

THE MANAGEMENT AND CAPITALIZATION OF THE LANDSCAPING POTENTIAL OF THE CRUCII SQUARE FROM TIMISOARA CITY

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Abstract

The Crucii Square is situated in the Elisabetin district in the city of Timisoara, in a residential area. According to a map from 1849, the current Crucii Square is situated on the very line of the building injunction circle around the fortress of Timisoara. The square name originates from an old cross which was preserved until today. Taking into the age of the oldest trees, the square was set as a green space after 1920. The current landscaping consists in tracing and slabbing the allies and building a new hero monument, also dates from after 1920. The square's surface is of 6255mp. In the present paper we carried out an estimate of the green space and determined the current vegetation state, since green cadastre is the only way to determine the real state of green spaces belonging to a city's patrimony, including parks and squares as well as the entire street vegetation (Ciupa *et al.*, 2005). The paper's character is thus that of a vegetation fund inventory, as well as organisational design based on ecologic and landscaping criteria. The paper also comprises a square landscaping proposal, highlighting the site's historic character and the high vegetation value.

Key words: Crucii Square, green cadastre, identification, capitalization, management

Introduction

The existence of a green cadastre in a big city is indispensable for a modern approach of the optimal relation issue, of ecologic and social nature, between a city's manager and its inhabitants. It is the only way to get to know the reality of green spaces which enter a city's patrimony, including parks as well as the entire street vegetation. It is also the only way to properly manage, from a technical as well as economic point of view, this important city component.

Material and methods

For each woody vegetation element identified in the field according to its position in the plan, after the topographic determinations, the following characteristics have been collected and registered in code as follows (Primaria Municipiului Timisoara, 2001):

1. Identification number corresponding to the one in the plan –NRI.
2. Scientific name – SPE.
3. Age – VIR: 1– 10 years – code 11; 11– 20 years – code 12; 21– 40 years – code 20; 41–

60 years – code 30; 61– 80 years – code 40; 81–100 years – code 50; over 100 years – code 60.

4. Height classes – INA: 1 - 1 – 5 m; 2 - 6 – 10 m; 3 - 11 – 15 m; 4 - 16 – 20 m; 5 - 21 - 25 m; 6 - 26 – 30 m; 7- 31 – 35 m.

5. Crown diameter – DCO.

6. Crown structured (standard) volume – VRE.

7. Ecologic value – VAE.

Tree and shrub ecologic value is determined by their influence on the surrounding areas' physical-climatic factors. This influence depends directly especially on the tree and shrub crown, respectively on its volume and branch and leaf density. The effects of the tree and shrub crown reflect on the following climatic elements: solar energy absorption; atmospheric turbulence – wind intensity reduction; CO₂ absorption; oxygen emission; filter effect on the solid particles from the atmosphere; negative ion emission; phytoncide emission; phonic isolation.

In order to determine this relative structured volume, we can use the following formula:

$$\text{Ecologic value} = \text{crown volume} \times \text{crown density indices}$$

As a maximum crown density index, with the value 1, one may take the de sycamore, linden, spruce, fir crown one. For all other species, this index is established by estimation, its minimum possible value being 0.5.

For the efficiency in the ecologic value expression, absolute values are grouped as follows: standard crown value → 2 mc - cod 1; 2,1 - 10 mc - cod 2; 10,1 - 20 mc - cod 3; 20,1 - 40 mc - cod 4; 40,1 - 80 mc - cod 5; over 80,1 mc - cod 6.

8. Landscaping value –VPE.

The landscaping value is an element of high importance in characterizing the park's woody vegetation. The park's recreational and educational function is fully correlated with this value.

This value generally depends on three characteristics: general species physiognomy in singular port; the specimen's height, crown and trunk, which depend especially on the age; trunk anomalies such as: tree forks, twisting etc. Regarding the general species physiognomy, the following are basic elements: general crown shape, leafage and structure, leaf colour, including its variation in time, blooming, remnant fructification. Another basic characteristic is the specimen's size which impresses through its grandeur and, implicitly, through the specimen's age estimation. Anomalies impress because of their rarity and singularity. From these characteristics, the last two have a permanent character, while the first presents a conjunctural, dynamic character and thus of a variable impressive value. Resineferous trees are the exception, for whom this characteristic is permanent, thus increasing their value.

The landscaping estimation stages used in the project are: Very low – code 1; Low – code 2; Medium – code 3; High – code 4; Very high – code 5; Exceptional – code 6 .

