

# Transport Infrastructure in the Process of Cataloguing Brownfields

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**Abstract.** To begin with, the identification and follow-up revitalisation of brownfields raises a burning issue in territorial planning as well as in construction engineering. This phenomenon occurs not only in the Czech Republic and Europe, but also world-wide experts conduct its careful investigation. These issues may be divided into several areas. First, it is identifying and cataloguing single territorial localities; next, it means a complex process of locality revitalisation. As a matter of fact, legislative framework represents a separate area, which is actually highly specific in individual countries in accordance with the existing law, norms and regulations (it concerns mainly territorial planning and territory segmentation into appropriate administrative units). Legislative base of the Czech Republic was analysed in an article at WMCAUS in 2016. The solution of individual identification and following cataloguing of brownfields is worked out by Form of Regional Studies within the Legislation of the Czech Republic. Due to huge the scale of issues to be tackled, their content is only loosely defined in regard to Building Act and its implementing regulations, e.g. examining the layout of future construction in the area, locating architecturally or otherwise interesting objects, transport or technical infrastructure management, tourism, socially excluded localities etc. Legislative base does not exist, there is no common method for identifying and cataloguing brownfields. Therefore, individual catalogue lists are subject to customer's requirements. All the same, the relevant information which the database contains may be always examined. One of them is part about transport infrastructure. The information may be divided into three subareas – information on transport accessibility of the locality, information on the actual infrastructure in the locality and information on the transport accessibility of human resources.

## 1. Introduction

To begin with, the identification and follow-up revitalisation of brownfields raises a burning issue in territorial planning as well as in construction engineering. This phenomenon occurs not only in the Czech Republic and Europe, but also world-wide experts conduct its careful investigation. These issues may be divided into several areas. First, it is identifying and cataloguing single territorial localities; next, it means a complex process of locality revitalisation. As a matter of fact, legislative framework represents a separate area, which is actually highly specific in individual countries in accordance with the existing law, norms and regulations (it concerns mainly territorial planning and territory segmentation into appropriate administrative units). Legislative base of the Czech Republic was analysed in an article at WMCAUS in 2016 and was declared particularly weak [1].



In addition, brownfields must be properly catalogued. Cataloguing brownfields is national-wide carried out by ‘Comprehensive study on localizing brownfields’ worked out in 2004-2006 [2]) and commissioned by Czech Invest Agency for business and investment support and individual regions. The gathered data clearly reflect the need for settling the issue of cataloguing brownfields not only on a local, but also on the national-wide level. Localization and monitoring were partly included in Planning Analytical Materials of Municipalities under No. 4 ‘areas to rebuild or reuse of devalued land’ (Regulation No. 500/2006 Col. 2006). A great advantage of this inclusion of brownfields is that it is updated every two years according to Act No. 183/2006 Col. ‘territorial planning and building regulations (Building Act)’. However, since Regulation No. 500/2006 Col. on planning analytical materials of municipalities, territorial planning documentation and records of territorial planning activities did not devise a common identification or register method, each author performs the identification in his own way. Thus, the gathered data of individual municipalities cannot be compared.

## **2. Regional Studies of Brownfields**

To put it in a nutshell, the solution of individual identification and following cataloguing of brownfields is worked out by Form of Regional Studies within the Legislation of the Czech Republic. Due to huge the scale of issues to be tackled, their content is only loosely defined in regard to Building Act and its implementing regulations, e.g. examining the layout of future construction in the area, locating architecturally or otherwise interesting objects, transport or technical infrastructure management, tourism, socially excluded localities etc. To put it more precisely, as a similar legislative base does not exist, there is no common method for identifying and cataloguing brownfields. Therefore, individual catalogue lists are subject to customer’s requirements. All the same, the relevant information which the database contains may be always examined. This is the name and catalogue number of a brownfield, its size, number of objects in the locality, their flooring and gross floor area, technical condition, property relations, information on ecological burden, locality limitations, information concerning transport and technical infrastructure. Everything also is supplied with information regarding the position of the relevant map data and characterizing photo documentation [3].

Furthermore, the attention will be drawn to information about transport infrastructure, which plays an essential role in categorizing the ratio of investments of private and public sector not only in a wider area, but also the very locality of brownfield. The information may be divided into three subareas – information on transport accessibility of the locality, information on the actual infrastructure in the locality and information on the transport accessibility of human resources. Furthermore, the multilevel database divided relevant information according to its suitability for the particular level of examination. Thus, a considerable disproportion on basic and super structural levels arises in regard to information subareas. In order to simplify the matter, only a two-level database system divided into primary information (basic ones) and secondary (additional ones) will be analysed.

### *2.1. The primary information*

The first database level should comprise information on the locality accessibility. This information is one of the most significant factors influencing brownfield’s attractiveness in regard to the private/public investment – development potential i.e. encouraging a potential investor to revitalise the locality [4]. Obviously, localities within the vicinity of significant arterial roads will not be omitted by potential investors whatsoever. On the other hand, localities with limited accessibility, and without active encouragement, will not attract potential private investors.

