

**IMPROVEMENT AND LANDSCAPING OF THE TERRITORIES OF PRE-SCHOOL EDUCATIONAL INSTITUTIONS IN KHARKIV, UKRAINE  
(FOR EXAMPLE, THE COMMUNITY PRE-SCHOOL EDUCATIONAL  
INSTITUTION CLUB "OKSAMIT")**

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**Relevance, purpose and significance of the study.** As a result of hostilities on the territory of Ukraine in 2022 and in the city of Kharkiv, in particular, many preschools built in 1980-1990 on standard projects were damaged buildings, facilities and landscaping. An urgent issue is their urgent reconstruction and creation of conditions for the resumption of the educational process.

An important point in the modern processes of urbanization of urban areas is the connection of both large and small settlements with the natural ecosystem. Green areas, individual trees and shrubs, features of the terrain, act as part of the organization of the territory, performing a number of functional tasks. They can be located and improve the central part of the settlement or a certain area, delimit the territories by functional zones.

At the same time, green plantations in modern urban planning play an important recreational, architectural-planning, engineering-protective and sanitary-hygienic role. Aesthetic, educational, environmental and educational functions should also be considered. Green plantings on the territory of preschool, educational, educational institutions are used in the educational and upbringing process of children through the manifestation of careful attitude to nature, the formation of their environmental education. In settlements, the territory of the educational institution is also a kind of "pearl" of the neighborhood. Here are solemn events, celebrations and other cultural events. In addition, given the densely built-up areas of large cities, it is a place for walks and recreation of the local population.

Green areas of educational institutions, in addition to their sanitary and protective functions, are also widely used in educational and training processes: landscaped area promotes comfortable recreation and games, develops aesthetic taste, instills a love of nature [1]. Architectural and planning decisions, landscaping and equipment of the institution should be as consistent as possible with its main purpose [2]. On the territory of the institution, children get an idea of nature, so most of the territory is set aside for greenery, except for alleys, driveways, playgrounds and sports grounds.

The urgency of the study is to restore a harmonious, comfortable environment near the restored buildings for children's education and recreation through the creation or reconstruction of greenery and landscaping elements on the territory of the institution. This would meet the recreational, cultural, aesthetic and educational needs of children, parents and employees of these institutions. The aim was to develop a basic project for the reconstruction of landscaping and landscaping of the school, which is important and meets modern requirements and makes the stay of children, staff, local population more comfortable, safe and enjoyable.

The objectives of the study are as follows:

1. Analysis of natural and climatic conditions of the area of their location, the actual state of landscaping and landscaping;
2. Development of project proposals for reconstruction and landscaping elements and landscaping;
3. Selection of species range of trees, shrubs and flowers for landscaping.

The tasks were implemented on the example of pre-school educational institution Club "Oksamit" in Kharkiv on Zubareva street, 33.

### **Greenery as an important component of modern urban planning**

Landscaping of settlements is a set of works on creation and use of green plantings in settlements. Landscaping is part of the overall set of measures for planning, development and improvement of settlements, acting as a so-called "ecological framework" [3], provides a uniform location among the buildings of gardens, parks and other large green areas, connected by boulevards, promenades, green strips, which with suburban forests and reservoirs are a single continuous system. In addition, landscaping in cities is a key element of artistic decoration (alley plantings, green walls, etc.).

Green areas, regardless of their functional purpose, are an organic part of the settlement. Placement in the plans of different categories of greenery depends on their functional purpose: to create comfortable conditions for recreation; for protection against wind, noise, harmful emissions of enterprises; improving microclimatic conditions; aesthetic considerations - landscaping of streets, squares, squares, neighborhoods, etc. [7, 23].

According to the functional purpose, greenery is divided into three types: general use; limited use; special purpose [4].

Public green areas - green areas located on the territory of city and district parks, specialized parks, parks of culture and recreation; in the territories of zoos and botanical gardens, city gardens and gardens of residential areas, inter-quarter residential buildings or their groups; squares, boulevards, plantations on the slopes, embankments, forest parks, meadows, water parks and others that have free access for recreation [4, **Ошибка! Источник ссылки не найден.**]. This type of plantings are located on the territory of the studied object.

The basis of the landscaping system of the modern city is the planting of residential neighborhoods, near educational institutions (kindergartens, schools, colleges, etc.); plantings of city and district importance in parks of culture and rest,

children's, sports and other parks, plantings in squares, boulevards; plantings in industrial areas, as well as reserves, sanitary protection and water protection zones.

The formation of the system of green areas of the city and their standards depend on many factors: geographical location, climatic conditions (rainfall, temperature, wind speed and direction), natural and landscape conditions, size and planning structure of the settlement [Ошибка! Источник ссылки не найден.].

