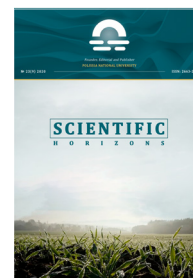


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Landscaping Project for a Private Garden Plot in the City of Zaporizhzhia

Leonid Khoroshkov, Nataliia Derevianko*

Khortytysya National Training and Rehabilitation Academy
69017, 59 Naukove Mistechko Str., Zaporizhzhia, Ukraine

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Abstract. Landscaped areas provide individual, distinctive features and play an important role in shaping the environment of a private garden plot. The authors of the present study developed a landscaping project for a private garden plot at 80 Izmailivska Street, city of Zaporizhzhia. One of the main points of the works was to conduct an inventory of the available plantings. The authors identified the species composition of trees and shrubs located on the landscaping territory. In the project territory, the largest area is occupied by herbaceous cover and is 32.5%, while the smallest area is allocated for tree plantations – only 1.9%. The area under paving and flower beds will be increased at the expense of the territory that is not occupied in the reconstruction project. In the project area, most woody plants require only pruning and are in good condition. Pruning is planned for 10 black mulberry trees (*Morus nigra* L.), remnants of a privet hedge (*Ligustrum vulgare*), one bush of Vanhoutt Spiraea (*Spiraea × vanhouttei* (Briot) Zabel.) and one bush of rosehip corymbose (*Rosa corymbifera*), which have lost their decorative appeal. The formation of plantings in this study aims to create an orderly shape of the crowns of trees and shrubs, which will give them a geometric shape. For decorative purposes, it is also planned to plant the following plants: boxwood tree (*Buxus sempervirens* var.), iris brazenberry (*Iris L. brazenberry*), moss phlox (*Phlox subulata* L.). On the site located to the east of the outbuilding, it is proposed to set up a flower garden from groundcover and flowering plants in a peculiar geometric shape that would follow the shape of the path. On the north-western side of the plot, it is planned to replace the fence with a modular gabion wall covered with rambling vine. The colour of elements of this style should be made in cool, grey tones, white, blue and purple colours are well combined. As a result, it is planned to set up a decorative pond near the arbour, the contour of which will be decorated with smooth stones. The rest of the area is to be covered with a rolled lawn. As a result, an individual and beautiful style of landscape design will be selected for the project area

Keywords: Art Nouveau, gardening, private territory, paths, bench, landscaping



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*Corresponding author

INTRODUCTION

Art Nouveau gardens replaced the then-popular luxurious gardens with a riot of colours and plants at the turn of the 19th-20th centuries and became a worthy alternative. It was an attempt to escape from a style that copied historical forms and set a new development vector. The main inspiration for the creators of this period was nature, its asymmetry, variety of textures, elegant colours or smooth and wavy lines. Artistic motifs were drawn from the richness of the local flora and fauna. Flowering shrubs, perennials and lianas were particularly inseparable decorative and compositional elements of the garden. A variety of shrubs – especially roses and perennials such as lilies, irises, and phlox – gave the impression of architecture immersing itself in the surrounding garden. [1] Art Nouveau appeared at the junction between the aesthetically beautiful and the pragmatically functional, between the idealised natural world and the industrialised society [2]. Nowadays, it is widely used in landscape design, which is expressed through a special interpretation of the basic rules and compositional techniques, the colour scheme of a small garden, the choice of plants and their combinations, types of decorative paving, small architectural forms and garden equipment [3].

When choosing the style of landscape design of the territory, it is worth paying attention to the style of the house and choose the style of landscape design accordingly. For the design of the territory, this style of landscape, described by aesthetics and simplicity, is combined with the plants existing on the territory [4-7]. Previously, all that could be attributed to professional landscaping in the city was large objects: squares, parks, boulevards, alleys, etc. But over the past few decades, the situation has radically changed. At present, the demand for the services of a landscape designer has increased, precisely if it concerns the landscaping of private garden plots. Modern trends in the design of such objects are becoming an integral part of creating a homely, aesthetically attractive object [8-10].

Efforts to design gardens and preserve and develop green open spaces in and around cities are efforts to maintain contact with the original rural landscape. Filling open areas in cities, gardens and design landscapes create integrity in the space between structural urban landscapes and open rural landscapes outside them [11; 12]. Key aspects of green plantings are their contribution to habitat suitability. A key feature of the home garden is that it is considered as an external extension to the residence, providing a unurged rest [13; 14].

