

## URBAN REGENERATION PROPOSAL OF A POST-INDUSTRIAL SITE IN BRAȘOV

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**Abstract.** The industrialization and especially the deindustrialization, have an impact on the current urban landscape, through the process of dismantling some industrial giants and the destruction or abandonment of those areas of land on which they once operated. The effects of these phenomena are fully felt in România and unfortunately there is still no well-established, professional plan for urban regeneration. The process of urban regeneration represents the adaptation to the present by rethinking the respective spaces in order to change their functions and aesthetics, considering that they have become unused spaces and even avoided by the population. Urban regeneration increases the quality of life and living conditions of areas adjacent to derelict sites and their reintegration into the urban environment, they generally become public spaces for leisure, entertainment, sports and why not, an oasis of greenery, created through proposed vegetation. Brașov is an example of a city with potential, but it lacks, for now, the official initiative and precisely because of this a plan is proposed to transform the former Hidromecanica industrial site into a place of aesthetic and functional relaxation, especially since the city of Brașov is a tourist town and the site is in its center.

**Keywords:** industry, urban regeneration, postindustrial, industrial landscape, sustainable development

### INTRODUCTION

The visible growth of the planet's population, together with consumerism, an indisputable phenomenon, and the change in consumption patterns, put a huge pressure on natural resources and services, whose support capacity is currently often exceeded, reaching, over time, to an unsustainable mode of exploitation of various resources, especially the biological resources of the Earth.



**Fig. 1. Sustainable development model and proposed objectives**

<https://danielaborontis.ro/2018/07/30/obiectivele-de-dezvoltare-durabila/>

The possibility of depletion, in the near future, of some elements that make up the natural capital of the planet has forced contemporary society to set targets,

increasingly precise and timely, to maintain, and why not, improve the current state through conservation biodiversity, essential in maintaining the various ecosystem processes and implicitly in the survival of the human species, without neglecting the challenge of sustainable development.

It is about needs, i.e. basic needs, not about desires and the present that is closely linked to the future and also about a balance that takes into account the **economic** and **social** and the **environment**. Some decisions made with these three aspects will lead to a development that is sustainable, in the long run. Many of the countries with problems in this regard have made progress towards sustainable development, but it is never enough, so in 2015, the process continued, by adopting the Sustainable Development Goals (SDGs) - which aim to also a period of 15 years, until 2030.

In the WCED Report of Brundtland since 1987, the most quoted definition of sustainable development was formulated: "The sustainable development is that which pursues the needs of the present, without compromising the ability of future generations to meet their needs", which is a process dynamic in which three mentioned elements must be taken into account, environmental responsibility, economic development and societal progress, to which, very frequently, governance is added, all leading to integration without discrimination, health, fairness and solidarity, a healthy and livable environment, production capacity and innovation, viable consumption processes and new resources.

The Conference on the Environment, held in Stockholm in 1972, acknowledged that human activities contribute greatly to the deterioration of the environment, which endangers the future of the planet.



**Fig. 2. Urban agglomerations (Tokyo, Sao Paolo)**

<https://www.9am.ro/stiri/International/331464/tokyo-ales-pentru-a-treia-oara-cel-mai-sigur-oras-din-lume.html>

<https://www.spatulconstruit.ro/articol/aglomeratiile-urbane-si-stilul-de-viata-al-viitorului/14637>

Although urban areas cover less than 3% of the Earth's surface, the phenomenon of urbanization is beginning to have repercussions on the environment, a study of land degradation in the 21<sup>st</sup> century revealing that urban activities are the basis of their global degradation.

The process of industrialization is the engine that generated a very rich built fund, which cities are now forced to take on as a theme of integration and development. The increase in the number of industrial constructions in a relatively

short time has transformed the structure and life of society and the image of cities, giving rise to areas difficult to assimilate. This process, through its temporal and spatial dynamics, led to the emergence of the term *industrial landscape*, integrated into the urban, peri-urban or rural space, which is undisputed in Romania as well. After World War II, a team of researchers from the West launched a series of scientific studies on environmental degradation due to industrial development and exploitation, the pollution and the environment became popular problems.

