MEDGIDIA
MUNICIPALITY

DOBRICH
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INTEGRATED

ELABORATION OF ROAD SAFETY MEASURES

WITHIN THE PROJECT

"IMPROVING THE CONNECTION TO THE TEN-T NETWOR IN THE CROSS-BORDER AREA MEDGIDIA – DOBRICH"
ROBG-439

2021

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"IMPROVING THE CONNECTION TO THE TEN-T NETWORK IN THE CROSS-BORDER AREA MEDGIDIA – DOBRICH" ROBG-439

Service contract 166/18.06.2021

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CONTENT

1. INTRODUCTION

1.1. The context of the study

This study is carried out within the project **"Improving the connection to the TEN-T network in the cross-border area Medgidia – Dobrich"** ROBG-439, financed by Interreg V-A RO-BG, carried out by Territorial administrative unit Medgidia Municipality, together with the partner Dobrich Municipality.

In the European context, the main objective of European transport policies is to create a transport system that supports economic progress, strengthens competitiveness and provides high-quality mobility services, while ensuring a more efficient use of resources and a greater lower impact on the environment, as set out in the *"A resource-efficient Europe"* initiative presented in the Europe 2020 Strategy.

"Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system"[1], developed by the European Commission, is the key document of the European Union in which mobility is addressed. According to it: *"Infrastructure shapes mobility. No major change in transport will be possible without the support of an adequate network and more intelligence in using it. Overall, transport infrastructure investments have a positive impact on economic growth, create wealth and jobs, and enhance trade, geographical accessibility and the mobility of people. It has to be planned in a way that maximises positive impact on economic growth and minimises negative impact on the environment".*

As an integral part of the European Union and as a full member of the European Commission, Romania must comply with the "Transport Policies" as well as the "Regional Policies and Instruments for the Structural Funds". Interventions in transport systems are planned in such a way as to maximize economic development and minimize the impact on the environment.

Given the process of urban development, mobility has become one of the main challenges for local governments. Transport currently covers about 20% of global energy demand,

[1] White Paper Roadmap to a Single European Transport Area, The European Commission, 2011

accounting for about 25% of CO_2 emissions from energy consumption. The negative effects associated with high traffic volumes, such as pollution, traffic safety problems and noise, are the main dysfunctions that require rapid interventions in order to improve the mobility of citizens.

1.2. Description of the Project "Improving the connection to the TEN-T network in the cross-border area Medgidia – Dobrich" ROBG-439

The general objective of the project *"Improving the connection to the TEN-T network in the cross-border area Medgidia – Dobrich"* it is **the improvement of the transport system in the cross-border area, through a better connectivity to the TEN-T network.**

The Program **2014 - 2020 INTERREG V-A Romania – Bulgaria,** through which the project is financed, is characterized by the following main coordinates: 171 projects, 71 documents, 321 partners, 450 partnerships.

The objectives, priorities and indicators of the program are:

Specific objective 1: Improve the planning, development and coordination of cross-border transport systems for better connections to TEN-T transport networks:

- Thematic objective and investment priority: (07) promoting sustainable transport and removing bottlenecks in key network infrastructures by: (07b) enhancing regional mobility by connecting secondary and tertiary nodes to TEN-T infrastructure, including multimodal nodes
- Result indicator (measurement unit): Cross-border population served by modernized infrastructure leading to TEN-T (Number)
- Output indicator (measurement unit): O1: Number of joint mechanisms (e.g. route guidance, incidents/emergencies detection and management, studies on traffic flows, feasibility studies addressing cross-border transport issues, traffic safety measures, black-spot maps, awareness raising activities (Number of mechanisms facilitating connection)
- Common output indicator (measurement unit): CO1: Total length of reconstructed or upgraded roads (Km)

Specific objective 2: Increase transport safety on waterways and maritime transport routes

- Thematic objective and investment priority: (07) promoting sustainable transport and removing bottlenecks in key network infrastructures by: (07c) developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility

- Result indicator (measurement unit): % of the RO-BG CBC Danube length and Black Sea where safety of the navigation have been improved (percent)
- Output indicator (measurement unit): O1: Number of studies, strategies and action plans to improve safety of the navigation on the Danube and the Black Sea supported (Number of strategies, action plans)
- Common output indicator (measurement unit): CO1: Total length of new or improved inland waterway (Km)

Specific objective 3: To encourage the integration of the cross-border area in terms of employment and labour mobility

- Thematic objective and investment priority: (08) promoting sustainable and quality employment and supporting labour mobility by: (08 ETC) ETC specific, for cross-border cooperation: promoting sustainable and quality employment and supporting labour mobility by integrating cross-border labour markets, including cross-border mobility, joint local employment initiatives, information and advisory services and joint training
- Result indicator (measurement unit): Population that have access to joint employment initiatives (Number)
- Output indicator (measurement unit): O1: No. of initiatives (trainings, education schemes, websites, agreements, networks, job-fairs etc.) that activate workforce mobility in the cross border area (Number)
- Common output indicator (measurement unit): CO1: Number of participants in joint local employment initiatives and joint training (Persons)
- CO2: Number of participants in joint education and training schemes to support youth employment, educational opportunities and higher and vocational education across borders (Persons)

Specific objective 4: To enhance the sustainable management of the ecosystems from the cross-border area

- Thematic objective and investment priority: (06) preserving and protecting the environment and promoting resource efficiency by: (06d) Protecting and restoring biodiversity and soil and promoting ecosystem services, including through Natura 2000, and green infrastructure
- Result indicator (measurement unit): NATURA 2000 sites from the cross-border area with coordinated management tools (Number)
- Common output indicator (measurement unit): CO1: Surface area of habitats supported in order to attain a better conservation status (Hectares)

Specific objective 5: To improve joint risk management in the cross-border area:

- Thematic objective and investment priority: (05) promoting climate change adaptation, risk prevention and management by: (05b) promoting investment to address specific risks, ensuring disaster resilience and developing disaster management systems

- Result indicator (measurement unit): The quality of the joint risk management in the CBC area (the satisfaction degree of the stakeholders in the area)
- Output indicator (measurement unit): O1: Population benefiting from actions of risk management (Number); O2: Number of joint partnerships in the field of joint early warning and emergency response (Number)
- Common output indicator (measurement unit): CO1: Population benefiting from flood protection measures (Persons); CO2: Population benefiting from forest fire protection measures (Persons)

Specific objective 6: To improve the sustainable use of natural heritage and resources and cultural heritage

- Thematic objective and investment priority: (06) preserving and protecting the environment and promoting resource efficiency by: (06c) Conserving, protecting, promoting and developing natural and cultural heritage
- Result indicator (measurement unit): Number of tourist overnights in the CBC region (Number of Overnights)
- Output indicator (measurement unit): O1: Number of integrated tourism products/services created (Number); O2: Number of common strategies, policies or management plans for valorising (including raising awareness) the cultural and natural heritage through its restoration and promotion for sustainable economic uses (Number of common strategies/management plans approved)
- Common output indicator (measurement unit): CO1: Increase in expected number of visits to supported sites of cultural and natural heritage and attractions (Visits/year)

Specific objective 7: To increase cooperation capacity and the efficiency of public institutions in a CBC context

- Thematic objective and investment priority: (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration through actions to strengthen the institutional capacity and the efficiency of public administrations and public services related to the implementation of the ERDF, and in support of actions under the ESF to strengthen the institutional capacity and the efficiency of public administration.
- (11 ETC) ETC specific, for cross-border cooperation: enhancing institutional capacity of public authorities and stakeholders and efficient public administration by promoting legal and administrative cooperation and cooperation between citizens and institutions
- Result indicator (measurement unit): Level of co-ordination of the public institutions in the eligible area (Intensity of cooperation between crossborder stakeholders)
- Output indicator (measurement unit): O1: Number of supported cross border mechanisms (agreements, networks, regulations, studies, policies, strategies, information exchange tools) to enhance cooperation capacity (Number)

The partners involved in project implementation *"Improving the connection to the TEN-T network in the cross-border area Medgidia – Dobrich"* are the Municipality of Medgidia and the Municipality of Dobrich, located on both sides of the Danube (figure 1.1).

Figure 1.1. *Partner cities and their location on both sides of the Danube.*

Both communities face the following common challenges:

- → *the economic gap with other European regions;*
- → *poor connectivity between the administrative units and the other communities in Romania, respectively Bulgaria in terms of infrastructure; this affects the common actions and businesses that citizens and businesses in both countries have developed in recent years;*
- → *the very high incidence of traffic accidents (including those resulting in deaths), with Romania and Bulgaria ranking last in the EU in terms of road safety;*

→ *low traffic speed on the road infrastructure, which generates long travel times, with delays in traffic.*

Thus, the aim of the project is to bring together the communities and businesses of Medgidia and Dobrich by improving the cross-border transport system, using a better connection to the TEN-T network.

1.3. The purpose of the prepared documentation

The specific goal of the project is to improve the conditions for traffic in the population of the two cities, as well as for other road users - in transit.

The project aims to limit the city's traffic from heavy vehicles in the Municipality city of Dobrich, as well as passenger traffic, thus reducing travel time and increasing traffic safety, while properly connecting the city with TEN-T and the municipality of Medgidia.

The Municipality city of Dobrich aims to modernize the leading exits of the city, ensuring a reduction in travel time and increasing traffic safety, as well as improving connections with the TEN-T network in both directions.

Roadside study carried out within the project "Improving the connection with the TENT network in the cross-border region Medgidia-Dobrich" ROBG-439 is the main goal to analyze the current state of the transport system and transport infrastructure in Medgidia, taking into account adjacent areas influence, including cross-border ones, in order to identify dysfunctions and formulate proposals to eliminate or reduce their negative externalities.

The preparation of a signpost will include all sites and places of interest in the Dobrich region. The routes to the border between Bulgaria and Romania will be indicated.

The development of an up-to-date and applicable roadmap is a necessity for the region of both partners: both cities are an important transit point for both goods and tourists. Proper route guidance will save time, avoid traffic jams and generate less pollution.

The study on traffic direction will take into account all sites and places of interest in the territorial zone of Municipality city of Dobrich. The routes to the border between Bulgaria and Romania will be indicated.

This study is part of a common mechanism developed for both sides of the Romanian-Bulgarian border. The contractor will develop the analyzes, routes, proposals related to the Bulgarian side, while for the Romanian side, the contract will be concluded by the partner from the municipality of Medgidia. The two contractors will work together and agree with the project implementation team on the framework content / chapters and aspects to be

addressed in the study, so that the 2 Romanian and Bulgarian studies can be integrated into a coherent and useful one. countries study.

The main objectives of the study are:

1. Accessibility - Identify optimal transport solutions for locals and those in transit and analyze transport options that allow access to key destinations and services: private road transport, public or private public transport, bicycle / scooter / transport, electric scooters, pedestrians; analyzes the possibility of establishing new domestic and international transport routes on the route Dobrich - Medgidia - other interesting locations in the 2 countries.