9. Global value – VGL. It is established by the computer using the formula: $VGL = VAE \times VIT \times VPE$

This value may vary between 0 when the vitality is 0 – dried tree and 108, at maximum values ($VAE = 6$; $VIT = 3$; $VPE = 6$). The maximum value is encountered very rarely, as in the example of a monumental sycamore forest. This global value bears a special significance for the establishment of a park's importance, or for the establishment of penalties in the case of some element destruction.

10. Proposed works.

Several works are foreseen: intact maintenance — code 1; toileting, pruning — code 2; dry extraction — code 3; biologically inadequate extraction — code 4; landscaping inadequate extraction — code 5.

Results and discussion

31 species have been identified, which represent a quite high variety for the square surface. The resiniferous proportion is of 20%, and the shrub's also of 20%. From this aspect, the structure is relatively close to that of a park. The high young specimen number, under 20 years, representing 83%, determine a rather high density: 193 specimens / ha. There are also some older specimens, even above 80 years, proving just how old the landscape is.



Picture 1. Crucii Square – Google Earth view



Picture 2. Crucii Square – current situation plan

The cover index is reduced, 24%, and the ecologic layer thickness carries a medium value of 0.80 m. The square is designed in a mixed style. As elements of a regular style, one can mention: the regular and somewhat symmetrical style of the alley network, the execution of a central focal point, “monumental – cross”, towards which the perspective of most alleys tends, bench

alignment, facing towards the central focal point, the central high vegetation placement, thus achieving a premises effect. All in all, the square displays a balanced design and achieves a valuable impressive effect. Due to lack of space, in Table 1 is presented trees and shrubs description inventory only for 40 specimens out of a total of 191.

Table 1. Trees and shrubs description inventory

No	Species denomination	Age class	Height	Crown diam.	Struct. volume	Ecol. value	Landsc. value	Proposed works
1	<i>AESCLUSUS HIPPOCASTANUM</i>	40	3	6.0	135.68	6	4	1
2	<i>ABIES ALBA</i>	12	1	1.0	0.56	1	3	1
3	<i>SPIRAEA VANHOUTTEI</i>	12	1	3.0	11.28	3	2	1
4	<i>AESCLUSUS HIPPOCASTANUM</i>	11	1	2.0	2.48	2	2	2
5	<i>SPIRAEA VANHOUTTEI</i>	12	1	2.0	5.04	2	2	1
6	<i>ROBINIA PSEUDOACCACIA</i>	11	1	2.0	2.17	2	1	1
7	<i>ROBINIA PSEUDOACCACIA</i>	11	1	2.0	2.17	2	1	1
8	<i>ROBINIA PSEUDOACCACIA</i>	30	2	5.0	47.12	5	4	1
9	<i>AESCLUSUS HIPPOCASTANUM</i>	40	3	7.0	134.61	6	4	1
10	<i>FRAXINUS AMERICANA</i>	20	2	7.0	107.73	6	3	1
11	<i>ABIES ALBA</i>	12	1	1.0	0.64	1	3	1
12	<i>AESCLUSUS HIPPOCASTANUM</i>	40	4	8.0	241.12	6	4	1
13	<i>ACER NEGUNDO</i>	40	3	9.0	228.90	6	4	1
14	<i>PICEA ABIES</i>	30	3	3.0	21.18	4	4	1
15	<i>FRAXINUS AMERICANA</i>	30	4	5.0	70.68	5	4	1
16	<i>AESCLUSUS HIPPOCASTANUM</i>	40	4	10.0	384.65	6	5	1
17	<i>ABIES ALBA</i>	12	1	1.0	0.64	1	3	1
18	<i>THUJA ORIENTALIS</i>	20	1	0.8	0.80	1	4	1
20	<i>PRUNUS CERASIFERA</i>	11	1	1.0	0.35	1	1	1
21	<i>BETULA VERRUCOSA</i>	11	1	0.6	0.18	1	1	1
22	<i>THUJA ORIENTALIS</i>	20	1	1.0	1.28	1	3	1
23	<i>ACER PLATANOIDES</i>	12	2	4.0	17.57	3	2	1

