

## METHODS OF REHABILITATION OF A DEGRADED AREA IN ORĂȘTIE CITY

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### Abstract

*In any city we find spaces that, either because of unsustainable exploitation or because of the wrong approach, fail to reach their full potential. As a result, there is a need to pay particular attention to these types of sites for their introduction into the landscape circuit. Thus, the paper intends to come up with a solution that transforms a space without identity of 35,125 m<sup>2</sup>, with a great need for completion, innovation, within a reasonable limit, in a space-volumetric environment that is more accessible to both the inhabitants of Orăștie city, as well as for the municipal administration. The architecture of the present arrangement proposes a different architectural concept, in which the landscape elements that come into its composition define the mixed style. The scenario, is proposed to be constructed from regular shapes that combine with free forms and creates a harmonious, balanced rhythm and thus strengthens the feeling of spatiality. The interior path of the proposed green spaces within the layout, offers a gradual transition, between the different functional areas.*

*By designing the rehabilitation solution within this project, we aspired to increase the value of the subconscious and the consciousness of the inhabitants of Orăștie city, adopting a timely energetic attitude to heal a land of no value.*

**Key words:** urban environment, landscaping, rehabilitation.

### INTRODUCTION

Sustainable development movement underline the role of green area and in order to achieve this goal, green space is considered the central character for improving urban sustainable development. Green elements connect the spaces and create green networks. Those networks can be planned and managed for multidimensional purposes such as ecological, recreational, cultural, recognizable beauty, body and mental health and many other reasons, together crating the concept of sustainable city (Karade, R.M., Kuchi, V.S., Kabir, J., 2017).

Our research draws the attention to the role of green space for sustainable landscape development. The design of the arrangement proposes a different architectural concept, the landscape elements that are part of it defining the mixed style. The scenario, built of regular shapes that combine with free shapes, creates a harmonious, balanced rhythm and strengthens the feeling of space. The interior path of the

proposed green spaces provides a gradual transition between the different functional areas.

The vegetation proposed in this arrangement is a fundamental element of the natural environment and is the main component of green spaces in Romania, being composed of rustic species with good resistance to weather conditions at the site. Through it, the objective of improving the environment and harmonizing the modified or landscaped landscapes with the natural ones can be achieved, so as to create environmental conditions appropriate to the development of social activities (Ward Thompson, C., 2011).

### MATERIALS AND METHODS

The rehabilitation project of the site considered by this paper has two components, which are proposed to be carried out in Orăștie Municipality, on Târgului Street, in locations located as follows:

*Objective 1:* Landscaping component (park and garden). The land is in the public domain of Orăștie Municipality according to the Government Decision no. 1352/2001. The land proposed for rehabilitation has an area of 35,125 m<sup>2</sup>, tabulated according to C.F. no. 65603 U.A.T. Drastic.

*Objective 2:* Modernization of Târgului Street component. The land is in the public domain of Orăștie Municipality according to the Government decision no. 1352/2001, land that has a surface area of 9,629 m<sup>2</sup>, tabulated according to C.F. no. 65610 U.A.T. Orăștie.

Based on the regulations of the urban planning documentation no. 11/2009, PUG phase, approved by HCL Orăștie no. 18/2014, the location is in M2 - Proposed mixed subzone (LFCm2 + ISP2), LFCm2 - Subzone of low-rise housing and complementary functions proposed on flat land (P-P + 2), ISP2 - Subzone institutions and services proposed public interest, max. Gf + 4 (sports, administrative, financial-banking, culture, trade, tourism, education, cults, health, social assistance). Category of use: unproductive - plot with cadastral number 65603; road - parcel with cadastral number 65610.

Currently, the land is unused being degraded and abandoned. The project provides for the arrangement of a green area consisting of a park and a garden for unlimited public access. Within the arrangement of the green space, pedestrian alleys will be built made of self-locking concrete pavers placed on a sand support layer 3 cm thick, the foundation layer being made of ballast 10 cm thick after compaction. The width of the alleys is variable between 2.00 and 5.00 m, they also serve for the occasional access of the means of intervention. On the green space, within the limit of 10% of its surface, placed constructions and endowments will be, subjects of this proposal.

