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classification; urban planning analysis; social infrastructure; residential area; geographical information system; satellite town; semi-autonomous suburban area; zoning of the territory.

Abstract

The subject of the paper is design using modelling methods of geographic information system (GIS). The authors propose using GIS modelling as a method to solve the actual problem of designing housing estates in a big city. The purpose of the paper is to design a model of a residential area with a complete infrastructure and all necessary elements. In the paper, the following tasks are solved: 1) developing design of a digital geoinformation model of a projected residential area; 2) formalization of the process of designing residential areas by developing a design algorithm; 3) creation of a visual twodimensional model of a residential area. The method used in the paper is geoinformation modelling of real estate objects using two-dimensional models in a geodatabase, and software implementation using the ArcMap application. As a result of the research, the authors obtained the following results: a centric approach to planning a semi-autonomous region was chosen as the most rational and effective for urban planning. To solve the problem, the geographic information system ArcGIS was used, and a geodatabase was created to analyse the existing territory of the city of Kharkiv and select a construction site. The developed geographic information system ArcGIS and the created geodatabase help in solving the issues of further designing the location of buildings and infrastructure elements of the area. Namely, “buffer zones” were used for further accommodation of schools, kindergartens, and shops. The use of “buffer zones” made it possible to optimally place these establishments depending on the number of potential visitors. The authors chose blocks for the division and development of the projected area, considering the historical aspects of the city of Kharkiv. This enabled to develop a GIS in which each block would have its urban ecosystem. The authors have also developed an algorithm for performing design tasks of residential areas. The algorithm can be applied when creating projects for residential areas not only in Kharkiv, but also in other cities of Ukraine and the world. Results of the research made it possible to use the capabilities of geoinformation systems in designing new types of residential areas with a highly developed social and transport infrastructure, harmonious development, as well as attractive features for stakeholders and future residents. Thus, the developed GIS visualization will enable a visual representation on the map of all spatial objects, which are necessary for analysis, and to reflect spatial patterns of the placement of all necessary infrastructure facilities.