

INFLUENCE OF PUBLIC ROADS DEVELOPMENT ON THE CADASTRAL DATA*

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Abstract

This paper presents the analysis of the impact of public roads development on the structure of parcels, as well as on land and buildings cadastral data. The analysis was performed on land cadastre documentation in which the public roads development had been made under the provisions of special act on preparation and permission for public roads development, as well the geodetic documentation prepared for the process.

The analysis shows that such a documentation prepared for the process based on the special act results in land cadastre data update. The road development process causes changes not only in the cadastral records but also in land parcels (within the farm) configuration.

Key words: *public roads, cadastral data, development.*

Introduction

Credible and reliable and up-to-date information allows to make the right decisions. This aspect concerns practically every sphere of life, including assets such as real estate. Therefore, as societies were evolving, various registers were created to collect information about land, buildings, and utility networks. The first real estate information comes from ancient times and has gradually evolved to the present day. Creation of real estate uniform system (more precisely on land) for Poland started after the Second World War. Its main purpose was (as with the rest of most land information systems) data collection for tax purposes. The reason was to unify real estate tax systems that were left after the Polish territory annexation by Austria, Prussia and Russia had ended.

At present, such a system for collecting real estate data and providing the basis for economic and spatial planning, taxation, real estate identification in land register and public statistics [USTAWA, 1989] is the land and building cadastre. It collects information about land, buildings and premises and its owners (tenants). In addition, the legislator has imposed on the authorities responsible for it [ROZPORZĄDZENIE, 2001] that the database of land and buildings is kept up-to-date with specific requirements. This is understandable because of the changes in space (and hence in the data included in cadastre) resulting from human activity.

One of the human activities that affect the data collected in cadastre is public roads development. It is based on the provisions of the act on special rules for the preparation and implementation of road development concerning public roads [USTAWA, 2003].

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Preparation of surveying documentation for administrative procedure, which finalizes the decision to authorize development of public roads, is based on data contained in land and building cadastre. On the other hand, this decision is the basis for introducing changes in land and building cadastre.

Documentation for linear development and cadastre

With the prospect of Poland's accession to the European Union, the question of proper and rapid use of European funds allocated to infrastructure developments, e.g. roads appeared. In order to carry out such developments without the risk of losing the allocated funds while consuming the aid funds quickly, it was necessary to create corresponding legal regulations. Because of not always efficient planning and expropriation system, it was decided to apply special provisions – acts, which in a simplified procedure would give the opportunity to realize key and necessary infrastructure developments [GDESZ, TREMBECKA, 2013].

The basic assumptions for the special acts (seven such legal regulations since 2003) - including road special act [USTAWA, 2003] are:

- • implementation of the development irrespective of the area assignments in the local spatial plans,
- • simplified administrative procedure for notifying the parties,
- • elimination of subdivision procedure,
- • elimination of expropriation procedure.

The most important characteristic of the special acts is the ability to locate and realize development irrespective of the local spatial plan assignments and sometimes even contrary to it. Eliminating the aforementioned procedures, the process of authorizing the development covered by the selected special act has been simplified.

Performing infrastructure development basing on special act (amended many times) [USTAWA, 2003] is based on the decision issued by *starosta* (county chief), respectively to municipal and county roads and by *wojewoda* (chief of region) respectively to national and provincial roads, at the request of the competent road administrator. Such an application is the subject to multiple arrangements with many institutions before the relevant ruling is issued. The decision issued in this case replaces several other decisions, that concern road localization, land subdivision, building permits and technical infrastructure rebuilding. Thus, for the purposes of administrative proceedings preceding finalizing such a decision, various documentation, including surveying documentation needs to be prepared [BALAWEJDER et al., 2015]. It is worth noting that the land procedures concerning subdivision are helpful in regulating the real estate legal status [BIEDA, HANUS, 2014]. The surveying and cadastral aspects appear very often there. It cannot be denied that these issues interpenetrate and interact.

The order of the consequent procedure stages that completes the decision to authorize public road development (*DoZRiD*) and the requirements that should be met by the application to launch the procedure in question is specified by the special act [USTAWA, 2003]. The summary of the procedure was divided into phases and stages. The phases are shown in Fig. 1. The individual stages of preparation and implementation with particular regard to surveying aspects are presented in Table 1.