The object of landscaping is the land on which the components of the landscape and buildings are interconnected and intended for recreation [4]. In large cities, all elements of the landscaping system are available; a rural settlement, settlement or small town has only a part of them. However, in urban and rural areas, protective greenery is needed between residential buildings and the production area. In large cities with a large share of industrial enterprises, it is important to ensure the aeration of urban development through its dismemberment into large green areas.

In many cases, the vegetation on the site can perform various functions, but depending on the conditions, one of the purposes is the main, others - additional. The main functions of greenery are: sanitary and hygienic (air purification and ionization, phytocide of plants, protection from noise), recreational, decorative and artistic.

In modern conditions of high anthropogenic loads, landscaping and landscaping of settlements becomes especially important; a prerequisite for the ecological comfort of the settlement is the creation and maintenance of high-quality greenery. At the same time, they play a significant microclimatic role, in particular, on green and shaded streets the temperature can be 4-5 °C lower, and relative humidity 10-15% higher than on unshaded and green areas [8].

### **Criteria for landscaping of educational institutions**

In today's urban environment, it is difficult to overestimate the role of greenery. In addition to the main sanitary and hygienic and environmental functions, they perform equally important recreational and aesthetic, improving physical condition, promoting normal emotional and mental development, so the improvement of educational institutions requires special attention [2]. In addition, the problem of landscaping and landscaping are very relevant for educational institutions that provide not only educational services but also promote education.

According to the state building regulations, the layout and dimensions of educational buildings are determined in accordance with the space standards. Thus, for up to 100 students the norm is 40 m<sup>2</sup> per place, with a total area of 0.2 ha; for 100-350 students - 30-35 m<sup>2</sup>, with a total area of 1.2-1.5 ha accordingly.

Secondary school buildings are located no closer than 25 meters to the red line, with a location in the center of the village - 10 meters, subject to sanitary and hygienic standards. The distance between the boundaries of the educational institution to the walls of residential buildings is not less than 10 meters, from the buildings of educational institutions - according to the norms of insolation, natural light and noise protection [11].

A protective green strip of trees, shrubs and lawn frames the entire side of the school. The minimum width of the strip is 1.5 meters, and from the streets - at

least 3 meters. Secondary schools must have a fence 1.2-2 meters high, when placing schools inside residential areas, the use of hedges made of shrubs or trees at least 1 meter high is allowed. On the territory there should be entrances for fire engines to the houses, the possibility of their detour around the buildings, parking for cars on other vehicles. All entrances must be paved.

The functional zoning of the area includes the following functional areas: educational (training and production, training and research), sports, recreational, economic and residential.

The educational zone includes academic buildings, separate buildings and the areas around them. The production and research areas include production workshops, laboratories, testing grounds, research areas and other facilities. Production and other facilities of service purpose are located in accordance with the requirements of regulations. Training grounds and research farms are not included in the territory, they are placed outside the area, if possible, co-operating with the appropriate enterprises.

The physical education and sports area is represented by sports facilities and playgrounds, open and closed type. The types and number of sports facilities are determined according to the standard requirements for sports facilities, taking into account the approximate age and number of students.

The sports area may be located adjacent to the study area, but not on the side of windows of rooms, elementary classrooms, classrooms or library rooms, or if there are noise abatement measures in place.

Playgrounds for playing with the ball, throwing sports equipment are located at least 25 meters from the academic building, if there is a fence of at least 3 meters in height, other sports grounds - at a distance of at least 10 meters.

The recreational area includes playgrounds for quiet and active recreation. Active recreation areas can be attached to the sports area, located near the entrances and exits of the territory, etc. Parks for quiet relaxation are located afterwards away, on the "wing" of the territory, often combining them with greening. Maidens for children of different age groups are isolated from one another by living planes or fences; for protection from noise and insolation, trees with dense crowns (oaks, limes, chestnuts) or high mantles are planted on the eastern side at 0.5-1.0 metres from the edge of the maiden.

Group playgrounds are envisaged for toddlers and children, their sizes depending on the age groups of the children: 100 m<sup>2</sup> for children 1-2 years old, 150 m<sup>2</sup> for 2-3 years old and 180 m<sup>2</sup> for 3-4 years old. Thematic and activity-specific playgrounds (transport, theatrical, fitness) of 200-220 m<sup>2</sup> are being built for pre-school children.

All playgrounds must be equipped with handy and safe garden furniture, the territory must have a sufficient number of lighters and lamps for illumination in the dark hours of the day, and waste bins.

An important consideration is the interplay of the outside and the inside of the grounds. This is achieved through the design of inner courtyards, playgrounds, differently designed outdoor and indoor spaces that can be used as play areas or places for recreation.

The proportion of the territory to be landscaped in educational institutions is very high: pre-schools - up to 60% and schools - up to 50% of the total area of the institutions [22], including green spaces for recreation, shelter strips and perimeter planting, areas for growing vegetables and berries, fruit and vegetable gardens, etc. When adjacent to the green areas, the area of the green zone may be reduced by no more than 30-40%. Distances from the building of the educational building for tall trees are at least 10 meters, for shrubs - 5 meters, 2 meters from the underground communications and 10 meters from the edge of the road.