The deindustrialization, a phenomenon that began in România after 1989, significantly changed the economic and social structure of cities, which, unfortunately, favored certain social classes, but disadvantaged a large part of the population, being called a "creative destruction" (Bluestone and Harrison, 1982). For a long time, urban growth has evolved rapidly, mainly due to the demographic impact of industrialization, and in the context of deindustrialization, the industrial cities have suffered economic crises, massive job cuts and emigration, cities in decline, and so-called *brownfields*, i.e. abandoned or underused industrial or commercial spaces or territories, in which the redevelopment is complicated or impossible.



**Fig. 3. Example of *brownfield***

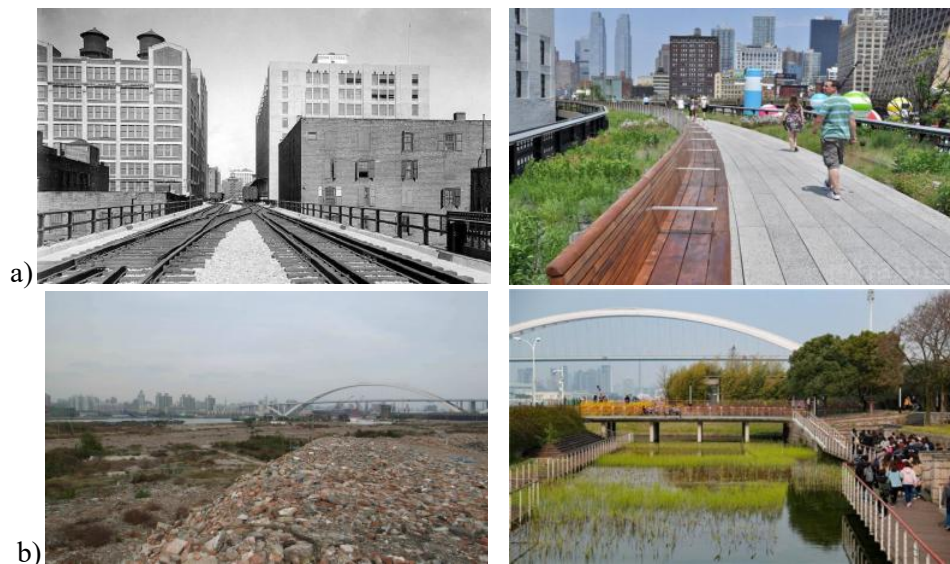
<https://www.cpajournal.com/2017/10/23/new-life-new-york-brownfield-redevelopment-credit/>  
<https://thepropertylifeboat.co.uk/buying-brownfield-land/>

These territories are required for urban regeneration, the essence being the reconsideration for a positive, functional aesthetic change, but also for a superior comfort, taking into account the need to define new public spaces with a well-defined character, regardless of whether they are private, public or public-private investments, and the fact that the physical degradation of abandoned industrial areas is complemented by the gradual degradation of the social image. It is an action which, taking into account certain principles, leads to the solution of urban problems and the finding of sustainable methods of long-term improvement for economic, social and environmental conditions in an area that needs to be changed, principles which represent the hallmark of urban regeneration. Reflecting the challenges of urban change and its outcomes, the urban regeneration should:

- Be based on a detailed analysis of the state of an urban area and deal with solving problems in a balanced, orderly and positive manner
- Ensure that the resulting strategy and implementation programs are developed in accordance with the objectives of sustainable development
- Set very clear operational objectives

- Make the best use of natural, economic, human and other resources, including land and existing features of the built environment
- Aim for consensus by the maximum possible participation and cooperation of all stakeholders, through partnerships or other ways of working
- Recognize the importance of measuring the progress of the strategy in achieving the specified objectives
- Accept the probability that the initial implementation programs will need to be revised in accordance with changes
- Recognize the fact that different elements of a strategy can make progress at different speeds

The change is inevitable because the functioning of political, economic and social systems constantly generates new demands and presents new opportunities for economic progress and civic improvement, with disused industrial areas being perhaps the best contemporary example of sites in urgent need of reorientation, change of destination, and very eloquent and well-known examples are the suspended park in New York, arranged along a former suspended railway (Fig.4.a.) and the park Houtan, Shanghai, in the past shipyard (Fig.4.b.).



