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## PRINCIPLES FOR PLANNING RESIDENTIAL AREA GREENERY

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### Abstract

The article presents information on the greenery in the large-scale residential area courtyards built in the Soviet period. The data on the importance of the greenery in the large-scale residential areas of the Baltic States were analysed. The analysis was carried out on the large-scale residential area courtyards built in the second half of the 20th century in Pärnu, Jelgava, and Siauliai, which until present have not experienced any changes of the landscape. The research established that these courtyards can be characterised as the unused territory resources. Consequently, there is a necessity to resolve the topical issues of the greenery in the Soviet period large-scale residential area courtyards. From the theoretical aspect, the information gathered in the research on the greenery in the large-scale residential areas has revealed relevant suggestions for the improvement of the present condition. The variety of information reflects the significance of the greenery in the large-scale residential area courtyards that have to provide an aesthetically pleasant image of the territory for every inhabitant of the territory. The methods applied in the research describe the present condition of the Soviet period courtyards.

**Key words:** large-scale residential area courtyards, importance of greenery.

### Introduction

The earlier researches established that the architecture, design, the common outdoor territory and functionality facilitate or on the contrary – slow down the development of mutual connections. For example, there have been conducted several studies that for a certain group of individuals a common outdoor territory is the most important place for everyday meetings and communication (Fleming et al., 1985; Ušča, 2010). It means that the quality of mutual outdoor territory affects the mutual social connections, for instance, in those territories with more greenery and trees the social activities of residents can be observed more often than in those territories with less amount of greenery (Coley et al., 1997; Sullivan et al., 2004). Consequently, the amount of greenery and the aesthetic quality is of great importance in courtyard planning process. The residential outdoor territory is one of the components that affect the health of inhabitants, and its quality can affect the level of inhabitants' satisfaction with the territory or their residential area. For example, an American urban planner Kevin Lynch, applying empirical researches, has made several significant discoveries in the field of urban planning, as regards, how the individuals perceive and travel around the urban environment, how the urban environment affects children, and how to use the human perception as a physical form, as a conceptual basis for a successful design of urban environment in the cities and regions (Bauls et al., 2003; Dimze, 2010; Jankava, 2010). A Swiss architect Le Corbusier proposed a new urban housing principle – large-scale residential buildings surrounded with greenery, with easy accessible fresh air and sunlight (Treija, 2007). The Danish architect and urban planner Jan Gehl has performed several significant researches from the perspective of functionality and aesthetics on the public outdoor territory design and improvement that covers the transport traffic and pedestrian orientation in the cities

(Grišins, 2001). The importance of greenery planning in Soviet period large-scale residential areas previously has not been widely studied.

Presently, the large-scale residential fund is rather neglected; therefore, it has resulted in multiple irreversible negative factors that slow down the development and improvement of these areas. There are various successful examples of large-scale residential area reconstructions in European Union, and their experience could be applied in the courtyard renovation processes in the Baltic States (Īle, 2011). For example, the renovated area Hellersdorf in Germany was a typical large-scale panel house area, and its territory was reorganized and landscaped with greenery (Treija, 2007). Whereas, the large-scale residential area courtyard built in the Soviet period in the Baltic States are presently free outdoor territories with vast lawn areas that have not experienced any changes in greenery and landscape, i. e., they are neglected. However, the quality of several buildings is slowly improving; nevertheless, the public outdoor territory continues to degrade, because it is still considered an issue of secondary importance (Treija, 2008). The courtyard territories are not usefully and functionally exploited, which would ensure the well-being of the large-scale residential area inhabitants (Īle, 2010). The research established that over the last years the greenery in the Soviet period large-scale residential area courtyards was neglected, as a result, because the heritage of greenery planning was not maintained, there are either no greenery, or only slight characteristics of once rich and flowering greenery systems left until the present time. The major part of these territories currently do not form a pleasant image of the outdoor territory, where the most important aspect, alongside with the infrastructure, was, in particular, the large-scale residential courtyard greenery. The author has performed a research on the landscape

development stages in the large-scale residential areas of the Baltic Sea region. The present article discusses one of the most important aspects – the greenery. Consequently, the aim of this article is to explore the condition of landscape planning in the Soviet period large-scale residential area courtyards in the Baltic States.