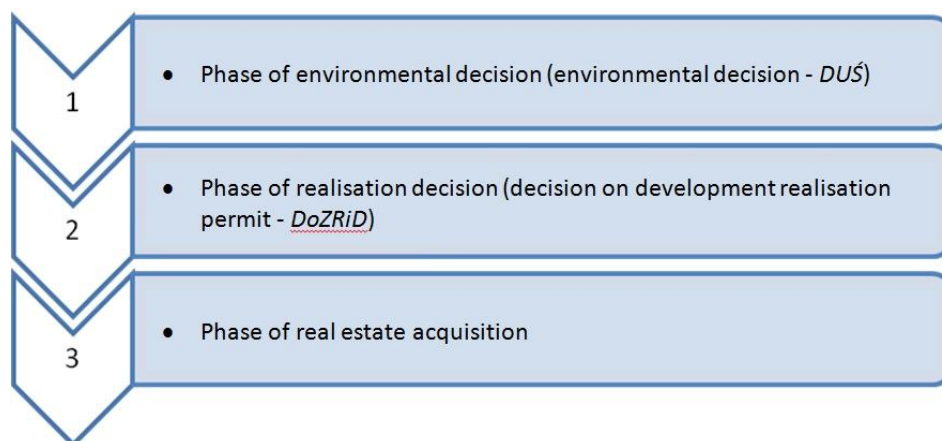


Fig. 1. Phases of obtaining real estate for developing public roads after 10.09.2008. Source: (BALAWEJDER et al., 2015)

Table 1. Stages of work for preparation and implementation of public roads development.

No.	Procedure	Approximate time to complete procedure (months)
1	Tender (for preparatory stage I)	0.5
2	Making map(s) (1:5000 or larger scale) for conceptual, planning and environmental purposes	3
3	Checking and accepting maps for geodetic resources	0.1
4	Designing route's several variants on the aforementioned maps	3
5	Reports on the planned road impact on the environment (for two variants)	3
6	Consultation and environmental decision for the chosen variant	3
7	Appeals, decisions, second-instance authorities decisions, complaints.	3
8	Obtaining excerpts from cadastre, before parcels subdivision	0.2
9	Tender for the road technical design - Stage II (including mapping for design purposes, subdivision maps and formal and legal documentation for issuing decisions on compensations)	0.5
10	Mapping for design purposes	3
11	Checking and accepting the aforementioned maps to a geodetic resource	0.1
12	Making map with real estate subdivision project	3
13	Checking and accepting the aforementioned maps to a geodetic resource	0.1
14	Elaboration of a technical design of the road and the project of technical infrastructure facilities reconstruction (also off-road)	5
15	Arrangements within <i>ZUD</i> or other structures	1
16	All other arrangements	1
17	Preparation of formal (legal) documentation concerning ownership, allowing for urgent valuation and issuance of compensation decisions	2
18	Issuance of a decision on a road development permit (<i>ZRID</i>)	3
19	Appeals, second-instance authorities decisions, complaints, proceedings before administrative courts	3
20	Indication of subdivision map with clauses	0.1
21	Stabilization of the boundaries delimitating road area lines	1.5
22	Tender for the valuation	0.5
23	Valuation of each property and issuing compensation decisions	3
24	Appeals, second-instance authority, complaint decisions, proceedings before administrative courts	3
25	The decision of the regional chief (<i>wojewoda</i>) to establish a permanent administration for parcels, which before the subdivision were owned by the State Treasury	1
26	Settlement of other formal, legal problems and compensation issues such as: tenancy, lease, rent, and so on.	1.5
27	Introduction of changes in the land and building cadastre on the basis of the <i>ZRID</i> decision	1
28	Valuation, land acquisition or land rights acquisition for parcels outside the road area, valuation and acquisition of "residual" parcels	2
29	Issuing excerpts from land and building cadastre after the introduction of changes concerning cadastral parties and objects	0.5
30	Parcels registration in land register	1

Source: (GRZECHNIK, MARZEC, 2014)

The end of the procedure and which allows to commence construction works and also affects the data contained in the land and building cadastre is the decision on the *ZRID*. It is the basis for changes in the land and buildings cadastral data as well as the disclosure of the new state in land register [USTAWA, 2003].

This is because the abovementioned decision on the *ZRID* includes in particular:

- requirements for linking the road with other public roads, including definition of their categories,
 - defining boundary lines,
 - conditions arising from the need to protect the environment and the cultural goods as well as meeting the needs of national defence,
 - requirements to protect legitimate interests of third parties,
 - approval of the project of real estate subdivision required to establish the road area range,
 - the designation of the real property or its parts according to the cadastre, which becomes the ownership of the State Treasury or the proper local government,
 - approval of the building design and other arrangements - if needed.
- In addition to the aforementioned decision, the property or its part become by the power of law:
- ownership of the State Treasury (national roads),
 - the ownership of proper local or regional government units (regional, county and municipal roads) starting from the date on which the decision to authorize the road development becomes ultimate.

