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## ENHANCEMENT OF ROAD SAFETY WITH IMPROVEMENTS OF THE AREA DEVELOPMENT AND PLANNING PROCESS

A road network should provide all its users with the safe and effective travel with specific means of transport. The process of its development and operation encompasses the inherent and consecutive stages of the road network implementation process, i.e. planning, designing, implementation, and operation. Errors made during one of the stages of the urban transport network development, despite optimal solutions adopted during next stages, may significantly lower the standard of road infrastructure and adjacent areas, leading to the deterioration of road traffic conditions and safety. This is particularly important at the stage of planning, because errors committed at that stage are often difficult to remedy and require additional financial outlays to mitigate their impact of compromising a safety level in road traffic. The results of a survey conducted in the Kujawsko-Pomorskie Voivodeship have led to diagnosing the most important problems that result from the improper planning of the road network at the stage of the area development and planning. Moreover, the method of improving that process has been proposed from the perspective of road safety.

**Keywords:** road safety, area development and planning, road network, mobility plan, transport plan, road network hierarchy

### 1. The Importance of Road Safety Problems in the Process of Area Development and Planning

The area planning and development of a road network has to be the first stage in every process related to road investment projects, because at this stage the most important technical assumptions are determined for a construction design of every road and, moreover, a number of issues are resolved that affect the

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subsequent safety level on the road. In many developed countries, the process of area planning and development, including plans of communication systems, is assigned a very high priority.

In the framework of the Program Improvement of Road Safety Gambit Kujawsko - Pomorski conducted a number of surveys of the persons responsible for drawing up the planning documents (Studies of Conditions and Spatial Development, Local Spatial Development Plans), as well as those responsible for the implementation and monitoring of decisions issued by the zoning of strategic documents. On this basis, we diagnosed the main problems that have a significant impact on the safety of users of road infrastructure. The impact of spatial planning on the level of traffic safety is so important that it constitutes one of the elements of the program Gambit. This article identifies the main assumptions in order to increase the level of road safety by improving the quality of planning and implementation of spatial policy in Kujawsko - Pomorskie.

The policy of area development and planning on different levels of local government administration starts from the Study of Land Use Conditions and Directions (SUiKZP). The Study includes decisions on the functions of specific areas. The document covers also the basic guidelines for all functional zones and the method of basic transport services with an outline of road-street systems. The Local Zoning Plan (MPZP) makes information given in SUiKZP more detailed. The Local Zoning Plan becomes a local law pursuant to a resolution of the gmina council, and its provisions are strictly followed when issuing decisions on building permits and when permitting the implementation of any structural facilities. The Local Zoning Plan includes the provisions that underlie the method of exercising the ownership rights to properties covered by MPZP. It means that an owner of a real property is obliged to follow the provisions concerning the use of a land for specific purposes and functions given in the plan. Therefore, MPZP is an important document that organizes space in an area. Due to the fact that it is not obligatory to prepare Local Zoning Plans for every area, although it is generally considered to be the most effective method of managing land in a municipality, the following documents act as 'safeguards' of proper area development and planning: 'a decision on land development and planning', and 'a decision on the location of a public purpose investment project'. Such decisions are dedicated to single investment projects or complexes of facilities rather than to an area. Provisions given in the decisions indicate only the basic parameters that result from the general local development policy applicable in a location. The draft amendments to the Act on area development and planning includes a proposal of introducing urban planning regulations to facilitate administrative procedures for obtaining a building permit, determining general parameters that have to be met by an investment project in an area. Both tools, the present and proposed in the bill, supplement the process of area development and planning, but they do not provide the in-depth analysis that would formulate a design of the gmina area development in a long term including the whole net-

