.

4 GRAPHIC DESIGN OF THE PROJECT

Computer graphic design of the project should help to reveal the architectural-planning and artistic idea of the village organization. For better disclosure of the idea, you should consider the means of graphic presentation of the project, so that you have completed the finished exhibition at a high level.

In the master plan, you need to show the wind rose, the horizontal relief. You also need to show a network of streets and driveways (in red lines) with the image of

the roadway. You must show the location of residential and public buildings, sports center, greenery, as well as show the boundaries of the village. You show the production zone (industrial and communal-warehouse) only within their territories. On a sheet of the master plan of the village, you need to place an explication of houses, constructions and territories. In addition, students must show the estimated and design balances of the territory and technical and economic indicators of the master plan.

In general, you can complete the final design of the project in monochrome or color (appendix N, O).

For design, we recommend that you use several computer programs that you could show a variety of graphics and prepare a 3D video presentation of your project proposal.

5 TECHNICAL AND ECONOMIC INDICATORS OF THE VILLAGE MASTER PLAN

1. Number of inhabitants (calculated in persons)_____

2. The territory of the village (calculated in hectares)_____

3. Housing stock of the village (the sum of the total area of all residential buildings of the village), calculated in square meters_____

4. Average number of storeys of residential buildings:

$$Ast = \frac{(Housing\ stock\ of\ the\ village, m^2)}{\frac{a_{sect}}{4} + \frac{a_{bl}}{2} + \frac{a_{ind}}{2}}$$

The letter «a» in this formula means the housing stock of sectional, block and individual houses; «2» and «4» means the number of storeys of buildings.

5. Housing security of the villagers, m²/persons:

$$\frac{Housing\ stock\ of\ the\ village, m^2}{Population, persons}$$

6. Density of housing stock (gross), m²/ha:

$$D_{gross} = \frac{Housing\ stock\ of\ the\ village, m^2}{Settlement\ area, ha}$$

7. Density of housing stock (net), m²/ha:

$$D_{net} = \frac{\text{Housing stock of the village}}{\text{Residential area, ha}}$$

8. Population density (gross), persons/ha:

$$D_p = \frac{\text{Housing density (gross), m}^2/\text{ha}}{\text{Provision of the population with housing, m}^2/\text{persons}}$$

9. Building density, %:

$$D_b = \frac{\text{Building area of all buildings of the village, m}^2}{\text{Settlement area, m}^2} \times 100 \%$$

10. Landscaping degree, %:

$$Deg_l = \frac{\text{Common green space, m}^2}{\text{Settlement area, m}^2} \times 100 \%$$

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GLOSSARY

A detached house is a one-family house intended for one family living, which has an adjoining plot.

A block of flats (blocked residential building) is an apartment-type building with two or more apartments, each of which has a direct exit to the apartment plot.

Building plot – a plot of land on which houses with adjacent plots or a block of flats with individual apartment plots are located.

Residential development complex – an area, usually less than 30 hectares (but not less than 5 hectares). We form this territory in the system of town and district infrastructures. This is transport, engineering, social infrastructure. This area is a relatively separate from the surrounding buildings and environment housing with a system of internal passages, with separate facilities and public areas.

Settlement (village) – an area larger than 30 hectares (usually more than 50 hectares), which we form as a self-sufficient housing entity in the system of city and district highways; this area has an independent system of internal streets, driveways, service facilities.

Red lines – lines that indicate the existing, planned (changed, newly formed) boundaries of public areas, the boundaries of land plots on which engineering networks are located, power lines, communication lines (including line and cable structures), pipelines, highways, railways and other similar structures. Buildings and structures should not protrude beyond the red lines towards the street or square. Within the red lines, the norms allow the placement of structural elements of road transport structures (supports of overpasses, stair and ramp stairs of underground pedestrian crossings, pavilions at public transport stops).

Building lines – conditional lines that set the boundaries of the building when we place buildings, structures with a deviation from the red lines or from the boundaries of the land.

Building indent – the distance between the red line or the boundary of the land and the wall of the building or structure.

Street – an area intended for traffic and pedestrians, which includes a

carriageway with two lanes, sidewalks, ditches and berms.

Passage – an area intended for traffic and pedestrians, which includes a single-lane roadway, curbs, ditches and berms.

A residential building is an apartment building in which apartments have common out-of-apartment premises and engineering systems.

Sectional dwelling house is a building consisting of one or more sections separated from each other by walls without openings. Apartments of one section have access to one stairwell directly or through a corridor.

Gallery-type residential building is a building in which all apartments on the floor have exits through the common gallery by at least two stairs.

Corridor-type dwelling house is a building in which all apartments on the floor have exits through a common corridor by at least two stairs.

Blocked building – a type of low-rise residential building, in which the same type of residential buildings are arranged in a row and interlocked with each other by sidewalls. Each of these houses has a separate entrance, a small front garden and sometimes a garage.

The community center is one of the functional zones of the village. The community center of the village is designed to accommodate the management, trade, services and cultural leisure of residents.

Recreational area – an area for mass recreation of residents. The recreational zone mainly includes recreational forests, recreational reservoirs, and national, natural, urban and other parks, etc.