Detailed research

Among the above-mentioned elements, the part of the decision that concerns the real estate (parcels) subdivision influences cadastral data. The second part influencing cadastral data is the one concerning real estate (parcels) that are no longer owned by the existing owners (by law) and transferred to the State Treasury or local government units. This information updates both the cartographic and the descriptive part of the cadastral documentation.

This is because the decision to authorize the implementation of the road development also approves the subdivision of real estate. This is done on the basis of project of division of real estate (land parcels) maps, which are the final result of the geodetic survey done for the purpose of the aforementioned procedure. An example of such a map fragment is shown in Figure 2. Changes in boundaries and parcel numbering (identification) are marked in red.

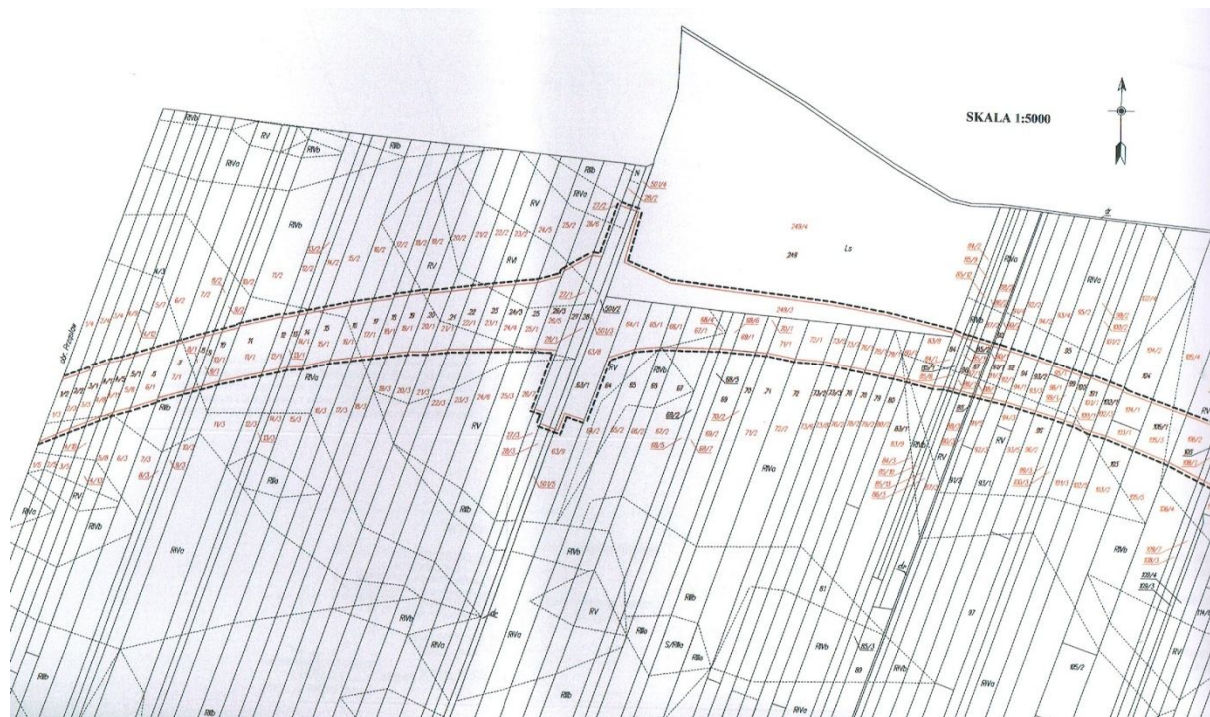


Fig. 2. Project of real estate (including those being within the road area) subdivision; Project (fragment) developed under the act on special rules of preparation and implementation of public roads development. *Source: Own elaboration on the basis of geodetic and design documentation prepared for obtaining the permit for the implementation of road development.*

