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ASSESSMENT OF CADASTRAL LAND CONFIGURATION AND ACCESSIBILITY IN RESIDENTIAL DEVELOPMENT PLANNING: A CASE STUDY OF GIARMATA-VII, TIMIȘ COUNTY, ROMANIA

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Introduction

Rapid residential expansion in peri-urban areas increases the need for accurate cadastral information, coherent land-use planning, and appropriate infrastructure development. The transformation of agricultural land into residential areas requires careful consideration of property boundaries, accessibility, environmental constraints, and urban planning regulations. This study examines a 37,891 m^2 agricultural site in Giarmata-Vii, Ghiroda Commune, Timiș County, consisting of three cadastral properties. The research focuses on evaluating land configuration, functional zoning, road accessibility, and the integration of complementary services and green spaces. Particular attention is given to the role of topographical and cadastral documentation in supporting sustainable residential development and ensuring consistency between proposed urban functions and existing infrastructure.

Material and method

The study is based on cadastral records, topographic documentation, and a Zonal Urban Plan (PUZ) prepared in 2026 for a 37,891 m^2 site in Giarmata-Vii. The methodology includes the analysis of property boundaries, existing agricultural land use, accessibility, drainage canals, and technical infrastructure. The existing conditions were compared with the proposed functional zoning, including individual housing, facilities and services, green spaces, and road infrastructure. Urban planning indicators, land allocation percentages, and the proposed street network were examined.Numerical verification of the territorial balance was performed to assess the consistency of the proposed areas. Particular attention was given to the integration of road access, drainage infrastructure, green spaces, and existing technical restrictions.

Result and discussions

The territorial analysis highlights the location of the 37,891 m^2 site within the peri-urban development area of Giarmata-Vii (Fig. 1). The existing conditions reveal agricultural land, road access limitations, drainage canals, and technical infrastructure constraints that influence future residential development (Fig. 2).

The proposed territorial balance allocates 44.75% to individual housing, 26.50% to facilities and services, 21.06% to road infrastructure, and 7.69% to green spaces (Fig. 3).

The proposed functional zoning illustrates the organization of residential plots, complementary functions, circulation networks, and green areas (Fig. 4). The comparison between existing and proposed land use demonstrates the transformation from exclusively agricultural land into a diversified residential structure (Fig. 5).

Housing and complementary functions account for 71.25% of the site, while circulation networks and green spaces represent 28.75%. The territorial balance is numerically consistent, and the proposed green space allocation exceeds the 5% minimum specified in the analyzed planning documentation.

The proposed road network includes a 16 m collector street and 12 m secondary streets, supporting accessibility and connectivity with neighboring residential areas. The integration of cadastral boundaries, functional zoning, and drainage infrastructure contributes to coherent land-use planning and future urban development. The proposed urban development also considers existing utility networks and environmental constraints to support the functional integration of the new residential area.

