

# Proceedings of the Fábos Conference on Landscape and Greenway Planning

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Volume 3

Issue 1 *Proceedings of the Fabos Conference on Landscape and Greenway Planning 2010*

Article 62

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2010

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### Recommended Citation

Dublinszki-Boda, Brigitta (2010) "Applying urban planning solutions in order to improve suburban greenway systems," *Proceedings of the Fábos Conference on Landscape and Greenway Planning*: Vol. 3 : Iss. 1 , Article 62.

Available at: <https://scholarworks.umass.edu/fabos/vol3/iss1/62>

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## **Applying urban planning solutions in order to improve suburban greenway systems**

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### **Introduction**

Greenway system elements lying on the outskirts of settlements may have different functions. According to their function, they may differ considerably in their layout, type of vegetation and plant structure.

In this research, I examined that in urban plans, by which solutions and how efficiently the ecologically significant characteristics of greenways are managed. The subjects of the research were 2 settlements (Túrkeve and Szigetmonostor) with different urban planning projects from the aspect of greenways.

### **Background/Literature Review**

The major task of an urban plan is to put into practice the residents' demands/decisions on the use of the administrative area of their settlement. While taking responsible care of the values of the area, assuring sustainability, it gives limited chance to apply ecological knowledge independently. The execution mainly depends on the professional "enthusiasm" of the designer (usually: landscape architect), and also on the vigilance of authorities. (Illyés, 2009)

The ecological state of greenway elements on the outskirts of a settlement is significantly influenced by the land use or possible land uses of the administrative area of the given settlement. The type, location and structure of land use must be defined in the development plan during the process of urban planning. Based on the unique natural and socio-economical characteristics of the area, the main purpose of the urban plan is to assure regionally equal conditions for development (regarding land-use, infrastructure system development, and controlling local housing policy) that makes it possible to preserve special landscape features, natural values and buildings to improve the environmental state of the settlement and to use resources deliberately.

These points must be taken into consideration in the land use plan, in order to control the building requirements, rights and responsibilities and way of land use (possibilities, restrictions) regarding the settlement's building sites.

Actually, the prime purpose of these documents is not the improvement of the ecological state (but the determination of building code). However, its interventions and building codes may extensively influence the ecological state.

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M. Szilágyi also emphasizes the significance of greenway elements. She sees it as a problem, that the orders of the housing departments (that control urban planning) do not define these elements as a part of the greenway system (M. Szilágyi, 2009). In this legal atmosphere, there is a much bigger responsibility on landscape architects, who deal with areas outside the settlement. In her opinion, the local society and non governmental organizations can be the “allies” of the professionals, who are able to put into practice local requirements while forming a liveable environment and proportional green infrastructure. (M. Szilágyi, 2009)

But what are those greenway elements that must be taken into consideration in the outskirts of settlements? In the outskirts of the settlement the following – in size, type and structure of vegetation different – greenway elements can be found: forest belts; alleys; bush belts/scrubs; groups of trees; single trees; biologically active environment – typically agricultural – plough lands and meadows. (Dublinszki-Boda, 2009)

**Method(s)**

The subjects of the research were 2 entirely different settlements (Túrkeve and Szigetmonostor). Túrkeve is located in the eastern part of the Great Hungarian Plain. This area used to be covered with a mixture of groves, forests and moorlands. Up to now, nearly all of its characteristics have changed, and it has been totally transformed into a typical agricultural landscape. The original vegetation cannot be found – except for smaller spots. The ratio of forest cover is especially low (2,1%, characteristically planted forests, shelter belts), breaking the continuity of extensive arable lands. Plough lands gained importance with the formation of collective farms. (In 1951, Túrkeve was pronounced to be the first town to have established a collective farm).

Szigetmonostor lies in on the Szentendre Island. The outskirts of this settlement is mainly exploited by agriculture from the aspect of land use. Its natural features are quite advantageous to be used by agriculture. The possibility of cultivation was restricted earlier by the setting out of massive areas for rural development (development of holiday resorts in the 1910-20s) and also by the demarcation of different natural reserves.

To determine how efficient the certain urban planning solutions are from the aspect of greenway elements, greenway system and their ecological state, we must find criteria for evaluation. The size of the area and the scale of process plan mostly determines how detailed these criteria can be. Taking into consideration the scale of 1:10000 that is usually used in structure plans, the following ecological aspects are applicable during the evaluation (Boda, 2002):

— How much is the continuity of vegetation cover assured?