It should also be noted that the lines delimiting the terrain (shown in the above diagram by a dashed line), determined by the decision to authorize the implementation of a road development, constitute the real estate division lines. It should be indicated here that the verdict of the WSA in Gorzów Wielkopolski of December 08, 2010 number Act II SA / Go 759/10 [ORZECZENIE, 2010], states that the obligation of the authority approving the project of real estate subdivision is to check whether the part of the real estate (located outside delimiting lines) will have access to the public road. It also has a great significance in terms of using the property. It is also emphasized that (as raised by the WSA in Gliwice in the judgment No. II / GI 206/09 [ORZECZENIE, 2009]) mutual relations in respect of the subdivision proceedings between the Act on Real Estate Management [USTAWA, 1997] and the Act on Special Rules Preparation and implementation of public roads development [USTAWA, 2003] are not exclusive. So, it can be deduced that technical documentation, which results, inter alia, in preparing maps of the real estate subdivision (drawn up on the basis of the regulation on the way and mode of the real estate subdivision [ROZPORZĄDZENIE, 2004]) must be accepted into geodetic and cartographic resources. List what should be included in such an operation is detailed in the regulation on technical standards [ROZPORZĄDZENIE, 2011] and consists, among others, of field sketches and measurement logs, protocols: establishment and acceptance of borders, and so on, proof of parties notifying and copies of summons, technical report, documents confirming measurement results, data files generated from the current database, lists of changes in cadastral data and other documents.

Data collected after the approval of the project of the real estate subdivision by decision based on the special act allow to update the cartographic part of land cadastre by revealing the newly created legal boundaries resulting from the real estate subdivision. It also allows us to determine the location of other boundary points with the precision of the I-st accuracy group details, which in turn translates into the possibility of determining the area of parcels (generally as well individual land use contours) with the required precision of square meters [ROZPORZĄDZENIE, 2001]. This allows us to update the subject data, i.e. the data concerning the parcels contained in the descriptive part of the cadastral documentation.

The updating of the descriptive data of the land and building cadastre is based on a list of changes that may be included in the technical documentation as well as being an indispensable part of the map of the property subdivision project approved by the *ZRID* decision. Such a list illustrates which parcels are subdivided from the land parcel for which the provisions of the special act [USTAWA, 2003] applies, as well as what part of it still remains under the current owner and what is taken to the road development. This document, in conjunction with the decision to authorize public road development, states what property becomes the property of the State Treasury or the competent local government unit and allows to make changes to the descriptive data of the land cadastre, both in the parties section - owners and owners as well as in the objects part, i.e. the total area of parcels as well as their respective areas.

However, it is important that the documentation does not allow for the soil classification update because it is not carried out in the preparation of the geodetic documentation for the purpose of the analysed procedure. Neither the special act [USTAWA, 2003] nor the soil classification regulation [ROZPORZĄDZENIE, 2012] require to perform an *ex officio* soil classification, there. There is no recommendation that it should be carried out in the course of proceedings which ends the decision on authorization for development in public roads.

It is also worth mentioning is that maps with real estate subdivision projects are an essential attachment only if the demarcation lines do not coincide with the land parcels boundaries and their geodetic subdivision is necessary [GDESZ, TREMBECKA, 2013].

Referring above the arrangements for the parcel attributes which, in the light of the regulation on land and building cadastre [ROZPORZĄDZENIE, 2001] are required and consist of:

- parcel identifier,
- numerical description of boundaries (accuracy for group I details);
- parcel area given with 1 m² precision,
- land use contours of grasslands and soil classes with 1 m² precision,
- the value of the land, if determined,
- number of land registration unit,
- identification in land register,
- identification of documents defining other land rights,
- number in the register of monuments,
- ID of the statistical region,
- parcel address (including TERYT).

They can be revealed on the basis of documentation prepared for the purposes of the procedure which the *ZRID* decision ends.