APPENDIX A

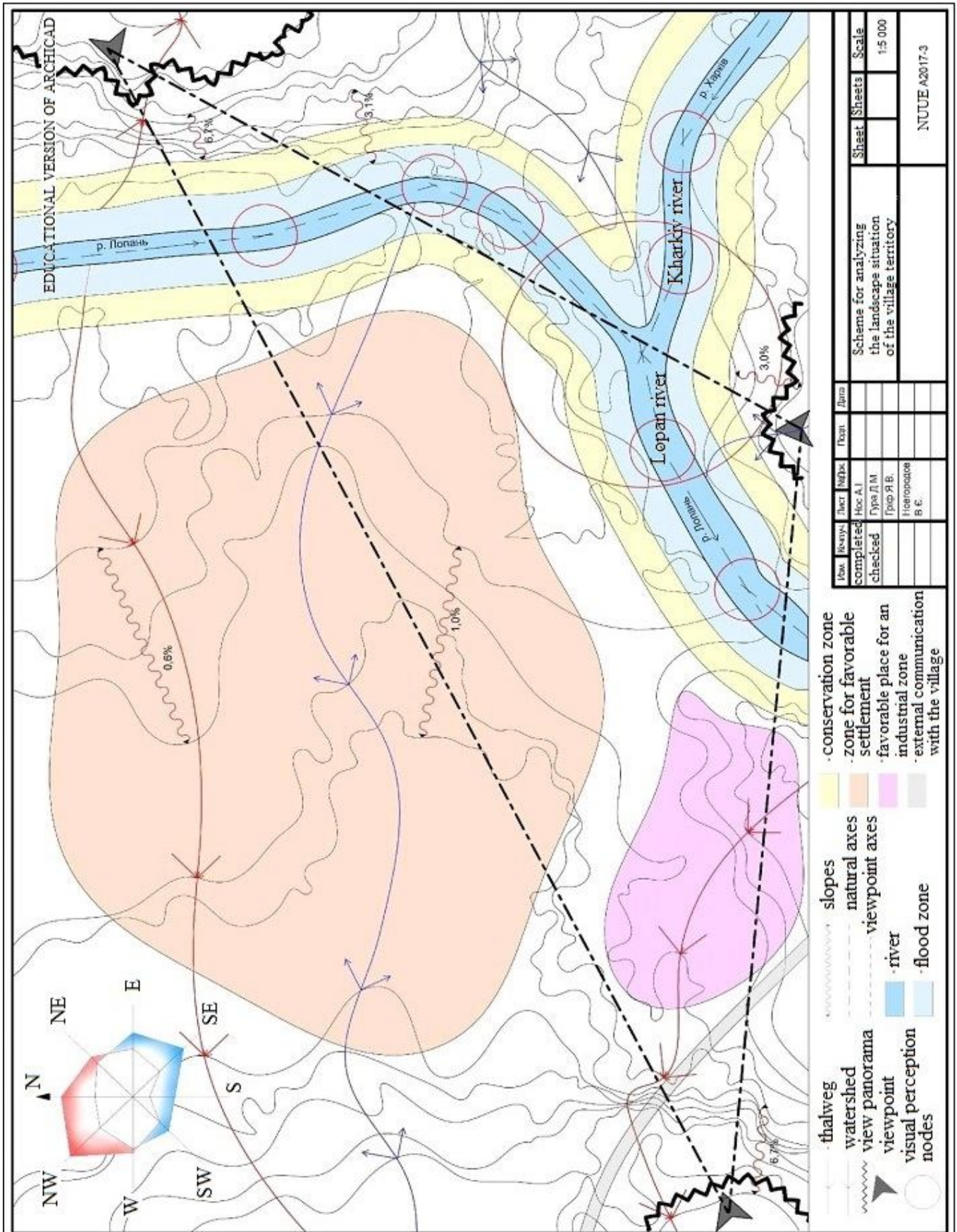


Figure A.1 – Example of the scheme of analysis of the landscape situation of the village

APPENDIX B

Table B.1 – Variants of tasks for the design of the village

Number of population living in:	The village has:			Coefficient of family
	4,000 inhabitants	5 000 inhabitants	6 000 inhabitants	
sectional houses	30 %	40 %	50 %	3
blocked houses	35 %	30 %	25 %	4
individual houses	40 %	30 %	25 %	5

APPENDIX C

An example of calculating the territory of the village per 5,000 inhabitants

A. Settlement area

1. We determine **the residential area of sectional buildings**. The population living in sectional houses is equal to 40 % of the total population of the village. Coefficient of family – 3. According to the notes of paragraph 3.8 of the State building Standards 360–92**, the residential area of the sectional buildings (with a building height of 4–5 floors) on one inhabitant is from 20,2 to 17,0 m².

The number of people living in sectional houses:

$$5,000 \text{ people} \times 0,4 = 2\,000 \text{ people.}$$

Residential area of sectional buildings:

$$20,2 \text{ m}^2/\text{people} \times 2\,000 \text{ people} = 4,04 \text{ ha (hectares).}$$

2. We determine **the residential area of the blocked buildings**. The population living in blocked houses is 30% of the total population of the village. Coefficient of family – 4. Determine the number of people living in blocked houses: $5,000 \text{ people} \times 0,3 = 1,500 \text{ people}$.

Number of families living in blocked houses

$$1\,500 \text{ people} \div 4 = 375 \text{ families (i.e. 375 blocks of flats)}$$

We take the area of the plot at each block of flats as 0,03 ha

The number of plots is equal to the number of apartments. Based on this, we

determine the residential area of the blocked buildings:

$$0,03\text{ha} \times 375 \text{ plots} = 11,25 \text{ ha}$$

3. We determine **the residential area of the estate**. The population living in individual houses is 30 % of the total population. Coefficient of family – 5. Determine the number of people living in individual houses:

$$5\,000\text{people} \times 0,3 = 1\,500 \text{ people.}$$

Determine the number of families living in individual houses:

$$1\,500 \text{ people} \div 5 = 300 \text{ families (i.e. 300 plots).}$$

We take the area of a site at individual houses – 0,06 hectares and then we determine the residential area of the estate:

$$0,06\text{ha} \times 300 = 18,00 \text{ ha}$$

4. Determine **the entire residential area of the village**:

$$4,04\text{ha} + 11,25\text{ha} + 18,00 \text{ ha} = 33,29 \text{ ha}$$

5. We determine the area of land plots of **children's preschool institutions (kindergartens)**. To do this, first determine the number of places in these institutions, based on the norm of 70–90 places per 1 000 inhabitants (table 6.1. of the State Building Regulations 360–92 **):

$$80 \text{ places} \times 5 = 400 \text{ places.}$$

Since the maximum service radius of a children's preschool institution is 500m (according to Annex 6.3 of the State Building Norms 360-92 **), we take two such institutions in the village of 200 places each. Determine the total area of land of children's preschool institutions, based on the norm of 40 m² for 1 place (table 6.1 of the State Building Regulations 360-92 **):

$$40 \text{ m}^2/\text{place} \times 400 \text{ places} = 1,60 \text{ ha.}$$

6. Determine the area of **the school land**. We take in the settlement full high school of 1–3 degrees. Determine the number of places in the school, based on the norm of 180 places per 1 000 inhabitants:

$$180 \text{ places} \times 5 = 900 \text{ places (i.e. 900 students)}$$

Given that the number of students in one class should be 33, determine the number of classes in the school:

$$900 \text{ students} \div 33 \text{ students in one class} = 28 \text{ classes}$$

A typical complete secondary school has 33 classes. For such a school the land plot has an area of 2,50 ha (Table 6.1 of the State Building Norms 360–92 **).

7. Determine the area of the **community center** of the village, based on the norm 5–8 m² per one inhabitant:

$$7 \text{ m}^2 / \text{inhabitant} \times 5\,000 \text{ inhabitants} = 3,50 \text{ ha.}$$

If we plan to build a religious building in the village, we will increase the territory of the center by 0,50 hectares.

8. Determine the area of the **village park**, based on the norm: 11 m² per one inhabitant (table 5.1 of the State Building Norms 360–92 **):

$$11 \text{ m}^2 / \text{inhabitant} \times 5\,000 \text{ inhabitants} = 5,50 \text{ ha.}$$

9. Determine the area of the **sports zone** of the village, based on the norm: 1–2 m² per one inhabitant (paragraph 5.7 of the State Building Norms 360–92 **):

$$2 \text{ m}^2 / \text{inhabitant} \times 5\,000 \text{ inhabitants} = 1,00 \text{ ha.}$$

10. Determine the area of the **polyclinic-hospital complex (hospital)**. To do this, we first find the required number of beds, based on the norm: 6.9–7.6 beds per 1 000 inhabitants (table 6.1 of the State Building Standards 360–92 **):

$$7,5 \text{ beds} \times 5 = 37,5 \text{ beds.}$$

If the number of beds is less than 50, the area of the plot is taken at the rate of 300 m² per bed (table 6.1 of the State Building Regulations 360–92 **), i.e. the area of the whole plot will be:

$$300 \text{ m}^2 \times 38 = 1,14 \text{ ha}$$

11. We determine 90 % of the residential area without taking into account the area of streets, roads and driveways (which is 10 % of the entire residential area):

$$33,29 \text{ ha} + 1,60 \text{ ha} + 2,50 \text{ ha} + 3,50 \text{ ha} + 5,50 \text{ ha} + 1,00 \text{ ha} + 1,14 \text{ ha} = 48,53 \text{ ha}$$

12. Determine the area of **the entire settlement**:

$$48,53 \text{ ha} / 90 \% \times 100 \% = 53,92 \text{ ha}$$

13. In this case, the area of **streets, roads and driveways** is:

$$53,92 \text{ ha} \times 0,1 = 5,39 \text{ ha}$$

B. Production area

14. We take in the settlement one small industrial enterprise of the fourth (width of a sanitary protection zone: 100 m) or the fifth (width of a sanitary protection zone: 50 m) class of harmfulness of production. The area of this enterprise together with a sanitary protection zone is taken within 6–10 hectares, for example eight hectares.

