Revista Minelor – Mining Revue
ISSN-L 1220-2053 / ISSN 2247-8590
vol. 30, selected papers from the 11th edition of
UNIVERSITARIA SIMPRO / 2024, pp. 174-182

TOWN PLANNING AND CADASTRE IN MINING AREAS. CASE STUDY OF THE FORMER BAIA BORȘA MINING ZONE, MARAMUREȘ COUNTY

Marius CUCAILĂ[1], Simona CUCAILĂ[2], Ioan BOROICA[3]*

[1] University of Petroșani, Hunedoara, mariuscucaila@upet.ro, tel. 0722514763
[2] University of Petroșani, Hunedoara, simona_cucaila@yahoo.com, tel. 0767919162
[3] Maramureș Museum, Sighetu Marmației, ionboroica@yahoo.com, tel. 0742400590

DOI: 10.2478/minrv-2024-0055

Abstract: *Some relationship between the cadastre and urban planning regulations can be detected since the second half of the 19th century, together with the introduction of the stable cadastre in Maramureș County and later in Transylvania. With the introduction of the cadastre, the first functional zoning of the territory of the cadastral localities was also carried out, which involved the cadastral registration of all parcels and the recording of the use categories, together with the delimitation of the intravilan or built area and extravilan lands grouped in fields according to the local toponymy. Both before the First World War and in the interwar period, town planning regulations paid little attention to the cadastre introduced in the second half of the 19th century, which is still in force today. During the communist period, urban planning, called also systematization, had a political purpose, especially in rural localities, when through the systematization sketches, the political authorities aimed to group within the intravilan area as narrow as possible to the advantage of agricultural surrounded areas and to standardize the built environment. Also during this period, delimitations of industrial zones, including mining areas, are introduced, as well as the first urban planning considerations regarding the planned evolution of these areas. In the post-December period, there are some regulations regarding urban planning, made concrete by several laws, especially the Law no. 350/2001 regarding territorial development and urban planning. The general and mining cadastre for mining or former mining areas does not find the place it should occupy in urban planning. The purpose of the paper is to follow through the chosen case study – the case of former Baia Borșa mining area, the particular situation of urbanism-cadastre relationship, with a focus on the relationship between the urbanism of mining areas - mining extractive cadastre. The working hypotheses are described based on the analysis of available working materials: archival documents and General Urban Plans. GIS analysis methods are adopted as work methodology. The results and conclusions will serve as a basis for the formulation of proposals that can be incorporated into future urban planning policies for mining areas.*
Keywords: *historical cadastre, mining cadastre, urban planning, former mining town*

1. Introduction

Acording to a report from 2015 of the Society for the Conservation and Closure of Mines, CORSERVMIN [1], from 1998 till 2015, by 11 Government Decisions, the definitive closure of 556 mines was approved. They were located on the administrative territory of 227 local communities from 28 counties. A number of 78 settling ponds with a total stored volume of 341.31 million cubic meters and an occupied surface of approximately 1,770 ha, as well as 675 mining dumps with a volume of 3,101.92 million cubic meters and an occupied surface of approx. 9,260 ha, were the subject of conservation. Safety works were carried out for 2,504 mining works connecting to the surface (galleries, shafts, raises). Closed mines are carring forth a high degree of associated risk due to underground technological voids that generate accumulations of toxic and potentially explosive gases, subsidence phenomena, uncontrolled surface collapses and massive landslides, destabilization of hazardous waste deposits with catastrophic consequences for adjacent communities and the environment with possible cross-border effects.

Integrating the issue of mine closures into urban planning and local development strategies in former mining towns represents a complex and multidimensional challenge for local administrations and urban

* Corresponding author: University of Petroșani, Hunedoara, mariuscucaila@upet.ro, tel. 0722514763

planners. The Romanian legislation on urban planning and local development, applicable to former mining localities, includes a series of laws and regulations that establish the necessary framework for urban planning, environmental protection and economic development.