From a climatic point of view, the location is in the area with a temperate-continental climate with strong Baltic influences, which gives a rich rainfall regime both in winter and summer and temperatures 1-2<sup>0</sup> lower compared to other regions of the Transylvanian depression. From the multiannual meteorological observations, it is found that from a thermal point of view, the analyzed area is characterized by average

annual temperatures of 8-9°C. The minimum air temperature drops to approx. -20<sup>0</sup>C in the winter months and reaches maximum values of approx. + 32<sup>0</sup>C in the summer. The warmest month of the year is July (with an average temperature of 18-19<sup>0</sup>C), and the coldest, January (-3.5 ÷ -20<sup>0</sup>C).

According to normative P100/1-2013, the location falls into the following characteristics:

- horizontal acceleration of the terrain - ag = 0.10 g;
- corner period - Tc = 0.7 sec.

The region is classified in the 6th degree of seismic zoning according to the Msk scale.

The surface of the green spaces that are proposed for development is estimated to be around 31,633.73 m<sup>2</sup>. Their arrangement is suggested to be done by carrying out the following categories of works:

- Landscaping (deforestation of existing vegetation; land modeling; planting perennials / lawning of surfaces, including planting of trees and shrubs). The arrangement of green spaces refers to those with unlimited access, in this case park, square and garden.
- Creation of pedestrian alleys, creation of facilities for recreation on the landscaped grounds (sports area, skate park area, outdoor events stage, playgrounds for children and fitness area for adults).
- Equipped with urban furniture (benches, trash cans, ecological toilets, urban billboards, drinking fountains).
- Installation of Wi-Fi in public spaces, installation of video surveillance systems of the spaces arranged by the project.
- Construction of an irrigation system and an outdoor lighting system for the spaces.
- Construction of a new road structure on Târgului Street, with asphalt pavement.
- Extension of the water supply and sewerage network to the site area.
- The water supply of the irrigation system for these green spaces (Figure 1) is proposed by this project to be achieved through several options:
- Water supply from the drainage groundwater storage tank. For this solution, considering the high level of groundwater, it is recommended to design a drainage system, according to the execution details,

which will store the infiltration water in an underground tank.

- Water supply directly from the public network in case there is no water accumulated in the storage basin and in case the necessary connection pressure is ensured.

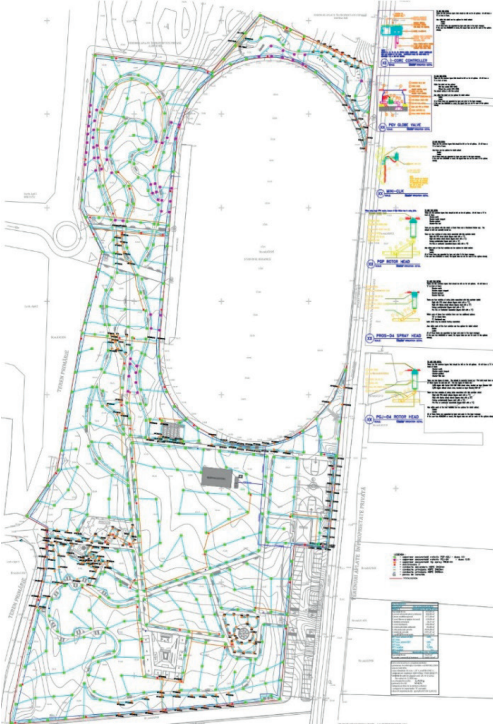


Figure 1. Irrigation system plan

The power supply of the site is proposed to be made from the National Energy System located in the area of the site through a three-phase electrical connection.

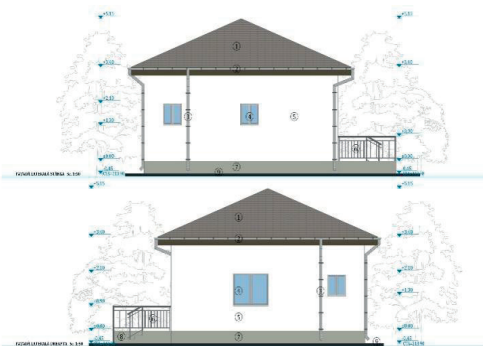


Figure 2. Administrative annex plan

The supply of electricity to the consumers of the objective (of the multifunctional field, of the event scene, of the administrative annex, of the video surveillance equipment, of the installations related to the wireless internet networks and of the automatic irrigation system) is proposed to be made from the general electrical panel (hereinafter referred to as TEG) located on the ground floor in the outbuilding in the porter's lodge (Figure 2).

For the lighting of the site, the project proposes a lighting system for pedestrian traffic that uses “green energy” and that has the role of ensuring a sufficient level of lighting for pedestrian traffic (Figure 3).

