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Methods of legal limitation of the structure of remote monitoring of soil quality

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Abstract

Normative and instructional documents serve to ensure the unity of urban policy by achieving appropriate quantitative and qualitative indicators of development. Among the normative and legal documents, a special place belongs to the Town Planning Code of the Russian Federation and construction norms and rules (SNiP). The urban planning code regulates relations in the field of settlement systems, urban planning of urban and rural settlements, environmental management and environmental protection. In addition, it defines the competence of public authorities, the rights and obligations of legal entities and individuals in the field of urban development, the role of urban planning documentation and urban planning regulations in regulating the use of territories. In other words, it addresses issues from all groups of normative documents at a fundamental level. The land cadastral assessment of the territory is made within one calculation three times: in the pre-planned and post-planned situation for the considered project variant and for the optimal plan of functional zoning. The decision on the final design version is made by the designer. The associated post-plan assessment is considered as a cadastral assessment and is included in the city land cadastre system. A similar set of calculations can be performed repeatedly during the development of the master plan as part of the iterative process of mutual coordination of design solutions for subsystems functional zoning, road network and urban transport system, system cultural-consumer services, engineering equipment, etc.

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Keywords

Remote sensing, formation, system, agricultural sector, law, regulation.

Introduction

Directive information includes resolutions of the government of the Russian Federation, ministries and departments. This information is intended to serve as guidance in nature. According to the nature of the issues addressed in them, these documents are divided into the following groups:

1) documents regulating design parameters of town-planning decisions on separate stages of designing (territorial complex schemes, master plans, building projects;

2) documents defining the order of construction and placement of civil and industrial facilities (residential buildings, children's institutions, garages, etc.);

3) documents defining structure and the maintenance of separate types of projects on stages of town-planning design, and also the order of their coordination and the statement;

4) documents on private matters (for example, on the demolition of residential buildings, land allocation for various types of construction, sanitary standards for the design of industrial enterprises, etc.).

Analytical information

Analytical information is the data characterizing the object of research-region (edge), part of the region (edge), city, part of the city – in three main directions:

1) study of the object (natural conditions, engineering conditions, sanitary conditions, landscape features, land, forest and water resources, minerals) – the study of features of the subsystem "Environment";

2) study of the economy of the object (development and placement of industrial and agricultural production, residential and public buildings, transport and engineering structures) – study of the state of the subsystem "Activity";

3) study of population and settlement (population, demographic structure, employment structure, placement of resettlement sites, etc.) – the study of the laws of the subsystem "Population".

During the survey of the object, not only its current situation is fixed, but also the trends of its development in each of the directions are revealed [Verenich, 2015]. The quality of collection and processing of analytical information largely determines the quality of urban planning forecast and design.

Main part

The concept of optimality is based on the consideration of the city as an urban planning system that combines industrial, residential, recreational and other zones and objects interacting in a single territory. The optimal placement of urban construction can be set in two main ways: indication of the uses of each site and the location of each projected object; definition for each district of socio-economic assessments of the territory, which are used to describe the plan.

A significant disadvantage of the first method is that it fails to take into account the appearance of new objects that are not provided by the previous stages of urban planning forecast.

In the second method of description, this disadvantage is absent, because there is no need to assign a specific territory to a specific function of use − for setting the plan, aggregated estimates are enough.

In practice, two fundamentally different methods of determining the estimates of urban areas are used: cost and rent-optimization [Qekaj-Thaqi, 2015]. The estimates obtained by these methods have different economic meanings and different applications.

In accordance with the first method, which has received the most widespread in the traditional

urban planning forecast (integrated urban planning assessment of the territory – KGOT), the economic assessment of urban areas is identified with the sum of past and future (projected) costs for the development and preparation of these areas for construction. The method takes into account the costs, damages and effects associated with the most important engineering-economic and socio-economic factors that determine the socio-economic value of sites.

