Research Journal of Agricultural Science, 58 (3), 2026; ISSN: 2668-926X;

http://doi.org/10.59463/RJAS.2026.3.39

CADASTRAL UPDATING OF A PROPERTY IN OCNA MUREȘ, ALBA COUNTY

Raducu-Alexandru NISTOR [1], Valentin-Marian CIOABA [1], Elena MIHAIESCU [1]
Marian Catalin NISTOR [1], Claudia Roxana HERBEI [1]
[1] University of Petrosani, Faculty of Minig
Corresponding author: nistor.raducualexandru@gmail.com

Abstract. *The paper presents the preparation of cadastral documentation for updating the technical and legal data of a property located in the municipality of Ocna Mureș, Alba County, Romania. The relevance of the topic stems from the need to correlate field information with the data recorded in cadastral records and the Land Book, within the context of the modernization of Romania's real estate registration system. The main objective of the study was to prepare complete, accurate and legally compliant documentation reflecting the actual situation of the property from both a technical and a legal perspective.The first stage involved analysing the existing status of the property, including the ownership documents, the information contained in the Land Book extract and the available technical documentation. Subsequently, field surveying was carried out using a Leica TS06 Plus total station and a UNISTRONG G10A GNSS receiver. These instruments were used to determine the boundary points, the parcel outline and the structural elements of the existing buildings. The collected data were processed and represented in AutoCAD. Based on these data, the areas were calculated, building floor plans were prepared and the Property Location and Delimitation Plan was drawn up.The results highlighted discrepancies between the actual field situation and the previously recorded data, enabling the updating of the technical information and the preparation of the documentation required for registration in the Land Book. The main limitation of the study lies in the dependence of the results on the quality and completeness of the legal documents provided, as well as on the field measurement conditions. The study demonstrates the importance of combining modern surveying techniques with documentary analysis to ensure the legal security of real estate ownership. The paper has an applied character and may serve as a reference for preparing similar cadastral documentation in urban and peri-urban areas.*

Keywords: *cadastre, Land Book, cadastral documentation, topographic surveying, GNSS, total station, updating of technical and legal data*

INTRODUCTION

Cadastral documentation plays an essential role in the accurate identification, registration, and legal protection of real estate properties. In Romania, the cadastre and land book system provide a unified framework for recording the technical, economic, and legal characteristics of immovable properties, thereby supporting property rights, real estate transactions, territorial planning, and administrative decision-making,. The continuous development of the real estate market and the need to correlate field conditions with official records have increased the importance of updating cadastral

This paper presents the preparation of a cadastral documentation for updating the technical and legal data of a property located in Ocna Mureș, Alba County, Romania. The main objective was to obtain a complete and legally compliant documentation that reflects the actual situation of the property, both from a technical and a legal perspective. The specific objectives included identifying the location and boundaries of the property, performing topographic measurements, determining the real surface area, verifying the correspondence between field data and existing legal documents, and preparing the documentation required for updating the land book records.

The study was based on the analysis of legal and technical documents, including the land book extract, ownership documents, previous cadastral records, and technical plans. Field measurements were carried out using a Leica FlexLine TS06 Plus total station and a UniStrong G10A GNSS receiver operating in RTK mode. The collected data were processed and represented in the Stereo 1970 projection system using specialized software, allowing the calculation of coordinates and surface areas, the preparation of building surveys, and the development of the location and delimitation plan.

The results highlighted several discrepancies between the previously recorded data and the actual field situation. The measured land surface was 388 m², compared with the 450 m² recorded in the existing documents. In addition, an existing annex building used as a garage was not registered in the land book, while the position and shape of the main dwelling required updating. These findings justified the preparation of an updated cadastral documentation and the registration of the necessary technical and legal modifications.

The paper is structured as follows: the first section presents the theoretical and legislative framework of cadastre and real estate publicity; the second describes the studied property and its area; the third details the methods and equipment used for the cadastral survey; the fourth presents the updating of technical and legal data; and the final sections discuss the results, conclusions, and practical relevance of the study.

MATERIAL AND METHODS

The study concerned an individual property located within the built-up area of Ocna Mureș, Alba County, Romania, at 33 Mihai Viteazu Street. The property was identified in Land Book No. 73569 Ocna Mureș under topographic number 1231, with the land-use category recorded as yards and buildings. Its position relative to the surrounding cadastral parcels and the street network is illustrated in Figure 1.