**Fig. 4. Urban regeneration - New York (a), Shanghai (b)**

<https://ecology.md/md/page/parcul-suspendat-din-new-york-si-a-largit-domeniile-video>  
[www.archdaily.com/131747/shanghai-houtan-park-turenscape/50142c2228ba0d3b45001599-shanghai-houtan](http://www.archdaily.com/131747/shanghai-houtan-park-turenscape/50142c2228ba0d3b45001599-shanghai-houtan)  
<https://archive.shine.cn/metro/society/Culture-park-will-be-sited-near-Expo-site/shdaily.shtml>

## MATERIAL AND METHODS

In the heart of Braşov, south of the new center, is located the Hidromecanica platform, currently a derelict area, with an area of 3.8 ha. Therefore, the former industrial platform, or the land on which the plant operated, is centrally positioned towards the extremities of the city, the late recognition of the consequences of the last

decades still making possible the presence of ex-industrial sites, in ruins, even in the central area, the only utility at present being an improvised parking lot, in the SW part, with an area of 3633 sqm., the rest of the surface being cleaned, mostly, of waste, currently being completely covered by ballast. Looking again at the consequences of deindustrialization, cities, including Braşov, seem to develop intra-urban peripheries, abandoned industrial areas, ruined neighborhoods or abandoned houses.



**Fig. 5. Site positioning**  
(Google earth)

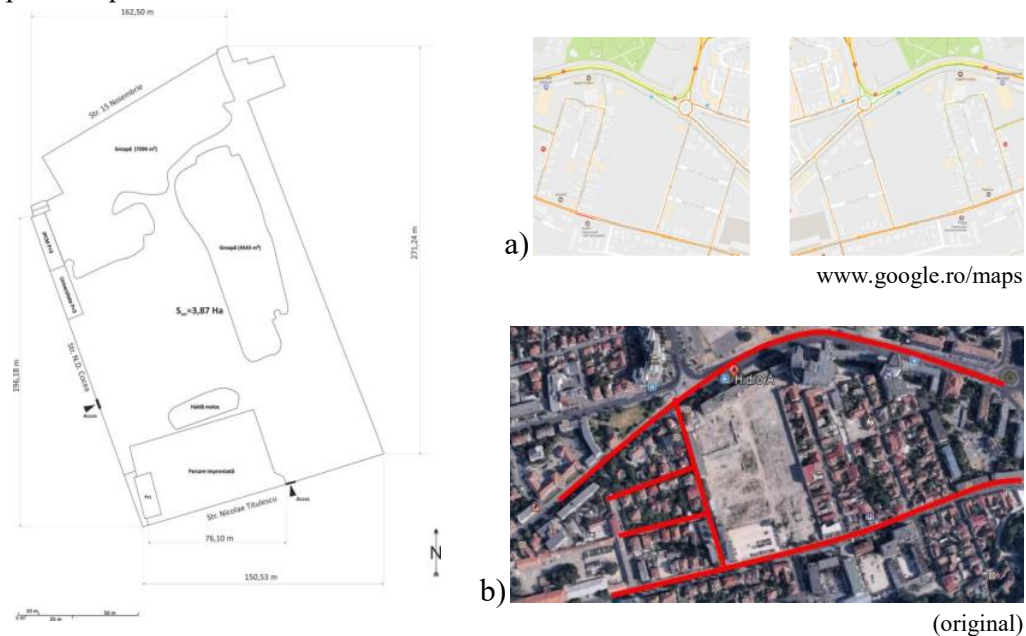


**Fig. 6. The relationship with important buildings and green spaces**  
(Google earth)

The central location of the site provides a good link to various important areas of the city, institutions or cultural objectives. The infrastructure has been modified over time to serve a large number of users of nearby functions, so the area benefits from numerous access roads and relationships with important locations in the city (Fig. 6.), on the other hand, the number of spaces green, on an area of about four kilometers from the area of the former industrial platform is, unfortunately, quite low, the lack of