### **Features of landscaping of educational institutions**

The landscaping in a pre-school must meet certain requirements [21]. The landscaping must be diverse, highly decorative and aesthetically pleasing, consisting mainly of native species or successfully introduced ones. The scale of plants and their useful properties should also be taken into account when designing the landscaping of the preschool area.

Scale is manifested in the use of second- and third-order trees. Trees of the first order - the common oak, the common chestnut, the linden and the birch - are used in limited numbers. Given the scale of children's perception, it is best to use low, closely spaced plants. Decorativeness is ensured by the use of beautifully shaped plants with decorative leaves, fruits or bark texture. The cinnamoniness lies in the rational use of the plants' tonic and ionising properties. The use of conifers (around 40 % of the total number of trees) is recommended. Phytocid plants such as juniper, spruce and pine are also useful.

The park area should be designed as an arboretum where students can learn about ornamental and local flora. If there is free space in the school garden, a 'nature park' can be created. Choose a quiet place, away from the group playgrounds and sports fields. Install a bird and squirrel feeder and bird houses in the centre.

Use hedges to enclose the perimeter of the grounds, various courtyards, homesteads, etc. Low and border plants look good on the façade of a building, near central corridors and in the square.

The walls of buildings, parks, pavillions, alcoves, pillars can be used as supports for vertical design; trellises for hanging plants, pergolas over borders and other structures can also be placed in the area. This is done by using plants with elongated stems and ornamental leaves (grapes, clematis, actinidia, honeysuckle, climbing roses).

When selecting the range for landscaping of the educational institution must take into account the content of toxic substances in plants [9]. Under no circumstances should plants with thorns and poisonous fruits be used: *Sophora japonica* L., *Daphne mezereum*, *Prunus spinosa* L., *Gleditsia triacanthos*, *Robinia pseudoacacia* L., blackberry (*Eubatus* L.), sea buckthorn (*Hippophae rhamnoides* L.), dog rose (*Rosa canina* L.), hawthorn (*Crataegus monogyna* Jacq.). Herbaceous plants such as black ash (*Hyoscyamus niger*), ash (*Dictamnus albus* L.), datura (*Datura*), cicuta (*Cicuta virosa*), foxglove (*Digitalis*), autumnberry (*Sternbergia colchiciflora* W), *Euphorbia*), poison lettuce (*Lactuca virosa*) and some others are also prohibited. Also undesirable are species that, during flowering or fruiting, saturate the surrounding area (poplars (*Populus* L.), willows (*Salix* L.) and increase

allergic sensitivity in humans or attract large numbers of insects (mulberry (*Morus L.*)).

The assortment of trees recommended for planting on the territory of pre-school children's educational institution should include the following: maple (sharply-leaved, riverine, Tartar), small-leaved linden (*Tilia cordata* Mill. ), birch (*Betula pubescens* L.) and bearded birch (*Betula pendula* L.), European larch (*Larix decidua* Mill. ), spruce (*Picea abies* L.), mountain ash (*Sorbus aucuparia* L.), oak (*Quercus* L.), ash (*Fraxinus* L.); shrubs - common lilac (*Syringa vulgaris* L. ) and Hungarian (*Syringa Josikaea* L. ), garden jasmine (*Philadelphus* L.) or chubushnik, various types of spirea (*Spiraea* L.), silver loch (*Elaeagnus argentea* Pursh.), acacia gum (*Caragana arborescens* Lam.). High ornamental value have such species of shrubs as hydrangea (*Hydrangea* L.), guelder rose (*Viburnum opulus* L.). Shrubs resistant to the lack of light can be planted in the shade: birch birch (*Euonymus verrucosus* Scop. ), irgu (*Amelanchier medik.*), snowberry (*Symphoricarpus* L.) [6, 12, 19, 20].

Floral decoration should be concentrated in the main viewpoints: at the entrance, in front of the facade of the building, in places where parents expect their parents. A variety of annual and perennial, round, bulbous and other herbaceous plants can be used for flower beds of various decorative qualities (shape, height, color of flowers, duration of flowering). At the main entrance, along the main paths are usually arranged flower beds of light-growing perennials (lilies, phlox, irises); annual flower beds are usually laid out along the paths so that children can water and watch. Perennials are placed farther from the paths on the lawns in the form of free groups [10] or in combination with low-growing trees and shrubs. Flower beds on the territory can occupy up to 2% of the total plot area. Preference is given to long-flowering plants that do not require special care (cosmea, marigolds).

Flower beds on the territory of educational institutions are arranged in a regular style with strict compositional lines, or in a looser landscape, where plants are placed more "naturally", there is no symmetry and linearity. Regular flower beds are more often arranged on the front parts, while landscape flower beds are arranged in the depths of the territory, near the recreation area.