**Materials and Methods**

The research on the condition of the greenery planning in the Soviet period large-scale residential area courtyards was carried out in the summer and autumn period from 2009 until 2010. To determine the present condition of greenery in the large-scale residential area courtyards, the comparative analysis and monographic (descriptive) methods were applied. The comparative analysis used in the research was based on the current Baltic Sea region Soviet period large-scale residential area observation and investigation according to the defined criteria. The analysis was used to establish the present condition of the greenery. The analysed large-scale residential courtyards were chosen according to one common characteristic – they were to be the large-scale residential area courtyards built in the Soviet period. To establish the present situation the author of the article investigated three Baltic State cities – Pärnu, Jelgava, and Siauliai. In every city 10 Soviet period large-scale residential area courtyards were chosen for analysis. Consequently, the study was performed on 30 courtyards in general, which is a sufficient amount of research in order to understand the importance of qualitative greenery in the Soviet period large-scale courtyards. The location of investigated courtyards was between the Mai and Papiniidu streets in Pärnu, on Satiksmes and Lielā streets in Jelgava, and RAF residential area courtyards, and the surrounding residential courtyards near Tilžes and Ežero gates in Siauliai. The present situation and the condition of greenery in these areas were established according to the criteria set by the author – the functional use of the greenery, the aesthetic value, and the amount of

greenery. To obtain the precise data, the defined criteria were evaluated according to specified values, where +2 means “fully agree”, +1 – “rather agree”, 0 – “average”, -1 – “rather disagree”, and -2 – “fully disagree”. To evaluate the functional use of the territory in every courtyard, the analysis was carried out to determine how rationally the greenery is used for dividing different functional areas, and whether they can perform their function as intended. To establish the aesthetic value, the visual condition of the greenery was evaluated. It was studied, if the presence of greenery improves or lowers the aesthetic quality of the courtyard landscape. The amount of greenery was analysed in relation to the free residential territories of the courtyard in every analysed city. As a result, a comprehensive description of the greenery in every courtyard was prepared. To interpret the data obtained, the monographic (descriptive) method was applied, which was based on the scientific findings and theory. From the theoretical aspect, the principles for planning greenery were researched, studying their relation to the Soviet period large-scale residential area courtyards. Based on the previous studies, performed by the author, on the development of landscape in the large-scale residential courtyards in the Baltic Sea region, alongside with the information used to determine the present situation, an informative material was obtained on the experience of other countries in planning and maintaining the greenery in the large-scale residential area courtyards.

**Results and Discussion**

*The characteristics of the greenery of the analysed courtyards*

To determine the importance and the present condition of the greenery in courtyards, the criteria defined in the research for the analysis of Pärnu, Jelgava, and Siauliai, are accordingly systematized (see Table 1). The research established the present condition of the greenery.

Table 1

**Current condition of greenery in courtyards analysed according to the criteria defined**

Analysed city courtyards	Functional use of greenery in courtyards					Aesthetic value of greenery in courtyards					Quantity of greenery in courtyards				
	Evaluation degree					Evaluation degree					Evaluation degree				
	+2	+1	0	-1	-2	+2	+1	0	-1	-2	+2	+1	0	-1	-2
In Pärnu	-	+	-	-	-	-	+	-	-	-	-	-	+	-	-
In Jelgava	-	-	-	+	-	-	-	+	-	-	-	-	+	-	-
In Siauliai	-	-	-	+	-	-	-	+	-	-	-	-	+	-	-

Source: table and data created by the author, “+” evaluation degree, “-” not established in the research.

The results obtained present that the greenery in the courtyards of Jelgava and Siauliai are of lower aesthetic quality and poorer greenery exploitation possibilities than the courtyards in Pärnu. After the analysis of the territories the research revealed that the greeneries in Jelgava and Siauliai do not form a qualitative landscape

in the residential outdoor territories. Mostly, the maintenance of greenery is neglected. Although the public spaces serve as important parts of living environment, their use significantly differs from the initially desired. The reasons are both social and economical. In the original projects, the initially planned landscape and

greenery mostly were not realised, the outdoors were not appropriately taken care of, and their landscape was not renewed, which led to territory degradation. As a result, these territories have obtained an image of neglected, useless, and unaesthetic environment, which often is looked at as an unused territory resource which is then built up, losing the originally planned public space quality of the large-scale residential environment (Treija et al., 2010).