2. Safety and security - Defines measures to improve the safety and security of people and businesses;

3. Environment - Reduction of chemical air pollution, noise pollution, greenhouse gas emissions and energy consumption;

4. Economic efficiency - Improving the efficiency and profitability of transport of people and goods;

5. Quality of the urban environment - Improving the quality of the environment and urban design for the benefit of citizens, the economy and society.

Starting from the existing reality, urban architecture, urban transport network, the location of interesting sites for citizens (public administrative, educational, hospital, cultural, tourist, entertainment institutions, economic structures with a large number of employees, etc.), the developer of the study will identifies possible transport routes and will offer the optimal mode of transport so as to ensure traffic flow to avoid congestion.

These plans prioritize the following: analysis of the possibility of reducing the excessive use of private cars in the city in favor of alternative transport; creation / development and modernization of public transport and local modes of transport (walking, cycling, electric vehicles, urban and extra-urban public transport); organization of the transport of goods and people; improving the quality of the environment and life - by increasing transport efficiency.

The report sets out the implementation of the following activities:

a) information on the current state of transport infrastructure in a cross-border context. The current routes used by the various participants and the means of transport used by carriers, residents of Municipality city of Dobrich, tourists, people in transit, etc. will be taken into account .

b) identification of optimal transport solutions for locals and transiters and analysis of transport options that allow access to key destinations and services: private car transport, public or private transport, bicycle transport / scooters /, electric scooters, walking

c) information on the possibility of establishing new domestic and international transport routes on the route Dobrich - Medgidia - other interesting places in both countries;

d) information on the possibility of removing congestion, reducing transport costs through the use of multimodal transport;

e) creating a list of interesting sites in Dobrich district, sites that should be part of the proposed routes;

f) participation in working meetings between the internal team of the contracting authority, the Municipality of Medgidia and the Romanian supplier;

d) the proposal for the routes for the Bulgarian part, including the routes to the Bulgarian-Romanian border, and for the implementation methodology (necessary resources, permits, permits, etc.)

h) integration with the study prepared by the Romanian side in order to prepare the common mechanism.

The development of routes will take into account the optimization of travel time, avoid congestion, reduce pollution. The results will be provided in written and electronic format, in Bulgarian and English.

The information provided in the guide should address and guide all existing modes of transport throughout the urban agglomeration, including public and private transport, passenger and freight transport, motorized and non-motorized, travel and car parks, and make suggestions for improving local transport (new routes, creation of public transport, priority streets or facilities for non-motorized transport, electricity, parking lots, etc.) with an impact on the cross-border zone Dobrich - Medgidia.

The proposals focus on the following:

- *public transport;*
- *non-motorized transport;*
- *electric transport;*
- *intermodality;*
- *urban road safety;*
- *road transport (moving and stationary).*

Special emphasis is placed on identifying ways to increase connectivity with the TENT network by improving the transport system in the cross-border area, a system that supports the further enhancement of Bulgarian-Romanian socio-economic relations, both with regard to citizens and with regard to economic operators.

The proposed solutions are in line with the current criteria for sustainable mobility at European level, aimed at promoting the use of clean vehicles, public transport, non-motorized alternatives, etc., in order to reduce the negative impact on the environment and the consumption of non-renewable resources, as well as increasing the level of safety on the road for all road users, especially the vulnerable.

1.3.1. Correlation with the general objective of the project ROBG-439

Medgidia:

The specific objective of the project "Improving the connection to the TEN-T network in the cross-border area Medgidia - Dobrich" ROBG-439 is to ensure better traffic conditions for the population of the two cities, as well as for the other traffic participants in transit.

The project aims to delimit in the Municipality of Medgidia the traffic composed of heavy goods vehicles from passenger traffic, thus ensuring the reduction of travel times and increased traffic safety, while properly linking the city to TEN-T and the Port of Medgidia.

The Bulgarian partner aims to modernize the main road in Dobrich, ensuring a reduction in travel times and increased traffic safety, as well as improving connections with the TEN-T network in both directions.

The route guidance study carried out within the project "Improving the connection to the TEN-T network in the cross-border area Medgidia - Dobrich" ROBG-439 has as main objective the analysis of the existing situation of the transport system and transport infrastructure in Medgidia, taking into account adjacent areas of influence, including cross-border areas, in order to identify dysfunctions and formulate proposals to eliminate or reduce their negative externalities.

Particular emphasis is placed on identifying ways to increase connectivity to the TEN-T network by improving the transport system in the cross-border area, a system that will further support the increase of Romanian-Bulgarian socio-economic relations, both in terms of citizens and economic operators.

The proposed solutions are in line with current criteria for sustainable mobility at European level, aimed at encouraging the use of clean means of transport, public transport, non-motorized alternative means, etc., in order to reduce the negative impact on the environment and the consumption of non-renewable resources, such as and increasing the level of road safety for all road users, especially the vulnerable.

Dobrich:

The project contributes to outputs I1 - Total length of reconstructed or upgraded roads with approximately 13.7 km of upgraded roads and to I2 - Number of joint mechanisms to facilitate the connection of secondary / tertiary nodes to TEN-T infrastructure. In addition, in the road modernization project, the infrastructure investment is supported by a series of soft actions, defined as 3 joint mechanisms. Given the geographical positions of the two cities, a cross-border approach is the best solution. Dobrich is the center of Dobrich district, while Medgidia is a multimodal junction passing along the Danube-Black Sea

canal. Therefore, given their strategic importance, the two cities are required to join a coherent and modernized cross-border road infrastructure network.

This procedure provides a service for the development of one of the joint mechanisms - Mapping and development of a signpost on the route from Dobrich in the direction of the town of Medgidia to the border with the Republic of Romania.

The implementation of the activity is necessary for the project, as it will create a joint mechanism "guide", thus achieving one of the results of the project and the program - Number of joint mechanisms to facilitate the connection of secondary / tertiary nodes to TEN-T infrastructure .

The activity was formed as a natural consequence of the need for guidelines that will be used by tourists and people passing through the cities and last but not least by the local population and those working in the areas on both sides of the border. Statistics show that the summer passes through both areas a large tourist flow - mainly road.

In addition to the need to rehabilitate the road network in both cities and connect to the TEN-T network, it is necessary to create a coherent roadmap for traffic. Ignorance of the routes by tourists or passers-by leads to longer travel times, congestion, increased pollution and loss of money. Both cities are important transit points for both freight and tourists. Proper route guidance will save time, avoid congestion and generate less pollution.

The guide will contain all the interesting places from both cities, highlighting the routes to the border with Romania / Bulgaria. It will contain written and drawn parts about the type of directional signs that are available and details of where they are located.

It will contain information on current and potential future traffic. It will present concrete measures for streamlining road traffic in both regions (directing traffic flow, reducing transport time, reducing pollution by choosing optimal routes and modes of transport to move between 2 or more points).

Route guidance requires not only a good knowledge of the legislation, especially with regard to the regulations, but also a good knowledge of the city and the district (Dobrich). approach.

1.3.2. Correlation with the expected results of project implementation RO-BG 439

Medgidia:

Expected results of project "Improving the connection to the TEN-T network in the cross-border area Medgidia - Dobrich" ROBG-439 implementation are the following:

- *modernized roads that ensure TEN-T connectivity: 13.73 km;*
- *population that will benefit from a coherent transport system: 136,000 inhabitants;*
- *common mechanisms to ensure a smooth and safe transport system: route guidance and traffic safety measures.*

The study is correlated with the expected results of the implementation of the RO-BG 439 project, both at the level of the existing situation, the transport model and the related simulations at the level of the base year and the forecast year, as well as the proposals.

In the transport model was taken into account the modernization of 13.73 km of roads, through the parameters: capacity of the network elements, free movement speed, condition of the running surface, existence of arranged parking lots and their typology, signaling and traffic direction. Also, within the territorial zoning, the distribution of population and density by areas was taken into account, given that this indicator is crucial for attracting and generating travel in the area considered, with a decisive influence on traffic and road circulation.

The study itself is also one of the common mechanisms of the project, along with the one on road safety measures.

Dobrich:

This activity is part of a common mechanism developed for both sides of the Romanian-Bulgarian border. The developed report examines various measures for specialized mapping for the territory of Dobrich district and a guide, which follow the integrated approach related to the Bulgarian side, while for the Romanian side, a separate report is being developed by the partner Medgidia Municipality.

The expected results from the implementation of the project "Improvement of the connection with the TEN-T network in the cross-border area Medgidia-Dobrich" ROBG-439 are the following:

- modernized roads providing TEN-T connectivity: 13.73 km;

- population that will benefit from a coherent transport system: 136,000 inhabitants;

- common mechanisms for ensuring a smooth transport system: and safety: road management: and road safety measures.

The study is related to the expected results of the ROBG-439 project, both at the level of the existing situation, the transport model and the related simulations at the level of base and forecast year, and at the level of proposals.

The transport model takes into account the modernization of 13.73 km of roads through the parameters: capacity of network elements, free speed, condition of the running surface, the presence of arranged parking lots and their typology, signaling and routing, regime circulation.

Territorial zoning also takes into account the distribution of population and its density by region, given that this indicator is crucial for attracting and generating travel at the level of the area in question, with a decisive impact on traffic and road traffic.

1.4. Establishing the study area

1.4.1-A. The main area – Territorial Administrative Unit Medgidia Municipality

The main area covered by the study is the administrative territory of Medgidia Municipality, located in the South-East of Romania, in the middle area of the Dobrogea Plateau.

Its geographical location places it at the following distances from the main transport poles: 200 km from the capital Bucharest, 39 km from Constanta, 144 km from Tulcea and 39 km from Vama-Veche, on the border with Bulgaria.

The area has connections with all modes of transport, as follows: road (through the national, county road network, etc.), naval (being crossed by the Danube - Black Sea navigable canal), railway (it is a station on the railway lines Bucharest - Constanta, Bucharest-Tulcea, Constanța - Negru Vodă), by air (at a distance of only 35 km by road, there is Mihail Kogălniceanu Airport).

The territorial Administrative Unit Medgidia Municipality is composed of localities: Medgidia (which represents the actual urban settlement, the third largest and most important in Dobrogea), Remus Opreanu and Valea Dacilor, periurban villages located on the first ring of development of the city.

The population in 2021 is 44,156 inhabitants, according to the latest data published by the National Institute of Statistics.

1.4.1-B. The main area – Municipality city of Dobrich and Dobrich District

Over the millennia, Dobrich, located in the very center of South Dobrudja, is a crossroads where different tribes, ethnic groups, peoples, cultures and civilizations meet and interact.

This predetermines the ethnographic and ethno-religious specifics of the city and the region as a whole, their turbulent historical destiny in modern times and their cultural and historical significance in the history of the Old Continent.

Within the project, a traffic census was conducted at four main intersections in the town of Dobrich. They were selected so that we could simultaneously obtain information about the traffic on the main boulevards and the intensity of the incoming and outgoing traffic flows. The intersections are:

- 25th of September Blvd. - Russia Blvd.
- Dobrudzha Blvd. - N. Petkov St.

- 25th of September Blvd. - Batovska St.
- Dobrudzha Blvd. - Dobrich Epic Blvd.