Both urban planning and cadastre (together with real estate advertising) through the specific tools have in mind the organization of space in its multiple meanings: territory, land, real estate, etc.) and its relations with individuals or communities. The configuration of space by means of urban planning is recently approached [2] from the perspective of space as an overlap of dynamic particular spaces, which through conjugation, articulation implicitly changes their balance. În general, urban development plans provide for the implementation of contingent, interdependent actions with the aim of generating desirable development patterns. These actions include, according to urban planning legislation, various regulations, such as zoning, subdivision regulations and official maps. Urban planners are involved in land use regulation, with distinctions between plans and regulations. Urban planning regulations affect the system of rights that have a spatial reference, modifying or resizing some of these rights that otherwise seem to be well regulated by laws or social norms.

The main normative act that regulates land use and urban planning activities is Law no. 350/2001 on territorial planning and urbanism According to the law, territorial (spatial) planning represents the harmonization activity of territorial structures, through territorial development management and coordination the territorial impact of sectoral policies. It defines the types of urban planning documents required, including the General Urban Plan (GUP), Zonal Urban Plan (ZUP), and Detailed Urban Plan (DUP) and refer to urban and rural localities regulating the land use and the conditions of their occupation with constructions. The GUP is drawn up based on the development strategy of the locality and correlates with the locality's budget and public investment programs, in view implementing the provisions of the public utility objectives. Each administrative-territorial unit is obliged to draw up and approve its GUP, which is periodically updated every 10 years at most and includes short-, medium- and long-term regulations. In the first category are included: the demarcation of the boudary line of the built-up territory in relation to the locality administrative territory, the land use within the built-up area, functional zoning according to different land use, like those for the traffic network, areas with public servitudes, historical monuments and archaeological sites as well as the areas for which a special protection regime provided by the legislation. The modernization and development of the technical-municipal infrastructure, ownership type and the legal sale provisions, also provisions on the conditions of location and compliance of built volumes, of landscaped and planted areas, of the natural risk areas delimited and declared as such and risk areas are considered due to historical waste storages. In the medium and long term, its provisions cover aspects such as: the future evolution of the locality, the directions of functional development in the territory, the routes of the circulation and equipment corridors provided for in the national, zonal and county land development plans, delimited natural risk areas and declared, the list of the main development and restructuring projects, the establishment and delimitation of the areas of temporary and definitive ban on construction, the delimitation of the areas where urban regeneration operations are expected.

Other tools in urban planning are the general and local town planning regulations provided by Government Decision 526/1996 and taken over by Law 350/2001. They detail the urban conceptual elements as well as those regarding the town's development strategy, accompanied by their implementation measures.

These urban planning tools actualize the proposals included in the national, zonal and county land development plans to the locality level. The law expressly provides that urban planning documents have a specific regulatory character and establish rules that apply directly to localities and parts of them up to the level of cadastral parcels.

The cadastre is a foundational element in urban planning and local development strategies by providing detailed information on land ownership, boundaries, and land use. The legal framework in force in Romania is represented by law no. 7/1996 of the cadastre and real estate advertising. The cadastre law envisages the creation of a national record-keeping system at the level that involves the realization of technical works (plan elevations), economic (credit rating-evaluation) and legal-administrative (insurance, conclusion and keeping records of various acts and other documents) grouped in cadastral documentation (plans and registers). It has the purpose of registration in the register of real estate advertising, called land register, operation that has legal character. The cadastre, which involves the systematic recording of land parcels with their boundaries, ownership, use, encumbrances and easements, is essential for the effective management and development of urban and rural areas including the former mining areas. It has to provide a clear legal framework for land

ownership, reducing disputes and enhancing property security, which is crucial for attracting investment and development. Cadastral records can be used to monitor changes in land use and urban growth, aiding in the assessment of urban development trends. Cadastral data supports the creation and enforcement of zoning regulations, ensuring land is used appropriately according to urban planning goals. Planners use cadastral data and maps to control development, ensuring it aligns with the urban plan and community needs, for spatial analysis and modeling, helping to predict future urban expansion and infrastructure needs, also help to identify environmentally sensitive areas and existing land uses that must be protected or managed carefully.

In the case of former mining localities having the potential to resume exploitation works, there must be correlations between urban planning and cadastre in order to ensure the protection and access to mineral ores while balancing other land uses, ensuring sustainable development. The cadastre, which involves the systematic documentation of land ownership, boundaries, and land use, plays a critical role in the redevelopment and revitalization of these regions. By integrating cadastral data with regulatory frameworks planners has to ensure that the future mining operations adhere to planning regulations, promoting orderly and lawful development. Combining cadastral data with environmental regulations helps planners designate protected areas and monitor the impact of former mining activities.