This is supported by the results obtained from the research on the cities of Pärnu, Jelgava, and Siauliai. One of the most typical examples of the analysed courtyards that have lost the visually aesthetic attractiveness over the years is the courtyard on the Lielā street in the city of Jelgava, and it is located in the city centre. The amount of the greenery planned in the Soviet period has changed significantly nowadays (Figure 1).



Source: by Пучин, Пиешиньш, Лусе (1977)

Figure 1. Jelgava city courtyard planning system in Soviet period:



1 – main pedestrian traffic directions; 2 – presently non-existent greenery massifs; 3 – grown trees; 4 – presently non-existent grown trees; 5 – loud resting area built in the second half of the 20th century; 6 – quiet resting area built in the second half of the 20th century; 7 – recently non-existent transport and economic area.

Comparing the past and the present situations in the previous example, there are presently no quiet resting places for residents, no row-type growing tree plantations in the northern direction, no greenery rows at the building entrances; they are presently used only as parking places. This is supported by the acknowledgements established in other researches. The free space between the residential buildings, previous greenery areas and children playgrounds, were used for commercial activities. The increasing amount of cars causes problems for the courtyard outdoor territory exploitation possibilities, because it eliminated the recreational function. In the process of privatization when the residential area was divided into private zones, the courtyards were used as parking lots and were built up by local services, consequently, it distorted the primary idea of the architects that originated from Le Corbusier's concept of the greenery surrounded large-scale residential areas. The problem is topical in the Baltic States cities (Liepa-Zemeša, 2008; Treija and Bratuškins, 2003). The quantity of greenery in the Soviet period large-scale residential area courtyards is sufficient, but it is necessary to functionally improve and reorganise the greenery systems in these territories. Many courtyard green zones are constructed without carefully considered projects, which resulted in trees being planted very densely and too close to buildings, creating shade which disturbs the growth of bush and grass, leaving the ground naked and trampled. These trees also damage the substructure and

roofs of buildings, moisten walls, and branches hit the windows. The courtyards are uncared-for and unorganised – the lawns are trampled, bushes are overgrown. There is a lack of resting places, playgrounds and dog-walking parks (Jelgavas teritorijas plānojums..., 1999). The research established that such characteristics are mostly found not only in Jelgava, but also in the analysed courtyards in Lithuania.

#### *Greenery planning principles for large-scale residential areas*

The progressive urban-builders began looking for new city structures already in the 19th century, planning the green structures in close proximity to residences as obligatory future city elements. In the beginning of the 20th century the city was understood as one or two apartment buildings located among multiple gardens. In the 30's of the 20th century several theories evolved in relation to the basic living unit in the multi-storey residential areas of the new city. The creation of these theories can be related to contributions by several Soviet urban planners. Beginning from the end of the 50's the mass-building of apartments in the Soviet Union was organised, based on the residential community housing principles. Beginning from the 1958, in the apartment mass-building quarters and areas, the greenery occupied around 40 – 45% of the territory. The traditional perimetral quarter housing with the corridor-type streets were replaced by freely located buildings surrounded by green gardens. The greenery becomes an essential part of

the living area. It is necessary for creating microclimate and hygienic conditions, to create an environment for recreational purposes, and an outstanding city landscape (Buka and Volrāts, 1987; Lūse, 1971). The aesthetic value of greenery does not depend on how varied is the greening material, how large is the flowerbed space, and on the amount of planted trees. It is determined by the location of greenery, the mutual organization according to the principles of art and architecture composition, as well as the appropriate choice of plants, observing the conditions of planting area (soil, lighting, wind direction, etc.), the territory exploitations type and the economical issues both in the greening process and in the choice of greening material and exploitation. Correctly built and well-cared greenery makes the residential territory not only pleasant and beautiful, but also healthy (Amatniece et al., 1973). Incorporating a building within the greenery and making the area closer to nature is one of the most common modern architecture tendencies. In the modern republic it is also a continuation of national traditions maintained for hundreds of years. Every building or house's main accessory are the trees. Oak-trees, lime-trees, or birches have been safeguarded for generations on the edge of a