This aspect is to taken into consideration in connection with biologically active areas. The presence of vegetation cover definitely indicates that the

state of the given area is ecologically more favourable. Although there is a seasonal rhythm in the activity of nature, this is advisable to be ignored, and the continuity/discontinuity resulting from the way of land use must be taken into consideration.

- What is the state of vegetation like?  
The vegetation of a given area is mainly in correlation with the possibilities determined by the abiotic and biotic natural factors present. Accordingly, the process of succession indicates different stages/states. In an ideal case, the series of these results in climax vegetation. This process can be influenced by different human effects and activities which must be evaluated as well.
- Stratification of plant community present!?  
Stratification is an important characteristic of the vegetation's spatial structure and horizontal layout. As a factor for evaluation, it is in tight correspondence with the state of vegetation.
- Extent of the zone (length, width)  
The ecological state of a given land-use zone, a suburban green space is basically determined by its size and shape. Each biotope zone has a so called core "lacking disturbance" and a strongly impacted barrier zone. Barrier areas usually separate totally different land-uses.
- Possible connections of zones!?  
Beyond the effects of greenway elements we must take into consideration the whole system made up by them to evaluate ecological state. In this, the followings play a remarkable role:
- Are there any possible connections between the identical and similar zones? Is the distance between them possible to be overcome?  
During the evaluation of a particular area, it is also reasonable to evaluate barrier areas; since typically in these areas, there may be such land uses that usually have negative effect on the entire system.
- How large is the negatively affected area?  
A biologically inactive area (barrier area) has an impact on the neighbouring biologically active areas. The extent of the affected area can only be estimated most of the time. Some of the legal orders concerning protection distances may help in the determination.
- How large is the pollution caused?  
The degree of the negative effect caused is influenced by the type of activities, and that on which one of the greenway elements these activities do have a negative effect? Are there any processes caused by the effect that might be present in the system for a long time?
- Extent of barrier areas!?
- How much are the connections of greenway elements inhibited?  
Taking into consideration the whole system it is determinative, that whether the occurring activities cut off zones from each other abolishing possible connections.

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The aspects mentioned above do not appear “clearly” in local development strategies, but are possible to be influenced indirectly. In the followings, I have been looking for those solutions and orders in the two settlement’s urban plans that have had influenced the ecological state of suburban greenway elements.

### **Discussion and conclusion**

In connection with the structure plan, in the documents prepared the arrangements in order to improve ecological state must be in a form that corresponds to the type of the document.

In the **local development strategy**, the long-term development conception, the settlement’s future plans, and the necessary arrangements are defined for each sector. The strategy evaluates the current environmental state comprehensively and defines the most important duties as a “system of goals”. The structure plan later on makes these ideas more accurate, it records and rephrases them in the form of specific arrangements and instructions.

In case of TÚRKEVE, arable lands, and the protection of reserves in their nearly natural state are the most emphasized intentions at the strategic level.

For SZIGETMONOSTOR it is elementary to preserve its “Island character”, which is characterized by the landscape, the atmosphere of the Danube and the historical land-use ratios. Thanks to the natural reserves and water preserve areas of national and international significance, the protection of these is an important task.

The **structure plan** determines the spatial array of each land-use units. The type of neighbourhood relations formed by the plan among certain land-use units has significance in influencing ecological state. (What are the spatial connections of the ecologically valuable, sensitive areas like?)

The periphery of TÚRKEVE is mainly exploited by agriculture. On the one hand, the state of green infrastructure within the land zone use is influenced by the landscape units that correspond to the type of cultivation. On the other hand, there are some suburban greenway elements that divide up land-use. During the application of these, their restatement as a structural unit is a problem. - E.g.: a small, but characteristically woodland, which functions as a shelter belt, is not necessarily a woodland in structural terms, (it might remain an agricultural area), and so its long-term existence is endangered.

A notable part of SZIGETMONOSTOR’s periphery belongs to a kind of national reserve category. The floodplain gallery forests near the banks of the Danube are national natural reserves. Besides this fact, the southern part of the administrative area is a water management area, which ensures a big portion from the water supply of Budapest. We can say that the ecological state of these areas is quite favourable, since they are well separated from the more intensive housing- and holiday resorts.

Only the determination of the type of the allowable activities and the acceptance of necessary restrictions can be a problem.