The mining cadastre can be used as a tool in territorial planning based on interrelationships established through the prism of the two specific branches of law: mining law and urban planning law. The concept of overlapping spaces was introduced long before through the mining law and applied through the extractive-mining cadastre through which the surface property rights e were separated from the mineral resources property rights. Both through urban planning and by the establishment of the mining cadastre, the exercise of certain rights involving individuals or collectives is assumed. These rights have as their object certain particular spaces that have a three-dimensional extension from the parcel, group of parcels, to the level of the territorial administrative unit, including rights over certain mineral ores from underground definitely identified and evaluated. In urban planning law, the rights beared on particular spaces with their attributes are taken into account.[3]. Certain rights, such as mining rights, are exclusive. Non-exclusive rights are usually associated with collective goods. In mining law, the attribute of exclusivity manifests itself as an attribute of priority, as a right conferred on the first applicant or the first occupier of the land intended for mining. Some rights, such as mining rights, are transferable to an individual or collective entities, but can also be withdrawn by the right holder, who is represented by the public authority. By laws or urban planning regulations, some rights, such as public properties, can only be granted, but cannot be transferred to another person.

Extractive legislation in Romania, consisting mainly of the Mining Law 85 of 2003 and the law and the Petroleum Law no. 234 of 2004, has no special provisions for the extractive cadastre. With the change in the ownership regime after 1989, it would have been necessary to carry out the cadastre in terms of mine closures. The normative-technical framework, already outdated in relation to trends in the cadastre, is provided by some orders of the director of the National Agency for Mineral Resources (NAMR) related to the mining book and the technical works of the mining cadastre. Taking into consideration the interrelationship with urban planning, the mining cadastre works have as their main purposes the demarcation of mining perimeters and locations, acquisition of land possesion and access, the creation of a topographic background necessary for determining the configuration of the ores and the technical data recording for mining book. The setting up of the shapes of the mining perimeters is left up to the the National Agency of Mineral Resources decision being in relation to the shape and dimensions of geological structures and ores.

Among the issues related to the interrelationships of urban planning, general cadastre and mining cadastre, two aspects will be analyzed by means of the case study method: the use of existing cadastral cartographic material, mining maps and plans as well as urban planning documentation as their use for GIS analyzes related to feasibility for construction.

2. Study case: materials and metods

2.1. Geographic, historical and geological background

Borsa located at the extremity southeast of Maramureș county, having been declared a town following the administrative reformfrom 1968, still having an important rural component today. The relief of Borșa is mountainous, uneven with large differences in level from 613 m up to an altitude of 2300 m. The mining activities documented since the 16th century took place within the area of Baia Borsa, today a district of Borșa. Relative to the built area of Borșa town, the Baia Borșa district is located at a distance of 6.5 km. Mining

activities have been carried out in areas with different levels of mineralization in igneous rocks in vein form or in crystalline shales in the form of compartmentalized stratiform bodies that occur as compact ore or as impregnations in various rocks. The mineralization zones, located in the basins of the Cisla and Vișeu rivers, are separated from the bedding and cover zones by banks of porphyrogenic rocks and are divided into three groups: the vein ores within the Toroioaga massif, the vein ores within the contact zone of the original andesite laccolite tertiary (Gura Băii, Valea Colbului, Valea Arinieșului) and the lentiform ores from the crystalline schists (Burloaia, Măgura, Vaser, Pui, Cornul Idei and generally those located in the northeastern part of the Baia Borșa district).

2.2. Materials

2.2.1. The stable cadastre as the basic cadastral plan for urban planning

Since the systematic cadastre has not yet been introduced in the city of Borșa, the cadastral plans made during the introduction of the so-called stable cadastre made in the period 1856-1864 can be used as a basic cadastral plan for urban planning works.

The first known functional zoning of the Borșa town was carried out with the introduction of the cadastre during the second half of the 19th century, with the two forms, the so called ”concretual” cadaste and stable cadastre. The ”concretual” cadastre introduced in the decade after 1854 also includes written and graphic inventory works executed without respecting the principles and methods of cadastral cartography. Only a little less than 215 fields named according to local toponymy have been inventoried and graphically represented in the form of figurative maps. They are important because the ”concretual” cadastre introduced during this period is still in force today.