With the rent-optimization method (ROM), the value of the economic assessment is determined by the amount of savings obtained from the development or (and) operation of the considered (estimated) site compared to the least favorable (closing) site included in the land development plan [Chelysheva, Verenich, 2010]. This method is based on the methodology of economic assessment of natural resources. The use of this method in urban planning is not ubiquitous.

If the basis of the first method of evaluation is to determine the costs that you need to make for development of the site, then the second − cost determination that you do not want to make (savings) [Alkhasawneh, 2016]. In the first method, the worst sites that require the greatest costs for their development receive the highest assessment, other things being equal, while in the second − the best sites that require the least investment. The first method (CLT) involves determining the estimates of each individual site, the second (ROM) – only on the basis of comparison of sites among themselves [Arslan, Farkas, 2016].

The KGOT method allows to receive the sizes similar to standards of the capital investments (or the reduced expenses) connected with various ways of development of sites. These estimates can be used for aggregated calculations at all stages of urban planning forecast.

The estimates obtained at the ROM are designed to justify local urban planning decisions, increase their socio-economic efficiency by creating special optimality criteria that ensure consideration of citywide economic consequences when making decisions on the development and placement of facilities, the use of individual sites. According to the type of socio-economic assessments of urban areas, other indicators can be obtained that provide a flexible transfer of management information from General urban planning decisions to private ones and thereby increase the socio-economic efficiency of urban design and management at the local level.

The concept of integrated urban assessment of the territory (cost method) was developed By S. I. Kabakova in the mid-70s of the twentieth century.

Rational use of urban areas allocated for housing, cultural, municipal and industrial construction is inseparable from the efficiency of capital investments in urban planning.

In a comprehensive urban assessment of territories the comparative value of sites or areas of the city is determined in two aspects:

− what actually costs the city the full development of areas of development taking into account all types of costs, both past and future;

− what economic and social effect is achieved as a result of the exploitation of these territories.

Thus, urban lands are evaluated according to two complementary categories of indicators: engineering-economic and calculated socio-economic [Karthi, Prabu, 2016].

Engineering and economic factors include:

7) preparation and engineering equipment of the territory;

8) demolition and relocation of objects located on the territory of the assessed objects;

9) withdrawal for building of natural-valuable lands.

Socio-economic factors include:

1) features of placement of sites in the city plan;

2) sanitary and hygienic characteristics of sites (measures related to the elimination of discomfort);

3) architectural, artistic and aesthetic characteristics.

The basis for the construction of a comprehensive urban assessment is the differentiation of the city's territories by zones or other planning elements (microzones, subdistricts, etc.) [Wright, 2014]. These planning elements or zones are characterized by: stages of development of the city; architectural and planning structure; system of main highways; the state of the housing stock and other types of development; the level of engineering improvement, transport support, public services; natural factor.

Zones represent different qualitative value and relative uniformity within each structural unit, both from the point of view of living facilities of the population, and under the conditions of placement of new construction.

The method of complex urban planning assessment of the territory is aimed at determining the global strategy of the city development, reflected by the scheme of functional zoning. The purpose of ROM is to obtain local town-planning estimates, increase on their basis the socio-economic efficiency of town-planning decisions by creating special optimality criteria that ensure consideration of citywide economic consequences when making decisions on the placement of objects, the use of individual sites.

Urban areas differ in the degree of their social and economic preference for the placement of objects for various purposes. In this case, often the best sites have advantages for the placement of objects of many kinds. However, as the area of these most favorable territories is limited, their occupation for the accommodation of some objects means that they cannot be used for the accommodation of others, which are displaced to the worst lands. At the same time, the economic and social characteristics of the displaced objects deteriorate to varying degrees, which leads to changes in the overall costs and living conditions in the city as a whole. The aim of ROM, as noted by its authors, "is to create an optimal plan for the placement of construction projects in the districts."

The optimal plan is the plan of placement of urban construction, the best in socio-economic terms, not for one object or a group of objects, but for the city as a whole

Analysis of the optimal plan allows us to note an important feature of the formation of construction costs. Different (in different areas or with different intensity) placement of each object is associated with a change in two categories of costs [Cao, Ding, Fang, 2014]:

1. The given expenses for the placed object essentially depend on the area where it is placed and on intensity of use of the territory.