For the purposes of the census, cameras were used, which are mounted on a suitable pole at a height of about 5 m, so as to record the movement through the intersection of all streams.

1.4.2. Highlighting the connections of the main area with the routes to the Romania - Bulgaria border

Medgidia:

The main area covered by the study is the Municipality of Medgidia, located near the A2 Bucharest - Constanţa Highway, part of the TEN-T network.

The main dysfunction is the negative effects generated by the fact that the traffic flows constituted by the heavy vehicles do not use the road bypass, due to its inadequate technical condition. These vehicles follow routes through the interior of the city, damaging the streets and contributing to traffic congestion.

The presence of heavy vehicles in internal traffic flows leads to a reduction in road safety in the city, as well as its pollution by emissionsand noise. It also contributes to greenhouse gas emissions into the atmosphere.

According to the Applicant's Guide of the mentioned program, Medgidia represents a multimodal tertiary node, but the extent to which the road and naval modes are interconnected is a small one, due to the deficiency of the road network in particular.

Some sectors of the modernized roads by the project ensure the direct connection of the urban area with the Medgidia Port, being of major importance in ensuring multimodality. Others are essential because they ensure the interconnection with the exit to A2 Highway, part of the TEN-T network.

Given the geographical positioning, the mentioned links and the attributes related to multimodality, the Municipality of Medgidia is a node of major importance for the cross-border network, especially for the road mode.

The modernized network through the project increases the connectivity of Medgidia Municipality to the TEN-T network, but also with the border area to Bulgaria.

The figure below highlights the connections of the study area with the TEN-T road network, as well as the fastest connection with the Romania-Bulgaria border, and then to the partner city Dobrich.

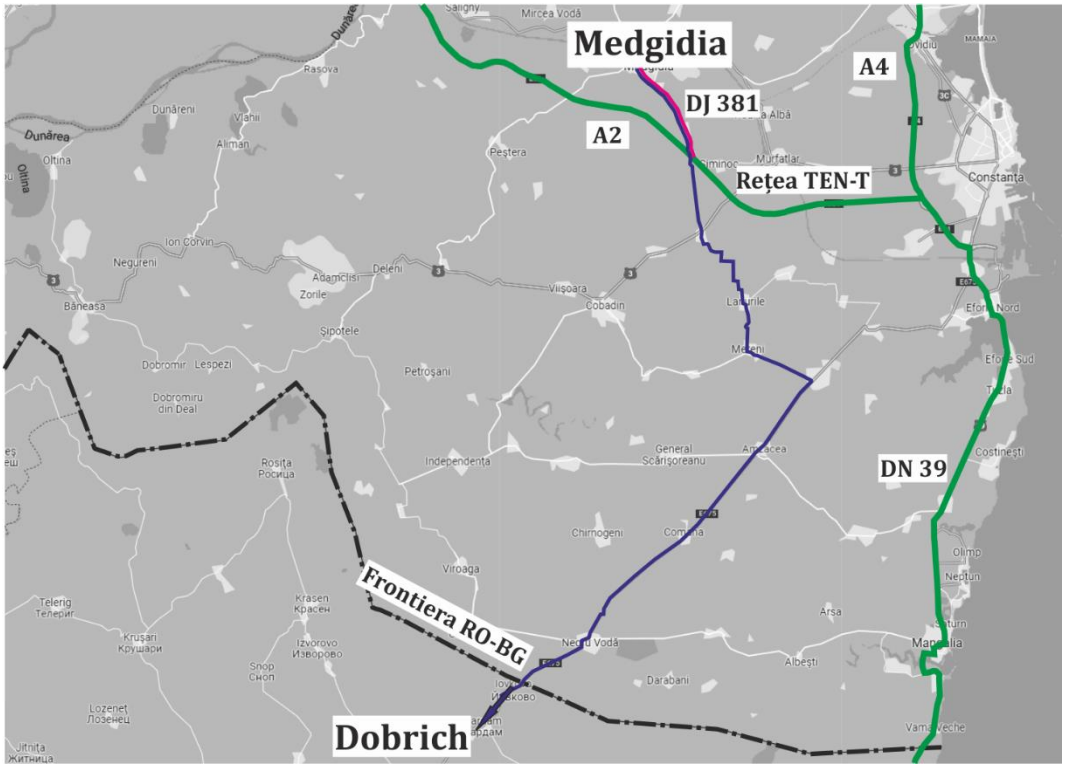


Figure 1.2, a. *The connections with TEN-T and RO-BG border.*

Dobrich:

The Municipality of Dobrich falls within the Bulgaria-Romania Cross-Border Zone, which is one of the least developed territories in the EU. In general, the low level of economic development hinders the business environment and encourages migration, which in turn hinders the region from realizing its potential.

According to the National Concept for Spatial Development (NCPD), in the Northeast region, city centers of the following hierarchical levels have been identified.

In terms of the hierarchical level of the cities, the city of Dobrich belongs to the cities of the third hierarchical level - together with Shumen and the city of Targovishte.

These cities successfully carry out the mission to balance the influence of very large cities and prevent the effect of monocentric development in the region, and although there is a large difference in population between them, the smallest city has the most favorable value of growth rate. Dobrich provides access to environments and services in the northern and central territories, and Shumen and Targovishte - in the southern parts of the region and in this capacity are particularly important.

Due to its geographical location, the city of Dobrich stays away from the main transport corridors "North-South" and "East-West". The most important road near the city is the coastal road I-9 from Romania - Durankulak - Shabla - Kavarna - Balchik - Varna, with European categorization E-87, which is part of the Trans-European Transport Network TEN-

T. The international railway Constanta - Varna, which is a connection between Russia, Ukraine and Moldova with the Republic of Turkey, passes through Dobrich.

The city of Dobrich stays away from the main axes of urbanization and is connected with the axis of development "north - south" with less pronounced force of influence on the main axis 1 Sofia - Veliko Tarnovo, Shumen - Varna.

Main conclusions of the analysis in terms of location and geographical features:

- The territory of the city of Dobrich is limited by the construction and regulatory boundaries of the settlement. This restriction does not allow the expansion of the territory outside the settlement, but implies a different approach in spatial and spatial planning;
- The town of Dobrich is close to the Black Sea, the Bulgarian-Romanian border, important port cities (including Constanta), which is a favorable factor for the development of the local economy;
- Due to its geographical location, the city of Dobrich stays away from important transport corridors that are part of TEN-T;
- The Municipality of Dobrich is one of the least developed cross-border areas in the EU - the Bulgaria-Romania Cross-Border Zone. In general, the low level of economic development hinders the business environment and encourages migration, which in turn hinders the region from realizing its potential.

The municipality has relatively good internal and external transport links, which provide access to sea and river ports, Ro-Ro terminals and Varna Civil Airport, as well as favorable transport links with Romania.

The town of Dobrich is served mainly by road.

The road infrastructure in the city is highly developed, creates good conditions for road transport and has the capacity to absorb road traffic. The poor condition of the road surface worsens the quality of transport services.

Due to the flat nature of the terrain, there is a clearly defined radial transport structure with a ring road for conducting and redistributing transit traffic (II-97) and second-class roads joining it, as follows:

§ II-29 - in this connection the traffic between Dobrich and Varna is carried out, which as a center with the greatest potential in the region naturally attracts and emits a significant amount of travel. The road is important as it is also a link to access the Hemus Motorway.

The readiness of the road II-29 in the section Dobrich - Varna requires the adoption of measures for its expansion. Proposals for the design and construction of two more lanes were discussed, which could facilitate regional connections between the two regional centers, improve mobility in the region, ease road traffic and ensure a higher level of traffic

safety. The problem of finding the optimal technical solution and appropriate funding has been facing the regional and municipal leaderships for more than 10 years.

This second class road (in the direction of Varna-Aksakovo-ring road Dobrich-General Toshevo - Romanian border) provides possible transport connection of the Port of Varna with the Dobrudja region and with the Republic of Romania through the Yovkovo border checkpoint and complements the service of the Port of Balchik (Maritime Spatial Planning). plan of the Republic of Bulgaria 2021-2035).

The Municipality of Dobrich sees potential for solving this problem by engaging more stakeholders in the implementation of a joint project of regional importance. This would accelerate the processes of economic and social cohesion at the regional level, and will have a positive impact on business development and job creation.

§ II-71 - main connection to Albena Resort. The road section is extremely busy, especially in the summer season. The access to Albena Resort on this road is connected with passing through a number of settlements, descending to the lower parts of the village of Batovo, followed by sharp turns. This increases the travel time, makes it difficult for the workers in the resort to access during the winter season due to icy road sections and snowstorms and the impossibility to maintain the road by the service units in winter conditions.

An option for building a northern tangent was discussed, which will significantly shorten the distance between Dobrich and Albena, avoid passing through settlements and facilitate transport access. The importance of this road is extremely important for the development of tourism, for ensuring mobility to tourist destinations and solving problems require an integrated approach.

§ II-27 - direct connection to Balchik, which provides relatively easy and fast access to its port. This road provides a direct connection of the port of Balchik with the interior of Dobrudja, as this port specializes in the processing and export of cereals.

This second-class road has a key role in the intra-regional connectivity of the two municipal centers - Dobrich and Balchik. It is characterized by intensive and heavy traffic of tourists from Romania, especially in the summer season. The region has a highly developed agriculture, and this creates additional problems with the traffic of specialized agricultural machinery at peak hours. This hinders the movement of people from neighboring small towns traveling in these directions.

The third-class road network on the territory of the Municipality of Dobrich serves local traffic and has only local significance.

In most of the roads the road surfaces are in unsatisfactory condition, as it is especially for II-97 (northern and southeastern bypass of the city), II-27 west of the ring road (II-97), II-71 (direction Branishte), III-293, III-9701 and III-7105.

Street network

The street network of the city of Dobrich is developed according to the typical terrain and the presence of a railway line, as the scheme of the city is radial-circular with elements of free or rectangular in some areas. The streets of the main street network are very well structured in functional terms and built according to the technical parameters for the individual street classes.

An inner-city ring of high-class arteries has been built around the central part of the city, to which arteries are directed radially, taking inbound and outbound traffic and making connections with the roads of the national road network. This creates an opportunity for a clear functional classification of the main street network with a descending gradation from the outer ring road to the inner city.

The main street network is classified as follows:

Class II city highways (with interrupted traffic)

- Bul. "March 3" from the ring road to Dobrichka Epopeya Blvd. The boulevard has two lanes with a width of 7.50 meters (in some sections up to 7.30 meters) with a middle dividing strip;

- Dobrudzha Blvd. (from the ring road to Dobrichka Epopeya Blvd. and from the entrance from Balchik to Russia Blvd.) there are two lanes with variable width - from 7.50 meters to 10.50 meters with middle dividing strip);

- 25th of September Blvd. from the entrance from the city of Varna to the crossroads with Batovska Street and from the entrance from the village of Durankulak to the crossroads with Gen. Stefan Popov "- has two lanes with a width of 7.50 m and a middle dividing strip.