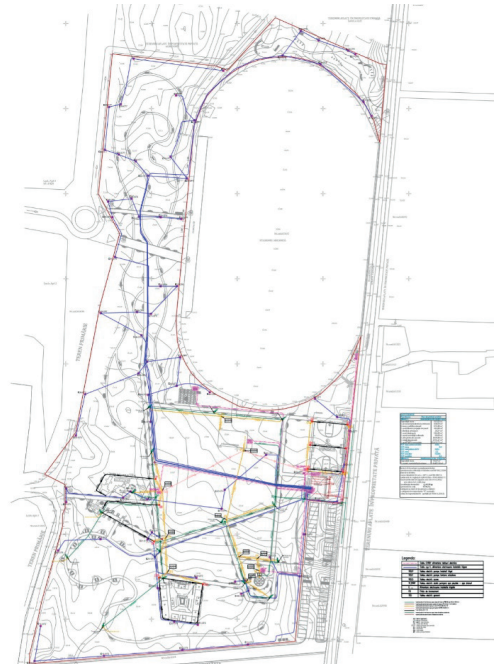


Figure 3. Electrical networks coordination plan

We suggest the lighting of pedestrian traffic to be done using LED lighting fixtures, installed on metal poles with a height of 3.50 m equipped with photovoltaic kits with autonomous operation. The designed photovoltaic lighting system consists of 100 lighting poles placed in the green space, according to the plan of electrical installations, in insulated foundations made of simple concrete in which the fixing bolts of the pole are embedded. The arrangement of the pillars will be done

equidistantly at an interval of approximately 10-15 m.

## RESULTS AND DISCUSSIONS

The design of the arrangement puts forward a different architectural concept, the landscape elements that are part of it defining the mixed

style. The scenario, built of regular shapes that combine with free shapes, creates a harmonious, balanced rhythm and strengthens the feeling of space (Brookes, 2009). The interior path of the proposed green spaces provides a gradual transition between the different functional areas, as can be seen in Figure 4.



Figure 4. Systematization of public green spaces with unlimited access in the degraded urban area "Stadion Mecanica" in Orăștie municipality, Hunedoara county



Landscaping will follow the application of the principles of harmony, unity in diversity and aesthetics, so that the final composition will ensure a pleasant, pleasant, sustainable architectural silhouette (McPherson, E.G. and Peper, P.J. (2012).

As a result, the arrangement of green spaces was done in the first phase by dividing the site into 7 areas. Thus, it is proposed in Zone 1 (Figure 5) to arrange a space for the promenade with pets, given that they need to be properly trained in an appropriate sector, regular outings to reduce boredom and deplete energy and for this reason the area in Zone 1 was created to give dogs different activities, along with other dogs, for example: throwing a ball, chasing a frisbee or a relaxing walk together with the master (Figure 6), aspects that contribute significantly to maintaining the health of both parties.



Figure 5. Zone 1 - Dog park

In each of these alveoli presented in Figure 6, it was wanted to satisfy the needs of the owners of quadrupeds in the city, who until now did not have a specially arranged place where they could walk their pet in peace. As can be seen, this space is a place where they can train and play without a leash in an area under the supervision of their owners.

This space for quadrupeds was introduced in the landscape of the site not only to facilitate traffic in the park but also as a way to concentrate the different areas of interest according to the selection criteria of the inhabitants of this city.

In an age where people are often reluctant to each other or are afraid to socialize, a leash-free and exercise area for quadrupeds also contributes to people's openness, creating a greater sense of community.



Figure 6. Systematization of the playground for pets

The most obvious reason dogs need an open public space is because of their popularity. For this reason, access to a park close to home or even at a reasonable distance is the safest and most efficient way to ensure a minimum of comfort for pet owners. Also, for the comfort of pet owners, sitting places (Figure 7), ramps, jumping hoops and tires were introduced in the arrangement.

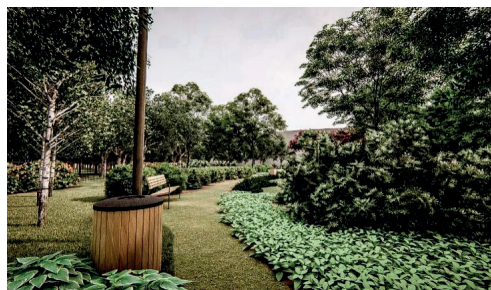


Figure 7. Main area

In organizing the space, all necessary precautions were taken into consideration, taking into account certain rules, namely, to avoid the appearance of potholes in the lawn but also to create a special chromatic effect, a space of over 1000 sqm of lawn with net inside the canine area, for the moments when the

The protective net of the lawn prevents the formation of ditches when passing frequently through that space and ensures an excellent anchoring of the roots, improving the resistance of the grass and avoiding the situation in which the lawn would become muddy. In addition to all these advantages, the lawn protection net is a product made of high-density polyethylene (HDPE) with rhomboidal mesh, for strengthening the lawn, offers a natural look and can be mounted immediately after planting the lawn rollers, being easy to mounted on their surface.