2. Each option is associated with the withdrawal of different quality (or size, if the intensity of development of the territory varies) sites from other possible land users, which are displaced to the worst sites, where the cost of construction is higher.

Given the above, as part of the costs associated with the development of each site, there are two components [Gunes, Kocak, Tahta, 2014]: costs for objects located within the site (direct costs); additional costs for objects that could not be placed within the site due to its withdrawal for the placement of the object in question and were placed on the worst sites (feedback costs or indirect costs).

The use of the indirect cost indicator provides an opportunity to obtain a criterion that provides a choice for one object or area of the option that will be the best from a citywide point of view. This indicator allows instead of a detailed, personalized description of the placement plan to limit the establishment for each district of some economic indicator similar to the indicator of regulatory efficiency. This indicator serves to convey information about the optimal plan and creates opportunities for greater maneuvering, in particular, determining the location of new facilities or solving detailed problems of urban management, and is called an economic assessment. Economic valuation corresponds to the theory of land rent, in which the price of land is identified with the savings from the use of the best plots compared to the worst. In addition, the formal calculation operation of determining

the total costs also corresponds to the addition to the real construction and operating costs of the land price [Zheng et al., 2015].

A special linear programming model can be used to determine the optimal plan for the use of the city territory and the corresponding economic estimates of the territory. Linear programming, despite some coarsening of the described phenomena, makes it possible to obtain simultaneously with the optimal plan, the so-called dual estimates. Dual estimates are interpreted as peculiar prices of resources and products.

Estimates have the properties of saving (or damage) from the use (or withdrawal) of resources. In this case, such resources are urban land, estimates of which are obtained simultaneously with finding the optimal plan.

The first main objective of economic (cadastral) valuation of real estate is to analyze the cost structure for the creation and reproduction of land real estate, consisting of the entire system of urban land, including engineering, transport, social and other components of infrastructure.

Based on this, the most important task is to assess not only the magnitude, but also the spatial and functional distribution of the cost component of the cost of urban land real estate. An algorithm is needed to find a reasonable answer to the question: at whose expense and how effectively the use and development of individual territories and urban land real estate in General is carried out.

The second purpose of economic assessment is to determine the rental component of the value of urban land for various purposes, i.e. the real or potential profit from their use.

Thus, the economic assessment of urban land allows you to create modern economic levers to change the system of modern land use in the interests of optimizing the living conditions, work and recreation of residents, more harmonious development of the city as a whole. To solve the problems of optimization of financial and economic relations of the city-the owner of the land and all land users cadastral valuation of urban land is of paramount importance.

Cadastral valuation of urban land includes three hierarchical levels of representation by the size of the estimated elements:

1) The level of evaluation of land;

2) The level of evaluation of quarters;

3) The level of territorial and economic zoning.

The creation of a system of cadastral valuation of urban land property is one of the most serious problems. The law on land valuation and other laws necessary for the full functioning and development of the city are still under development. Unified methodological approaches to cadastral valuation of urban land and land plots have not yet been finalized.

The solution of the problem of cadastral valuation of urban land should be sought in the framework of broader approaches, a comprehensive analysis of economic processes occurring in the city as a whole.

The land policy of the city is closely connected with economic, ecological, town-planning and social policy. Accordingly, the processes of creation and development of the urban land cadastre should be coordinated with the system of description, evaluation and registration of all types of real estate, the General plan of development of the city, the urban cadastre, all information systems that ensure the management of the city. The system of cadastral valuation of urban land and territorial and economic zoning should become an information and legal basis for cadastral and individual assessment of all types of value of individual land plots in accordance with the purpose of assessment in all types of market transactions with them, the creation and development of a full-fledged land market.

In accordance with the purposes of cadastral assessment of urban land property, the assessment is

based on quarterly cadastral valuation, as the most convenient level to form the basis for the solution of urban problems, both at the stage of town-planning forecast and manage efficient use of urban areas. Cadastral valuation of urban areas has a clear sequence of basic valuation actions.