Regional arteries III-A class:

- The streets of the inner ring - the boulevards "Dobrudja", "March 3", "September 25" and "Russia" Blvd. - all with two lanes with a width of 7.50 m. and middle dividing strips.

District arteries III B class:

- Str. Batovska, Gen. Stefan Popov Str.

Main streets IV class:

- Str. "Father Paisii" in the section from "Dobrudzha" Blvd. to "25 September" Blvd. (this includes a small part of "Gen. Gurko" St.), one lane with 8.50 to 10.50 meters wide;

- Str. "San Stefano" - one lane with a width of 10.50 meters;

- Str. Vasil Levski from San Stefano Street to Tsar Petar Street, one lane 8.50 m wide.

- Str. "King Peter" - a canvas 8.00 meters wide.

- Str. Gotse Delchev from Batak Street to Russia Blvd .;

- Str. Batak from Otets Paisiy Street to Gotse Delchev Street;

- Streets "Nikola Petkov", "General Georgi Popov", "Hr. Botev ",“ Volunteer Dimitar Kovachev ",“ L. Popov ",“ Angel Stoyanov ",“ Pop Bogomil ",“ Voyvoda Dimitar Kalachliyata ",“ Voynishka ",“ Khan Tervel ",“ Gotse Delchev ".

The secondary street network includes class V collection streets and class VI service streets.

The total length of the street network in the Central City Hall is 36,100 km, and of the main street network - about 14,600 km. The main streets have the required density according to Ordinance № 2, which should be 3-4 km / km2, or with an average distance between them from 650 to 500 m. total length of the main streets 14.6 km., the density is 6.4 km / km2, which is significantly above the regulatory requirements and is a very good indicator of the level of accessibility by car.

Repairs and reconstructions have been made, but all city arteries and main streets were built more than 25-30 years ago and their service life has long expired. The main entrance-exit streets and boulevards (city highways II class) are a natural continuation of the national roads from the ring road to the city center. They are large enough to conduct traffic and bring traffic to the central part of the city. This creates problems with accessibility, increased traffic and the resulting problems (air pollution, risk of increased accidents, reduced mobility, etc.).

Through the transport and communication system built on the territory of the city of Dobrich, only the so-called interrupted transit. The continuous transit takes place entirely on the outer ring of ring roads.

Pedestrian and bicycle traffic

Pedestrian traffic is carried out on the available street network - on the sidewalks (and more often on the roads), on pedestrian alleys in parks, places for recreation and entertainment, in separate pedestrian areas, organized specifically or by banning car traffic.

Dobrich has one of the largest pedestrian areas in the city center, which has been restored in the past few years and is currently actively used for recreation. However, pedestrian traffic in the neighborhoods is not well organized. In some places it is difficult or blocked due to the location of restaurants, shops, parked cars, reduced size of sidewalks and poor condition of pavements, improper location of bus stops, poor lighting and security of the areas.

The development of the bicycle routes on the territory of the municipality is symbolic. In most cases, they have been neglected in the development of transport infrastructure, at the expense of priority growing automotive infrastructure. There is a lack of an adequate bike lane network to meet the need for this type of mobility in urban environments.

The Municipality of Dobrich has a "Scheme for the organization of bicycle traffic in urban and suburban areas of Dobrich", which has been updated and adopted by the Municipal Expert Council on Spatial Planning (OSESUT). From the analysis of the updated scheme for the organization of bicycle traffic it can be concluded that the proposed routes follow the radial-circular orientation of the street network. They are classified conditionally by purpose and degree of importance. The main bicycle routes have a radial orientation and provide access from the center to the outskirts of the city. In the areas with public functions, the social zone and the business zone, a network of routes is provided, which leads to the main bike lane network. The routes in the designated areas are classified according to their purpose - for work and school, business, recreation and tourism, sports and training. Long-distance cycling routes are also provided. The places of special bicycle centers and zones, bicycle crossroads and bicycle underpasses are marked. They should be considered as a proposal for the development of a main cycle lane. The realized bicycle lane in the separate zone in the central part of the city is extremely insufficient for serving the citizens and for realizing their access to public and administrative services. On the other hand, the construction of bike lanes in areas with a predominant social character, where there are the most problems with transport services, would maximize the effect due to the fact that most of the active population of the city will be served. Given the specific features of the city, it is necessary in the future to thicken and compact the proposed bike lane.

It is necessary to envisage and develop the relevant technical projects for the construction of specific bicycle routes. Their construction would significantly contribute to improving urban mobility, alleviating traffic problems and congestion on the street network, reducing the carbon footprint of transport, improving air parameters and more.

Parking

Parking is done primarily on the streets. There is indiscriminate parking in the active lanes, which further reduces the throughput of the primary street network. Specially built parking lots are available only in the central part of the city, but they are extremely insufficient and do not meet the needs for parking. In the neighborhoods with social functions there is a tendency in the improvement of the inter-block spaces to create new parking lots or garages according to the current PUP.

Parking in the Central City Hall is in great demand. Due to the radial-circular structure and the public nature of the services offered, it attracts large amounts of traffic.

The organization and control of parking are currently insufficiently effective and it is necessary to conduct a new study, after analysis of the PUP, based on which to take measures if necessary to solve problems related to parking: construction of buffer parking zones; improved access to the CGC; digitalized traffic control systems; introduction of a new organization of traffic and zoning of parking places (separation of "blue zone", "green zone", "yellow zone", etc.).

Traffic organization and traffic accidents

According to data from the General Plan, in the city of Dobrich there are 20 intersections with traffic lights and pedestrian paths. The traffic lights work with a solid cycle of signal management, ie. there is no adaptive regulation of the movement according to the uneven daily, weekly and monthly load.

There is no centralized traffic management and / or control system. There is no video surveillance or any transport detectors, both in terms of control and traffic management.

The current organization of the movement is not efficient enough and it is necessary to update it in order to improve mobility in urban conditions in a sustainable way. No intelligent transport systems have been introduced or implemented.

Urban transport and transport schemes. Road safety policies

Transport is key to the development of any modern society, as a means of economic development and a condition for achieving the goals of social and regional cohesion. With the development of cities and urban infrastructure, the needs for transport are increasing, as are the requirements for their quality and commitment to sustainability policies. Urban transport is an important element of the European Commission's plans for sustainable smart growth, the transition to a low-carbon economy and sustainable urban mobility.

Local policies for the development of urban transport follow European and national policies based on the basic principles of:

- Balanced development of all components of the transport system;
- Elimination of bottlenecks in the infrastructure;
- Putting public transport users at the center of local policies;
- Managing the consequences of globalization processes.

The actions of the Municipality of Dobrich are aimed at providing quality public transport services, appropriate infrastructure and environment that meets the expectations and needs of users of this service.

As the transport system is a set of infrastructural elements of the urban environment for the provision of services for accessibility and connectivity within a certain territory, its good construction implies a better quality of life for the inhabitants of the municipality, smarter and sustainable growth and transition to resource-efficient economy.

The current municipal transport scheme of the Municipality of Dobrich needs to be updated, as it has a design and quality that do not provide good coverage of the territory, are not effective (duplicated for the most part), do not meet the real needs of the population in the choice of movement, do not reflect the changes in territorial and economic aspects. There are still unserved areas of residential areas, much of the Industrial Zone North and the Industrial Zone West.

2. ANALYSIS OF THE EXISTING SITUATION

2.1-A. Collecting the necessary data - Medgidia

2.1.1. Demographic data

The demographic variation in territorial profile registered in the last 10 years highlights the reduction by 7.0% of the number of inhabitants with permanent residence in Medgidia Municipality, a tendency of variation similar to the one registered at national level (-1.4%), but much more accentuated.

Figure 2.1 shows the variation in the number of inhabitants in the period 2010 - 2020 for Romania, Constanţa County and the urban localities in this county. The extreme values are given by the increase of the population by 7.6% in Năvodari City, respectively by the accentuated reduction registered in Mangalia Municipality (-7.4%). During this period in Constanţa there were reductions in the number of inhabitants of 4.1%.

Data on the total number of inhabitants available for 2020 are presented in table 2.1.

***Table 2.1**. Number of inhabitants, year 2020.*

Town	Number of inhabitants	Source
Medgidia Municipality	44.647	National Institute of Statistics (NIS), TEMPO On-line
	44.108	Directorate for the Registration of Persons and Database Administration (DRPDA), Ministry of Internal Affairs

The analysis of the distribution of the annual weights represented by the main age groups during the analyzed period (figure 2.2), reveals the decrease by 31% of the share of the young population, aged between 15 and 24 years, simultaneously with the sharp increase of the percentage inhabitants over the age of 65 (by 34%), an aspect that reflects the phenomenon of demographic aging. In general, these people are characterized by reduced mobility, requiring facilities to increase the accessibility of the transport system.

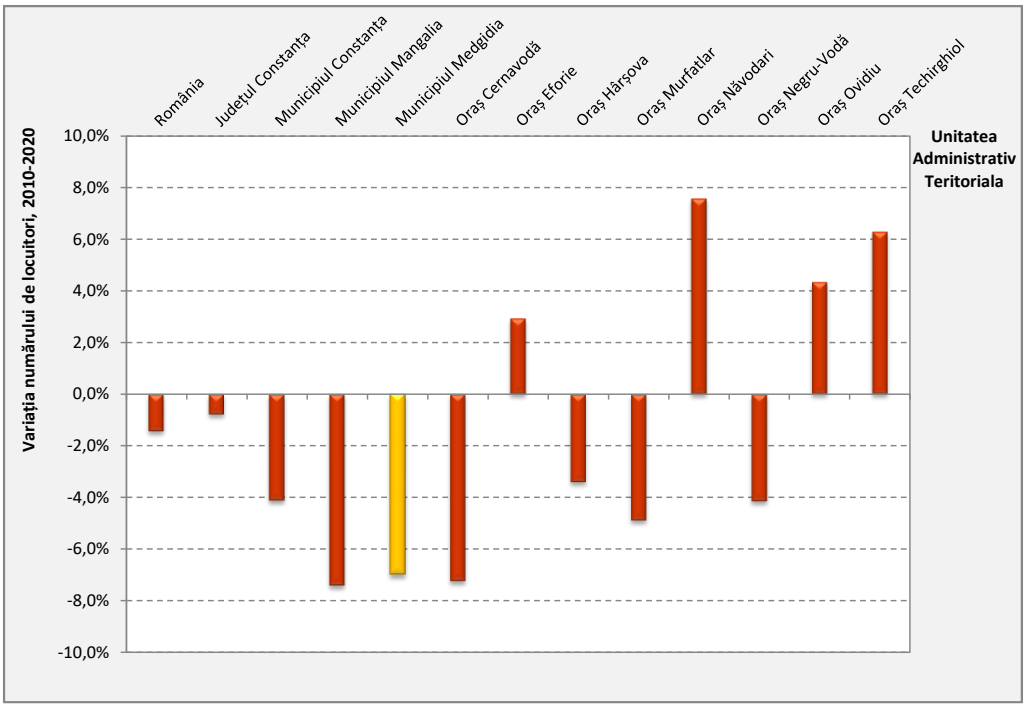


Figure 2.1. *Variația numărului de locuitori în intervalul 2010 – 2020, zonele urbane din Jud. Constanța. Sursa datelor: INS, TEMPO On-line.*