An important key to successful landscaping is to think about the people who use the space. An important element of any project is the seats and they should be placed where the hosts and guests will feel comfortable. Many successful locations currently have movable chairs so that people can find the most comfortable location

and feel a sense of ownership in this territory [13; 15]. The scientific originality of the obtained research results lies in the development of new proposals for landscaping of private territory.

The purpose of the study – development of a landscaping project of a private garden plot in the conditions of the city of Zaporizhzhia.

To achieve this purpose, *the main objectives of this study* are determined as follows: conduct a comprehensive assessment of the territory to be reconstructed; create a reconstruction project for the object; give recommendations on the maintenance after the project is implemented.

MATERIALS AND METHODS

One of the main points of the works was to conduct an inventory of the available plantings. Based on the data obtained, drawings were compiled. The survey data was used to develop a project on improvement of the existing condition of plantings and decorative design of the object. Inventory of existing plantings was performed in accordance with the Instructions for Inventory of Green Plantings in Localities of Ukraine [16]. Plant names are given according to the guide to plants [17], Latin names are specified according to the international classification of The Plant Database.

The design site is located in the private sector “Zelenyi Yar” of the Shevchenkivskiy District in the city of Zaporizhzhia, at 80 Izmailvska Street. The territory has a rectangular shape, bounded on three sides by other private estates and partitioned off from them by a fence. The entrance to the property is on the west side.

At the pre-project stage, a survey of the proposed site was carried out, considering the terrain features. The landscape type is open. The terrain of the site is flat. The object area is 520 m². Length is 46.9 m; width is 11.1 m. Survey of soil conditions: the mechanical composition of the soil was determined according to the N.A. Kachynskiy's “wet” method. The reaction of the soil solution was determined using the Alyamovsky's device. The structure and colour of the soil were determined visually [15]. The authors investigated the state and proper condition of stationary engineering and architectural structures and gardening equipment, underground and ground engineering networks and communications. On the project territory, engineering networks are in satisfactory condition: air electric network, underground water supply, sewerage. In the course of the study, the authors developed a calendar plan for landscaping works on the object, indicating all types of works according to seasons.

As a result, all project work, namely the key plan and the landscaping plan, were created using the CorelDraw 2018 software.

RESULTS AND DISCUSSION

Territory inventory at the 80 Izmailivska Street, city of Zaporizhzhia

After the inventory, the following indicators were identified:

1. Land use distribution (total area under green plantings, in particular under trees, shrubs, lawns, flower

beds; paths, buildings, and structures, etc. – Table 1).

On the project territory, the largest area is occupied by herbaceous vegetation. It is 32.5%. And the smallest area allocated for tree stands is only 1.9%. The reconstruction project will be increased the area under paving and flower beds at the expense of the territory that is not occupied.

Table 1. Land use distribution at the 80 Izmailivska Street, city of Zaporizhzhia

Seq. No.	Structure elements	Current state		Under project	
		m ²	%	m ²	%
1.	Path coverage	131.4	25.3	135.0	25.9
2.	Plantings:	197.7	38.0	120.1	23.1
	Namely: trees	10.0	1.9	10.0	1.9
	shrubs	18.9	3.6	19.8	3.8
	lawns	169.0	32.5	103.3	19.9
	flower beds	–	–	9.0	1.7
TOTAL		520	100	520	100

2. Species composition of trees and shrubs. Most woody plants are in good condition and only require pruning. The vast majority of plantings are about 5 years old, some were planted in sanitary areas of engineering

networks, and according to the rules must be removed. However, according to their indicators, they do not cause damage to engineering networks; therefore, it is recommended to leave them in the reconstruction project (Table 2).

Table 2. Species composition of trees and shrubs in the landscaping territory at the 80 Izmailivska Street, city of Zaporizhzhia

Seq. No.	Plant names, species	Quantity	Share of the species in the totality of plantings, %	Decorative features	Condition
1	Boxwood tree <i>Buxus sempervirens</i> L.	9	33.3	Crown shape, evergreen	Good
2	Red raspberry <i>Rubus idaeus</i> L.	6	22.2	Crown shape, decorative fruits	Good
3	Grape vine <i>Vitis vinifera</i>	4	14.8	Liana, decorative fruits	Good
4	Domesticated apple <i>Malus domestica</i> (Borkh.)	2	7.4	Crown shape, decorative fruits	Good
5	Common juniper <i>Juniperus communis</i> L.	2	7.4	Evergreen, crown shape	Good
6	Peach tree <i>Prunus persica</i> L.	1	3.7	Crown shape, well-flowering, decorative fruits	Good
7	Common lilac <i>Syringa vulgaris</i>	1	3.7	Crown shape, flowering	Good
8	Common plum <i>Prunus domestica</i> L.	1	3.7	Well-flowering, decorative fruits	Good
9	Sweet cherry <i>Prunus avium</i> L.	1	3.7	Crown shape, decorative fruits	Good
TOTAL:		27			

3. State and proper condition of stationary engineering and architectural structures and gardening

equipment, underground and ground engineering networks and communications (Table 3).