field or even in the middle of it (Šusts, 1966). Therefore, the aesthetic value of large trees, especially pine trees, saved in the housing composition, is priceless. Their rich forms and vertical shapes contrast with the simple geometric horizontal shapes of residential buildings, and they are irreplaceable in the nature's environment composition, making it richer (Bajārs, 1979). In the Danish territory planning, there often apply a method of restricting the city green zone lanes and locating linearly ordered city satellites in the neighbourhood territory (Briņķis, 2005). Construction and maintenance of the mosaic-type greenery structures in the territory planning is essential both for safeguarding the resident's emotional perception and the psychological well-being, for realization of aesthetic necessities, and for maintaining the biological diversity in the territory (Jelgavas teritorijas plānojums, 1999). Restructuring and constructing new green zone structures simultaneously with new buildings and roads, the urban environment could improve in quality, even if the territory of greenery is diminished (Stahle, 2002). Based on the analysis of the scientific findings, the established greenery structure in the large-scale residential areas is illustrated in Table 2.

Table 2

**The structure of the large-scale residential area greenery**

Greenery types	Types of exploitation	Common characteristics
public use greenery	community gardens, squares, and boulevards	combining greenery into united massifs (community centre greenery, residential area gardens, and greenery for physical training)
limited use greenery	near pre-school children institutions, schools and health protection territories	
specialty gardens	greenery shelter belts	

Source: by Briņķis, Buka (2001); Buka, Volrāts (1987)

Trees near buildings should be planted so that the insolation of the building, and pedestrian and transport movement would not be disturbed, and so that constructions of building are not damaged (Saistošie noteikumi Nr. 09 – 11..., 2009). The tree foliage purifies the air from hazardous gas and smoke, blocks dust, and forests protect cities and residential areas from wind, even out temperature variations and regulate other climate and meteorological conditions. Building walls, cobblestone and asphalt accumulate warmth in the summer, they act as accumulators. In the sunny side, buildings overheat in the summer, and trees, providing shade on the walls, can improve the well-being of residents. A tree in a courtyard is a decorative construction which sometimes, like a centre of gravity of a certain space, optically lies on buildings. Trees with rich foliage (maples, chestnuts, etc.) create total shading and act as umbrellas; their roots do not receive moisture; therefore, they look for water around the crown area and suck the water from building substructure, drying the land.

The latter is affected by building disposition, sometimes causing wind whirlpools mainly in community residence courtyards. It is also important to determine the duration of shading in different areas of courtyards, because it is essential when choosing plants with particular lighting requirements. The blossom period depends on the intensity of the lighting. Plants will not blossom in a fully shaded area; whereas, the more sunlight gets through to plants, the more beautiful they will bloom (Vikmanis, 2005). The research established that the amount of the asphalted and paved areas is significantly larger in the courtyards landscaped in the Soviet period, and it takes over the major part of the territories allocated for recreation. Consequently, the landscape in the courtyard is to be planned in a way that the resting and playground areas would provide hygienic, functional, and aesthetically pleasant environment, diminish the amount of dust and noise, provide benches for sitting, places and equipment for playing, a green lawn with a decorative pavement, etc. Planning a courtyard composition in a large-scale

residential area, the architect has to consider not only the existing three dimensions, but also the fourth dimension – the time. Plants in the courtyard greenery grow over time, thus changing the features of courtyard’s landscape. The construction of green zones should agree with the social character and should provide good conditions for people

from every age group, for different group and individual activities, for children development, and for economic processes (Amatniece et al., 1973; Dāvidsone, 1988). The information obtained in the research on the rational renovation of the greenery in the degraded courtyards is illustrated in Table 3.