The second stage. Determination of the total costs of the city (direct and indirect) for the expanded reproduction of urban land real estate, their territorial and functional distribution.

Stage 3. Analysis of local situations in the assessment of urban land real estate for individual parts of urban areas and individual land plots, taking into account all urban, historical, architectural, environmental and other constraints and determining their potential market value.

Stage 4. Preparation of the resulting local balances of costs and revenues from all types of land and other payments for individual territories and lands of various functional purposes.

Stage 5. Identification of the possibility of improving the efficiency of the entire management system of the city development.

Earlier it was noted that in urban planning and cadastral assessment of territories it is possible to use a single methodological and model tools, and that land cadastral assessment can be obtained from urban planning assessment by certain transformations.

This circumstance was used to develop the necessary methodological and instrumental tools based on the results of the work. Modern SOFTWARE is focused on a wide range of tasks related to land use, and include tools for working in two interrelated areas: design and urban planning and land cadastre, in particular, tools for calculating urban planning and land cadastre estimates of the territory. Other software systems are similarly oriented, and it is possible to say with a sufficient degree of confidence that all of them are identical in terms of urban planning assessment (cost method). Therefore, they are characterized by approximately the same set and structure of input and output information.

Initial data for calculations

Since, as noted above, for urban planning and cadastral assessment uses a common conceptual and model apparatus, and the composition of the primary source data for calculations are basically the same source data that are used by designers in the development of functional zoning section within the traditional technology.

1. The reference plan containing information on physical geography, the existing functional use of the territory, the road network.
2. Cartographic and other data on engineering and geological characteristics of the territory.
3. Data on industrial enterprises and other places of employment, including such characteristics as name, location on the plan, industry affiliation, number of employees.
4. Data for the urban environment: point sources of emissions, the ranges of indices of total pollution and so on.
5. Data on the state of housing: types of housing, differentiated by density of housing stock, number of storeys, period of construction, degree of wear.
6. Data on the public service system: location and capacity of shopping centers, fairs, markets.
7. Data on the system of gardening and recreation.
8. Data on historical and architectural monuments and zones.
9. Data on the urban transport system.
10. Employment structure and mobility structure of the population.
11. Task for the design of the master plan: development goals for the settlement period, the main design parameters, the volume of housing construction, trade, business, production, approximate territorial areas of possible placement, construction for the settlement period, etc.

Data should not be limited to the urban area: they should include data on the immediate environment of the city, the nearest settlements, recreation areas, agricultural land, etc. in Other words, at this stage the city should be considered as an urban planning system.

As a base can be used maps M 1: 25000 and complementary maps M 1: 10000. For large cities, maps of non-standard scales (M 1:20000) and plans of M 1:5000 may be technologically more convenient.

Thus, any city for which the master plan was previously developed, has at its disposal all the necessary data for the calculation of land cadastral valuation in the software and model complex.

For simplicity of process of management of development of the city the assessment is made on administrative units (areas or districts). The results for each administrative unit include quarterly assessment and territorial and economic zoning. The materials of territorial and economic zoning have a visual character of the relief of values, where each interval has its own color, and the scale is selected in such a way that there is a smooth transition from red tones through yellow, green, blue to purple tones in accordance with the movement of the most valuable lands to the least valuable. The color relief of cost corresponds to the analytical description of the relief of costs. It is also possible to represent the corresponding analytical description of the monochrome image of the relief costs isolines. Sometimes this representation helps in a more accurate assessment of the causes of differentiation of the consumer value of the urban area. It should be noted that in the formation of land assessment in addition to the territory under consideration, along with the Central administrative units are considered and remote from the center (the addition is always specific) in order to include the full range of assessments (in one embodiment, and the most valuable and less valuable areas).