Table 3. Explication of aboveground and underground engineering networks and communications

Seq. No.	Type of utility networks	Length, m	Area of the protected territory, m ²	Placement	Note
1.	Sewerage	14.5	72.5	Underground	Planting trees is forbidden in a zone of 5 m
2.	Water supply system	44.6	223.0	Underground	
3.	Power grid	32.2	161.0	Air	
4.	Inspection wells of eng. networks	-	5	Overland	

The project territory contains an inspection well of the drainage network. According to the Construction Standards and Regulations (SNiP), it is prohibited to plant woody plants that fall under the five-metre sanitary zone of engineering networks [5]. Currently, there are

six architectural elements on the site.

During the preliminary survey of the site and work on the inventory of plantings, it was established that the territory of the design object, in general, is in good condition (Fig. 1).

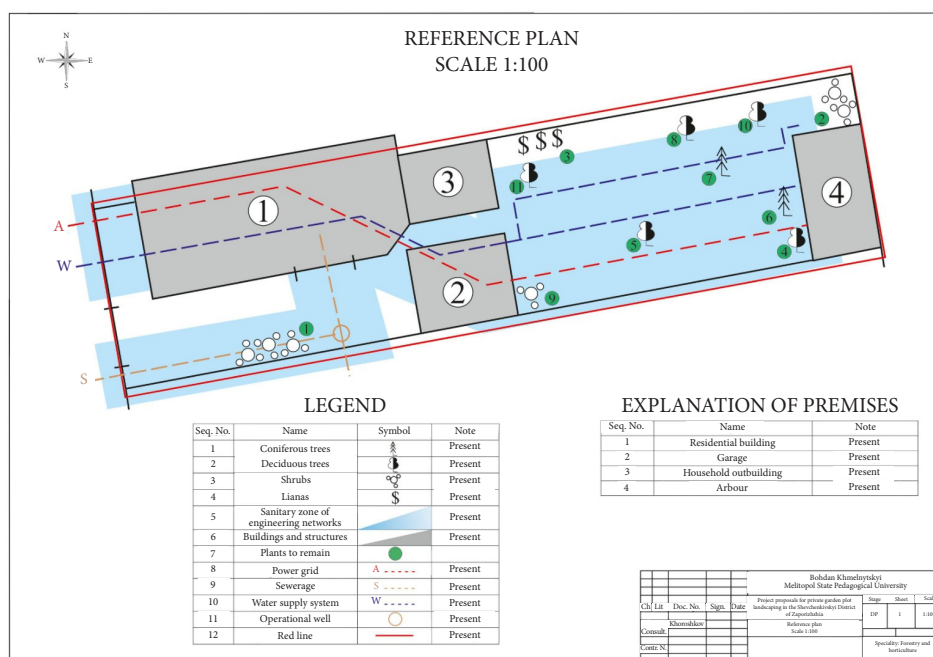


Figure 1. Reference plan based on the inventory of plantings

Pre-project survey of the soil allowed identifying the characteristics of the soil as follows: mechanical composition – sandy loam; soil structure – pulverescent and granulated; pH of water extraction – 7.2; soil colour – grey. With this colour, soils usually contain about 3-4% humus.

General planning composition and landscape organisation of the territory

The choice of plot design was influenced by its small size, rectangular shape of the garden plot, including buildings and structures available on the territory. Art Nouveau was chosen as the best and appropriate style, through which it is proposed to create a unique place

for recreation and embody original and bold landscaping ideas. The design of a private garden plot in the Art Nouveau style is an opportunity to create maximum beauty with a minimum of space. The main principle of organising a plot in this style is geometric shapes and natural decorative materials.