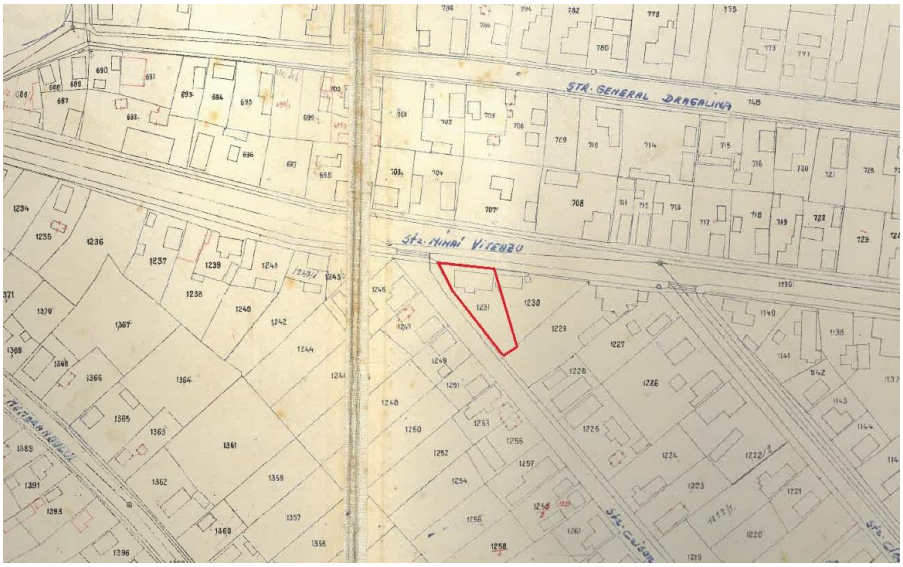


Figure 1. Location of the studied property within the surrounding cadastral parcel layout, Ocna Mureș, Alba County

The documentary analysis included the land book extract, the prefect's order concerning ownership, the street nomenclature certificate, the fiscal certificate, the owners' declarations, and the available cadastral plans and previous records. These materials were examined to establish the initial identification of the property and to compare its recorded technical and legal characteristics with the situation observed on site. Existing cadastral representations and the graphical information supplied by the cadastral authority were used to examine the relationship between the surveyed property and neighbouring parcels. Older documentation served as reference material rather than being adopted directly as the geometry of the updated cadastral plan.

Surveying equipment

Field data were acquired using a Leica FlexLine TS06 Plus total station and a UniStrong G10A GNSS receiver operated in real-time kinematic (RTK) mode. The total station was used to measure characteristic points along the property boundary and the exterior outlines of the buildings, while GNSS observations were used for points where satellite reception was suitable. A Bosch GLM 50 laser distance meter and a 50 m measuring tape were used for supplementary measurements and the building surveys. The equipment and software employed at the successive stages of the work are presented in Table 1

Table 1

Equipment and software used

Equipment or software	Role in the study
Leica FlexLine TS06 Plus total station	Angular and distance observations for surveying boundary details and exterior building outlines.
UniStrong G10A GNSS receiver	RTK positioning of points under suitable satellite reception conditions.
Bosch GLM 50 laser distance meter and 50 m measuring tape	Interior dimensions, supplementary measurements and dimensional checks.
Leica FlexField Plus	Recording and management of total-station observations in the field.
TransDat	Transformation of GNSS-derived coordinates into the Stereo 1970 coordinate system.
AutoCAD	Point import, construction of parcel and building outlines, area determination and preparation of graphical documentation.

The fieldwork began with site reconnaissance, including the assessment of access, intervisibility and the physical features relevant to boundary identification. Fences, building corners and other identifiable features were examined in conjunction with the available cadastral documents and the boundaries indicated by the owner. Particular attention was given to sections where the boundary was not physically marked, for which field observations were correlated with the existing documentation.

The survey combined GNSS RTK observations with total-station measurements, according to point accessibility and site conditions. Detailed points were surveyed by the polar method from stations established on site, including 1004, V1002, R2, V1001, R1 and V1003. The measured features included changes in boundary direction, fence alignment and the characteristic corners of buildings C1 and C2. Observations obtained from different instrument positions were

compared to check the consistency of the collected data. Figure 2 illustrates the use of the total station during field data acquisition.



Figure 2. Total-station observations during the field survey of the studied property

Coordinate processing and area determination

GNSS-derived coordinates were transformed into the Stereo 1970 coordinate system using TransDat, and the surveyed points were imported into AutoCAD for processing and graphical representation. The imported data were checked for coordinate consistency, point sequence and continuity of the parcel outline. Characteristic points were then connected to construct closed parcel and building outlines, which were examined for closure and possible geometric inconsistencies.