Studies have shown that people are able to talk to each other more easily by focusing on the common center of interest, which is why in Zone 2 of this arrangement, shown in Figure 8, was created as a forest-park space, thus demolishing all barriers. constraint on socialization in which people regularly perceive themselves as strangers (Irvine, KN, Warber, SL, Devine-Wright, P. and Gaston, KJ, 2013).



The functional urban furniture and the beautifully arranged green spaces that can be seen in Figure 9, will create a pleasant and civilized environment in the city. In this space,



Figure 9. Location of resting places in zone 2

Through this intervention on the landscape it can be concluded that this arrangement sums up all the natural factors: water, air, soil, subsoil, solar energy and existing organisms, which determine the living conditions of man and the development prospects of society (Hanus-Fajerska, E., Karczevska, I. and Ciarkowska, K., 2010).

The vegetation proposed in this arrangement is a fundamental element of the natural environment and is the main component of green spaces in Romania, being composed of rustic species with good resistance to weather conditions at the site. Through it, the objective of improving the environment and harmonizing the modified landscapes with the natural ones can be achieved, so as to create environmental conditions corresponding to the development of social activities.

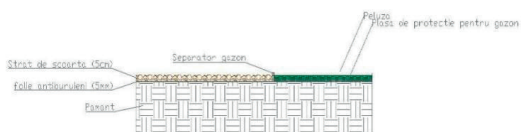


Figure 10. Section through the lawn with mesh



Taking into account the need of the population to get rid of daily stress, in the newly arranged space, it was necessary to take measures to amplify the atmosphere created by the forest (Jorgensen, A., Hitchmough, J. and Calvert, T., 2002) and because of these considerations in this area built alleys were not introduced, but only rustic lawn trails on which a protective net was mounted, which would create a special circuit at the site and also prevent the easy formation of mud in wet seasons. In order to avoid the monotony and to respect the mixed style of the arrangement, alveoli were created on the edge of the alleys where the benches were placed. In the alveoli, the use of built elements has also been avoided and, therefore, for a better sustainability of the arrangement and to facilitate the maintenance process, the surfaces under the benches we propose to be covered with protective net for lawn that provides a nice look to the site.

Man is closely connected with nature and will always feel the need to return to its midst. For this reason, serious measures have been taken to preserve the existing green areas at the site and to capitalize on them as constructively as possible (Honold, J., Lakes, T., Beyer, R. and van der Meer, E., 2015).

To help preserve nature within the city, the shrubby and arboreal vegetation has been carefully placed at the site (Figure 11) for maintenance and possible correction work where appropriate, so as not to represent a danger to the inhabitants.



Figure 11. Systematization of vegetation in zone 3

Taking into account the sustainability of plant compositions, in the area with ornamental shrubs it was decided to cover the soil with an anti-weed foil that allows water to enter the soil, but does not allow weeds to spoil the appearance of plant compositions, over which it is suggested to place a layer of at least 5 cm of tree bark (Figure 12).

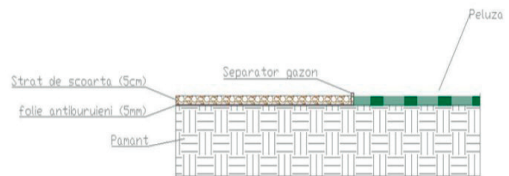


Figure 12. Section through the bark area

As a result, it is considered that green spaces represent that functional category within the localities or areas connected to them, whose specificity is determined, first of all by vegetation and secondly by the built environment, including endowments and equipment intended for cultural and educational activities, sports, recreation of the population (Oguz, D. and Çakıcı, I., 2010).

This concept of urban planning combines two aspects of maximum relevance, namely, an aspect related to the reduction of extreme climatic manifestations that lately manifests itself as a clear reaction to the ongoing abuses on forests and the environment in general and an aspect related to the dimension of the human psyche through which it is desired to determine those who live in this environment to be aware of the importance of returning to nature, by bringing to the fore a landscape close to the human soul (Morales, D., 1980).