The bulk of plantings on the territory of the garden plot were laid recently, but without considering any rules and styles. Since the plants are arranged randomly, it was necessary to pay attention to their harmonious combination with the style of the future garden. It is proposed to leave the entire western half of the plot unchanged. On the site located to the east of the outbuilding, it is proposed to set up a flower garden from

groundcover and flowering plants in a peculiar geometric shape that would follow the contour of the path. On the left, near the arbour, it is planned to set up a decorative pond of square shape, decorated with smooth stones (pebbles) along the contour, stretching it directly to the arbour. The path leading to the arbour is proposed to be made step-by-step, slightly wavy in shape. In addition, on the north-western side of the plot, it is planned to replace the fence with a modular gabion wall covered with rambling vine. The rest of the area is to be covered with a rolled lawn.

The formation of plantings in this study aims to create an orderly shape of the crowns of trees and shrubs, which will give them a geometric shape. In this case, it includes 10 black mulberry trees, remnants of a privet hedge, one bush of Vanhoutt Spiraea and one bush of rosehip corymbosem which have lost their decorative appeal. According to the landscaping plan (Fig. 2), the following plants are to be planted: boxwood tree (*Buxus sempervirens* var.), iris brazenberry (*Iris L. brazenberry*), moss phlox (*Phlox subulata* L.).

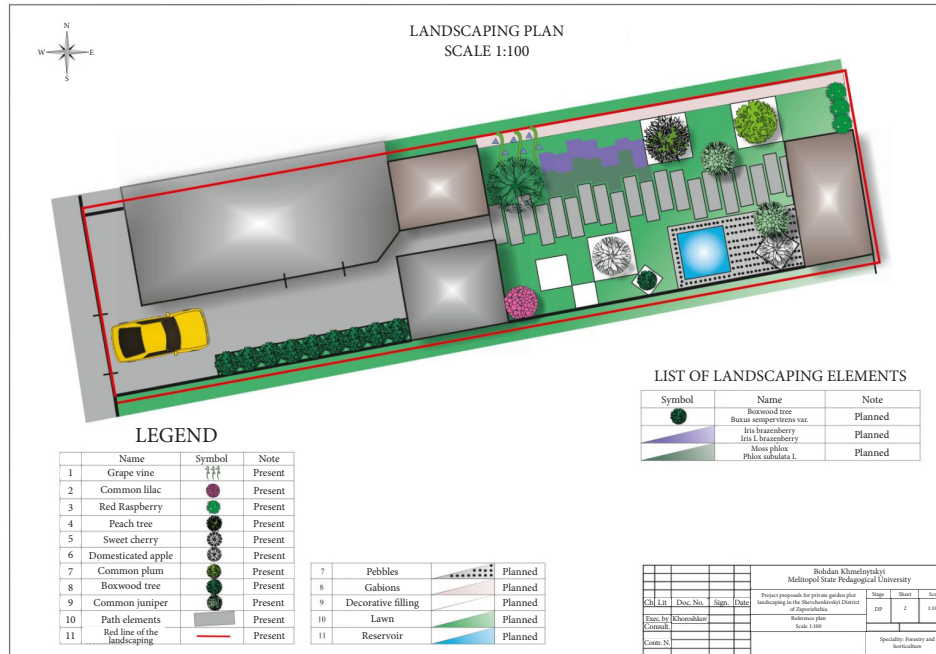


Figure 2. Landscaping plan for the territory at the 80 Izmailivska Street, city of Zaporizhzhia

Garden and park equipment for landscaping and calendar plan of landscaping works

To improve the territory, it is proposed to create conditions for comfortable rest using the following elements: a step-by-step path; decorative filling; a reservoir; gabions. The future pathway will cross the eastern part of the garden from west to east. The shape and surface of the paths are designed according to the style of the reconstruction project. Material – white granite. Using decorative filling, it is proposed to make squares of different sizes on the surface of the soil, which are inherent in the Art Nouveau. Material – white granite chips. Due to their shape, ornaments made of coloured filling form a single composition with other landscaping elements, reproducing the contrast against the background of a green lawn.

Gabions are three-dimensional factory-build

structures, made of galvanised metal gauze. Gabion structures perfectly fit into the environment, often almost completely merging with it. Not only do they not alter the aesthetic value of nature (unlike, for example, reinforced concrete structures), but even complement it. For a rational organisation of the construction of an object, it is necessary to establish the order of execution of certain types of work. When establishing such a priority, it is necessary to consider the following factors: the performance of one type of work should not complicate and affect the quality of another type of work; natural conditions and weather features; real opportunities for obtaining the necessary materials.

The calendar plan for works at the landscaping object was developed in accordance with the design decisions and is presented in Table 4.