The land area was determined from the closed parcel outline using the area calculation functions available in AutoCAD. The resulting value was compared with the area stated in the existing records, while the footprints of buildings C1 and C2 were calculated separately from their respective outlines. Coordinate inventories and area calculation sheets were included among the supporting technical documents. The numerical differences and the updated graphical representation are presented in the Results and Discussions section.

Building surveys and cadastral plan

Building surveys were prepared for the dwelling, identified as C1, and the ancillary building used as a garage, identified as C2. Exterior outlines were established from the topographic observations, whereas interior dimensions, wall thicknesses and room arrangements were determined using the laser distance meter and measuring tape. The drawings were checked against the measured dimensions to maintain consistency between the interior layout and the exterior outlines.

The processed information was integrated into the property location and delimitation plan (PAD), prepared at a scale of 1:500. The plan represented the parcel boundary, the two buildings, neighbouring properties and the identification information associated with the cadastral

documentation. The technical report, coordinate inventories, area calculations, building surveys and supporting legal documents were assembled to support the requested cadastral and land book update

RESULTS AND DISCUSSIONS

Land area discrepancy

The cadastral survey identified a discrepancy between the recorded land area and the area determined from the surveyed parcel boundary. The existing records indicated 450 m², whereas the analytical area calculation yielded 387.78 m², reported as 388 m² in the property location and delimitation plan (PAD). Using the whole-square-metre values adopted in the documentation, the surveyed area was 62 m² smaller than the recorded area, equivalent to approximately 13.8% of the latter. Table 2 distinguishes the analytical results from the rounded values used in the final plan.

Table 2

Recorded information, analytical areas and values adopted in the cadastral plan

Component	**Information in previous records**	**Analytical area (m²)**	**Area adopted in PAD (m²)**	**Result of the update**
Land parcel	Recorded area: 450 m²	387.78	388	Survey-based parcel outline and revised land area.
C1 dwelling	Previously recorded; no comparable previous footprint value specified in the case-study narrative.	77.55	78	Updated outline and position; total built floor area reported as 95 m².
C2—garage	Not registered in the previous cadastral and land book records.	21.31	21	Identified, surveyed and included in the technical documentation.

The discrepancy concerns the correspondence between the previous record and the boundary adopted in the updated survey; it does not, by itself, demonstrate a physical loss of land or identify the cause of the difference. In this case, the cadastral update therefore required both a revised numerical area and a coordinate-based representation of the parcel, rather than an isolated amendment of the recorded area.

Updated parcel geometry

The surveyed boundary was represented in the Stereo 1970 coordinate system and incorporated into the updated PAD together with the footprints of C1 and C2. The resulting drawing brought the parcel outline, the buildings and the neighbouring properties into a common graphical representation. Figure 3 presents the relevant detail of this plan

http://doi.org/10.59463/RJAS.2026.3.39

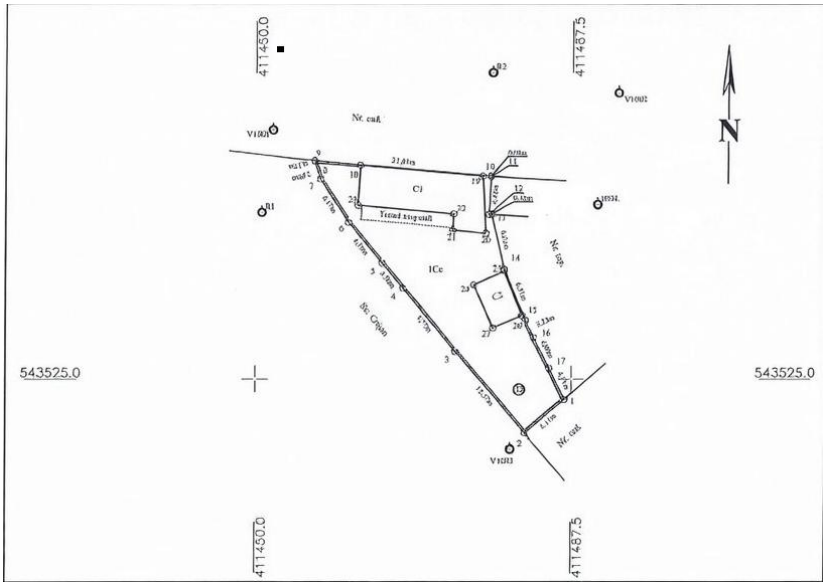


Figure 3. Detail of the updated property location and delimitation plan showing the parcel boundary and buildings C1 and C2

Boundary identification remained an important interpretative element of the update because the property was only partially enclosed by physical features. Where fences or built elements were absent, the boundary was established by correlating the available documentation, field observations and the owner's indications. Consequently, the coordinate-based representation should be read together with the supporting boundary documentation, rather than treated as independent proof of the legal boundary.