WYKAZ ZMIAN GRUNTOWYCH WRAZ Z REJESTREM DZIAŁEK WCHODZĄCYCH W ZAKRES PASA DROGOWEGO

Obręb: 32 Gmina: Jędrzejów Województwo: świętokrzyskie

STAN DOTYCHCZASOWY WG. EWIDENCJI														STAN NOWY PO PODZIALE			
Lp.	Nr ark.	Nr jedn. rej.	Nomenk. Prawna	Właściciel/Władający Nazwisko i Imię Adres	Nr dz. ewid.	Klasa użytk.	Pow. w ha	Działki pod drogę			Działki pozostające			Właściciel/Władający Adres	Akt. Nomenklatura prawna	Uwagi	
								Nr dz. ewid.	Klasa użytk.	Pow. w ha	Nr dz. ewid.	Klasa użytk.	Pow. w ha				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	1	G.241	AN 139/00 KW	Grzegorz Piotr Treła							R11b	0.3958	Grzegorz Piotr Treła	K11J0005			
											R1Va	0.2901					
											R1Vb	0.1822					
											1/4					0.6681	
											R11b	0.2217					
											R1Va	0.9548					
											R1Vb	0.3978					
											RV	0.1100					
											S-R1Va	0.1200					
											S-R1Vb	0.0100					
B-R1Vb	0.1100																
1/2			3.0100	1/3	0.2176	1/6	1.9243										
R11b	0.3183																
R1Va	0.3044																
R1Vb	0.1734																
2/4			0.7941														
R11b	0.2022																
R1Va	0.7559																
R1Vb	0.3666																
RV	0.1600																
S-R1Va	0.0800																
S-R1Vb	0.0300																
B-R1Vb	0.0900																
R11b	0.1415																
R1Va	0.0297																
2/2			2.6500	2/3	0.1712	2/5	1.6847										
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											R1Va	0.3521					
											R1Vb	0.1795					
											3/4					0.8591	
											R11b	0.2626					
											R1Va	0.8245					
											R1Vb	0.3639					
											RV	0.1711					
											R11b	0.1680					
											R1Va	0.0218					
3/1			2.6900	3/3	0.2096	Razem			2.4802								

Fig. 3. List of changes in cadastral data for real estate falling within the scope of the road area. Project developed under the act on special rules of preparation and implementation of public roads development (fragment).
Source: Own elaboration on the basis of geodetic and design documentation prepared for obtaining the permit for the implementation of road development.

In addition to the aforementioned aspects, it should also be noted that the geodetic documentation developed for design purposes, inter alia, project maps used later is the basis for updating the databases composing the base map. These maps (for design purposes) should include, in addition to the elements that form the content of the base map, the boundaries of property (parcels) tenure or ownership, [ROZPORZĄDZENIE, 1995]:

- Geodetic lines demarcating areas of different use, built-up and streets and roads axes, if they have been determined in a local land use plan or in a decision establishing the conditions for land built-up and development,
- high greenery with indication of nature monuments,
- location of other objects and details indicated by the designer according to the purpose of work.

The scale of the listed maps is 1: 500, 1: 1000 or possibly 1: 2000. In addition, rules for mapping for design purposes have been clarified by the regulation on technical standards [ROZPORZĄDZENIE, 2011], which has imposed additional obligations regarding the establishment and measurement of boundaries and display of land easements. Although it should be noted that in current legislation there are no patterns how such a map is supposed to look.

The above considerations can be transferred to a concrete example of reality. For example, a geodetic documentation was prepared for the construction of a bypass of a county town in the Świętokrzyskie voivodship, which together with the other necessary for this type of development became the basis for the decision of the voivode (*wojewoda*) to issue a road development permit. In order to select the appropriate route, the topographic maps of scale of 1: 10000 were used, for area where the planned route was designed (Figure 4). This provided the basis for preparing the map for the real estate subdivision. It is presented in the (fragment) in Figure 2. The land change lists (fragment) is shown in Figure 3.



Fig. 4. Topographic map with the proposed bypass being part of national road (fragment). *Source: Own elaboration based on the documentation available at <https://www.gddkia.gov.pl>*

We can mention that here that the bypass crosses through seven cadastral sections surrounding the county town on two sides: west, north. The area directly adjacent to the town from the west was chosen for this analysis. The cadastral documentation for this area was created in the 1960s during the nationwide land cadastre creation for the whole country. Then, in 1991, cadastre modernization was carried out, followed by the implementation of a cadastral numerical map in 1999 with calculated coordinates of boundary points. Classification contours were obtained by raster vectorization. Current update is made by applying individual changes resulting from geodetic documentation. The total area of the cadastral section is 743.5787 ha, while the areas of particular land use groups are shown in Table 2.

Table 2. Area juxtaposition in individual land use groups.

No.	Land use group	Area (ha)
1	Arable lands	468.8184
2	Orchids	12.8008
3	Permanent pastures	2.0658
4	Built-up arable land	29.5387
5	Forests	185.4499
6	Residential areas	8.6900
7	Other built-up areas	0.6992
8	Roads	34.8289
9	Wastelands	0.6870
AGGREGATE		743.5787

Source: Own study based on cadastral data.