15. We determine the area of **the communal-warehouse zone**, where warehouses of products and manufactured goods are located, as well as procurement enterprises, garages and various objects of communal services. The total area for warehouses is determined by the norm of 2,5 m² per one inhabitant:

$$2,5 \text{ m}^2 \times 5\,000 \text{ inhabitants} = 1,25 \text{ ha}$$

Taking into account all the objects of the communal-warehouse zone, we finally take its area of 3 hectares

16. The zone of **external transport** (bus station with the market at it) we take 1 hectare

17. Determine the **entire area of the industrial zone** of the village:

$$8 \text{ ha} + 3 \text{ ha} + 1 \text{ ha} = 12 \text{ ha}$$

C. Landscape and recreational area

If there is a river or reservoir near the village, we provide a beach area, an area near the beach, and a water area for swimming.

18. Determine the area of **the beach**, based on the norm of 8m² per 1 visitor on a hot summer day (paragraph 5.17 of the State Building Regulations 360–92 **). The number of visitors is taken to be equal to 30% of the population of the village, i.e.

$$5\,000 \text{ inhabitants} \times 0,3 = 1\,500 \text{ visitors}$$

Determine the area of the beach: $8 \text{ m}^2 \times 1\,500 \text{ visitors} = 1,20 \text{ ha}$

19. Determine the area **near the beach**, based on the norm of 15 m^2 per one visitor on a hot summer day (paragraph 5.17 of the State Building Regulations 360–92 **):

$$15 \text{ m}^2 \times 1\,500 \text{ visitors} = 2,25 \text{ ha}$$

20. Determine the area of **the water for swimming**, based on the norm of 5 m^2 per one visitor (paragraph 5.17 of the State Building Regulations 350–92 **):

$$5 \text{ m}^2 \times 1\,500 \text{ visitors} = 0,75 \text{ ha}$$

21. If there is **a forest** near the territory of the projected settlement, part of it should be turned into a forest park, the area of which should be taken at the rate of not more than 5 m^2 per 1 inhabitant of the settlement (paragraph 5.4 of the State Building Regulations 360-92 **):

$$5 \text{ m}^2 \times 5\,000 \text{ inhabitants} = 2,50 \text{ ha}$$

22. Determine **the entire area of the landscape and recreational zone** of the village:

$$1,20 \text{ ha} + 2,25 \text{ ha} + 0,75 \text{ ha} + 2,50 \text{ ha} = \mathbf{6,70 \text{ ha}}$$

23. We define the area of **the whole village** as the sum of settlement, production, and landscape-recreational zones:

$$53,92 \text{ ha} + 12,00 \text{ ha} + 6,70 \text{ ha} = \mathbf{72,62 \text{ ha}}$$

After that, we draw up the settlement balance of the village territory

24. Determine the area of **the traditional cemetery**, which should be located outside the village at a distance of not less than 300 m from the building line of the settlement zone (table 6.1 of the State Building Regulations 360–92 **), based on the norm of $0,1 \text{ ha}$ per 1 000 inhabitants:

$$0,1 \text{ ha} \times 5 = 0,5 \text{ ha}$$

APPENDIX D

Example of calculating the number of sections in the section building

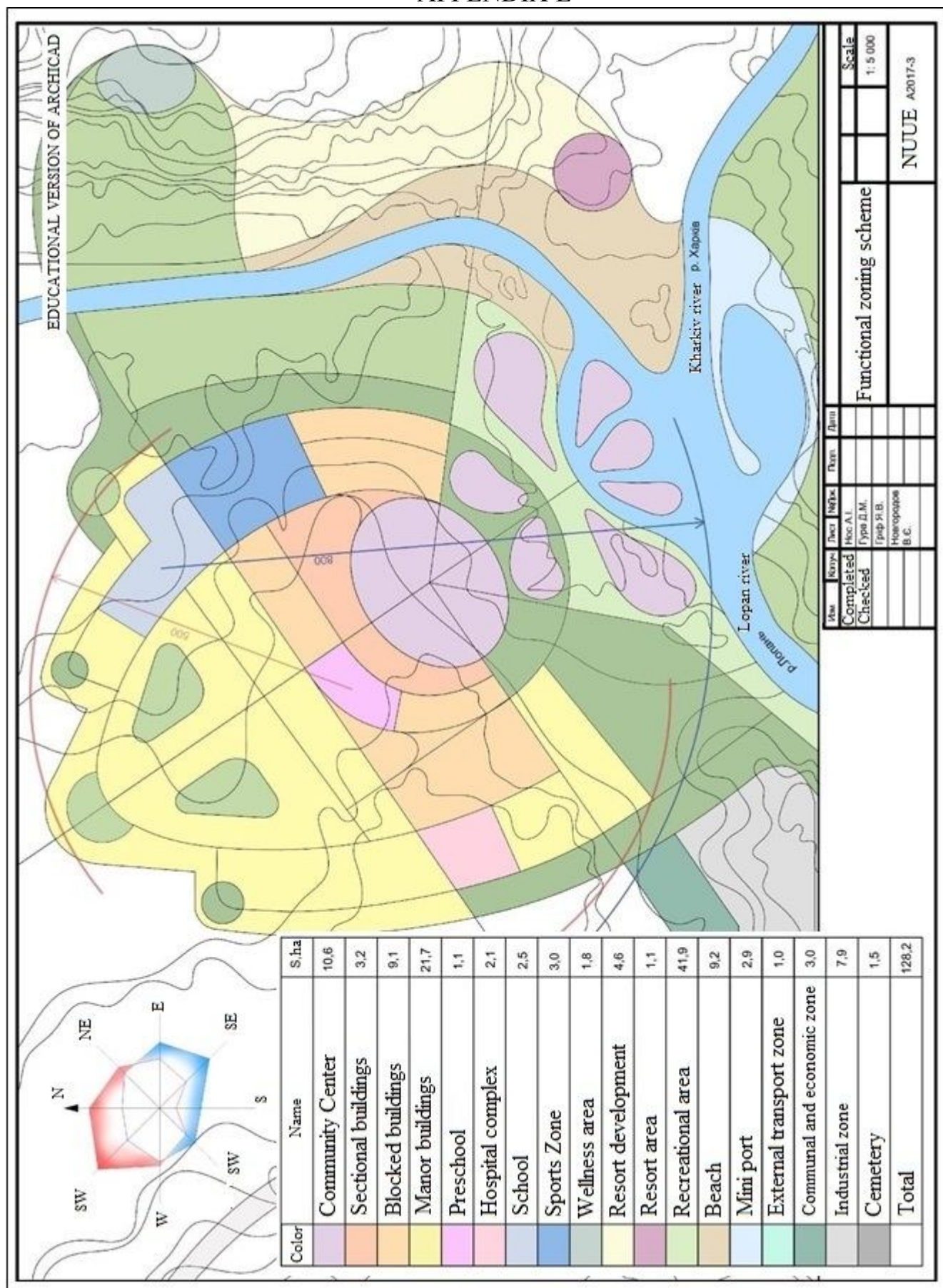
To pre-determine the required number of sections in sectional buildings, we need to know the number of apartments in sectional houses of a residential group. The number of apartments is equal to the number of families. Knowing the number of people living in these houses (2 000 people) and the family ratio – 3, we determine the number of families (apartments) in sectional houses:

$$2\,000 \text{ people} \div 3 \text{ people} = 667 \text{ families (667 apartments)}$$

Next, we set the approximate number of ordinary and end sections required for sectional construction, taking two-apartment sections, i.e. for four floors in each section contains $2 \times 4 = 8$ apartments:

$$667 \text{ apartments} \div 8 \text{ apartments} = 83 \text{ sections}$$

Students can determine the exact number of different types of sections by composing residential buildings in the appropriate group.



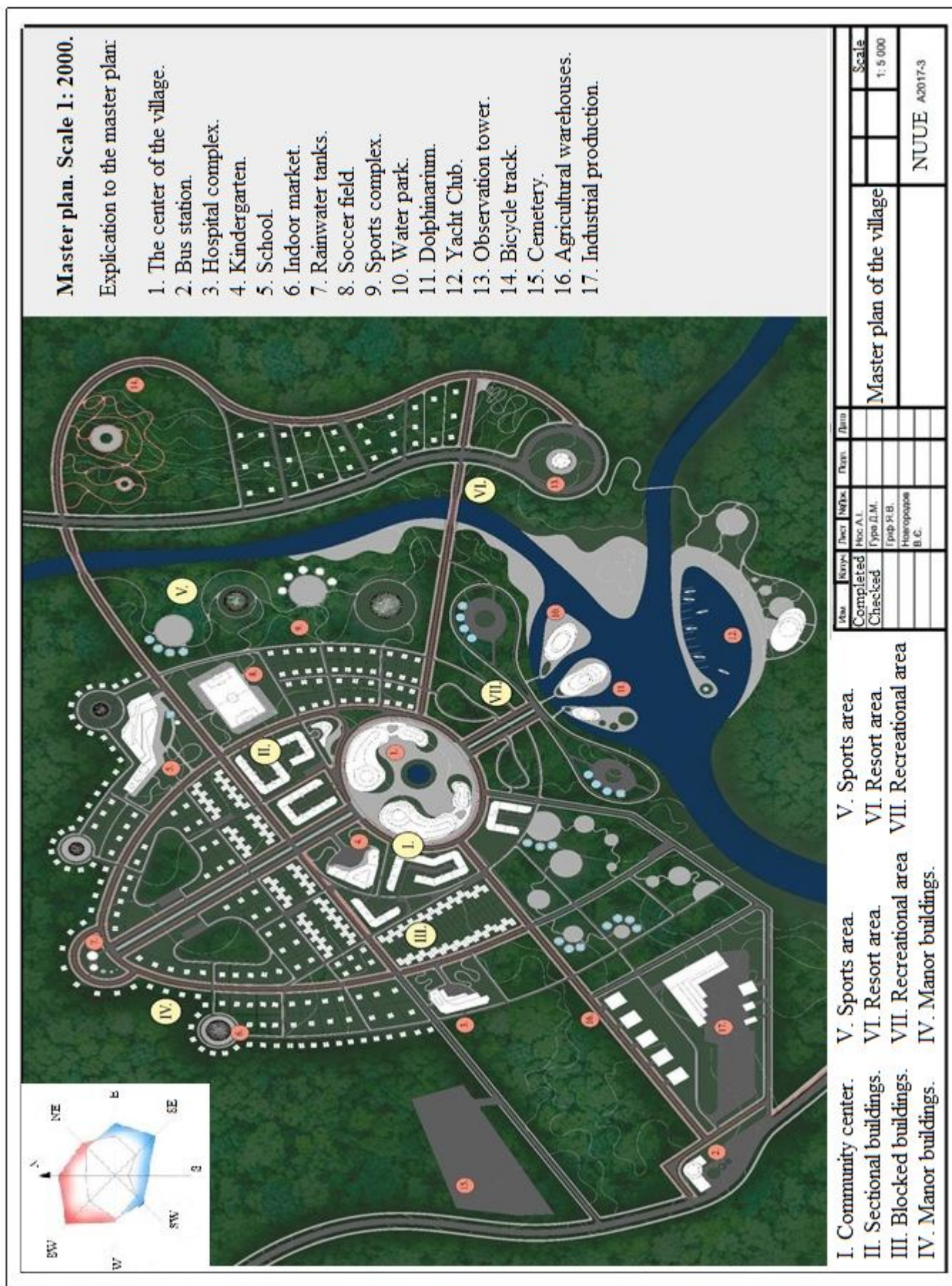


Figure F.1 – Example of drawing up a master plan of the village

APPENDIX G

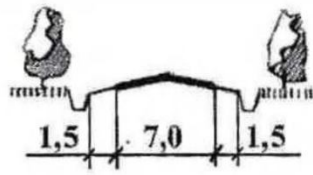
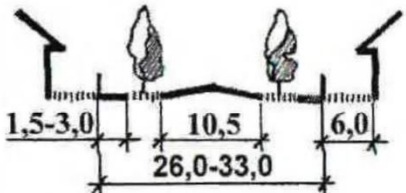
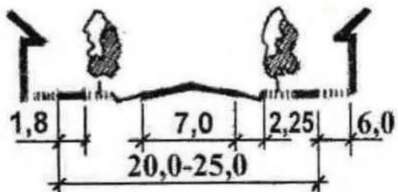
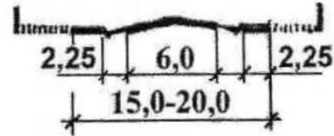
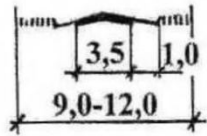
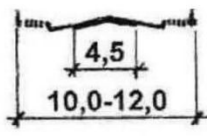
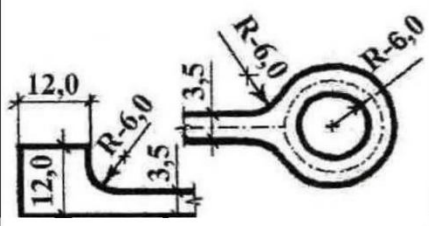
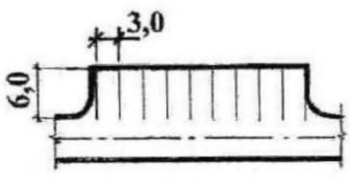
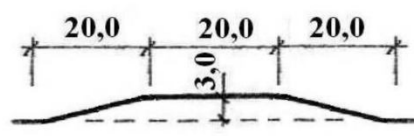
Type and purpose of communication routes	Trace	Cross section
Village road (transport of all kinds, cattle, pedestrians go along the roadside)	The village road connects the village with the external roads of the general network and the settlement with production	
The main street of the village (pedestrians, passenger transport, bicycles)	Element of the community center of the village; connects the entrances to the village with the community center	
Street in a residential building (pedestrians, passenger and commercial transport): - main street - secondary street	The residential street connects the residential areas with the main street, as well as connects the streets in areas with heavy traffic. The secondary street connects the main residential streets	 
Driveways (pedestrians, commercial transport)	The driveway connects the street with buildings located deep in the block. Dead ends up to 150 meters with reversible platforms	
Farm drive to homesteads, the possibility of driving cattle	Farm driveway leads to homesteads	
Reversible platforms	Car parking	"Pocket" for a bus stop
		