Building survey results

For dwelling C1, the analytical footprint was 77.55 m², adopted as 78 m² in the PAD; the documentation also reported a total built floor area of 95 m². The update established the exterior outline and the position of the dwelling relative to the surveyed parcel boundary. The measured floor plan provided the corresponding dimensional and internal-layout information, as illustrated in Figure 4a.

The second building, C2, was identified as a single-storey ancillary building used as a garage, although it was absent from the previous cadastral and land book records. Its analytical footprint was 21.31 m², adopted as 21 m² in the PAD, and its measured floor plan was prepared separately (Figure 4b). Its inclusion in the technical documentation addressed an omission in the recorded description of the property; it did not represent the construction of a new building during the study

http://doi.org/10.59463/RJAS.2026.3.39

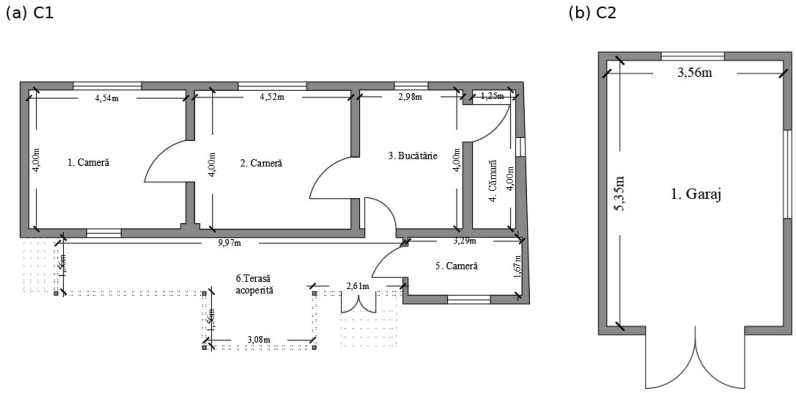


Figure 4. Measured building floor plans: (a) dwelling C1; (b) ancillary garage C2. The two panels are reproduced at different scales (source: case-study documentation)

The buildings required different forms of updating: C1 needed a revised geometrical description, whereas C2 required the addition of a previously unrecorded building to the technical file. These findings show that the discrepancies were not confined to land area, but also concerned the completeness and spatial detail of the property description.

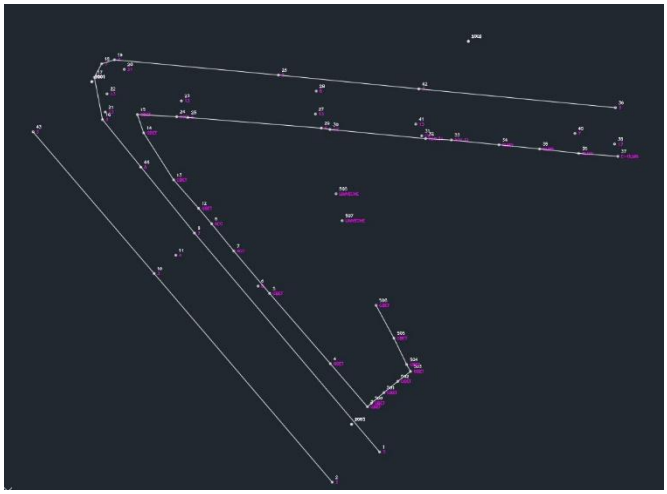


Figure 5. Building outline based on GPS measurements

Documentary and legal correlation

The final documentation combined the updated PAD, the building surveys, the coordinate inventories, the area calculations, the technical report and the supporting identification and ownership documents. The ownership information in the initial land book identified the Romanian State, while the prefect's order was included as the supporting document for the requested ownership update. The street nomenclature certificate was used to

correlate the address with the property identification, and the declaration concerning C2 formed part of the supporting file.

The operations addressed by the file were the revision of the land area, the definition of the cadastral outline, the inclusion of C2, the address update and the requested ownership registration. The result presented here is the preparation of the integrated technical and documentary file; it is not a confirmation that all requested entries were subsequently admitted by the cadastral and land registration authority. In particular, representing C2 on the plan must be distinguished from establishing that all legal conditions for its registration have been fulfilled.