The total number of parcels within cadastral section is 727 and its grouped in 361 register units. On the other hand, the geodetic work on the project of real estate subdivision covered the land contained in 69 register units, which constitutes 19.11% of all register units. As regarding the area under the road development, 20.9421 hectares of area were allocated, which constitutes 2.82% of the total area. It should also be noted that the subdivision on the basis of the decision to authorize the implementation of road development concerned 84 parcels. That is 11.55% of all parcels within the cadastral section.

The realisation in the mode of special act [USTAWA, 2003], which is the bypass of a county town, passing through the analyzed cadastral section, divided the land belonging to into two parts - the north and the south ones. The northern part covers the area of 243.2156 hectares and consists mainly of agricultural and forest land, since it is located on the site of a forest complex belonging to the State Forests. The southern part (i.e. 479.4210 ha) is used for agricultural production and building development.

The above mentioned division of the area is shown in Figure 5, where roads were marked in blue, forest complexes are green and buildings red. The completed development bypassed from the north side all the built up areas of the village, passing along the border of forest complexes. Selecting this variant of

the route, both reduced the cost of the development and did not violate the structure of the village. Built-up land (habitat, housing) was intact, as they are located in the southern part of the cadastral section, crossed by the bypassing road. Thus the structure of the habitat component of village remained unchanged and the land used for agriculture was affected by road development.



Fig. 5. Area land map with the roads routes (including bypass roads), forest complexes and buildings. *Source: Own elaboration based on cadastral data.*

While analyzing the shape of the overwhelming majority of cadastral complex parcels is close to the rectangle but strongly elongated with relatively narrow width and large length. The parcels are arranged parallel to each other and extend from the built up areas to the cadastral complex boundaries. This arrangement of parcels can be classified into a ribbon system that is characteristic for parcels located on flat land, where primitive stripes of land can be divided (by inheritance) into parallel, narrow stripes of land, often extending from the bottom of the valley or built up areas to the village boundaries [NOGA, SCHILBACH, 1991].

Considering the ownership structure of the parcels, which after the construction of the bypass remained on its northern side, we may notice that 74 parcels (belonging to 48 individual owners) were left in this part of the cadastral complex. 36 parcels belongs to persons residing in the analyzed area (i.e. 26 individual holders). The remaining part belongs to 22 non-resident owners, that means owners who own their land in the analyzed village and live in other villages [NOGA, 1977]. It should be noted again that the land parcels under the development changed ownership status. They became ownership of the State Treasury.

The changes that public road development causes such as those discussed above result in transformations in the spatial structure of the countryside and in the state of land tenure and use. The consequence of these changes in spatial land development is the formation of defects in the land structure known as: land fragmentation [LEŇ, 2010], so called the formation of internal and external chess board of land parcel [DUDZIŃSKA, 2012] [BALAWEJDER, NOGA, 2016] or disorders in local road system [BALAWEJDER, 2010]. To eliminate, minimize the negative impact of the development, it is necessary to consider merging and exchanging land [USTAWA, 1982], which aims to achieve multifunctional rural development [SOBOLEWSKA-MIKULSKA, WÓJCIK, 2012]. It should also be noted that merging and land exchange lead, apart from reducing land fragmentation, to the complex modernization of land and building cadastre [GRABOWSKI et al., 2016].

Summary and conclusions

- Based on the analysis, it can be concluded that:
- the process of preparation and realization of development in public roads, and in principle the geodetic documentation produced for its needs, updates the data contained in the land cadastre as regards the location of the boundary points and thus in the course of the boundaries between the land parcels, determining the area of land parcels in accordance with the applicable requirements, regarding the land and building cadastre or land use contours,
 - documentation produced during the road development process carried out on the basis of road special act updates the data in the land register in a limited way because of its linear nature it is not covering the whole area but the land parcel needed to realize the development,
 - data from the land and building cadastre updated on the basis of the resulting technical documentation are the basis for describing land parcels using numerical data and to generate the cadastral land map applying the standards in force,
 - only the selected parcel boundaries being the subject of administrative proceedings based on the provisions of the special act become legal boundaries,
 - the documentation prepared for the purposes of the special act does not update the land and building cadastre data of the entire register unit through which a linear road development crosses, and therefore it cannot be regarded as a land cadastre modernization, but merely as a current update of cadastral data.
 - the implementation of linear developments, which is a road development based on the special act, causes changes in the structure of land through the emergence of fragmentation and disturbances in existing road systems,
 - linear development of public roads, results in the lengthening and complicating of access to many land parcels and thus raising costs associated with growing crops.

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