The most common types of floral decoration used in floral decoration of educational institutions:

Rabatka - a narrow (1-3 meters) flower garden of regular type, located along roads, around monuments, ponds. There are two types of borders: one-sided - low plants are located in the foreground, followed by medium height and high; bilateral - when the tallest plants are located in the center of the flower bed, along the contours - low.

Flowerbed - a regular flower garden of strict geometric shape (rectangular, round, square, rhombic), with an area of 4 to 30 m<sup>2</sup>. Plants of different heights, colors and textures are combined in the flowerbed in order to obtain a finished composition. A characteristic feature is the raised center, which allows you to view such a flower garden from all sides. Flat variants are also allowed, but then taller plants (peonies, aquilegia, delphinium, dahlias, etc.) are planted in the central part. On the edges of the desired border of densely planted low-growing plants (host, marigolds, stonecrops, phlox, alissum) or lawn border of about 20 cm

Arabesque - a complex large flower garden with original ornaments. At the heart of arabesque are low-growing flowering plants (ageratum, lobelia, fuchsia, begonia) or ground cover (coleus, stachys, pyrethrum, sedum, echeverria, etc.).

When choosing plants should take into account their vital needs, otherwise the stronger will grow and suppress the less adapted, and the decorative arabesque will suffer.

Border - solid strips of low-growing plants planted for edging. They are created to highlight any boundaries (paths, garden areas, etc.). Suitable for this pillow or creeping, necessarily compact plants (gatsania, alissum, verbenas, pansies, stonecrops, marigolds, etc.), close together when growing. The flower border is made from 10 cm to 40 cm wide, from 20 cm to 35 cm high. There can be up to 5 rows of plants in the border. The decoration of the edging should be different from the main flower garden. In wide borders it is possible to use evergreen or ornamental shrubs that tolerate haircuts to maintain shape. In long borders smooth or contrasting transition of one color of flowers in another is allowed.

Mixborder is an elongated flower garden in which multi-group and multi-row mixed plantings of ornamental plants (perennials, biennials and annuals) are located in the form of natural groups near walls, houses, on the edge of higher plantings [13]. For mixborders, the plants are selected in such an assortment that they bloom from early spring until frost. The height of the plants should gradually increase from the viewing point from low to higher. The edge of the mixborder is surrounded by a border. Light-loving plants are planted in mixborders, which often occupy a sunny location. If the mixborder is limited on one side by a road (path) and on the other by a wall (fence), then low-growing plants are planted along the road, and the tallest - along the wall (the highest may also be vines that surround the wall); plants in the center have an intermediate height.

### **Location of the object of research and characteristics of the territory**

The "Oksamit" Club pre-school educational institution is located at the following address: 61000, Kharkiv city, Industrialny district, 33 Zubareva Street, located on the territory of Rogan housing estate.

The residential area of Rogan (also known as Yuzhny Pyatykhatki) is an industrial and residential area in the south-east of the city. Nearby is the settlement of Rogan and the village of Malaya Rogan in Kharkiv Oblast [14]. The central axis of the massif and its main traffic artery is Rohan Street, perpendicular to it - Gritsivets Street. The pre-school educational institution is located at a safe distance (170 metres) from the central streets of the housing estate 759-A of the residential area, and Kharkiv specialised school No. 85 is located nearby.

The city of Kharkiv is characterized by a temperate-continental climate, with moderately cold winters and dry, hot summers. The average annual temperature is 8.1 °C. The average annual rainfall is 515 mm.

The city is located almost on the border of forest-steppe and steppe zones, evaporation significantly exceeds precipitation, especially in summer. The wettest month there is July (67 mm of precipitation), which is due to summer rains. From August to January, 35-45 mm of precipitation falls. The driest months are February, March and April. The least precipitation falls in March, about 27 mm. [15].

Winter is characterized by extremely changeable weather: together with low temperatures of -20 ... - 25 °C there are thaws up to +4 ... + 5 °C. There are icebergs.

The height of the snow cover does not exceed 18-20 cm on average, the maximum is 67 cm. The depth of soil freezing is on average 65 cm, the minimum is 48 cm, and the maximum is 95 cm.

### **Analysis of the state of landscaping and landscaping of the object**

The territory of the educational institution is about 0.96 hectares and is an almost flat area of land (there are slight slopes on the north side). The total area of the club building is 1541 m<sup>2</sup>. This is a two-storey building with attached one-storey pavilions. Along the perimeter the territory is fenced, asphalted paths and platforms are arranged. There are greenery, flower beds, lawn cover is partially present, but in poor condition.

In addition to the club building, there are outbuildings, a parking lot for vehicles, pavilions for recreation; there are plantings of fruit (common apricot), ornamental (pointed maple, spherical shape, black poplar, pyramidal shape) and other species (spruce, thuja western, mountain ash, birch hung, ash), flower beds. The perimeter of the territory is fenced with a low (up to 1 meter) fence, the integrity of which is violated, there are large holes, a few meters are absent, which leads to entering the territory in places not intended for this purpose people and animals.