interest in providing a minimum of green space per capita, leading to a deterioration of air quality in Braşov. There are no parks and green spaces, very important for the community, and according to the data posted on the website of the Braşov County Council, in Braşov there are 5 sqm of green spaces per capita, while in the European Union the average is somewhere at 24 sqm, the difference being enormous. It was probably not understood that the mountain and the forest on the outskirts of the city could not take the place of the green spaces inside the city.

In view of a proposal for the arrangement, practically of the urban regeneration of the site, various measurements, plans and studies were made, of pedestrian and car traffic, noise pollution study, following which it is observed that on three sides of the site, pedestrian traffic it is intense, its arrangement being able to create a functional space for pedestrian traffic and relaxation.

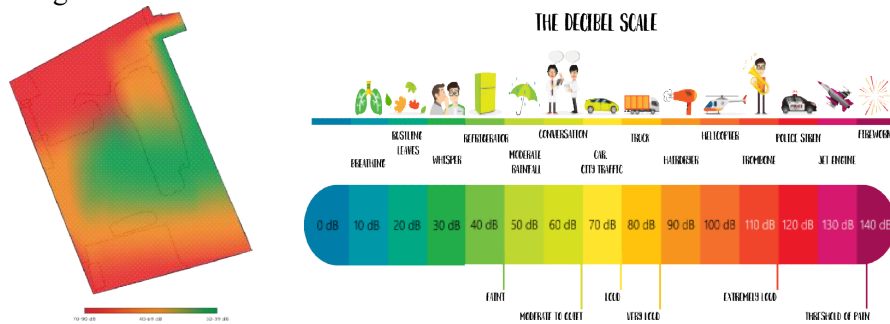


**Fig. 7. Plan, car traffic study (a), pedestrian traffic study (b)**

In terms of noise pollution, the study was conducted during the week, during which time the number of moving vehicles is high. On the decibel scale of Fig. 8. it can be seen that road traffic is the one that produces noise at the level of 70-90 db. The results of the measurements carried out inside the site show that the north and south sides of the terrain are most affected by the noise produced by vehicles. Values between 70 and 90 decibels were recorded in these areas. The western side is less affected, the values here being between 40 and 70 decibels, and the least affected are the center of the studied land and its eastern side, where the values did not exceed 40 decibels.

Following the studies carried out in the area, the sound and visual stimuli, the tiring congestion and especially the car traffic stood out, so the proposed concept is thought around the man as an active participant in urban life and not just a beneficiary of services. The wide open spaces aim at removing the barriers between those present

and inviting interaction. The open interior character, but somewhat isolated from the urban jungle due to the placement of the park below the street level by two meters, allows and encourages the organization of cultural and social events of any kind designed to revitalize the current cultural environment.



**Fig. 8. Noise pollution and decibels scale**

<https://www.goodscience.com.au/year-9-physics/sound-waves/6-the-decibel-scale/>



**Fig. 9. The current situation of the site**

<https://vimeo.com/48132026>

[https://adevarul.ro/locale/brasov/uzina-hidromecanica-stearsa-harta-brasovului-1\\_50acb94b7c42d5a66388f5d3/ind](https://adevarul.ro/locale/brasov/uzina-hidromecanica-stearsa-harta-brasovului-1_50acb94b7c42d5a66388f5d3/ind)

## RESULTS AND DISCUSSIONS

The urban regeneration is an intense phenomenon circulated worldwide but not very well understood. Although several cities in different countries have been involved in regeneration schemes and many development companies, financial institutions and community organizations have participated in such activities, there is no exact and safe form of urban regeneration practice and no single authority source of information. It is essential to look at the process of urban regeneration as a long-term process, there are no "quick" or permanent solutions in this area. Each generation faces specific problems, different priorities and works in different ways. However, while each successive generation will face its own challenges, the value of previous work cannot be denied.