work of functional connections between its constituents. It is generally known that area development and planning is not limited to plans that concern specific real properties and the attribution of utility functions or architectural parameters to them. It also involves the management of a roadway, the development of its course and surrounding, including the suitable selection of the roadway functionality that should meet both transport needs and the visual and ecological requirements. However, the essential function of area development planning in the transport dimension is the management of future travels by different means of transport, including on foot and by bike, together with the determination of their routes. The survey conducted by the Department of Road and Transport Engineering at the University of Science and Technology in Bydgoszcz in 2009-2012 among respondents involved in road management and officers responsible for development and implementation of the area development and planning policy in gminas and towns of the Kujawsko-Pomorskie Voivodeship revealed numerous problems that have to be solved to make the further increase of road safety possible. Importantly, the detailed analysis of responses given in the survey showed the imperfections in the creation of the road network development plans in the process of area development and planning. The identified major problem is the general lack of sensitivity to and ignorance of phenomena generated by specific ways of area development and planning in road traffic or the how the method of area development and planning may affect a road safety level. Neither are special positions created in organizations that determine the development plans of gminas, poviats and voivodeships, also with regard to the transport network, which would enable to take account of the correlation of the road-street network plans, area development and planning, and road safety. On the other hand, personnel who are either directly or indirectly involved in area development and planning often do not have sufficient knowledge necessary to implement the solutions that are safest and optimum in terms of transport and economics. Furthermore, there are no catalogues of good practices or workshops that might improve the qualifications of officers in these fields. As a consequence, both personnel and their superiors find it difficult to make a change. Because of that, hardly ever are good examples of area development in terms of road safety in gminas and voivodeships used. Finally, the principle that the general shape of a transport network should emerge from analytical studies that take a multi-sided approach to the subject is violated.

## **2. General Outline of the Concept of Improving the Area Development and Planning Process**

To improve the process of area development and planning and, simultaneously, to reduce the negative impact of area development on road safety, it has been proposed in Gambit Kujawsko- Pomorskie program to raise the quality of solutions included mostly in the Studies of Land Use Conditions and Direc-

tions and Local Zoning Plans. The way to eliminate errors in developing road-street systems is to supplement the action plan of a typical area development and planning process with new elements. In this respect, five main groups of actions have been focused on (see Figure No. 1):

- 1) Raising the professional awareness and knowledge of persons involved in preparing planning documents related to area development through:
  - a) training for personnel responsible for area development and planning;
  - b) additional courses for road safety auditors in the field of area development and planning; and
  - c) holding annual seminars dedicated to the exchange of experiences in implementing new procedures in the process of area development and planning.
- 2) The introduction of new documents into the process of area development and planning:
  - a) Transport Study that is used to prepare the Study of Land Use Conditions and Directions,
  - b) Local Mobility and Transport Plan formulated with draft local zoning plans; and
  - c) Mobility and Transport Plan drawn up for the designed new facilities or investment projects when applying for a building permit and determining the development terms and conditions as well as the conditions of connecting a facility to a road network.
- 3) Introducing quality control tools to be applied to drafted planning documents by:
  - a) conducting road safety audits of Studies of Land Use Conditions and Directions and Local Zoning Plans; and
  - b) issuing quality certificates for individual planning documents; a certificate is to be issued to recognise the fact of including road safety dimensions in the document and obtaining the approval by road safety auditors.
- 4) Developing auxiliary materials in the area development and planning process, including:
  - a) individual guidelines for drawing up new documents:
    - Transport Studies,
    - Local Mobility and Transport Plans, and
    - Mobility and Transport Plans for newly designed facilities,
  - b) guidelines for conducting road safety audits for area development and planning studies;
  - c) a manual entitled 'Road Safety in Area Development and Planning'; and
  - d) training materials concerning road safety in area development and planning and a catalogue of good and bad practices.

5) The promotion of new procedures by:

a) developing promotional and information materials concerning the method of and benefits resulting from the application of the following new documents in the process of area development and planning:

- Transport Studies;
- Local Mobility and Transport Plans;
- Mobility and Transport Plans for investment projects and facilities; and
- road safety audits;

b) entering documents that obtained a quality certificate in the central database of area development and planning.