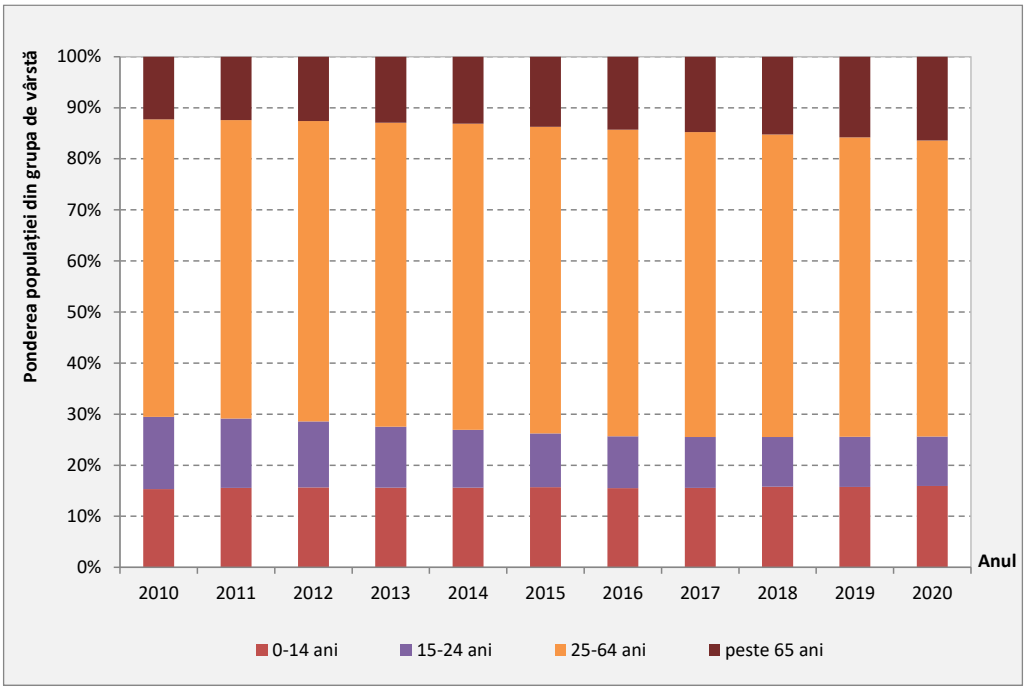


Figure 2.2*. The share of the population in the main age groups, period 2010-2020. Data source: NIS, TEMPO On-line.*

Following the request of the Municipality of Medgidia, the Directorate for the Registration of Persons and Database Administration (DRPDA) of the Ministry of Internal Affairs provided the situation with the total number of residents with permanent and floating residence in the Municipality of Medgidia registered at the end of 2020. The data were detailed at the address level (street, number, block).

The distribution by age classes of these data (figure 2.3) was made respecting the proportion held by each class for 2020, according to data published by the National Institute of Statistics.

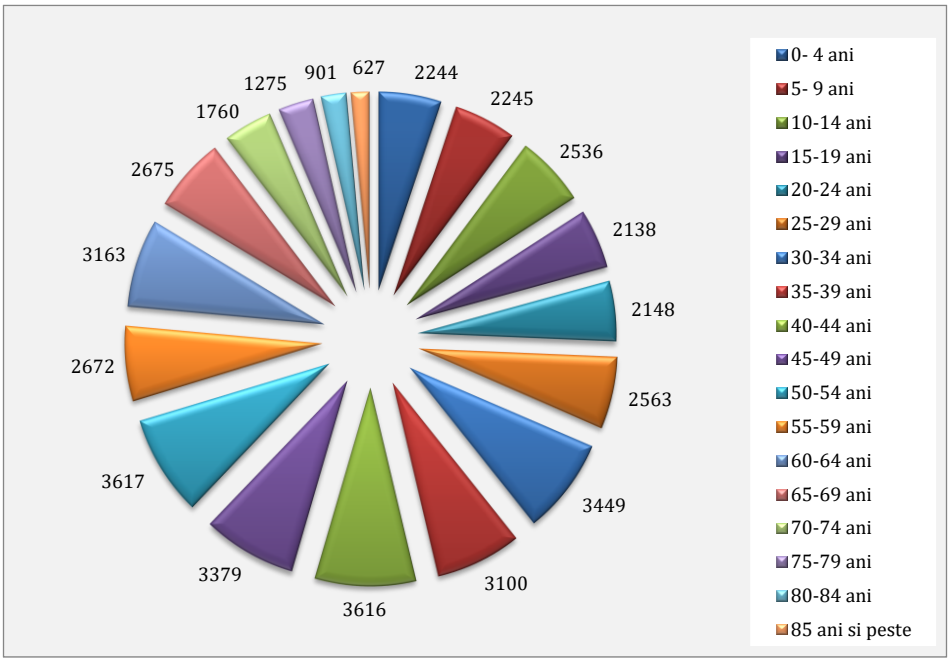


***Figure 2.3**. Distribution of the population registered in 2020 by age groups, Medgidia Municipality.*
Data source: D.R.P.D.A.; NIS, TEMPO On-line.

According to the existing statistical data (National Institute of Statistics, TEMPO On-line), the urban territory of Medgidia Municipality is 1,977 ha. By dividing the total number of inhabitants by the surface of the urban territory, it results that the population density at the level of 2020 is 2,258 inhabitants /km^2.

The spatial distribution of the number of inhabitants is a factor with a significant impact in the field of urban mobility. In this context, it is essential to analyze demographic data in terms of the following indicators: *total population and population density.*