Figure G.1 – Types of roads, streets, driveways and turning areas, parking lots

APPENDIX H

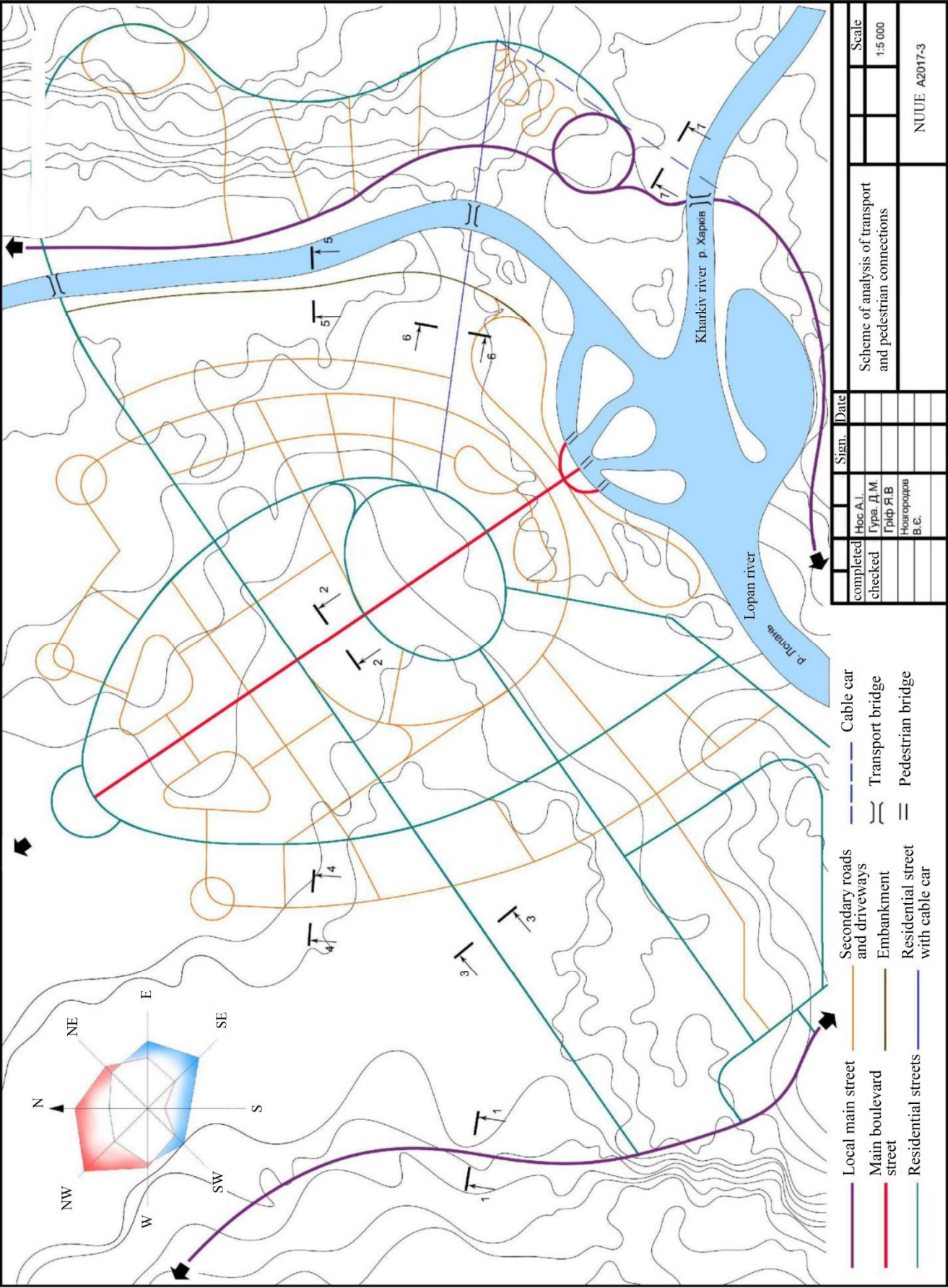
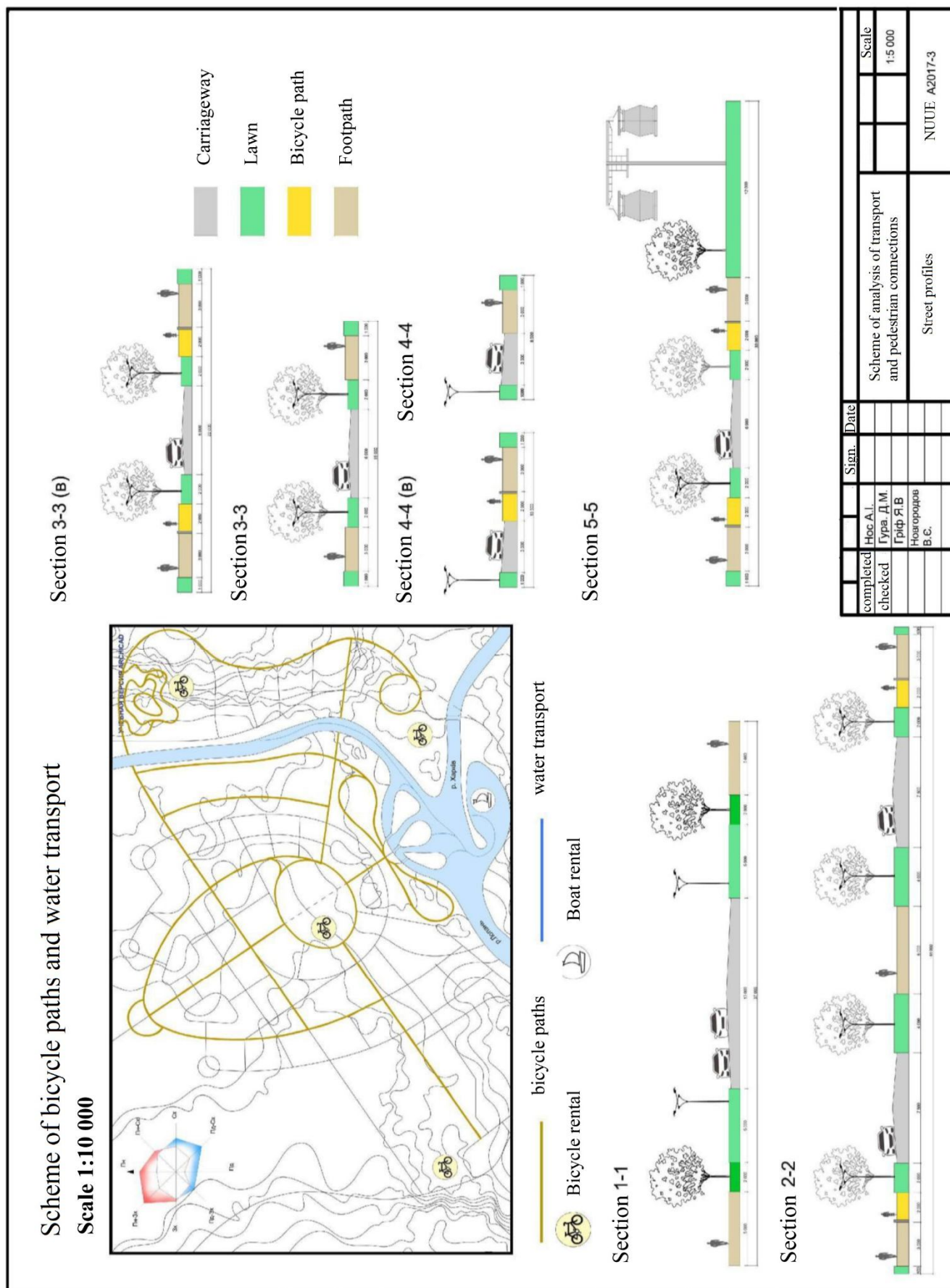