24	<i>PINUS STROBUS</i>	12	2	2.0	7.52	2	4	1
25	<i>ROBINIA PSEUDOACCACIA</i>	12	2	4.0	17.57	3	2	1
26	<i>JUGLANS REGIA</i>	12	2	5.0	47.10	5	2	1
27	<i>ACER PLATANOIDES</i>	12	2	3.0	33.92	4	2	1
28	<i>ACER NEGUNDO</i>	40	2	7.0	103.86	6	4	1
29	<i>JUGLANS REGIA</i>	20	2	5.0	78.48	5	3	1
30	<i>FRAXINUS AMERICANA</i>	40	4	10.0	329.70	6	4	1
31	<i>AESCULUS HIPPOCASTANUM</i>	40	2	6.0	39.55	4	4	1
32	<i>ROBINIA PSEUDOACCACIA</i>	30	1	1.0	0.64	1	4	1
33	<i>ACER PLATANOIDES</i>	12	2	2.0	6.58	2	2	1
34	<i>ACER PLATANOIDES</i>	12	2	2.0	6.58	2	2	1
35	<i>AESCULUS HIPPOCASTANUM</i>	40	3	6.0	98.91	6	4	1
36	<i>AESCULUS HIPPOCASTANUM</i>	40	4	7.0	242.34	6	4	1
37	<i>ACER PLATANOIDES</i>	12	2	2.0	2.17	2	2	1
38	<i>AESCULUS HIPPOCASTANUM</i>	40	4	7.0	161.56	6	4	1
39	<i>ABIES ALBA</i>	12	1	1.0	0.56	1	3	1
40	<i>ACER PLATANOIDES</i>	12	2	3.0	19.81	3	2	1

Table 2. Centralizing species situation – specimen no. and crown surface

Centralizing species situation – specimen no. and crown surface			
No.	Species denomination	Crown surface	Specimen no.
1	<i>ABIES ALBA</i>	3.140	4
2	<i>ACER NEGUNDO</i>	228.435	5
3	<i>ACER PLATANOIDES</i>	43.175	7
4	<i>AESCULUS HIPPOCASTANUM</i>	364.240	11
5	<i>BETULA VERRUCOSA</i>	12.843	2
6	<i>CATALPA BIGNONIOIDES</i>	22.765	3
7	<i>DEUTZIA SCABRA</i>	31.400	13
8	<i>FORSYTHIA INTERMEDIA</i>	5.495	4
9	<i>FRAXINUS AMERICANA</i>	164.065	7
10	<i>FRAXINUS EXCELSIOR</i>	445.095	13
11	<i>JUGLANS REGIA</i>	39.250	2
12	<i>JUNIPERUS SQUAMATA MEYERI</i>	0.785	1
13	<i>LONICERA FRAGRANTISSIMA</i>	10.990	3
14	<i>PHILADELPHUS CORONARIUS</i>	8.831	6
15	<i>PICEA ABIES</i>	28.260	4
16	<i>PINUS NIGRA</i>	43.960	6
17	<i>PINUS STROBUS</i>	20.410	8
18	<i>PINUS SYLVESTRIS</i>	25.120	2
19	<i>PLATANUS ACERIFOLIA</i>	63.585	1
20	<i>PRUNUS CERASIFERA</i>	87.920	5
21	<i>PRUNUS PISSARDI</i>	45.530	4
22	<i>ROBINIA PSEUDOACCACIA</i>	230.005	41
23	<i>SALIX MATSUDANA</i>	69.865	2
24	<i>SAMBUCCUS NIGRA</i>	12.560	1
25	<i>SPIRAEA VANHOUTTEI</i>	13.345	3
26	<i>TAXUS BACCATA</i>	25.120	6
27	<i>THUJA OCCIDENTALIS</i>	0.785	1
28	<i>THUJA OCCIDENTALIS AUREO-VARIEGATA</i>	0.785	1
29	<i>THUJA ORIENTALIS</i>	4.427	3

30	<i>TILIA CORDATA</i>	127.170	5
31	<i>TILIA PLATYPHYLLOS</i>	58.090	2
	TOTAL	2237.446	176.000

Proposal for the re-landscaping of the Crucii Square

The landscaping way aims to fulfil the following functions: social, decorative, and recreational. The decorative or aesthetic

function will be achieved through material alternation, succession, chromaticity as well as various textures, in vertical as well as horizontal plain turning the park into a living mechanism in continual transformation.