Utilizing this type of land contributes to the sanitary function precisely through the ability of vegetation to retain, fix and sediment particles in the atmosphere, in suspension, smoke or fine dust. For these reasons, a buffer zone has been created around the children's area, which aims to protect this space but also to create the much sought-after shade from the hot season (Szarek-Łukaszewska, G. and Grodzińska, K., 2007).

An important note that was taken into account when the systematization of the plants at the site level was also related to the physical characteristics of the land in sight, namely:

location, size, surface and shape of the land, topography, parceling, access to utilities, pedological features, local climatic conditions. Free or built, the value of the land is created by the utility or capacity of the land area to meet the wishes and needs of society, as a result, the introduction of a space for children determines the exponential increase in the value of the site. Also, a sense of unity is created throughout the arrangement by introducing the species of *Betula pendula* and the areas where the *Ajuga* specimens were placed. Because the appearance of order and cleanliness has been taken into account, numerous dining areas have been placed at the site, as can be seen in Figure 13, and in order to avoid crowding in the hot season, shaded areas have been introduced. in the landscape numerous trees to provide shade in the summer season.



Figure 13. Recreation zones in the park forest area

Given the inappropriate initial operation of the site, due to a wrong approach that failed to reach the maximum potential of the space, this project proposes a different approach to cover all the needs of the inhabitants of this city as can be seen in Figure 14.

This way of systematizing the arrangement aimed at the efficient and intense capitalization of the land by creating new points of attractiveness that could contribute

considerably in the development of the tourist circuit, but also in bringing an aesthetic value to the whole area (Mansfield, C., Pattanayak, SK, McDow, W., McDonald, R. and Halpin, P., 2005).



Figure 14. Detail from area 6

Thus, in this space, by respecting the design principles, the beneficiary will not be aware of the specific forms in the plan, but will be delighted by the countless pleasant relationships produced by the designed environment.

By proposing this concept of development within the site, it was considered to send an ecological message in the context of climate change, but also saw the possibility of bringing to the fore a good opportunity to get closer to nature and socialize the inhabitants of this city. In this space, by rehabilitating the green areas, the place is given functionality and vitality, in order to restore the connection between man and nature (Figure 15).

The vegetal compositions that make the transition between the parking space and the arranged area create volume in a special way and at the same time lead the eyes to the area with water which is highlighted by creating a brightly colored background behind it.

Since the artesian fountain does not have a central position, it is proposed to create a large plant composition (Figure 16), consisting of both deciduous and coniferous species, a



composition created in an organic form that "dissolves" even more the geometric center of rounding while providing a background to the proposed plant compositions to the edges of the round.



Figure 15. Detail from area 6 and 7

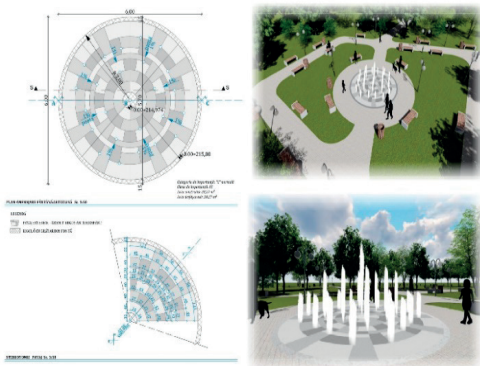


Figure 16. Artisan fountain arrangement plan

In order to achieve the sustainability of this arrangement, plant species were chosen due to their resistance to pollution and poor quality of the substrate, but also for their decorative properties (color and texture of foliage, flowers, fruits, vines, rhytidome, etc.). they

transmit to the landscape the characteristic features of the season according to the phenophase, underlined by diversity and chromaticity. Thus, the harmony and polychromy of colors in terms of aesthetic orientation, can interrupt the daily delimitations of the rehabilitated landscape.

## CONCLUSIONS

Considering the importance of green spaces, especially in urban areas, the concept of Urban Orchard is meant to create a space, not only with an aesthetic role, but also with an important sanogenic, economic and social role. This desire can be achieved by introducing an oasis of relaxation, as close as possible to nature for site visitors.

The advantage of using this type of arrangement of fruit species, initially induces visitors the feeling of modernism, but in reality, the landscape created is a rustic, natural and local, being easy to maintain.

The site has been designed so that each space has a well-defined role, both as an orchard, but also as a space for relaxation, trying to please all types of visitors.

The planting of trees and shrubs species will take into account the optimal conditions for these works to ensure the highest possible planting success.

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