Figure H.1 – Example of the scheme of organization of transport and pedestrian connections



APPENDIX J

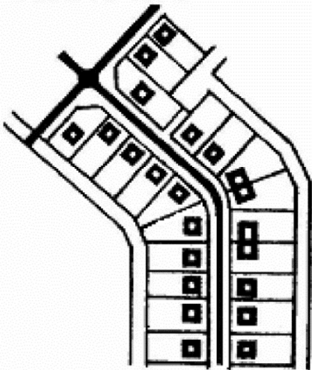
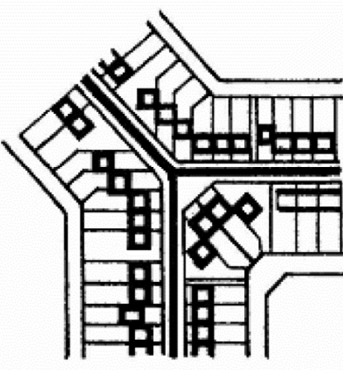
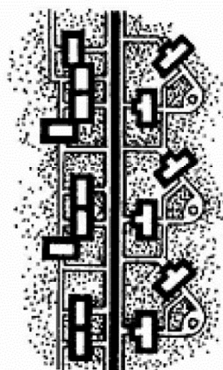
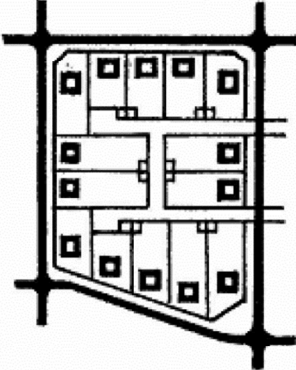
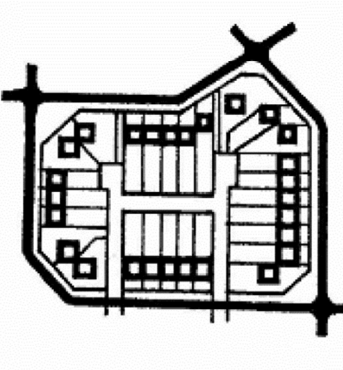
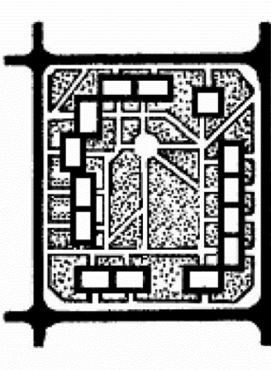
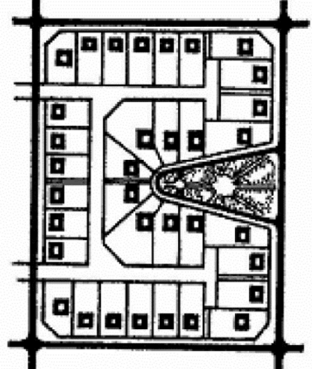
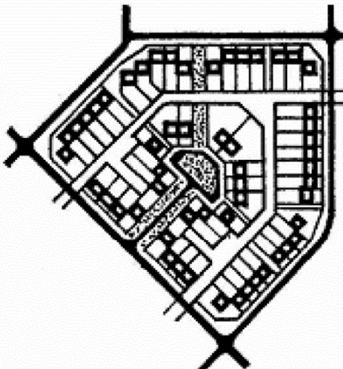

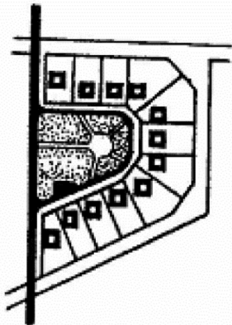

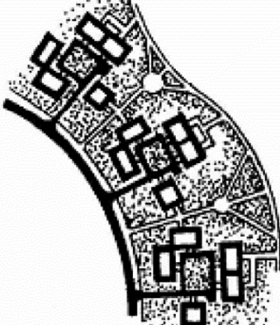
	Single-family manor houses	Blocked manor houses	Sectional apartment houses (without garden plot)
Ordinary buildings			
Quarterly perimeter buildings			
Quarterly deep buildings			
Group building			

Figure J.1 – Examples of the planning organization of residential development in the village

APPENDIX K

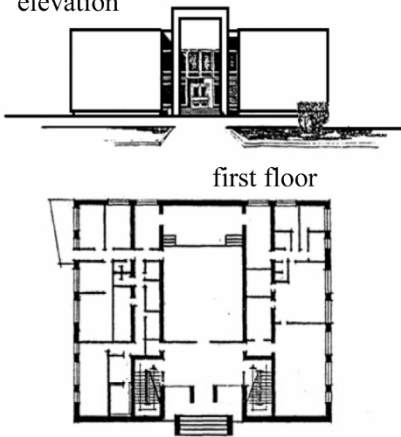
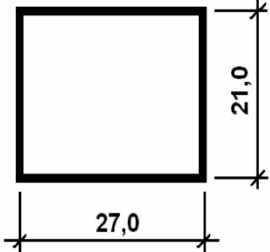