The road network on the territory is irrational and is in a careless state. Asphalt pavement is partially broken, there are large cracks, in need of major repair or replacement; this also applies to the coverage of sites. Dirt paths (paths) are arbitrarily trodden by the local population and do not correspond to the original project.

The results of the survey are shown in table 1.

**Table 1 - Balance of the territory of the Club "Oksamit"**

№	Territory	Area, m <sup>2</sup>	%
1	Buildings and structures	2097,0	21.8
	Buildings	1541,0	16.0
	Outbuildings	90.0	0.9
	Pavilions	466.0	4.8
2	Tracks and platforms	2401.0	25.0
3	Landscaping	5116.0	53.2
	Trees	450.0	4.7
	Brush	2.0	0.0
	Flower beds	95.4	1.0
	Lawn	4568.6	47.5
4	Total area	9614.0	100.0



## Modern Challenges of Agrarian Transformations In Ukraine: Agriculture, Forestry And Horticulture

The recreation pavilions are currently in an emergency condition (broken walls, partially or completely missing roof) and therefore need to be dismantled and replaced with more modern ones. Sports facilities (swings, slides) are also subject to repair or replacement. There are no benches or lanterns on the territory; the number of garbage cans is insufficient.

The range of woody and shrubby plants on the territory is represented by 15 species (see table 2); flower beds are represented by flower beds of annuals and perennials. The lawn is significantly damaged and needs to be completely replaced. Some plantations need to be removed due to their emergency, sanitary condition and low decorative value. Flower beds are in poor condition, with single flowers (marigolds (*Tagetes* L.)). Flower design requires a complete change.

Table 2 - The range of plants that grow in the area

№	Breed	Latin name	Number	Sanitary condition *
1	Common apricot	<i>Prunus armeniaca</i>	3	1
2	Birch	<i>Betula pendula</i>	5	1
3	Birch (up to 10 years old)	<i>Betula pendula</i>	1	2
4	Lilac	<i>Syringa vulgaris</i>	1	3
5	Garden elder	<i>Home sorbet</i>	1	1
6	Common elder	<i>Sorbus aucuparia</i>	4	1
7	Common elder	<i>Sorbus aucuparia</i>	4	2
8	Common elder	<i>Sorbus aucuparia</i>	5	3
9	Horse chestnut	<i>Aesculus hippocastanum</i>	2	1
10	Norway maple	<i>Acer platanoides</i>	3	1
11	Norway maple	<i>Acer platanoides</i>	1	2
12	Norway maple v. globular	<i>Acer platanoides "globosa"</i>	1	1
13	Field maple	<i>Acer campestre</i>	1	3
14	Field maple	<i>Acer campestre</i>	1	1
15	Tatar maple	<i>Acer tataricum</i>	1	2
16	Small-leaved linden	<i>Tilia cordata</i>	1	2
17	Small-leaved linden	<i>Tilia cordata</i>	1	1
18	White poplar v. pyramidal	<i>Populus alba</i>	28	1

## Modern Challenges of Agrarian Transformations In Ukraine: Agriculture, Forestry And Horticulture

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19	White poplar v. pyramidally	Populus alba	8	2
20	White poplar v. pyramidally	Populus alba	1	3
21	Thuja westerly	Thuja occidentalis	2	1
22	White silkwood	Morus alba	1	1
23	European spruce	Picea abies	6	1
24	European spruce	Picea abies	1	2
25	European spruce v. dwarf	Picea abies	6	3
26	Ash	Fraxinus excelsior	1	3

*\* - Sanitary index: 1 - good, 2 - satisfactory, 3 - unsatisfactory (dried up).*

Based on the results of the survey, the following trees are proposed to remain: common apricot - 3 pcs, warty birch - 4 pcs, mountain ash (common and garden) - 1 pc, horse chestnut - 2 pcs, norway maple - 2 pcs, globular norway maple - 1 pc, field maple - 2 pcs, small-leaved lime - 1 pc, western Thuja - 2 pcs, common fir – 5 pcs. A total of 67 trees are proposed for removal.

As a result of the landscaping analysis, it can be concluded that the area has been neglected for a long time, as a result of which the functional purpose of the area is disturbed, the landscaping elements do not comply with norms and regulations and are potentially hazardous. In order to improve the situation it is proposed to make significant changes in the area planning structure, to optimise the area distribution by functional zones, to remove and dismantle potentially dangerous structures, trees; to choose typical projects of pavilions, sports, children's and other playgrounds that comply with the current regulations.

### Suggestions for the species range of plants and landscaping elements

Landscaping and landscaping reconstruction works include a set of planning, engineering, landscaping and other works aimed at improving the functional, aesthetic and decorative condition of the territory, landscaping elements, greenery. Reconstruction works are preceded by a survey of the territory, during which the general condition of the territory and its individual elements (paths, sites, buildings, landscaping, etc.) are determined, the main goals and objectives of the work are determined.