An example of such a hardware-software complex can serve as a PC Land Use. The main elements of the complex, representing the stages of work and at the same time the results, which have independent value, are the following:

1) pre-planned urban planning and land cadastre assessment of the territory;

2) evaluation of the considered design variant of functional zoning of the territory (there may be several such variants): calculation of the target function values is a task that is important for urban planning;

3) post-planned town-planning and land-cadastral assessment of the territory for the considered project variant of functional zoning of the territory;

4) optimization of the functional zoning plan of the territory: formation of the optimal plan by software;

5) evaluation of the optimal functional zoning plan of the territory: calculation of the target function;

6) post-plan urban planning and land cadastre assessment of the territory for the optimal plan of functional zoning of the territory.

Conclusion

Thus, the land cadastral assessment of the territory is made within one calculation three times: in the pre-planned and post-planned situation for the considered project variant and for the optimal plan of functional zoning.

The decision on the final design version is made by the designer. The associated post-plan assessment is considered as a cadastral assessment and is included in the city land cadastre system.

A similar set of calculations can be performed repeatedly during the development of the master plan as part of the iterative process of mutual coordination of design solutions for subsystems functional

zoning, road network and urban transport system, system cultural-consumer services, engineering equipment, etc.

The best plan of functional zoning of the territory formed the settlement process, plays a special role in the context of the problem of finding the best, most effective way to use site with limited demand for volume of functions and competition for territory.

In essence, this problem finds its natural solution here, unattainable when considering each land plot separately, when the determination of the best, most effective way of using the site is conducted without taking into account the decisions taken at the same time with respect to other sites.

Any model underlying the software systems is an approximate, much simplified and rough description of the urban situation. Therefore, it is necessary to check the results of calculations for adequacy and bring the model into line with the real situation – calibration. The methodology of land cadastral valuation based on urban planning assessment of the territory requires calibration according to sales of land or according to sales of apartments and other types of real estate. In principle, for calibration it is necessary to have two values of land value: maximum and minimum for the city. Is a linear mapping of calculated values of the urban planning and assessment on these boundaries so that the minimum town-planning evaluation corresponds to the maximum cadastral estimation and vice versa. The minimum value of land value is determined by the amount of total previous investments in engineering and transport infrastructure, evenly distributed over all urban areas. It can be obtained on the basis of data available to the city services of operation of these systems, as well as other simple methods. The maximum value can only be obtained from sales data. Since the reliability of sales data always raises some doubts, it is desirable to rely not on one most expensive transaction, but on several. In addition, it is necessary to have data in reference points, allowing to estimate the value of cost allowances associated with the prestige and reputation of the city districts.

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Методы правового ограничения структуры дистанционного мониторинга качества почвы

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Аннотация

Нормативно-методические документы созданы для обеспечения единства городской политики путем достижения соответствующих количественных и качественных показателей развития. Среди нормативно-правовых документов особое место принадлежит Градостроительному кодексу Российской Федерации и строительным нормам и правилам (СНиП). Градостроительный кодекс регулирует отношения в области систем расселения, градостроительства городских и сельских поселений, природопользования и охраны окружающей среды. Кроме того, он определяет компетенцию органов государственной власти, права и обязанности юридических и физических лиц в области градостроительства, роль градостроительной документации и градостроительных норм в регулировании использования территорий. Другими словами, он затрагивает вопросы всех групп нормативных документов на фундаментальном уровне. Земельно-кадастровая оценка территории производится в рамках одного расчета три раза: в заранее спланированной и постпланированной ситуации для рассматриваемого варианта проекта и для оптимального плана функционального зонирования. Решение об окончательной версии дизайна принимается дизайнером. Соответствующая послеплановая оценка рассматривается как кадастровая оценка и включена в систему городского земельного кадастра. Подобный набор расчетов может выполняться многократно при разработке генерального плана как часть итеративного процесса взаимной координации проектных решений для подсистем функционального зонирования, дорожной сети и городской транспортной системы, системы культурно-бытового обслуживания, инженерного оборудования и т.д.

Для цитирования в научных исследованиях

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Ключевые слова

Дистанционное зондирование, образование, система, аграрный сектор, право, регулирование.

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