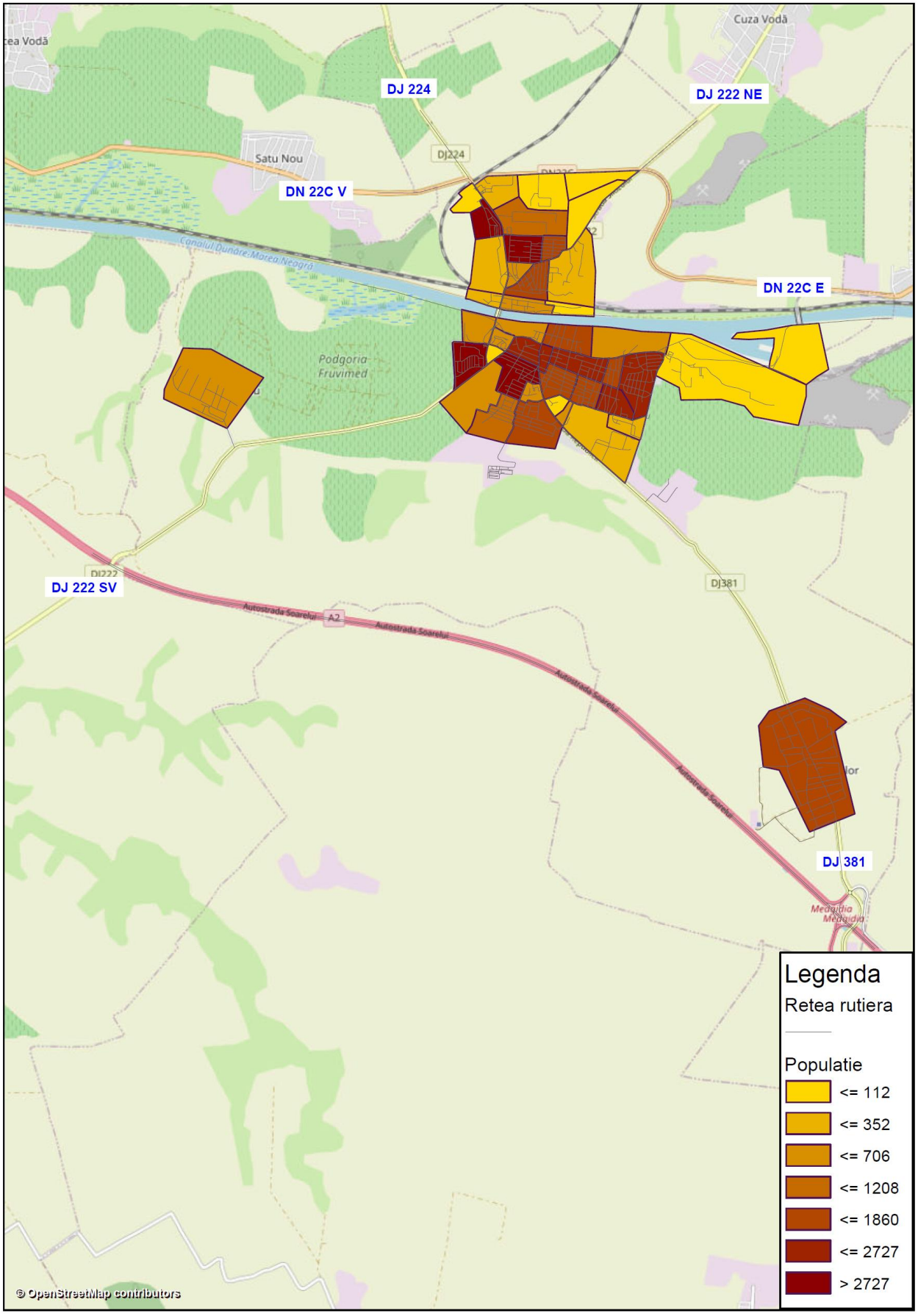


***Figure 2.4**. Territorial distribution of the population. Data source: D.R.P.D.A.*

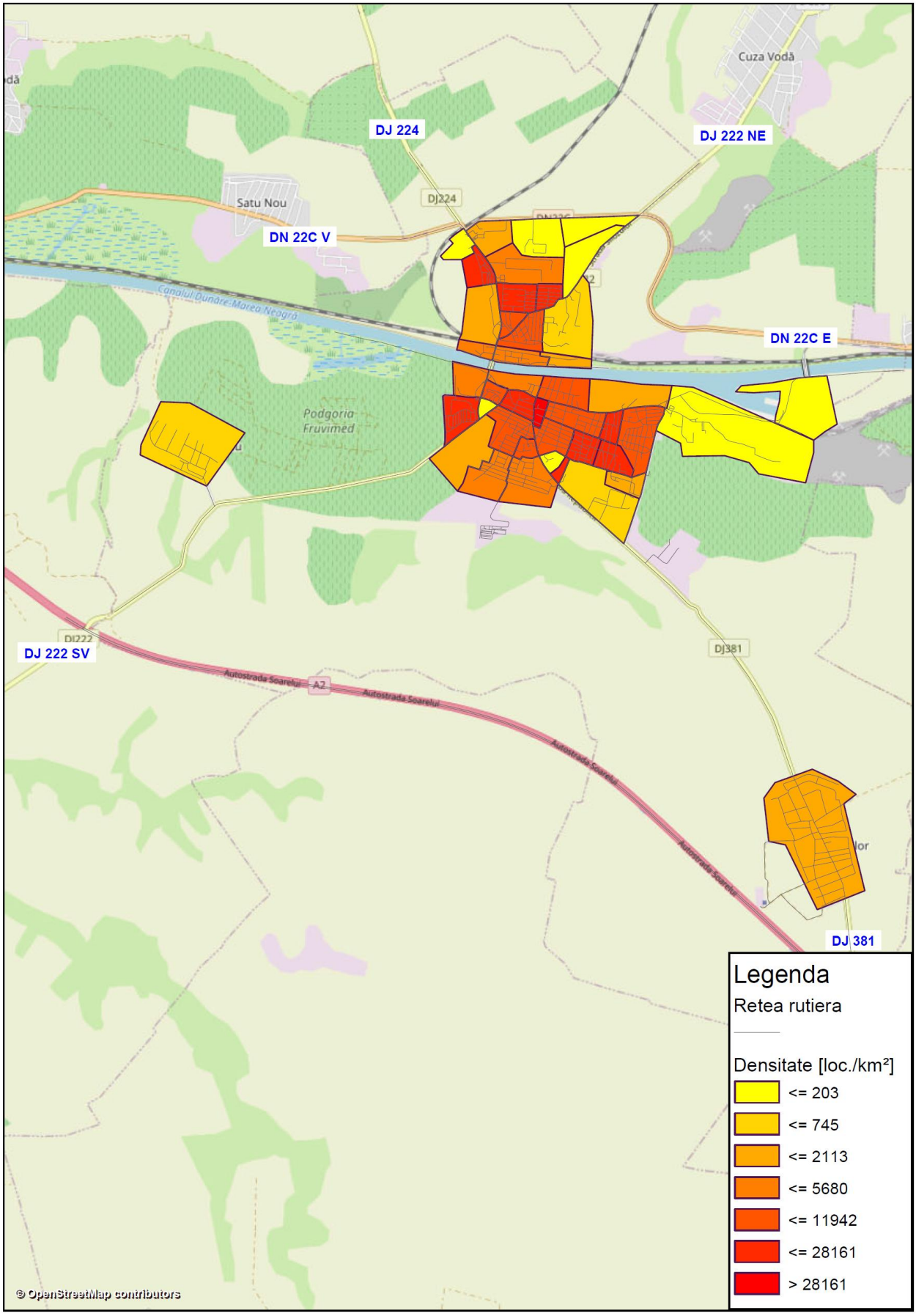


***Figure 2.5**. Population density at the level of traffic areas (inhabitants/km²). Data source: D.R.P.D.A.*

2.1.2. Socio-economic activities

The development of economic activities involves the generation of travel with a significant share in the case of both passenger and freight transport (by ensuring the flow of raw materials, materials and finished products).

According to the data provided by the Territorial Labor Inspectorate of Constanța (TLI), at the level of 2020 in Medgidia Municipality 6,407 active employees were registered, distributed to the 949 public and private employers based in this locality.

At the level of the analysis territory, the share of the employed population represents 15% of the total number of inhabitants, while at the county level this indicator has the value of 24% (table 2.2). The data used for this analysis represent statistical data for 2019 (most recent - published by the National Institute of Statistics, TEMPO On-line database).

***Table 2.2**. Share of the employed population, 2019. Data source: NIS, TEMPO On-line.*

Administrative-Territorial Unit	Number of Employees	Number of inhabitants	Share of the employed population
Medgidia Municipality	6.625	45.022	15%
Constanta County	181.817	766.205	24%

The main employers, category in which those with more than 100 employees are considered, concentrate 28% of the total number of jobs occupied at the locality level (table 2.3). With the exception of services provided by public authorities or institutions, the main employers are engaged in production and trade (manufacture of other plastic products and retail sale in non-specialized stores, with predominant sale of food, beverages and tobacco).

In the analysis presented below, the employer Cement Roadstone Holdings Group was not considered, as no data were available. Based on an estimate of the number of employees, this pole of attractiveness at the local level was taken into account in estimating the transport demand.

***Table 2.3**. The main employers, the year 2020. Data source: TLI Constanța.*

No.	Company	CAEN code	Field	Number of active employees
1	MEDGIDIA MUNICIPAL HOSPITAL	8610	Hospital care activities	464
2	STERK PLAST	2229	Manufacture of other plastic products	453

No.	Company	CAEN code	Field	Number of active employees
3	MEDGIDIA CITY HALL	8411	General public administration services	313
4	FOIŞOR COM	4711	Retail sale in non-specialized stores with food, beverages or tobacco predominating sales	222
5	DIRDATES PRODUCT S.R.L.	2562	General mechanics operations	144
6	GEKGUARD SECURITY	8010	Protection and guard activities	112
7	SECONDARY SCHOOL "LUCIAN GRIGORESCU"	8531	General secondary education	104

Out of the total of 949 employers, 90% have less than 10 active employees, a situation in which 856 cases are registered (figure 2.6).

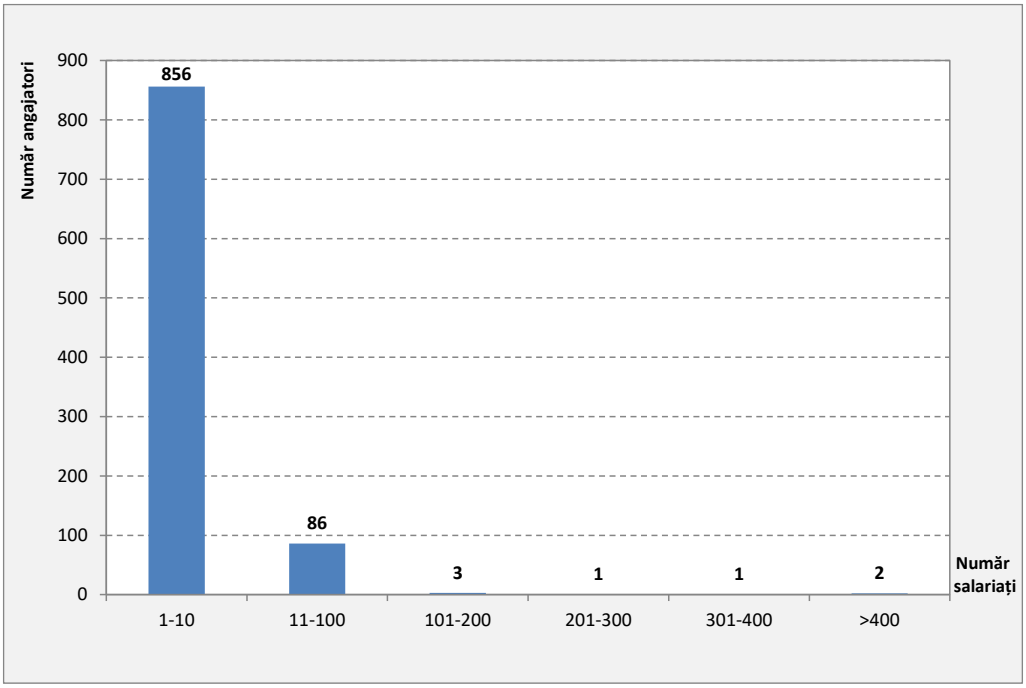


Figure 2.6. *Distribution of employers by number of employees. Date source: TLI Constanța.*

The distribution in the territory of the number of employees (at the level of the traffic areas in which the territory of Medgidia Municipality was divided) is presented in figure 2.7.

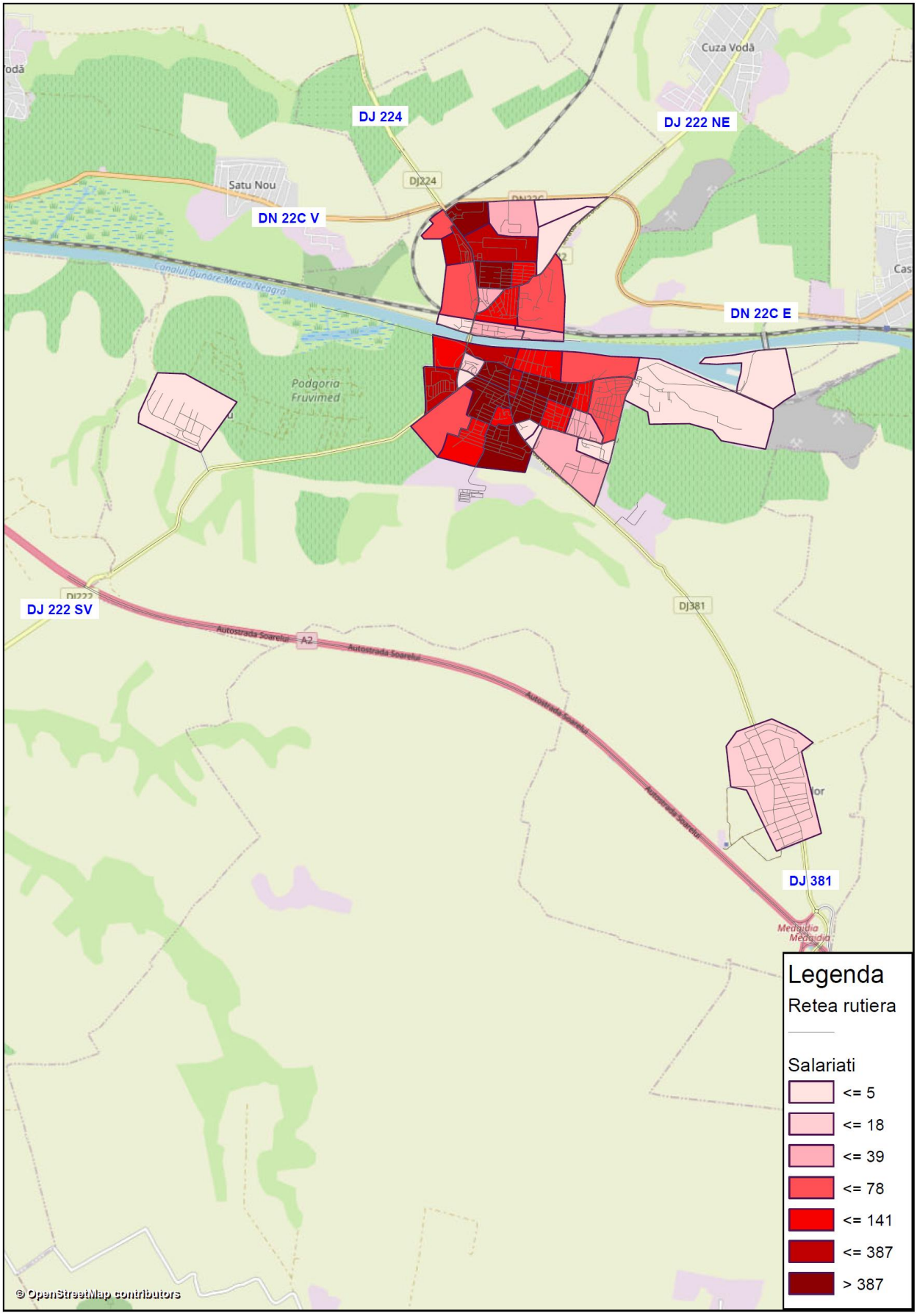


***Figure 2.7**. Territorial distribution of jobs. Data source: TLI Constanța.*

Based on the available statistical data, the dynamics of the number of employees at local and county level in the last 9 years was studied (figures 2.8 and 2.9). The results indicate a decrease in the share of the number of employees in Medgidia Municipality from the total of those registered at county level, from 4.4% in 2010, to 3.6% in 2019.