After the inspection of the territory of the object, the main tasks of the reconstruction works were determined: 1. To carry out the functional zoning of the territory, as now the territory of the institution by functional purpose does not meet the requirements; 2. Develop a project of landscaping and landscaping, taking into account the possibilities and location; 3. Choose a range of plants that will meet the conditions of the site and the requirements for it.

**Changes in the planning structure of the territory.** By analysing the network of roads, paths and tracks, it can be concluded that the area was often used not only for walks and recreation by local residents, but also for transit traffic (as a shorter route). It is therefore planned to increase the number of entrances to the site from two to four. Additional entrances are proposed on the north and south sides and the perimeter of the site will be fenced. Trees will be planted on the north, east and west sides to provide protection from wind, noise and dust and the site is bordered by a multi-storey building on the south side.

According to the *functional purpose*, it is proposed to allocate the following zones: educational, physical culture and sports, zones of short-term and long-term recreation for different age groups, orchard, economic zone.

*Training area* consists of the main educational building and the surrounding area. The project proposes the demolition of the pavilions adjacent to the main building, as they do not fulfill any functional purpose and are potentially dangerous due to their emergency condition. This will allow you to use the free space to create a short rest area. The area around the educational building has a solid asphalt surface of satisfactory condition. There are 2 symmetrical rosaries on the east side of the building, the green areas on the south side remain unchanged.

*Short-term recreation area* is located on the right side of the school, adjacent to it. The area covers the area from one of the entrances to the orchard, includes 2 playgrounds with equipped seating areas, a stage for ceremonial events.

Site I is made in a landscape style, made of a winding path of natural stone, decorated on both sides with arrays of chrysanthemums, a group of rhododendrons and perfectly inscribed in the landscape style weeping crowns of weeping willow and hanging birch "Jungi". The choice of plants is emphasized by the fact that the willow will visually separate the site from the path, create comfort, shade and coolness in summer; dwarf birch "Jungi" will look harmonious against the background of chrysanthemums and rhododendrons. The perimeter of the site is lined with a single-row hedge of evergreen boxwood. Next to the willow there is a swing for children, comfortable garden benches and trash cans.

Site II is arranged in a regular style, with clear straight lines, as opposed to the first. The perimeter is also framed by boxwood hedges, benches and dumps, the compositional center of the site is a solitary planting of weeping willow surrounded by hedges.

The sites are separated from each other by a green area decorated with ordinary plantings of Sulange magnolias. In spring, the magnolia will decorate the facade, and the hedge will mask unattractive hatches. Between the second platform and the orchard there is a stage for ceremonial events, gathering of students and similar purposes. On the side of the site is a hedge, a place to rest.

The *area of the orchard* behind the stage can be considered as a kind of buffer between the residential area and the educational building. In addition, this area is also suitable for walks, recreation, you can hold environmental classes with children, instill in them a love of nature.

*Sports area* is located in the eastern part of the territory, between the zone of short-term recreation (site I) and the contour of the site. The functional area is a specially equipped area for sports games, physical education and other activities.

The site is surrounded on all sides by a high fence, it is separated from the sites by a green wall of apricot (site I), plantings of maple and ample lawn space (playground).

*Long rest area* extended from east to south, conditionally divided into Zone I and Zone II. Long-stay zone I is intended for parents with children, holidaymakers; it includes recreation rooms and a children's playground located directly behind the sports area. Further up to the entrance, zone II starts and is intended for young people. This layout is based on the fact that the recreation area is designed for different age groups, taking into account the proximity of the area to the housing estate.

The *recreation area* is surrounded on all sides by trees, bushes and hedges. Comfort and coolness here are created by planting apricots, at the entrance there are groups of spirea and lilac. All pavilions are equipped with benches, trash cans, lighting elements, safe and reliable coverage for the sites.

*Economic area* occupies the southwestern part of the territory. It includes a parking lot, outbuildings. It is separated from the residential area and the orchard by large-sized (sharp-leaved maple, small-leaved linden) trees.

**Landscaping.** The functional purpose of greenery on the territory depends on the nature of land use, the functional purpose of sites and structures on it. Green plantations create favorable conditions on the territory, perform a protective function, enhance the aesthetics of the site.

When planning the range of wood species for landscaping, first of all select local, most common or successfully introduced plant species. Trees and shrubs can be located in alley and row plantings, singly, in groups, small arrays. Solitary plantings or compositions of trees and shrubs look good in the open space, single specimens and groups of shrubs are often arranged near sites, at the intersection of paths [17]. Hedges are arranged to separate the sites along the paths. Floral decoration should be located near the facades, in the central points and near places of rest.