Table 3

**The greenery planning principles in the large-scale residential courtyards**

Greenery renovation aspects	Courtyard landscape comprises		Greenery renovation aspects, requirements, and characteristics
ecological expertise in courtyards	data on climate, ground-water depth, types of soil, soil base, amount of storm-water		it is necessary to consider the direction of prevailing winds by months, shade zones, appropriate greenery for lighting requirements
improvement of microclimate conditions in residential courtyards	greenery that protects the territory from the heat from building fronts, and apartments from overheating	greenery for protecting pathways, squares form insolation, for soil protection from insolation	provide variety of vegetation, plant trees in groups that form habitats, or in lines, because they can bare the impact of the surrounding environment; build hedges and flower beds in a united system
aesthetic quality of greenery in courtyards	multiple types of hedges that form different combinations and variations; maintenance of grown trees and at least 30% of the new greenery is to be made of 10 – 15 year old planting materials	repetition of colours and shapes creates an illusion of organization; plants with architectonic shapes, with their defined contours, texture or shapes of leaves stand out in any area	the type and appearance of greenery is the most important aspect in facilitating the exploitation intensity of residential areas; the hedges can be located freely in the territory or be specially cut, fruitful, high, low, thick, sparse, wide, narrow, fast-growing, combined with stone or land walls; they serve as shelters from winds and for territory demarcation
greenery planning in courtyards	greenery shelter belts are used to demarcate the unpleasant views and to shelter the area from prevailing winds; wide greenery shelter belts diminish the traffic noise	a variety or plants are used to demarcate different functional areas, to create pleasant atmosphere in sitting areas; trees give shades, bushes shelter from winds and provide good, warm and moist climate for the plants in the soil	the greenery has to be evergreen and with rich foliage, as well as fast growing; in open areas, to protect the territory from winds, the greenery is planted in rows; in this case, the best option is to choose trees with smaller foliage, because they absorb the wind, but trees with rich foliage cause turbulence, therefore, are not advisable; such wind-breaker shelters provide 6 time wider lee areas than the height of the trees used for sheltering

Source: by Auders (2006), Hesejons (1998), Kruše et al., (1995), Lūse (1971), Vidlunda (2009), Vikmanis (2005), Горюхов (2005).

The next most important development step of these areas, involving its inhabitants in all processes, is the reconstruction of the mass-housing. There are multiple possibilities in the large-scale areas to perform physical changes. The development of these objects can critically affect the social structure of the property. The choices made can affect the way how the buildings are used and their maintenance process. It is an essential criteria for

a successful regeneration (Towers, 2000). Therefore, there is a necessity to construct specific residential area conceptions, which intend the trees to be planted not one by one in free spaces, but in a unified systems located throughout the residential area. Only this could achieve sustainable effect. The residential area and the quality of the environment are of great importance in the development process of every city (Karpova, 2008; Kruše

et al., 1995; Vidlunda, 2009). The development in the territory that is important in the urban landscape, and that is an essential part of the public outdoor territory, as well as the areas that are to have a large-scale development, is to be performed according to the plan accepted by all the parties involved. The creation of attractive residential outdoor territories for its inhabitants will improve the quality of the greenery in courtyards (Liepa-Zemeša, 2008; Kruise et al., 2005). Consequently, a rationally planned and organized landscape of the residential area can be achieved.

### Conclusions

The facts established in the research illustrate the present condition of the analysed Soviet period large-scale residential area courtyards. There are multiple inconsistencies that need to be eliminated. The principles established in the research are to be applied to improve the condition of the greenery and its planning processes in the Soviet period Baltic States courtyards. The landscape in the analysed courtyards in Jelgava and Siauliai need to be re-planned, thus, improving the aesthetical quality and facilitating rational exploitation of the courtyard greenery. Whereas the greenery in courtyards in Pärnu should be maintained as originally, but new modern and useful greenery elements should be added. Such improvements would enrich the landscape of the courtyard and would provide a certain atmosphere in every season of the year. It is essential to maintain, expand and improve the green zone resources in the large-scale residential area courtyards. The importance of green zones to be aesthetically pleasant hides in the fact that it models a certain landscape space with its own character and features. In many analysed courtyards the quantity of the greenery is sufficient, but it needs to be visually improved and reorganized. The research established one characteristic that affects the general greenery system of every analysed courtyard. Residents of these territories plant their own trees or other plants, according to their own preferences and taste, thus causing different negative consequences in the landscape of the territory. Such actions should not be approved because they divide the area into several unrelated courtyard territories, and do not provide a united greenery system, as well as generally do not agree with any of the basic planning principles. Consequently, it causes the landscape to develop unevenly. To prevent such actions, the architects should consider the opinions of inhabitants prior to reconstructing the courtyard, as well as to provide specially allocated territories where the residents would be able to plant their greenery according to their own taste. This solution would significantly improve the quality of the landscape in courtyards and would rationally integrate into the whole greenery system. This is also an important issue for improving both the microclimate, and the aesthetic quality, and it prevents the division of the landscape into multiple unrelated areas of the large-scale residential courtyards.

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