Until 1856, skechy cadastral works were carried out drawing up the so-called "croqis" (see fig. 1), a town map drawn up for tax purposes without an inscribed scale, on which the built up area and 25 fields were confined according to local toponimy and the land use of that times. The field numbering was done concentrically, starting with built up area. After import into AutoCAD Map of the scanned map turn out that 1:144000 scale was used, convenient for framing the town within three frames of map sections measuring 33cm x 28cm, a scale probably derivative from the one used during the Second Military Topographical Survey of the Habsburg Empire for the southeastern extremity of Maramureș county (1:2880000).

Fig. 1 Borșa cadastral ”croquis” drawn up in 1856. Source: Uzhhorod State Archives, Ukraine

The stable cadastre was introduced in the Borșa cadastral community between 1856 and 1864, when cadastral plans with the proximate dimensions of 33 cm x 28 cm were drawn up, grouped in folding collages from 1 to 6 pieces depending on their arrangement in the locality grid. [4] In this research, 187 black ink copies

made of the cadastral plans (also called indicative sketches) with the standard graphic dimensions of of the cadastral grid of 65.82 cm x 56.67 cm on cardboard paper were used. [5]

The processing of the cadastral plans in analogue format was done by scanning them followed by georeferencing and mosaicking in a GIS environment to obtain the overall historical cadastral map. (see fig.2) The presumed projection system is Soldner Cassini, with corrections being made. In order to achieve a correct georeferencing, some field control points considered stable within the Baia Borșa mining area were used and compared with corresponding points on the cadastral plans.

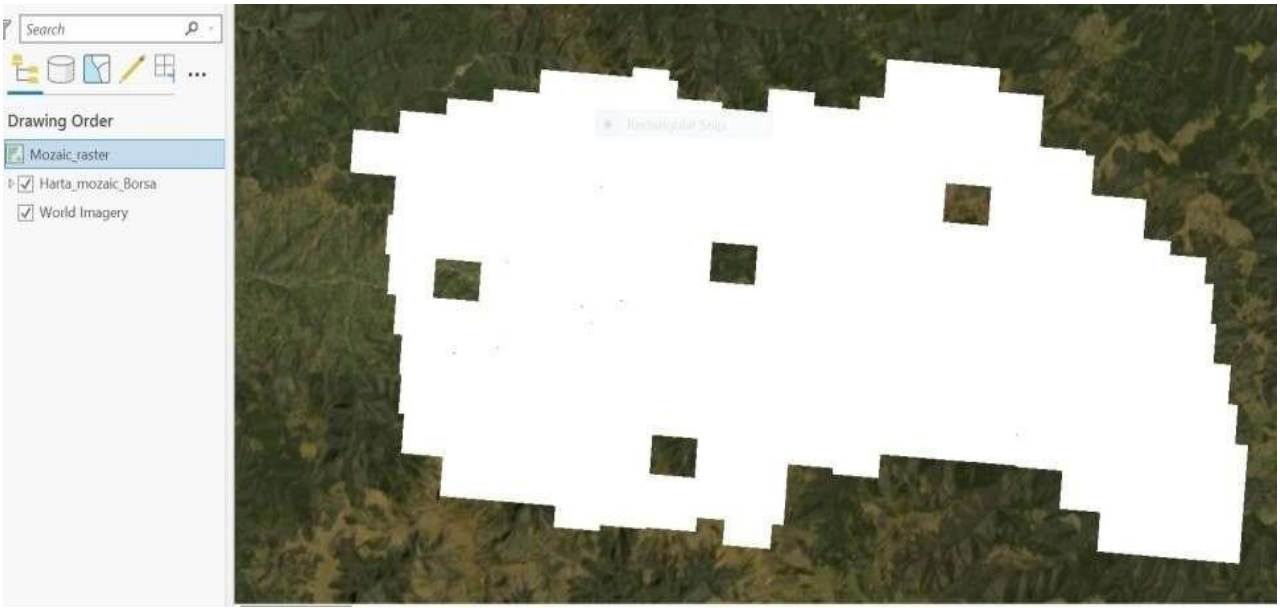

Fig. 2 The overall cadastral map of the historical cadastre obtained by mosaicking in a GIS environment. Source National Archives, Maramureș County Service

The general historical cadastral map of Borsa can be used through the correspondence registers [6] between cadastral and topographical numbers.