Picture 3. Top view proposal

The decorative function is supported by the usage of dendrologic material already existent which forms a „curtain", conferring the space an intimacy nuance. The vegetation influence is directly or indirectly reflected in the people's health. Air purity, lower day or season temperature amplitudes or the tree shadow exercise a direct physical-sanitary action on the organism, while the line, shape and colour harmony, the aesthetic tree, shrub and flower grouping enchant the eye, creating a positive state of mind which, in its turn, positively influences the general state of mind.

Through oxygen production and carbon dioxide consumption, the vegetation, especially the woody one, contributes to the obvious air composition improvement, insuring life maintenance. Today, we acknowledge the fact that negative ions have a positive influence on the psyche. Their presence is insured by natural ionizing factors, by ion generators, alongside which the woody vegetation, through the photosynthesis process, contributes to a large extend to air ionization. Also, the sharp points of the leaf needles facilitate, under certain atmospheric conditions, electricity discharge in the soil.



Picture 4. 3D perspective

Through subtle means like colour and shape harmony, suave perfumes, leaf murmuring, fragile grace or impressive firmness, life pulse in every leaf, flower, branch, the vegetation touches people's sensitivity, positively influencing their psychological tonus (Iliescu, 2003). It is known that people's health is influenced not only by environmental balance,

but also by compensating the physical and intellectual effort and nervous strain through recreational activities (Florincescu, 1999). For city inhabitants, the open air recreation option is conditioned by the necessary moving time, the movement facilitation, the landscape organization and design, their natural ambiance etc. The benches introduced in the

landscape will be placed in the centre focal area but also on the entire alley length. There will be an adequate garbage bin number and the lighting will also be optimal. There shall

be easy access, all alleys being traced in a hierarchical order (secondary alleys flowing into main alleys). The composition is unitary, coherent and simple.



Picture 5. 3D perspective

The harmony is achieved by identity, as well as resemblance, and the succession of certain elements is accomplished by logical order, harmonizing the various spaces complex. Within this landscape the harmonious combination of simplicity and variety was achieved. The visitor perceives the space as a unitary whole. The proportionality principle is especially highlighted by the use of the individual scale so as to offer visitors heightened comfort impression and to eliminate the overwhelming element sensation. The space must offer a welcoming place that is why where elements were designed on an individual scale. The rhythm is differentiated by means of various dimension circle usage, even though it may create monotony. Due to the fact that the elimination of the existing vegetation was avoided as much as possible, as well as the fact that local, rustic plants were integrated in the landscape, from the start conditions were created for the plant biologic potential achievement as well as the harmonious development of all existing species. From a technical point of view, we adopted solutions to satisfy movement safety and comfort requirements, but which are simultaneously aesthetic and harmonizing with other landscape elements. For the landscaping, we used natural elements instead of manufactured ones, as well as the maximum capitalization of the terrain possibilities, function adaptation and the establishment of the equipment in relation with the previous elements, interweaved with the compositional and aesthetic organization. The landscape can be accessed through four entrances. The alleys follow itineraries linking the main interest focal point (compositional centres, entrances,

objectives). They are of various widths. Their functional role is organically intertwined with their compositional importance. The landscaping needs to encompass circulation itineraries which firstly answer some functional requirements such as insuring visitor access to well-chosen points, leading visitors to several areas fulfilling various functions, connecting objectives included in every part of the landscape, insuring movement comfort and influencing traffic on drive areas. Species proposed for the landscaping: trees (*Tilia tomentosa*, *Acer palmatum*, *Populus tremula*, *Quercus rubra*, *Acer saccharinum*, *Citrus bergamia*, *Fagus grandifolia*), shrubs (*Sambucus cerulea*, *Lonicera caerulea*, *Hibiscus rosa-sinensis*, *Chaenomeles superba Texas Scarlet*), flower plants (*Coreopsis gigantea*, *Anagallis arvensis*, *Aster alpinus*, *Centaurea cyanus*, *Iris croatica*, *Petunia hybrida*, *Impatiens new guinea*, *Aster amelus*).

Conclusions

The following works are foreseen: toileting and pruning, dried branch cutting, extraction of the dried specimens, as well as of the inadequate ones, from a biological and landscaping point of view, the execution of a minimum of 4-5 mowing in summer, with immediate grass collecting. On surfaces where the carpet density is reduced, we propose either the rehabilitation of the entire vegetal carpet, or the execution of *Lolium perene* overseeding. The following maintenance works are deemed necessary: alley repairing, repairing or replacing deteriorated benches, garbage bin supplementing.

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