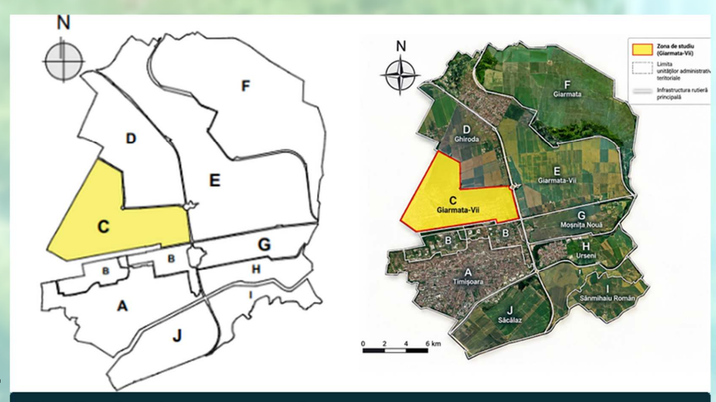


Fig. 1 – Study area location

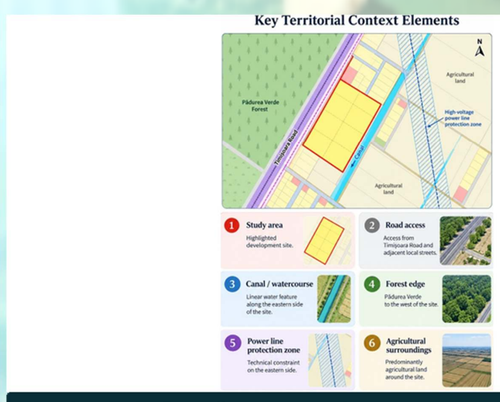


Fig. 2 – Existing site constraints

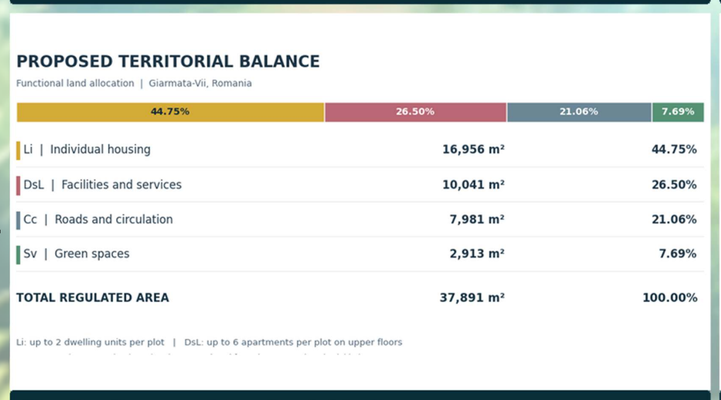


Fig. 3 – Proposed territorial balance

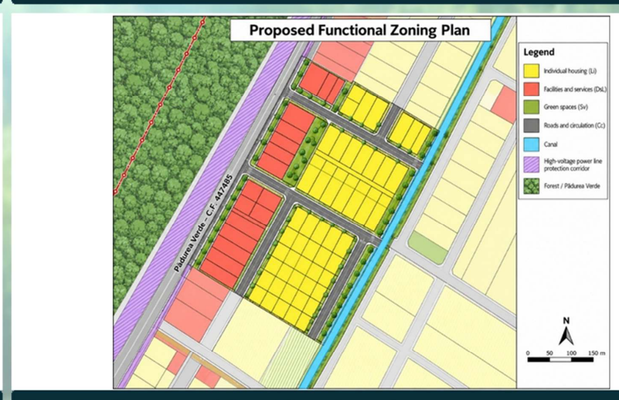


Fig. 4 – Proposed functional zoning

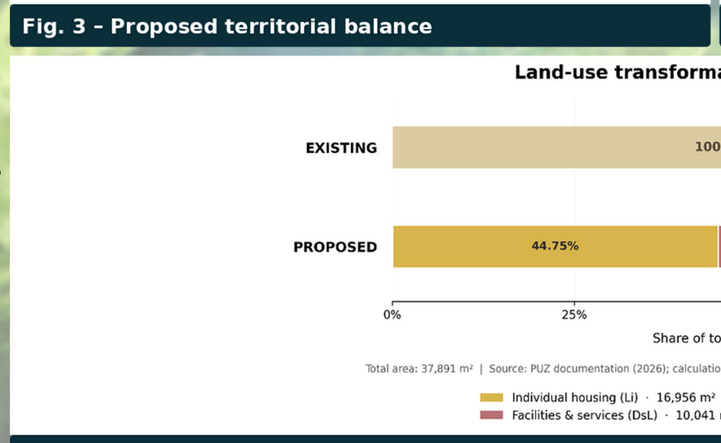


Fig. 5 – Existing and proposed land use

Conclusions

The study highlights the importance of integrating cadastral information, topographical documentation, and urban planning regulations in the transformation of agricultural land into residential areas. The proposed development of the 37,891 m^2 site allocates 71.25% to residential and complementary functions and 28.75% to roads and green spaces. The verified territorial balance confirms the numerical consistency of the proposed functional distribution. The planned street network and the consideration of drainage canals and technical infrastructure provide a coherent basis for future residential development. The allocation of 7.69% to green spaces also exceeds the minimum requirement established in the analyzed proposal.

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