2.2.2. Urban planning documents from the communist period: systematization sketches

An important category of documents for the diachronic analysis of urban planning dynamics are the systematization sketches. The urban and rural systematization was a political program initiated and applied by the communist authorities since 1958, being the consequence of the application of Decree 545/1958 and the Decision of the Council of Ministers no. 1678 of November 20, 1959 and later of Law 58 of 1974 on the systematization of the territory and urban and rural localities. At the declarative level, according to some authors [6] the systematization had as its main object the correlation of different economic and social functions that plyed aut themselves on the same territory, as well as those of production, housing, communications, water improvement, etc., aiming at the balanced development of the territory and settlements. The systematization sketches were in fact urban planning documents that set up the functional zoning of the locality, municipal equipment, the boundary demarcation of buit up area, including some directives for the future development of the locality. The systematization details addressed a narrower territory, usually for the areas where new homes, social-building are to be located in civic centers were to be located. Starting from the obsession of the communist authorities to maximize the areas needed for agriculture, the inner areas of the localities were successively restricted from 1973, with consequences on the built spaces. In the case of the city of Borșa, the first systematization sketch was drawn up in 1970, being successively revised în 1977, 1992, with the drastic reduction of the urban area in 1987. In 1982, the mining precincts in the Baia Borșa area were included for the first time in the systematization sketches. [7] (see fig. 3) In the case of the present research, plans made in 1977, 1982 and 1987 were scanned and georeferenced in GIS.

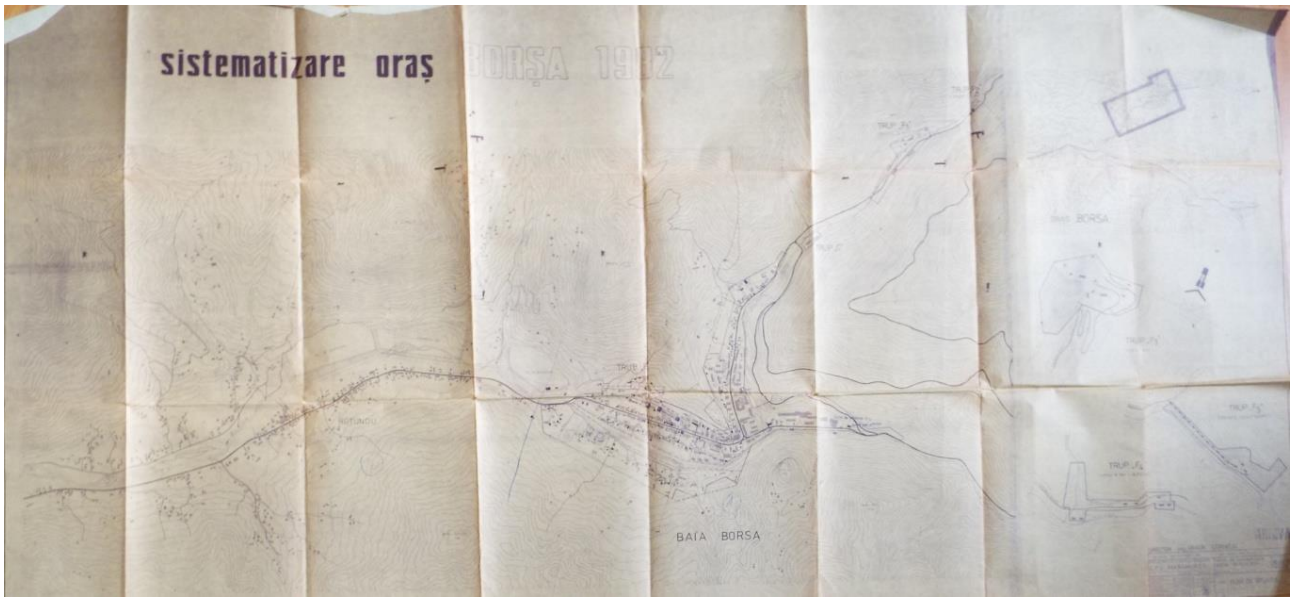

Fig. 3. Systematization map of the Borșa town including mining premises and a mining perimeter. Source: National Archives, Maramureș County Service