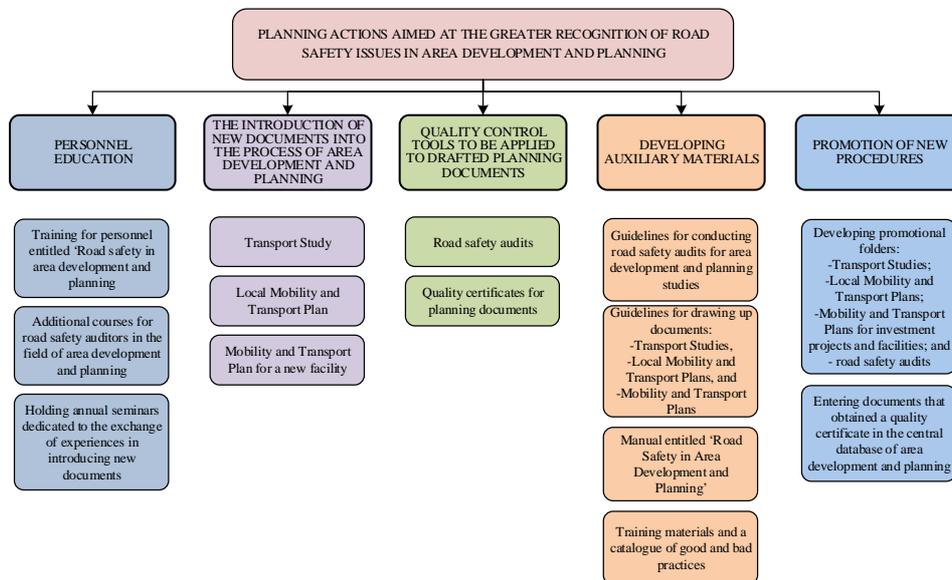


Fig. 1 Planning actions aimed at the greater recognition of road safety issues in area development and planning to be implemented in the Kujawsko-Pomorskie Voivodeship

Rys. 1. Planowane działania prowadzące do większego uwzględnienia problematyki bezpieczeństwa ruchu drogowego w planowaniu przestrzennym zaproponowane do wdrożenia w województwie kujawsko - pomorskim

### 3. Basic Instruments of Improving Road Safety

It is noteworthy that the process of preparing the area development and planning policy, mostly for gminas, includes four tools of supervision over proposed solutions that determine the effects of interaction between area development and planning and traffic. The basic instruments of formulating a relevant

road safety standard, and hence the comprehensive transport services in a gmina, should include:

- Transport Study prepared for a draft Study of Land Use Conditions and Directions;
- Local Mobility and Transport Plans – when preparing local zoning plans;
- Mobility and Transport Plans for investment projects and new facilities; and
- The road safety audit for Studies of Land Use Conditions and Directions and the Local Zoning Plans.

The prime aim of the Transport Study is to outline the foundations for formulating the sustainable policy of transport development and safe transport in the area. Another objective of the document is to determine the optimum actions involved in the development of individual transport subsystems and their infrastructure as well as to identify the methods of performing the main tasks of local government administration in maximising transport availability of specific areas, while minimising the costs of transport system operation. Moreover, the analyses included in the Transport Study should make it possible to gather information on conditions and methods of limiting the negative impact of transport on the environment and the conditions and method of the optimum development and planning of a specific area.

The Transport Study should be developed in the process of drawing up and updating the Study of Land Use Conditions and Directions for the area. The implementation of the Transport Study should also take place as a part of the regularly prepared Transport Plans, which are required under the Regulation of the Minister of Infrastructure of 25 May 2011 on the detailed scope of the Plan of Public Transport Sustainable Development. As Transport Plans concern the operation of public transport, they must constitute an element of the Transport Study. Their preparation within the Transport Study gives a distinct advantage in terms of accuracy and details compared to transport plans prepared without consideration for the Transport Study. The Transport Study gives a chance to develop Transport Plans based on a broad range of in-situ tests and in relation to other transport systems and with simulation models, because the Transport Study has to include such a scope.