For the needs of landscaping, there are 123 trees, 365 shrubs, of which: conifers - 13, fruit - 22 pcs. Large trees on the territory are planned to be used for protective and fencing purposes. Thus, along the perimeter of the territory it is planned to plant a single-row strip of small-leaved linden; sharp-leaved maple is used to separate the economic zone from the orchard. The full range of plants is shown in table 3.

**Table 3 - Species range of trees and shrubs for landscaping**

№	Ukrainian name	Latin name	The need for material, pcs. *	Total number, pcs **
<b>Trees</b>				
1	Apricot tree	<i>Prunus armeniaca</i>	4	7
2	Birch wartwood	<i>Betula pendula</i>	10	14
3	Birch "Yungi"	<i>Betula pendula</i> "Youngi"	1	1

**Modern Challenges of Agrarian Transformations In Ukraine:  
Agriculture, Forestry And Horticulture**

4	White willow	Salix babylonica	2	2
5	Garden elder	Sorbus domestica	-	1
6	Common mountain elder	Sorbus aucuparia	-	1
7	Horse chestnut	Aesculus hippocastanum	-	2
8	Norway maple	Acer platanoides	2	4
9	Globe-shaped maple	Acer platanoides "globosa"	26	27
10	Field maple	Acer campestre	-	2
11	Small-leaved linden	Tilia cordata	46	47
12	Magnolia Sullanja "Big Pink"	Magnolia soulangeana "big pink"	3	3
13	Thuja westerly	Thuja occidentalis	-	2
14	Apple tree	Malus domestica	18	18
15	Common spruce	Picea abies	-	5
16	Spruce "Glaucous"	Picea pungens "glauca"	11	11
Brush				
17	Common lilac "Vestalka"	Syringa vulgaris "vestalka"	8	8
18	White Currant	Cornus alba	5	5
19	Rhododendron "Atumnus Embers"	Rhododendron "autumn embers"	5	5
20	Box evergreen	Buxus sempervirens	242	242
21	Spiraea Bummalda 'Goldflame'	Spiraea bumalda "goldflame"	9	9
22	Spiraea Vangutta	Spiraea vanhouttei	23	23
23	Rose floribunda 'Black Cherry'	Rosa floribunda "black cherry"	64	64
24	Thuja westerly 'Danica'	Thuja occidentalis "danica"	2	2
25	Medium Forsythia	Forsythia intermedia	7	7

\* - must be purchased, pcs. \*\* - projected quantity on the territory, total pcs.

***Alley and row planting.*** The rows of plants on the grounds are of purely decorative value. On the north side, for example, symmetrical rows of glaucous spruce and western Danica have been planted, decorating the entrance to the courtyard; and along the path connecting the utility area and the long leisure area. Given the existing specimens of hanging birch and holly maple "globos" there, it was decided to complement them and create a row of plantings. The globular-shaped shrub maple was also used at the entrance to the long resting area, in groups of 2-3 specimens in 'green pockets' formed by the hedgerow.

***Compositions of coniferous and deciduous trees, shrubs.*** The most decorative part of the territory is the composition near the eastern building of the main building. It is represented by a group of prickly spruce and birch hanging in the first tier, and symmetrically located white and middle forsythia.

Shrubs on the territory are used mostly in the design of entrances, in groups along paths, playgrounds. The southern entrance to the area will be decorated with lilac bushes. Bumalda and Vangutta spiers are used near the sports ground and long-term recreation areas, respectively. Deren and middle forsythia - near the economic zone.

Landscaping of the short-term recreation area is represented by weeping (weeping willow, hanging birch) and beautifully flowering forms (Sulandzha magnolia) and tree species, beautifully flowering shrubs (rhododendrons). Evergreen boxwood is used as a hedge.

Fruit trees are used for the formation of the orchard (home apple tree), as well as in the design of playgrounds and recreation areas (common apricot).

***Floral decoration of the territory.*** Along the eastern part of the building are symmetrical rosaries with bright red floribunda roses (Black Cherry variety), along the paths - landscape groups of garden chrysanthemums. The range of flowers used for floral decoration of the territory is given in table 4.

Table 4 - Assortment of flowering plants

№	Type, variety	Color	Terms of flowering	Number		
				pcs / m	m2	total, pcs.
1	Garden chrysanthemum	Violet	September October	25	29.29	732
2	Black Cherry Floribunda Rose	Red	June-October	2	30	61

The area of the rosary is 40 m2, flower beds occupy 29.29 m2.

***Lawn.*** Grass cover on the territory of educational institutions must meet certain requirements. It must be dense, strong, resistant to trampling and mechanical damage, tolerate shading, and so on. As a lawn covering it is offered to use a grass mix "Universal". Decorative grass mixture when sowing forms a beautiful and dense grass, resistant to trampling and mechanical stress, adverse weather conditions and

shading. The mixture includes 25% red oatmeal, Roland variety; 25% red oatmeal, Rufilla variety; 20% pasture ryegrass, Henrietta variety; 20% pasture ryegrass, Talgo variety; 10% meadow poa, variety Balin (Balin) [16].