2.2.3. Mining maps with the ground projection of galleries

The maps drawn up for different mining projects on which the galleries of some mines are represented as projected on ground surface. In the case of Borșa town, the mining perimeters in from eastern part of the Baia Borșa district are of interest. These maps are useful for the ground demarcation of the closed mines. (see fig. 4)

Fig. 4. A georeferenced map with the representation of the mine galleries for the eastern area of the Baia Borșa district. Source: National Archives, Maramureș County Service

2.2.4. Recent General Urban Plans

Starting with 2000, the preparation of General Urban Plans became mandatory. For the city of Borșa, the urban plans drawn up in 2013 were available for research [8]. (see fig. 5)

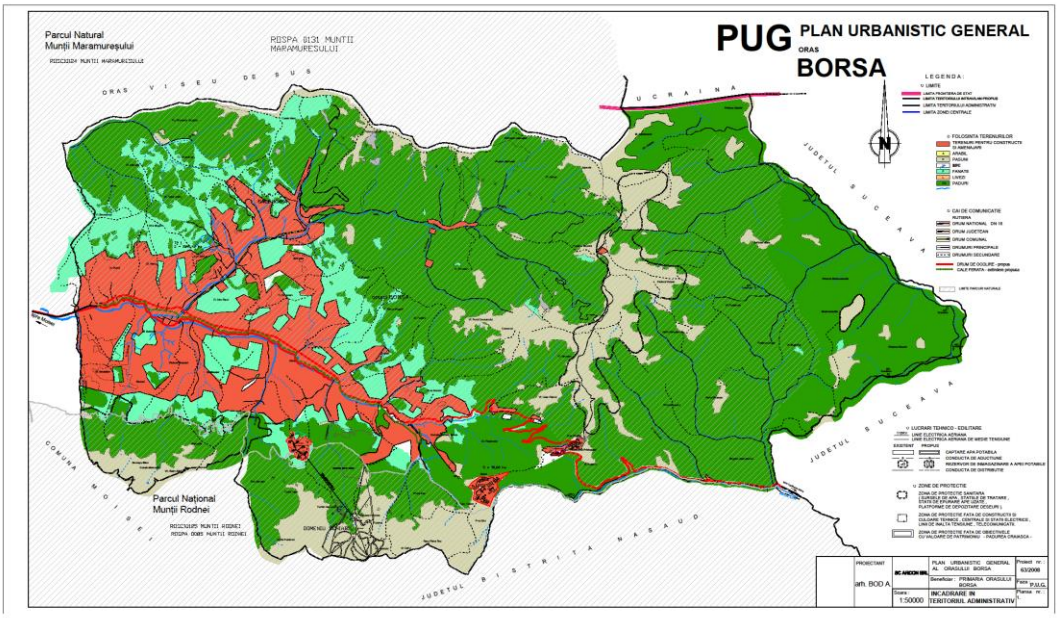

Fig. 5. Map of the Borșa town with the inclusion in the administrative territory. Source: City hall of Borșa

Since there are no longer any political constraints regarding the establishment of the built up area, an expansion of built area can be observed with the partial inclusion of some former mining precints.

2.3. Methods

For urban planners, the creation in GIS environment of a spatial database is useful. This comprises two stages: the articulation of a logical data model followed by the physical implementation of the data model, i.e. the implementation of the model schema.

The database has a tabular structure by initially defining a number of feature datasets. A feature dataset is a container that stores spatial entities (features) and non-spatial entities (objects) as well as the relationships between them having a common coordinate system. The following types of cadastral data corresponding to datasets in a geodatabase were considered: - National Agency for Cadastre and Land Registration NACLR database for the Borșa area, historical, mining, forestry and sporadic cadastres. The database for the Baia Borșa mining interest area can provide various information and analyzes for the urban planner. Querying the spatial database involves retrieving previously stored information by means of parameters or criteria. By using the Intersect tool, different geometric relations can be determined between the different competing cadastres: the historical, sporadic, forest cadastre and the surface projection of some underground mining works. (see fig. 6)