Table 4. Calendar plan of works for the construction of a landscape architecture object

Seq. No.	Name of works	Schedule											
		January	February	March	April	May	June	July	August	September	October	November	December
1	Engineering preparation of the territory												
2	Dismantling the path												
3	Laying the lawn												
4	Path arrangement												
5	Construction of a water body												
6	Planting flower beds												
7	Sanitary care of plants												

The calendar plan of reconstruction works on the territory of a private estate is designed for 1 year. According to the calendar plan, all types of work can be divided into seasons as follows:

1. **Autumn.** Starting from October, one can start engineering preparation of the object's territory; collection and removal of garbage; laying of engineering networks; dismantling of the old road surface, planting seedlings of woody plants.

2. **Winter.** Starting from January, sanitary care is to be carried out for the available tree plantings.

3. **Spring.** Starting from April, one can start the reconstruction of the path; installation works on the arrangement of a gabion fence, including the setup of a water body; breakdown and arrangement of flower beds and decorative filling; pruning of woody plants; laying of lawn cover.

4. **Summer.** Plant maintenance: watering, fertilising

plants, pest and weed control, lawn mowing.

CONCLUSIONS

The authors developed a landscaping project for a private garden plot at 80 Izmailivska Street, city of Zaporizhzhia:

- a comprehensive assessment of the territory to be reconstructed was carried out. An inventory was carried out and the land use distribution was identified. The species composition of trees and shrubs was studied.
- According to the project, the main landscaping features of the site will be in the Art Nouveau style, which will fit harmoniously into the project.
- A project for the reconstruction of landscaping of the garden plot has been created, tackling the urgent problems of the given territory and considering the intended functionality of the object.
- Recommendations for the maintenance of plantings after the project implementation are presented.

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Проект благоустрою та озеленення приватної присадибної ділянки у місті Запоріжжя

Леонід Михайлович Хорошков, Наталія Петрівна Дерев'янка

Хортицька національна навчально-реабілітаційна академія
69017, вул. Наукового Містечка, 59, м. Запоріжжя, Україна

Анотація. Зелені насадження надають індивідуальні, своєрідні риси та відіграють важливу роль у формуванні середовища приватної присадибної ділянки. Авторами статті було розроблено проект благоустрою та озеленення приватної присадибної ділянки за адресою вул. Ізмайлівська, 80, м. Запоріжжя. Одним із основних пунктів робіт було проведення інвентаризації існуючих насаджень. Визначено видовий склад дерев і кущів, які знаходяться на території озеленення та благоустрою. На території проектування найбільшу площу займає трав'яний покрив і становить 32,5 %, а найменша площа відведена під деревні насадження – всього 1,9 %. Буде збільшено площі під мошнями і квітниками за рахунок території, що не є зайнятою у проекті реконструкції. На території проектування більшість деревних рослин потребують тільки заходів з формуючої обрізки та є у доброму стані. Заплановано обрізку 10 дерев шовковиці чорної (*Morus nigra* L.), залишки живоплоту із Бирючини звичайної (лат. *Ligustrum vulgare*) та по одному чагарнику Таволги Вангутта (*Spiraea × vanhouttei* (Briot) Zabel.) і Шипшини щитконосної (*Rosa corymbifera*), які втратили свою декоративну привабливість. Формування насаджень у даному дослідженні має на меті створення акуратної форми крон дерев і чагарників, що надасть їм геометричної форми. Для декоративності заплановано також висадка таких рослин: Самшит вічнозелений (*Buxus sempervirens* var.), Півники блазенбері (*Iris L. brazenberry*), Флокс Шиловидний (*Phlox subulata* L.). На ділянці, що розташована на схід від господарської споруди, пропонується розбити квітник цікавої геометричної форми, яка повторює вигляд доріжки, з ґрунтопокровних і гарноквітучих рослин. З північно-західної сторони ділянки передбачається змінити існуючий паркан на модульну стінку з габіонів, прикривши її в'юнким виноградом. Колір елементів такого стилю має бути виконано в холодних, сірих тонах, добре поєднується білий, синій і фіолетовий кольори. У результаті біля альтанки планується облаштувати декоративну водойму, контур якої буде задекоровано гладким камінням. Усю іншу площу запропоновано вкрити рулонним газоном. В результаті буде підібраний індивідуальний та красивий стиль ландшафтного дизайну для території проектування

Ключові слова: стиль модерн, озеленення території, приватна територія, доріжки, лавка, благоустрій