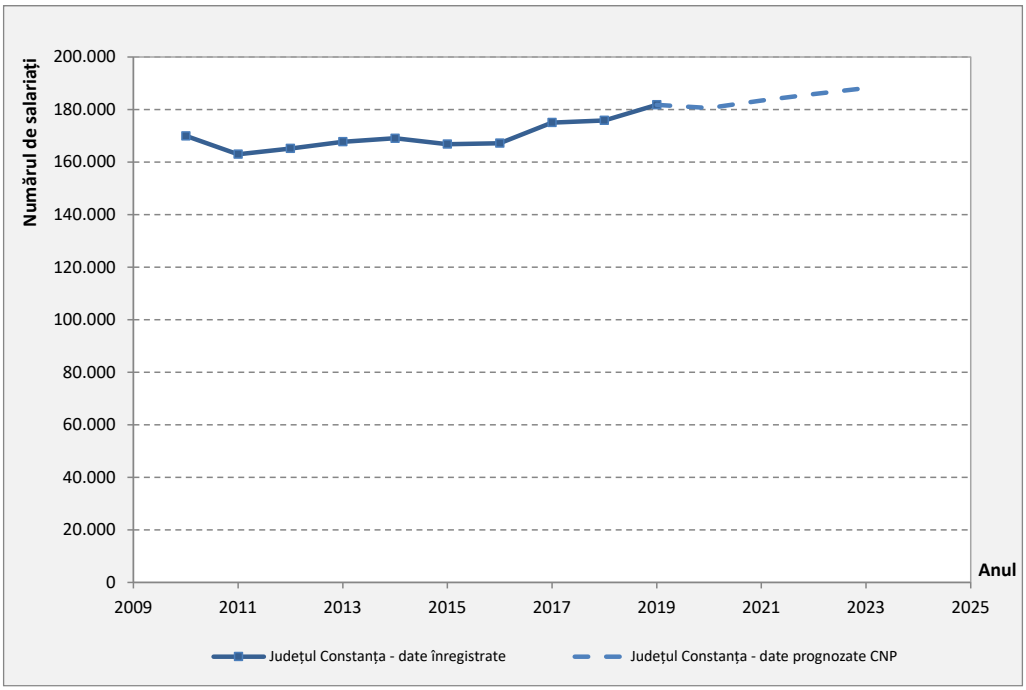


***Figure 2.8**. Variation in the number of employees - Constanța County, period 2010-2019; 2020-2023. Data sources: NIS, TEMPO On-line; National Forecast Commission (NFC).*

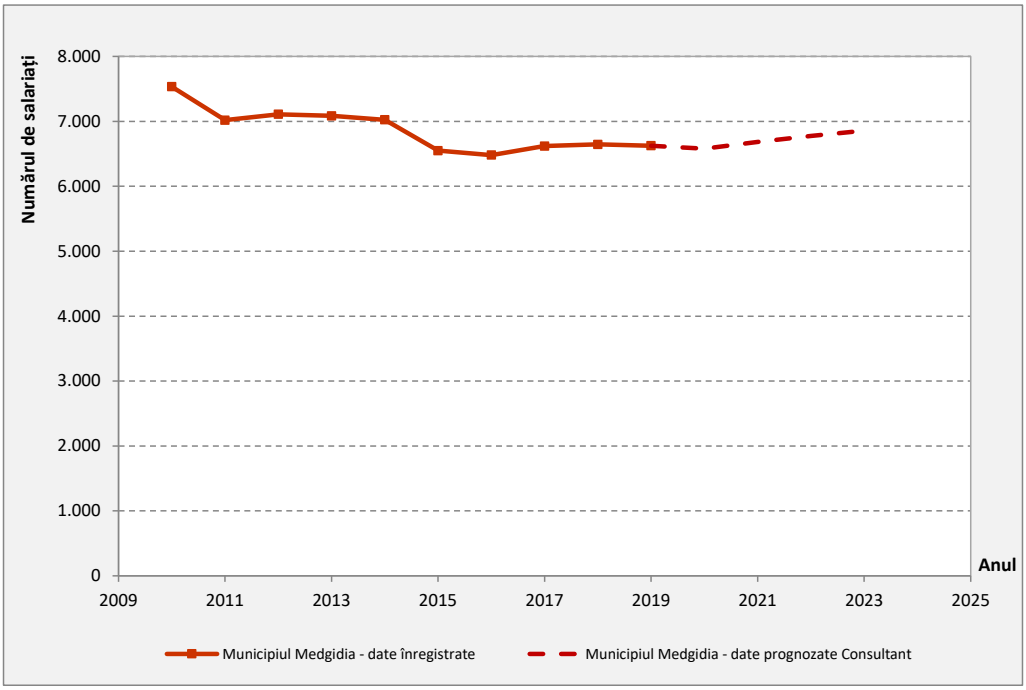


***Figure 2.9**. Variation in the number of employees - Medgidia Municipality, period 2010-2019; 2020-2023. Data sources: NIS, TEMPO On-line; National Forecast Commission (NFC).*

Knowing the historical data on the number of employees registered at county and local level in the last 9 years and forecast data[1] of this indicator for Constanța County (National Forecast Commission), it was estimated the annual number of employees in Medgidia in period 2020-2023. There is an increasing trend, which leads to an increase of 4% in the number of employees in the Municipality of Medgidia in 2023 compared to the value recorded in 2020.

At the same time, within the analysis were processed data on the variation of the number of registered unemployed in Medgidia Municipality, resulting that in the analyzed period 2010-2020 (the one for which statistical data are published) there was a decreasing trend in the number of people in this category (figure 2.10). In the hypothesis of translating these persons into the category of employees, we can conclude that in recent years there has been an increase in commuting from home to work.

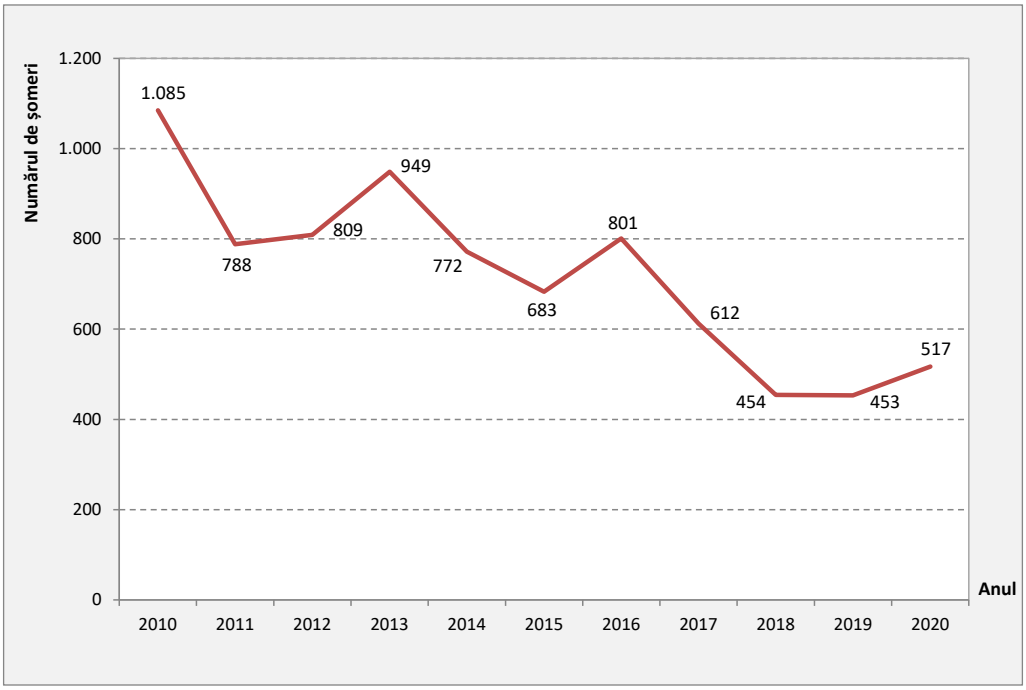


***Figure 2.10**. Variation in the number of unemployed, period 2010-2020. Data source: NIS, TEMPO On-line.*

Regarding the causes of unemployment in Medgidia, these are the classic ones: the low number of jobs, imbalances between the professional training of the available labor force (the unemployed usually come from collective or individual dismissals, being people who have lost employment by restricting the activity) and the specific requirements of the jobs that constitute the offer, the ratio between the minimum wage level for which the population is willing to work and the level of social benefits offered by the state. In order to support the development of economic activities, an action that brings social benefits as a result of reducing unemployment in the analysis area, measures will be proposed to improve the accessibility and efficiency of the urban transport system.

[1] National Forecast Commission, *Projection of the main economic and social indicators in TERRITORIAL PROFILE until 2023*, December 2019.

The areas where commercial activities take place are poles of interest for local travel. These objectives are connected to the main traffic artery – Independenţei Street, but also on Poporului Street, Str. Street and Pieţii Street, as well as Eroilor Street in Valea Dacilor locality (figure 2.11).