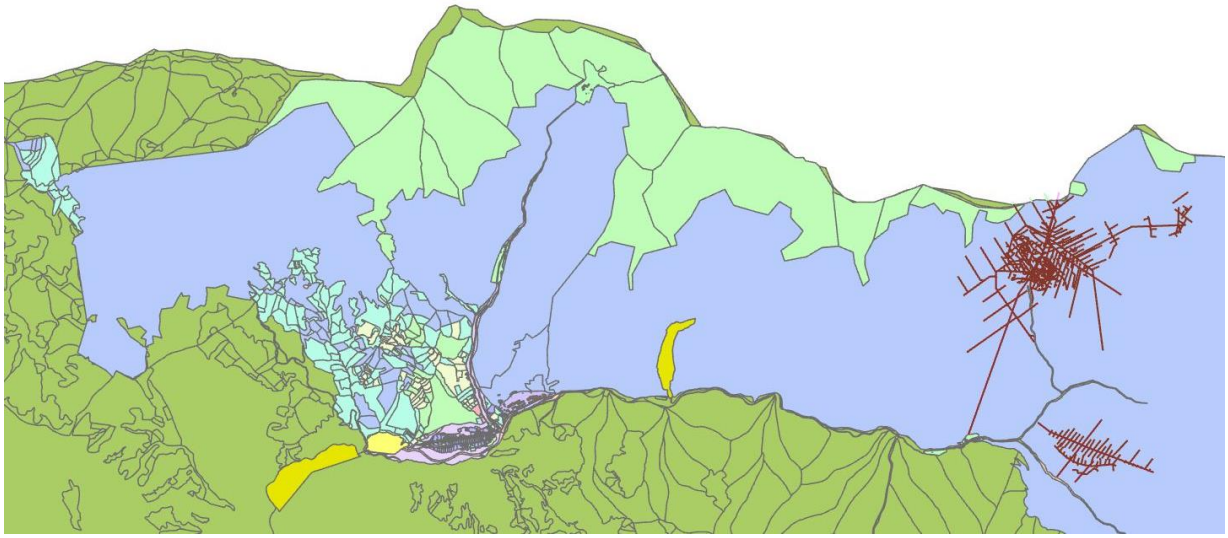

Fig. 6. Map resulting from processing by overlaying the historical, sporadic, forest cadastre in the Baia Borșa mining interest area

The materials above described, together with georeferenced satellite imagery and orthophotomaps can be used for various works with urban planning purposes. In the current urban planning legislation, only the forestry cadastre is mentioned, the prohibition of building in forest land and implicitly the reduction of the forest areas described in the forest work plans.