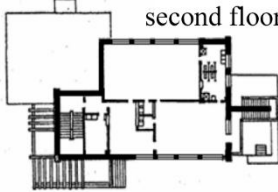
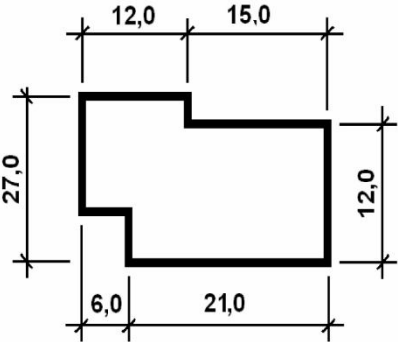

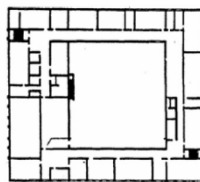
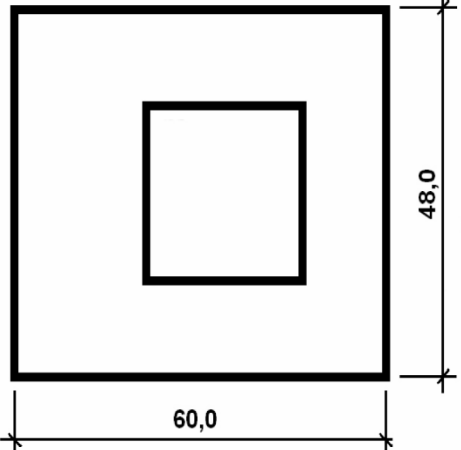
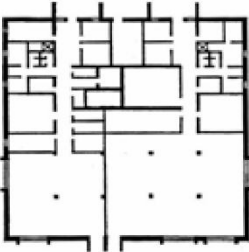
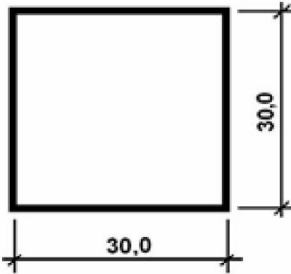
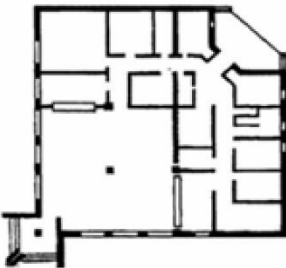
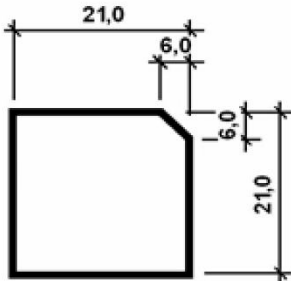
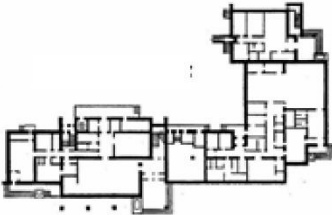
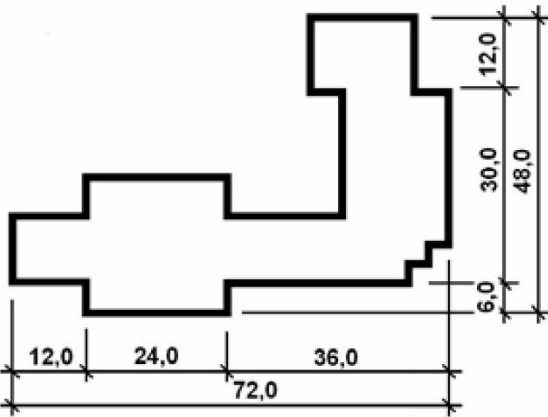
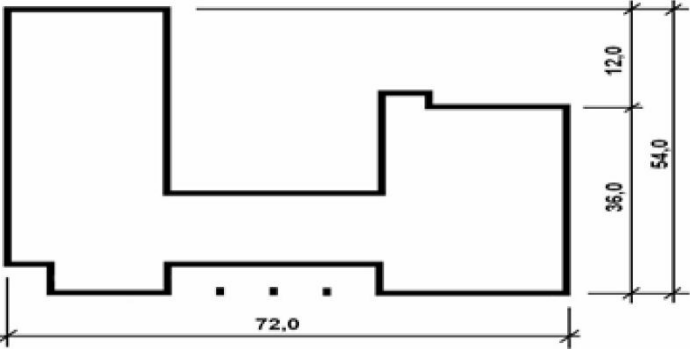
	Plot area (ha)	Architectural and planning schemes	Dimensions of buildings
Administrative building for the village council and the management of the enterprise	S of area = 0,15 - 0,20	<p>elevation</p>  <p>first floor</p>	
Children's preschool institution (kindergarten)	Plot with a fence S of area = 0,10 - 0,16	<p>first floor</p>  <p>second floor</p> 	
Secondary School	Plot with a fence S of area = 2,6 (with sports grounds)	<p>first floor</p>  <p>second floor</p> 	

Figure K.1 – Examples of architectural and planning solutions and dimensions of the main public buildings

	Land area (measured in hectares)	Architectural and planning solutions	Building dimensions
Rural department store	$S_{\text{land}} = 0,30$	<p>first floor</p> 	
Convenience store	$S_{\text{land}} = 0,20$	<p>first floor</p> 	
Shopping mall	$S_{\text{land}} = 0,70$	<p>first floor</p> 	
Sports center	<p>Fenced plot</p> <p>$S_{\text{land}} = 0,9 - 1,5$ (plot without a football field, with sports grounds)</p>		