Disused industrial areas are perhaps the best contemporary example of sites in urgent need of reorientation, change of destination, and the expansion of areas affected by polluting activities makes traditional technologies inadequate due to high costs associated with soil remediation and the potential impact on the environment, in particular the change in landscape and soil properties. Therefore, a redevelopment of

the phytoremediation type site was considered. The plants were first proposed for wastewater decontamination three hundred years ago. *Thlaspi caerulescens* - perennial or rarely biennial plant found in soils or rocks enriched with lead or zinc, mineral waste or river gravels and *Viola calaminaria* - found in soils with high concentrations of zinc, lead and cadmium, most often with other metallophilic plants were the first plant species used in the ninth century, due to the accumulation properties of high concentrations of metals.

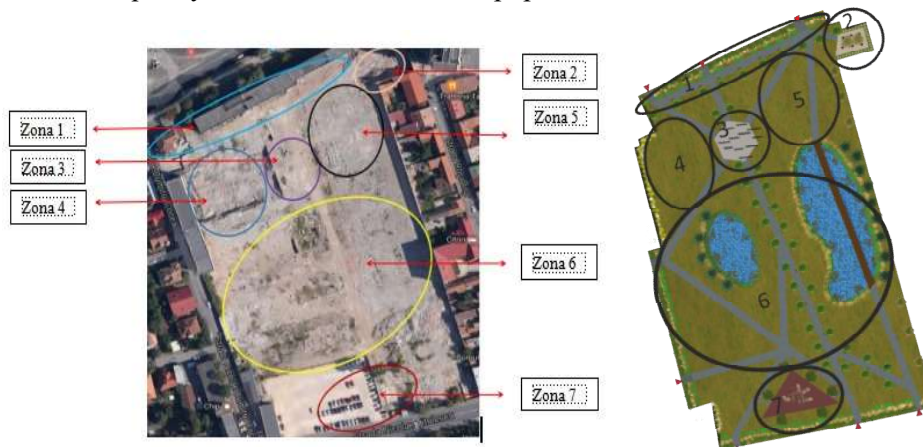


**Fig. 10. *Thlaspi caerulescens* and *Viola calaminaria***

<http://www.fotoflora.lcu.se/backskao.htm>

<https://www.euregio-im-bild.de/fotos/galmei-veilchen-viola-calaminaria-beim-schlangenbergbreinigerheide-nordeifel.html>

A first step towards the transformation of the site is the zoning and it was done following the analysis of the results of the studies made, in such a way that the space becomes aesthetic, but especially functional. It is very important that each meter of land is used by the inhabitants of the city, each area of the concept being intended for various activities, so this proposal highlights the need to reintroduce degraded sites in the urban fabric, turning them into public spaces and green spaces, with a positive impact on the quality of life and health of the population.



**Fig. 11. Site zoning**  
(original)



Zone 1 includes the entrances from 15 Noiembrie Street, an artery which, as it resulted from the analysis of pedestrian traffic, is very busy, which is why it will be proposed to place several banks, which will be used by people waiting at the bus station in immediate proximity, becoming a space for rest and even relaxation. The proposed trees, *Platanus x acerifolia*, in addition to their specific habitus, stand out through their particularly decorative rhytidome, and from a functional point of view, they will create shade in the relaxation area. The alley that will follow the entire northern side has been designed as a transit area.



**Fig. 12. Northern area - rest and relaxation**  
(original)



**Fig. 13. Pavilion area**  
(original)

Zone 2, the smallest in size, a secluded area, is proposed to be arranged with 6 chess tables, intended for lovers of this sport. The space is in such a way that the activity for which it was designed is not disturbed by traffic and does not interrupt any pedestrian route. The perimeter of the space, marked with *Hydrangea paniculata*, can provide more privacy and charm to the area.