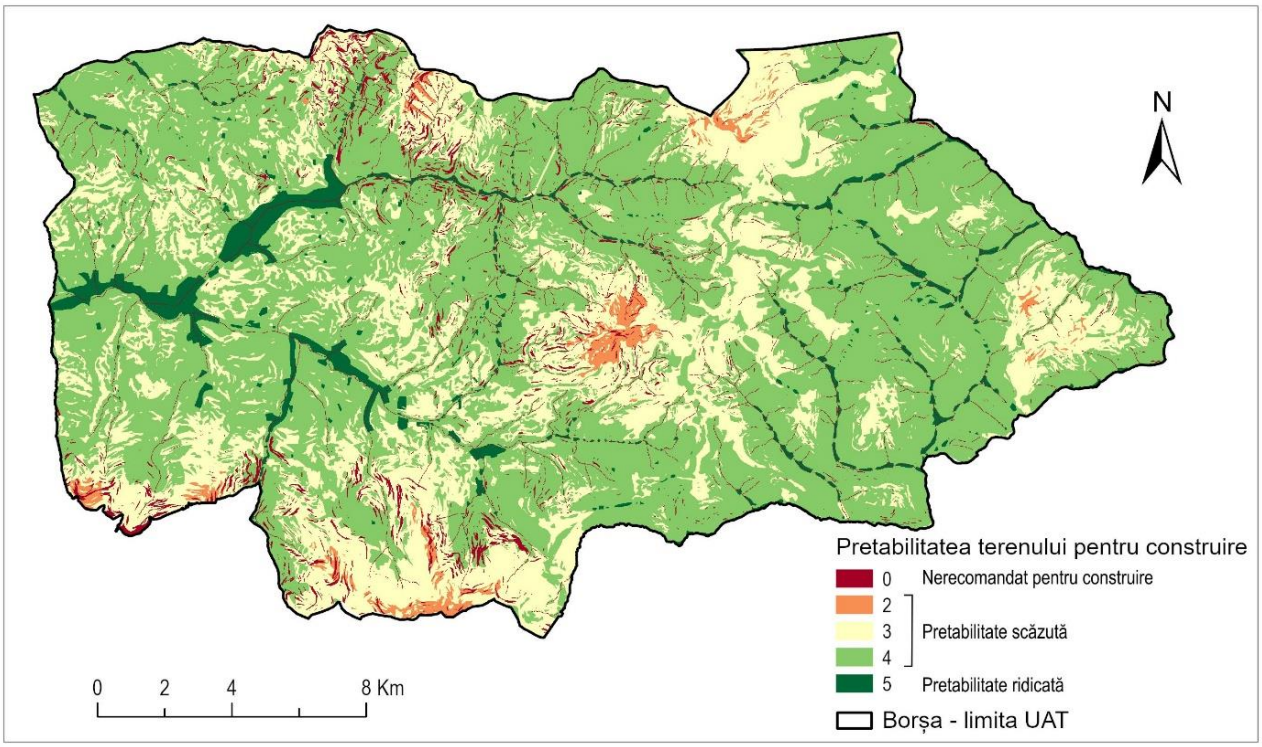

Fig. 7. Map of the city of Borșa with the suitability and favorability of the ground for construction and future mining facilities

By using several thematic layers of the raster type, a modeling in GIS environment with land classification in the city of Borșa was carried out depending on the favorability and suitability for construction with the help of the "Weighted Overlay" tool.(see fig.7). Each raster is assigned a weight in the model according to the importance that the favorable conditions have reported, respectively favorable or unfavorable. To these are added any restrictions regarding the arrangement of industrial and mining buildings. Thus it was considered that the use of the land has a weight of 40%. The slope in degrees has a weight of 30%. Accessibility expressed by the Euclidean distance from roads has a weight of 20%. The hydrographic network constitutes a restrictive factor for constructions, having a weight of 10% within the model.

3. Conclusion

The general cadastre and the mining cadastre, although they are tools that form the basis of the drawing up of General Town Plans in former mining areas, are little or even not used by urban planners. This is primarily due to legislative deficiencies, and on the other hand, the lack of concern for areas of mining interest on the part of local authorities and urban planners is obvious. Using the mentioned materials, a study of urban dynamics can be carried out to form the basis of some predictions regarding the further developments of local urban planning. The local town planning regulations do not include measures to protect the zones of mining interest, such as for example declaring them or part of them as protected areas that would make it difficult to clearing out mining within the region. Also, the current legislation on the mining cadastre will have to be updated. Also the legal provisions on urbanism will have to include correlations with the general and mining cadastre to ensure access and protection of areas of mining interest.

References

[1] **Societatea de Conservare şi Închidere a Minelor CONVERSMIN S.A. Bucureşti**,
Raport privind modul de îndeplinire a serviciilor de administrare şi gestionare a programului anual de conservare, închidere, reconstrucţie ecologică şi activităţi postînchidere a minelor pe anul 2015 realizate în baza contractelor subsecvente nr.12/19.02.2015, 82/30.09.2015 şi 94/07.12.2015,
https://www.google.ro/url?sa=t&source=web&rct=j&opi=89978449&url=https://conversmin.ro/wp-content/uploads/2022/07/Raport-activitate-CVM-2015.pdf&ved

[2] **Minea E. M.**, 2010
Influenţa noilor reglementări din domeniul cadastrului şi publicităţii imobiliare asupra activităţilor de amenajare a teritoriului şi urbanism, în Revista Transilvană de Ştiinţe Administrative 2 (26)/2010, pp. 40-54

[3] **Lewis D. Hopkins**, 2001
Urban Development: The Logic of Making Plans, Island Press, Washinghton, 2001, p.106-139

[4] **State Archives of Uzhhorod, Ukraine**
Archival Fund 125. The maps are available for viewing on the website
https://maps.arcanum.com/en/map/cadastral/?layers

[5] **National Archives, Maramureș County Service**
Archives Fund: Forestry Administrative Commission, file 117

[6] **Borșa Town Hall archive**
Collection of cadastral registers from the historical cadaster

[7] **Bold I., Matei M., Sabadeanu P.**, 1974
Sistematizarea rurală. Sistematizare și urbanism, Editura Tehnică, p. 19

[8] **National Archives, Maramureș County Service**
Archives Fund ARIS, project 3931-4