The *environmental management* (recommendations of natural conservation, environmental protection, greenway management) is a compulsory and supplementary part of the structural plan, that details the factors influencing the environmental and settlement- ecological state of the settlement – it deals with media, environmental and natural values and the effects on them. Besides the description of its state, it also formulates the thematic instructions needed. Since the environmental management is not accepted as a local law, its instructions can only become really efficient, if they are also put down in local building codes.

In TÚRKEVE the recommendations put down in the document are still mostly determined by the fact that on the outskirts of the settlement agricultural land use dominates. In connection with that the main purpose is to improve the state of the environment with e.g. the insurance of continuity of plant cover (state of air and soil, insurance of ecological connections), formulating conditions for land uses of different purposes (regarding the protection of the quality and quantity of soil, minimalizing ecologically endangering activities), the conditions of application of chemical fertilizers (in connection with the state of surface and subsurface waters).

In SZIGETMONOSTOR, the recommendations refer to the preservation of the state of the environmental media; within these it mostly restricts the activities that directly or indirectly endanger the water resource (questions of community sewage and waste management).

The *landscape planning part of the structural plan* is also compulsory and supplementary. Theoretically, its purpose is to improve the landscape's physiologically conditioning effect, and to enhance efficiency and yield. In practice, it typically evaluates and influences these aims from the aspect of land use, the type of these land uses. With that it supports map projection of the area.

As a supplementary work part it is not accepted as a local law, either. Its instructions can become really efficient, if they are also put down in local building codes.

The *contents of the local plans and building codes* regarding landscape preservation and environmental protection and natural conservation are framed according to the corresponding laws. However, its basic purpose is to form local building codes, there is a possibility to determine local requirements, laws and orders that are able to influence ecological state as well. (These can influence the ecological state indirectly) Both (together) are approved by an order of the local government, the regulations of which apply to each resident, which is why these are efficient solutions.

According to Hungarian Government Order of 2/2005 (I. 11.), it is necessary to conduct a process of environmental analysis. Essentially, this is the preparation of the decision making process. Its purpose is to reveal and evaluate the (estimated)

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environmental effects during the enforcement of the conceived development plans, and possibly to feed back (or maybe make a recommendation) in connection with the development decisions.

Necessarily, *environmental analysis* is connected to the local development strategy formulated according to the local plan, the environment management and landscape planning processes of the supplementary work parts, and also to corresponding parts of the structure-, local-, and building plans. The document created during the process is called an environmental impact assessment (EIA).

From the designer's point of view the benefit of this document is that it also gives a feedback to the designer itself, so it makes possible to make necessary corrections. Moreover, it might give a chance to the designer to argue over the development requirements formulated by the settlement if those are not acceptable from the professional point of view.

For the current structure plan of TÚRKEVE there has not been made any environmental analysis yet. In connection with the structure plan it can be stated, that it has been created to have taken into consideration the laws and orders of environmental protection and natural conservation, to be adjusted to the local facilities, with the priority of environmental protection in view. There was big attention payed to the existing natural and landscape potential. The plan does not contain such solution elements the application of which may cause significant destruction for environmental elements.

In SZIGETMONOSTOR, environmental analysis pointed out, that as a result of the structure plan the developments carried out will result in a quality change in the administrative are of the settlement. The size of building sites increases several times, which affects ecological states of course. However, thanks to the strict regulations, the protection of these sensitive and vulnerable areas is assured for a long time.

### **Results**

It is possible to improve the ecological state of the outskirts of a settlement significantly through the instructions of documents in connection with urban planning.

Intentions and tasks conceived in order to preserve ecologically valuable greenway elements and the connections between them become directly or indirectly enforced during the preparation (planning process) and application (authority decision-making process) of urban planning solutions, such as development plan, land use plan, local building rules and regulation plan. The main natural and land use characteristics of the affected area determine which one of the applied solutions becomes more emphasized and may be more effective. According to my

assumption, by choosing the proper solution the ecological state of suburban greenway elements can be improved significantly.

As a result of the study in connection with the 2 settlements it can be concluded, that the following ecologically significant greenway characteristics were managed: size of greenway elements, plant structure; neighbourhood relations (according to the presence, restraint or lack of connections); land use (according to the sensitivity of the area).

It can be stated, that in relation to ecological state of certain greenway elements, regulation plans; in relation to greenway system, structural development plans are the most efficient solutions.

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