Interpretation and limitations

The case illustrates how documentary review and combined GNSS and total-station surveying can be used to reconcile the numerical and graphical descriptions of an individual property. The principal contribution is the traceable relationship between the surveyed outlines, the calculated areas and the information assembled for the requested cadastral update. However, the study concerns a single property, and the discrepancy between recorded and surveyed area should not be extrapolated to other properties in Ocna Mureș.

Although measurement checks were described in the survey workflow, the reported results do not include a numerical uncertainty budget, residual statistics or an independent validation of the complete survey. The two-decimal analytical areas in Table 2 therefore indicate the numerical output of the area calculation, not a demonstrated area accuracy of 0.01 m². Likewise, the available results do not establish the exclusive cause of the historical area discrepancy or support a quantitative comparison of the accuracy of GNSS and total-station observations.

CONCLUSIONS

The study demonstrated the practical importance of preparing an updated cadastral documentation for a property whose technical and legal records no longer corresponded to the situation identified in the field. By combining documentary analysis, GNSS observations, total-station measurements and CAD-based data processing, it was possible to obtain a coherent technical representation of the parcel and the existing buildings, expressed in the national Stereo 1970 coordinate system.

The main technical result of the work was the determination of a surveyed land area of 388 m² in the final cadastral plan, corresponding to an analytical area of 387.78 m², compared with the previously recorded value of 450 m². The survey also clarified the geometry and position of building C1 and documented building C2, an ancillary garage that was physically present on site but absent from the previous cadastral and land book records.

From the perspective of cadastral updating, the work showed that the revision of a property file does not concern surface area alone. The update required the coordinated treatment of parcel geometry, building representation, address information and supporting ownership documents, so that the final documentation could reflect the field reality in both technical and documentary terms.

At the same time, the case study underlines the need for caution in interpreting cadastral discrepancies. The difference between the previous records and the surveyed area must be understood as the outcome of the updated documentation process and not, by itself, as proof of a specific historical error or of a physical change in the property. Likewise, the inclusion of a previously unrecorded building in the technical file must be distinguished from the formal approval of its registration by the competent authority.

The practical relevance of the study lies in its applicability to similar urban properties affected by incomplete records, outdated graphic representations or partial inconsistencies between documentary and field data. The study confirms that a rigorous cadastral workflow, based on modern surveying instruments and careful correlation of technical and legal evidence, is essential for producing reliable documentation for land book updating.

BIBLIOGRAPHY

ABAZA, C. G., 2024 – Tranziția sistemului de publicitate imobiliară – principii și evoluții de la modelul francez la cel german. Universul Juridic, 07: 24–42.

BADEA, G., 2013 – Cadastru. Editura Conspress, București, România.

BOȘ, N., 2003 – Cadastru și carte funciară. Editura All Beck, București, România.

GHERHEȘ, V., GRECEA, C., VÎLCEANU, C. B., HERBAN, S., COMAN, C., 2025 – Challenges in systematic property registration in Romania: An analytical overview. Land, 14(5): 1118.

HERBEI, R. C., CUCĂILĂ, S., CUCĂILĂ, M., 2024 – Cadastru general. Petroșani, România.

IORDAN, D., MUNTEANU, B., ENI, I., 2012 – Sporadic and systematic cadastre in Romania. Land Reclamation Journal.

MINEA, E. M., 2010 – Influența noilor reglementări din domeniul cadastrului și publicității imobiliare asupra activităților de amenajare a teritoriului și urbanism. Revista Transilvană de Științe Administrative, 26(2).

TĂMĂIOAGĂ, G., TĂMĂIOAGĂ, D., 2005 – Cadastrul general și cadastrele de specialitate. Editura Matrix Rom, București, România.

*** Agenția Națională de Cadastru și Publicitate Imobiliară, 2026 – Legea cadastrului și a publicității imobiliare nr. 7/1996. Available at: https://www.ancpi.ro/legea-cadastrului-si-a-publicitatii-imobiliare-nr-7-1996/

*** Agenția Națională de Cadastru și Publicitate Imobiliară, 2023 – Regulamentul de aplicare a Legii cadastrului și a publicității imobiliare nr. 7/1996. Available at: https://legislatie.just.ro/Public/DetaliiDocumentAfis/268229

*** Codul civil al României, 2009 – Codul civil. Available at: https://www.codulcivil.ro/