The idea behind the implementation of Local Mobility and Transport Plans is to obtain the maximum transport accessibility of gmina areas for which Local Zoning Plans are prepared and to raise their general attractiveness while keeping financial outlays at minimum and protecting the natural environment. All such actions are accompanied by the special attention devoted to the safety of all road and street users. This is possible owing to the development of optimum solutions of transport services as well as the infrastructure, through the in-depth analysis of the area. The Local Mobility and Transport Plan is the direct executive tool for implementing the premises of the transport and development policy of a gmina. Its foundations are the interests of the gmina, which result from its economic and social successes. Moreover, the scope of the design concept and

analyses that are the final product of the Local Mobility and Transport Plan are supplemented by the needs of the Local Zoning Plan. Therefore, the selected option of developing transport systems will be accurate and adapted to every individual characteristic of the area development and planning.

The Mobility and Transport Plan is dedicated to individual investment projects and building facilities that need to be connected to a road network and whose location and the detailed service method cannot be determined either in the Study of Land Use Conditions and Directions or even in the Local Zoning Plan. Such factors are variables that depend only on a business decision of an investor. This problem is additionally aggravated by the fact that not all areas, especially in towns and cities, have their Local Zoning Plans, and decisions are issued according to 'decisions on area development and planning' and 'decisions on location of public purpose investment projects'. Moreover, the location at a spot that is not suitable or not prepared in terms of transport often has a major impact on the traffic, resulting in the lower road safety level and the excessive congestion on a specific area of the road network. In response to the need of endorsing or indicating the method of transport service of traffic-generating investment projects of varied characteristics (housing estates, shopping centres, business parks, hospitals), the introduction of the procedure for preparing the Mobility and Transport Plans for such investment projects is proposed. The procedure would be carried out during the initial phase of preparing a design of a building or another traffic-generating facility, which ends with a decision on a building permit, and would result from the provisions in the Local Zoning Plans and the conditions of developing and locating public purpose investment projects or the connection to the road network.

No process of selecting the best solutions will be effective or productive, unless the participation of adequately qualified personnel is provided. For this purpose, the promotional campaign is needed to raise the awareness of the fact that transport systems constitute a key element in the area development and planning practice, rather than just being one of many aspects that have limited influence on the life of local communities. The term of a 'promotional and awareness-raising campaign' means mostly a series of courses or workshops as well as post-graduate studies for officers who take decisions on the shape of planning solutions. On the other hand, the fulfilment of duties by such officers should be safeguarded by the developed codes of good practices and guidelines. Access to such materials should be practically unlimited, so that everyone who treats one's job as the mission of creating safer and better living areas could find best practices in such codes and guidelines.

## Literature

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## POPRAWA BEZPIECZENSTWA RUCHU DROGOWEGO POPRZEZ UDOSKONALENIE PROCESU PLANOWANIA PRZESTRZENNEGO

### Streszczenie

Sieć drogowa powinna gwarantować wszystkim jej użytkownikom bezpieczne i sprawne przemieszczanie się określonymi środkami transportu. Proces jej rozbudowy i funkcjonowania obejmuje nieodłączne etapy procesu realizacji sieci drogowej uszeregowane w czasie, tj.: planowanie, projektowanie, realizacja, eksploatacja. Błędy popełnione podczas jednego z etapów rozwoju sieci transportowej miasta, pomimo przykładowych rozwiązań w ramach pozostałych etapów, mogą znacznie obniżyć standard infrastruktury drogowej i przyległego terenu, w tym mogą prowadzić do pogorszenia się warunków i bezpieczeństwa ruchu drogowego. Jest to w szczególności istotne na etapie planowania, ponieważ błędy popełnione na tym etapie częstą są trudne do usunięcia lub wymagają dodatkowych nakładów finansowych w celu zniwelowania ich wpływu na pogorszenie poziomu bezpieczeństwa ruchu drogowego. Na podstawie wyników badań ankietowych przeprowadzonych na terenie województwa kujawsko – pomorskiego zdiagnozowano najważniejsze problemy wynikające z niewłaściwego planowania sieci drogowej na etapie planowania przestrzennego. Równocześnie zaproponowano sposób udoskonalenia procesu planowania przestrzennego z punktu widzenia bezpieczeństwa ruchu drogowego.

**Słowa kluczowe:** brd, plany przestrzenne, sieć drogowa, plan mobilności, plan transportowy, hierarchizacja sieci drogowej

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