The passenger and freight national transport in the Czech Republic is realized mainly by road and railroad transport – 79% road transport in 2015 and 18% railroad transport from the whole. As a result, the next kinds of transport – air, ship and others – are considered marginal.

For that reason, the primary information will include only data regarding the vicinity of the infrastructure. Of major importance will be the adjacent road, then the gross distance from the roads of higher class – 2<sup>nd</sup> and 1<sup>st</sup> class and expressways/highways.

The information about the roads needs to be supplied with basic information about the railway lines, which is considered not only the second most significant, but also the most ecological transport regarding the actual operation. Reliable figures on existence/non-existence of railway trailer in the locality or its vicinity play an important role, together with the possibility of a connection to railways and corridors. Both kinds of transport may be supplied with information about other possible kinds of transport crucially important for the concerning locality.

As a matter of fact, with respect to the internal infrastructure, only data about locality road infrastructure, possibility of calm transport in particular, should be included in the primary information. All the same, neither this aspect is urgently required. In a view of the last subarea, the transport accessibility of human resources presents no reliable data for the primary information whatsoever. An example of order of information on the infrastructure in the primary database is illustrated in the figure 1.

Road:	Railway:
adjacent road:	trailer:
high transport infrastructure:	railway:
expressways/highways:	Other transport:
1st class:	
2nd class:	
parking place:	

**Figure 1.** The example of order of information on the infrastructure in the primary database.

## 2.2. The secondary information

To begin with, the second phase concerns gathering and presenting the data – the secondary part must supply and develop the information from the primary phase; therefore, its segmentation to the road infrastructure must be preserved. It exerts clear predominance of information concerning the subarea of locality infrastructure and transport accessibility of human resources. However, in order to preserve the chronology, it is advisable to start with the information about the territory accessibility.

In addition, the basic information should be re-checked and re-specified. As for an adjacent road, it is necessary to specify its class and number, surface layer and its condition, clearance profile (number and width of traffic lanes) and clearance junctures e.g. sharp curves, narrowing the traffic profile, reducing the clearance height etc. Concerning highway higher class, it is necessary to specify figures on the distance from the connection point to the real mileage; in case of slip road highways (exits), it is also necessary to define their designation.

Railway transport needs to be supplied with information about the owner of railroad siding and points, their technical condition, the maximum load and railway indication where it leads. Furthermore, it is necessary to carefully define the position where reloading may be carried out, including existing reloading device. The nearest railways need to be more specifically defined by a particular railway line and its distance. Moreover, there should be information about the nearest railway station, its distance and number of railway tracks.

The internal infrastructure in the locality should start with a brief description of traffic routes scheme in the locality, e.g. branching, circular, and radial, combined, or undefined structure. The description should be followed by information on the position, capacity, surface layer and condition of parking lots. Furthermore, data concerning internal roads and other areas should be provided i.e. clearance profile, clearance height, surface layer and its condition and clearance junctures.

The transport accessibility of human resources in secondary information should provide information about public transport stops, bus lines and railway transport. Information board at each stop should contain information about the distance from the main entrance to the locality, connection frequency (e.g. 2 in the morning + 2 in the afternoon, 3 times an hour, every 10-15 minutes etc.) its connection to the pedestrians' walkway, or alternatively, another safe route leading to the main entrance. Provided stops do not exist within the walking distance, there should be relevant information concerning the necessity/uselessness of its construction in the appropriate area.

The information from the secondary area or more precisely, the example of its structuring is illustrated in table 2.

ROAD	adjacent road:			inner infrastructure:		
	no.:	surface:	condition:	description:		
	transit profile:	width:	critic point:			
	expressways/highways:					
	no.:	distance:	exit:	surface:	condition:	trans. profile:
	1st class:					
	no.:	distance:	exit:	critic point:		
	2nd class:					
	no.:	distance:	exit:			
	parking place:					
public transport	localization:	surface:	capacity:	condition:		
	station:	bus	station:	railway	station:	
	distance:		distance:		distance:	
	interval:		interval:		interval:	
RAILWAY	trailer:					
	owner:		condition:		max. load:	
	railway:					
	no.:	distance:	number of lines:		loading area:	
OTHER TRANSPORT						

**Figure 2.** The example of order of information on the infrastructure in the secondary database

### 3. Conclusions

The process of creating and updating databases of brownfields in the Czech Republic have just entered the development phase, which reflects real needs resulting from practical use of the databases. The multilevel system of registering brownfields enables to gather all valuable information for potential investors; however, at the same time, it offers a possibility of a clear and simple choice in the initial phase.

Information concerning transport infrastructure helps to characterize brownfield in regard to the necessity of investment incentives. These enables for the financial sources to focus on important, yet unattractive localities, and yield the revitalisation of attractive brownfields to private investors as a result of which public resources will be optimized.

Comprehensive knowledge of transport structure is practical also for the investor. As a matter of fact, a good functional recovery of a locality and a future high-quality material flow and human resources will be easier to choose; for that reason, the congestion in some parts of the territory will be avoided. Consequently, the land use will be optimized in a way that safeguards the environment.

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