Zone 3 proposes the presence of a pavilion with a decorative role, with an area of 600 square meters, and what will have to attract attention are the 11 concrete pillars,

with a height of up to 8 m, whose massiveness and color will suggest the impact that the industry had it on the environment, and their hard texture contrasts with the texture of the vegetation in the area and the one that will partially cover these pillars, all this being a courageous and unique proposal. The fickle plants that are proposed on the upper part of the pillars will be changed annually, so that the decoration is always different. The location of the pillars will not obstruct the pedestrian traffic and they will be able to be admired from all directions.

Zone 4 and 5, respectively, have an open character with a considerable area and are designed to host various sporting or cultural events, will be grassy areas and decorated with flowering plants, with the role of phytoremediation, such as *Solidago canadensis*, *Achilleia millefolium*, with a slightly wild appearance, in order to be in relation to the vegetation proposed in the other areas.

For zone 6, which has the largest area, over 1 ha, it is proposed to arrange two ponds with areas of 3000 sqm and 1000 sqm, respectively, shallow, on the place where there are currently two huge pits, the proposal speculating this. The arrangement of these ponds will eliminate the leveling operation by adding many cubic meters of land, the generous surface of the area allowing this type of arrangement. They will be decorated on the banks with plants from the grass group, such as *Agrostis capilaris* or *Acorus gramineus*, moisture-loving plants, *Typha latifolia* and trees of the genera *Platanus* and *Salix*, and in time they will attract fauna, which increases the well-being of people in the park and can remedy the ecological balance that the site has been lacking for more than 100 years. A wooden footbridge will pass over the larger pond, which will give more charm to the area. Various cultural events can also be organized here.


















**Fig. 14. Lake area**  
(original)

Zone 7, with an area of 2000 square meters, was designed as an area for children, with a set of "playscape" and places to stay, especially for parents. Also here, in order to create shade, very ornamental trees of the genera *Quercus* and *Rhus* will be planted.

The plot of the alleys is based on the concept of minimizing the time spent crossing the park, a concept based on studies made on the dynamics of pedestrians

crossing the area and the most frequented points of interest. The green spaces delimited by the alley plot remain ample to be able to host different events.

The table below contains the plant species used in the development proposal, specifying the functions they have.

Category	Scientific name	Function		
Trees	<i>Platanus x acerifolia</i>	phytostabilization		
	<i>Quercus robur fastigiata</i>	phytostabilization		
	<i>Salix alba</i>	decoration		
	<i>Rhus typhina</i>	decoration		
Shrubs	<i>Cotoneaster dammeri</i>	decoration		
	<i>Hydrangea paniculata</i>	decoration		
Grasses	<i>Agrostis capillaris</i>	phytoextraction		
	<i>Acorus gramineus</i>	phytoextraction		
Aquatic plants	<i>Typha latifolia</i>	decoration		
Flowering plants	<i>Achillea millefolium</i>	phytoextraction		
	<i>Solidago canadensis</i>	phytoextraction		
Herbaceous plants	<i>Festuca</i> sp.	phytoextraction		
	<i>Lolium perene</i>	phytoextraction		
	<i>Poa</i> sp.	phytoextraction		

**Fig. 15. Proposed plant species and their functions**

## CONCLUSIONS

The urban areas are constantly subject to contemporary challenges posed by the process of diminishing the negative impact of global economic competition, quality of life or eliminating the effects of global warming.

Through urban regeneration, public urban environments can become true symbols of cities, giving them their western identity, and studying areas that need revitalization means drawing the attention of those able to generate strategies for immediate and effective implementation of solutions, these areas having a high potential to be transformed.

The present project aims at urban regeneration through phytoremediation of a site that has feasible advantages in the development of the city, especially due to its strategic location, being in immediate relation with important institutions, cultural objectives. The rendering of a public function will be able to successfully coagulate a tourist and cultural route to the city, the concept proposing the creation of an oasis of vegetation in an ultra-central space, protected by urban agglomeration which, through design inspired by local natural landscape and open spaces and socialization creates a family atmosphere, a starting point for a new community.

It is desirable that as many abandoned or useless sites as possible are in the attention of those who want and are able to take action, so that natural or temporal elements do not accentuate their degree of degradation.

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