APPENDIX L

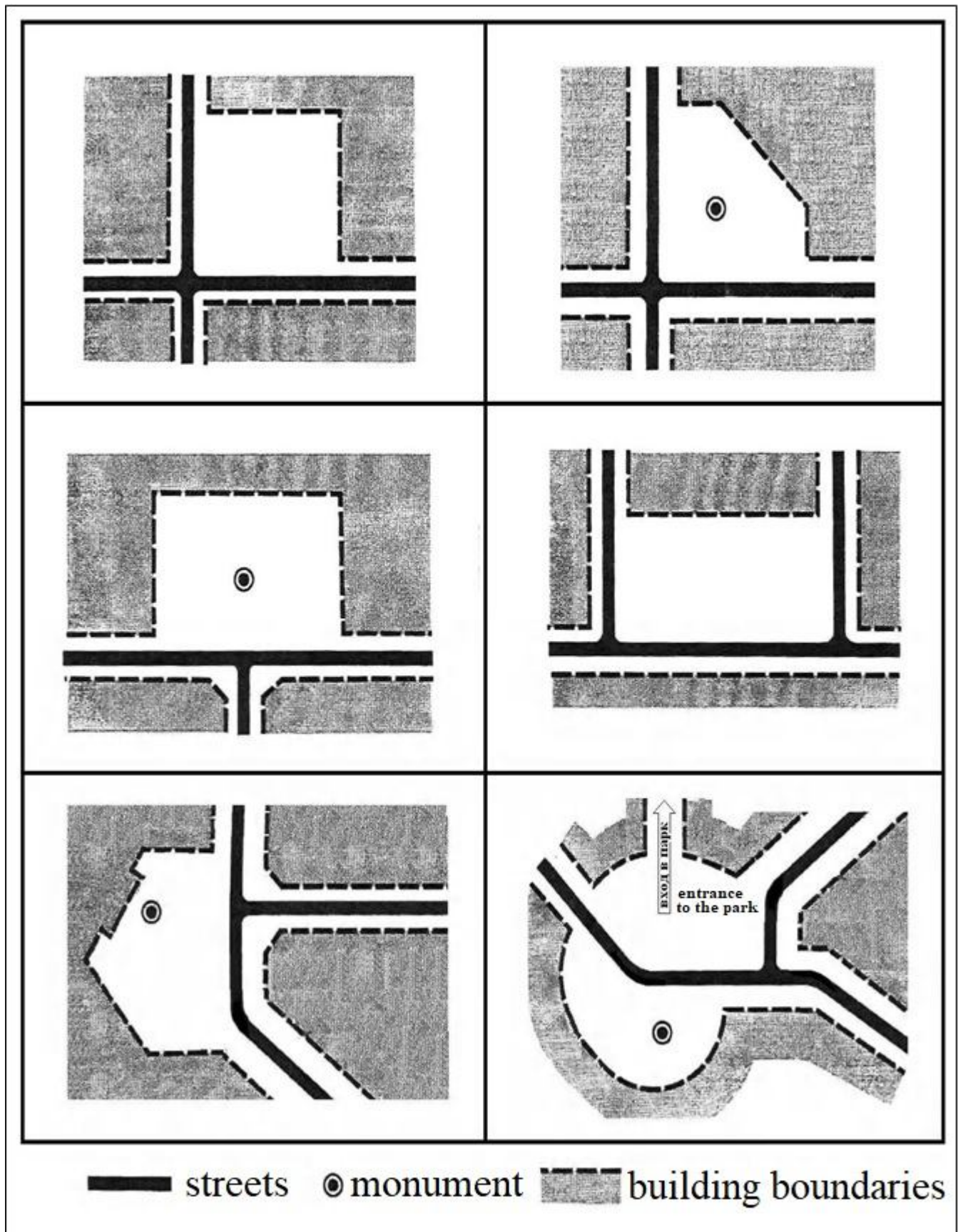


Figure L.1 – Examples of planning of village squares

APPENDIX M

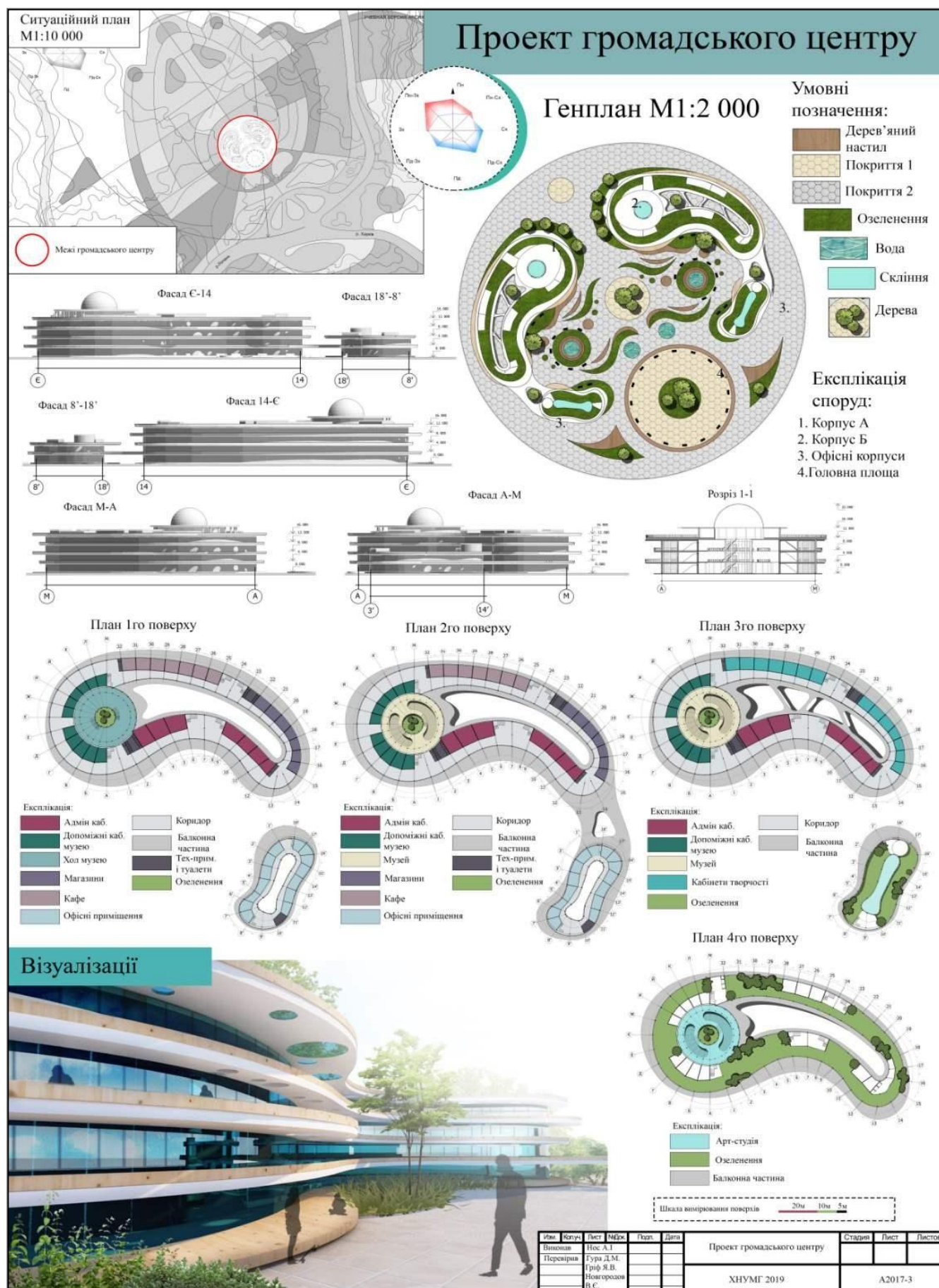


Figure M.1 – An example of a detailed architectural solution of the community center of the village

APPENDIX N



Figure N.1 – Examples of the complex exposition design of the project «Village for 4 - 8 thousand inhabitants»

APPENDIX O



Figure O.1 – Examples of complex design of the exposition of the project «Village for 4–8 thousand inhabitants»

Виробничо-практичне видання

Методичні рекомендації
до проведення практичних занять, організації самостійної роботи
та виконання курсового проєкту
«ПРОЄКТ СЕЛИЩА НА 6–8 ТИСЯЧ МЕШКАНЦІВ»
з навчальної дисципліни

**«АРХІТЕКТУРНЕ ПРОЄКТУВАННЯ БУДІВЕЛЬ І СПОРУД:
ЖИТЛОВЕ ПОСЕЛЕННЯ НА 6–8 ТИС. МЕШКАНЦІВ»**

*(для студентів 3 курсу денної форми навчання
спеціальності 191 – Архітектура та містобудування)
(англ. мовою)*

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