For sowing of this grass mix on the area of 3001,8 m<sup>2</sup> 105 kg of mix from which: red fescue, Roland variety - 26 kg; red fescue, Rufilla variety - 26 kg; pasture ryegrass, Henrietta variety - 21; pasture ryegrass, Talgo variety - 21 kg; meadow poa, grade Balin (Balin) - 11 kg. Calculations of the number of seeds for the grass mixture are given in table 5.

Table 5-List of lawn grasses

Lawn category	Plant species	Seeding rate grams per m <sup>2</sup> pure	The content of the mixture, %	Seeding rate in the mixture, kg	The required number of seeds for lawn arrangement, kg
Landscape sports	Red fescue, Roland variety	40	25	0.25	26
	Red fescue, Rufilla variety	40	25	0.25	26
	Pasture ryegrass, Henrietta variety	25	20	0.2	21
	Pasture ryegrass, Talgo variety	25	20	0.2	21
	Meadow poa, Balin variety	20	10	0.1	11

A separate decorative element of the area is the installation of **decorative dumping**. The most common materials for dumping are crushed bark, pebbles, colored stones, crushed remnants of trunks, and other materials. It prevents the growth of weeds, improves the aesthetic appearance, retains moisture.

It is suggested to use bark shedding for maple trees, near the main entrance under the preserved specimens of western thuja and spruce. The total area of the dump is 16.5 m<sup>2</sup>.

**Landscaping.** The project proposes to replace the asphalt pavement of paths and areas, in addition to the training area, with more modern - paving slabs and natural stone (in areas of short-term and long-term recreation).

To create comfortable conditions on the territory, in the areas of short-term and long-term recreation it is proposed to install garden benches, garbage cans; garden lanterns in the central points of the territory (near the entrances, at the intersections of paths, near the platforms, the main building). For children's and sports grounds, other landscaping, it

## Modern Challenges of Agrarian Transformations In Ukraine: Agriculture, Forestry And Horticulture

is proposed to use standard projects "Children's swing", "Children's playground" 33.5 m<sup>2</sup>, "Sports ground" 146 m<sup>2</sup>, "Garden pavilion".

The full list of used buildings, equipment, small architectural forms, taking into account the amount and materials is given in table 6.

The organization of landscaping and landscaping of the pre-school educational institution Club "Oksamit" was carried out on a total area of 0.96 hectares. Most of the territory is occupied by buildings and farm buildings (about 17%).

Landscaping accounts for 4,054 meters (42.2% of the total area), most of which is lawn (31%). Compared to the current situation, the area of paths and sites has significantly increased (up to 40%); functional zoning was carried out and territories were allocated for specialized functional areas, play areas, recreation areas. Typical projects for functional areas, 2 large garden pavilions, 23 garden benches, 11 waste bins and 72 lanterns were used for landscaping.

Table 6 - List of buildings, equipment, small architectural forms for landscaping

№	Item name	Material	Quantity, items.
1	Swing for children	A typical project	1
2	Playground	A typical project	1
3	Sports ground	A typical project	1
4	Garden pavilion	A typical project	2
5	Garden bench	Wood, metal	23
6	Waste bins	Metal	11
7	Lantern	Metal, glass	72

The results of design decisions on landscaping and landscaping are shown in table 7.

Table 7 - Balance of the reconstructed territory of the "Oksamit" Club.

№	Territory	m <sup>2</sup>	%
<b>1</b>	<b>Buildings</b>	<b>1541,0</b>	<b>16.0</b>
<b>2</b>	<b>Outbuildings</b>	90.0	0.9
<b>3</b>	<b>Pavilions</b>	33.8	0.4
<b>4</b>	<b>Paths and Grounds</b>	<b>3895,0</b>	<b>40.5</b>
	Asphalt driveways and areas	1381,57	14.4
	Tiled Driveways	1976.6	20.6
	Natural stone walkways	244.7	2.5
	Sports Ground	146.0	1.5



## Modern Challenges of Agrarian Transformations In Ukraine: Agriculture, Forestry And Horticulture

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	Playground for children	33.5	0.3
	Recreation Grounds	112.6	1.2
<b>5</b>	<b>Landscaping</b>	<b>4054.2</b>	<b>42.2</b>
	Trees	732	7.6
	Bushes	193	2.0
	Hedges	51.61	0.5
	Rosarium	40	0.42
	Flowerbeds	29.29	0.3
	Bark bed	16.5	0.2
	Lawn	3001.8	31.1
<b>6</b>	<b>Total area</b>	<b>9614.0</b>	<b>100.0</b>

The master plan of the territory is made in the program AutoCAD 2009, visualization elements are created with the help of Realtime Landscape Architect and are added to the working project. The calculation of the estimated cost and other organizational and technical indicators should be carried out at the time of the start of work on the project.

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