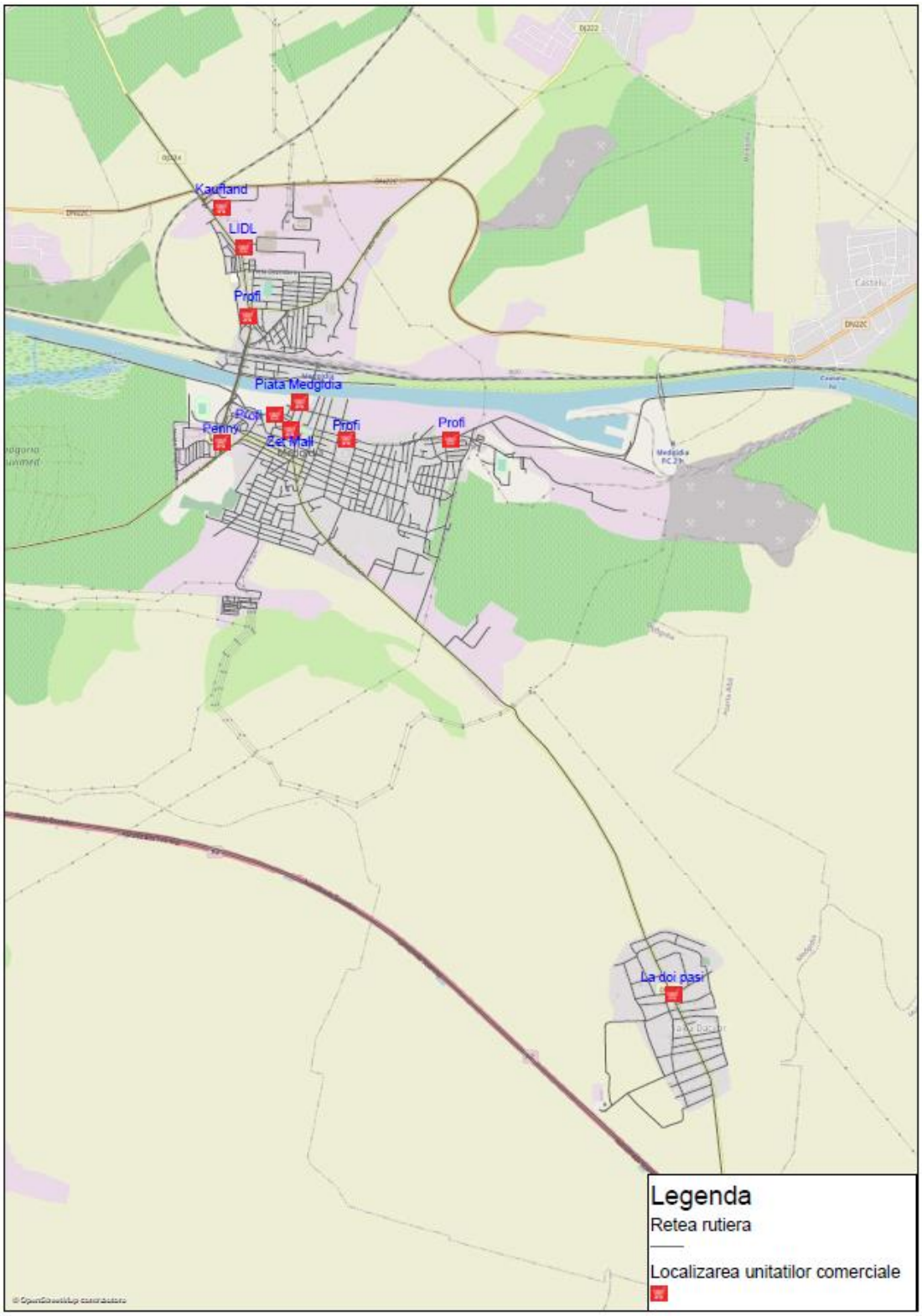


Figure 2.11. *Location of the most important commercial areas in Medgidia.*

2.1.3. Traffic data

The volume and structure of traffic flows specific to the transport system which is the object of the study represent output elements within a transport model. The calibration and validation of such a model requires the knowledge of a data set characteristic of the *ex-post* transport demand, regarding these parameters, as representative as possible from the point of view of the considered sample and of the recording accuracy.

There is a wide range of methods for collecting traffic data in order to estimate *ex-post* demand. Depending on the location of the observatories in relation to the road, they can be classified into two main categories:

→ *intrusive methods* – involve placing the observer in contact with the road;

→ *non-intrusive methods* – involve the use of remote sensing techniques.

In order to accomplish the correlationwith the traffic values characteristic of the major transport network in the studied area, the values of traffic flows recorded on national and county road sectors during the general traffic census conducted by CESTRIN - CNAIR / Constanța County Council in 2015 were used:

→ *County Road 222, post 1383 (km 155+000);*

→ *County Road 224, post 1381 (km 2+500);*

→ *County Road 381, post 1384 (km 33+000).*

The vehicles in the composition of the traffic flows are classified in 10 main categories (table 2.4).

***Table 2.4**. The categories of monitored vehicles.*

No.	Category	
1./ 1'.		Bicycles /Motorcycles, scooters, etc.
2.		Cars
3.		Passenger minibuses
4.		Pick-ups and trucks with Gross Vehicle Weight <=3.5 tons

No.	Category	
5.		Trucks and derivatives with 2 axles
6.		Trucks and derivatives with 3 or 4 axles
7.		Articulated lorries (semi-trailer type) and trucks with a trailer, over 4 axles
8.		Buses and coaches
9.		Tractors with / without trailer and special vehicles
10.		Truckswith 2, 3 or 4 axles with trailer (road train)

In the present study, the traffic data were collected by the non-intrusive method, which consists of manual metering. Registration forms were used in which the number and type of vehicles transiting the monitored infrastructure element (street section or intersection branch) were noted. This method made it possible to carry out a detailed monitoring of road traffic by number of vehicles (size of traffic flow), types of vehicles (structure of traffic flow) and directions of travel.

The counting posts were located in key points within the road network, as can be seen in figure 2.12. Countings were performed in 6 posts: 5 intersections (I1 - I5) and one section (S1). The counting of the number of vehicles by types took place in June 2021, during 8 hours (between 07:00 -11:00 and 14:00 -18:00).

For example, in figures 2.13 - 2.16 are presented the temporal distributions of the number of counted vehicles, by categories, registered in the survey posts I1, Intersection Silozului Street – Industriei Street and S1, Section Decebal Street (in front of the City Hall).

Figure 2.12. *The locations of traffic survey posts.*

The distribution on turns of the traffic volumes measured in intersections, during 8 hours is highlighted in figures 2.17-2.21.

POST I1. Intersection Silozului Street – Industriei Street

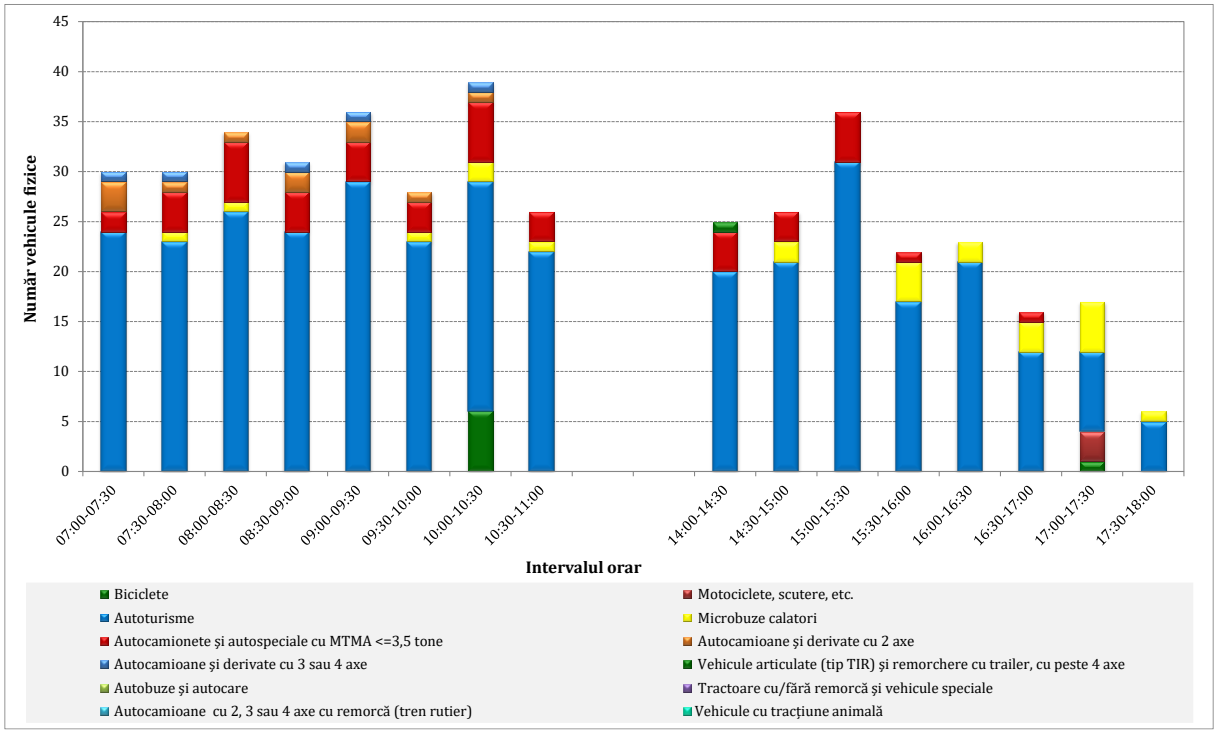


***Figure 2.13a**. The distribution of traffic volumes. Post I1, Branch – Silozului Street East, forward.*

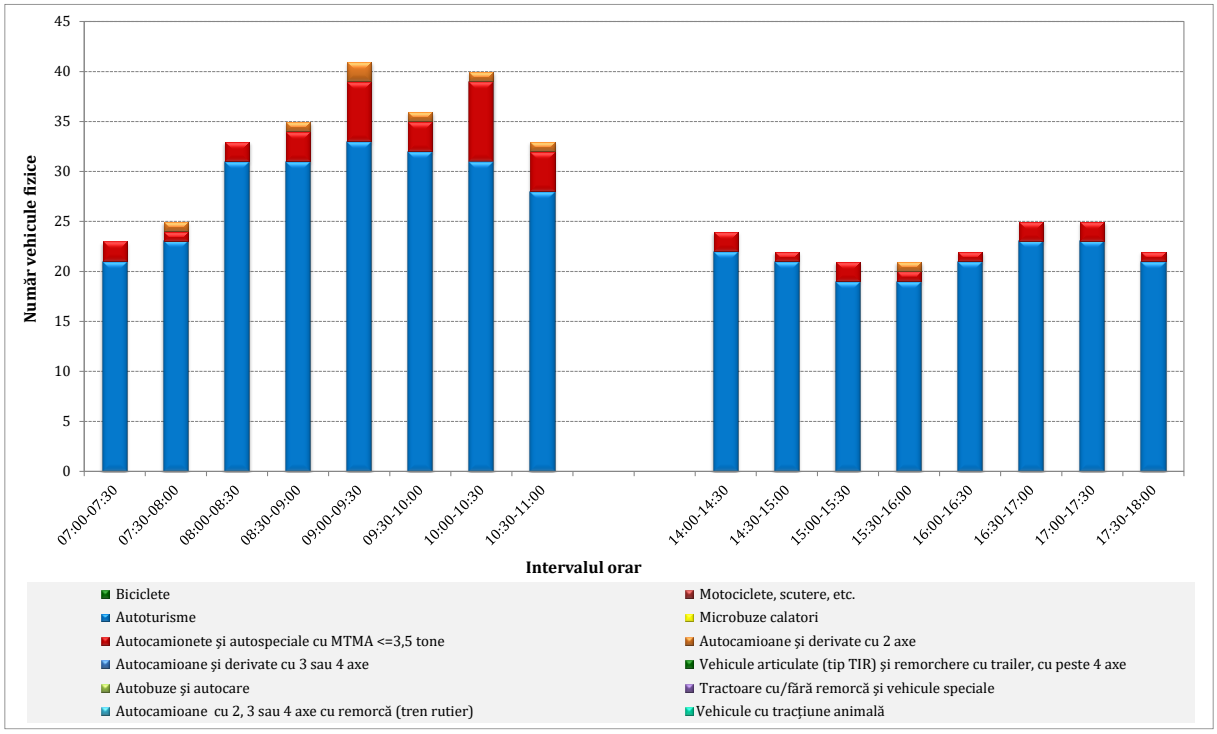


***Figure 2.13b**. The distribution of traffic volumes. Post I1, Branch – Silozului Street East, right-turn.*

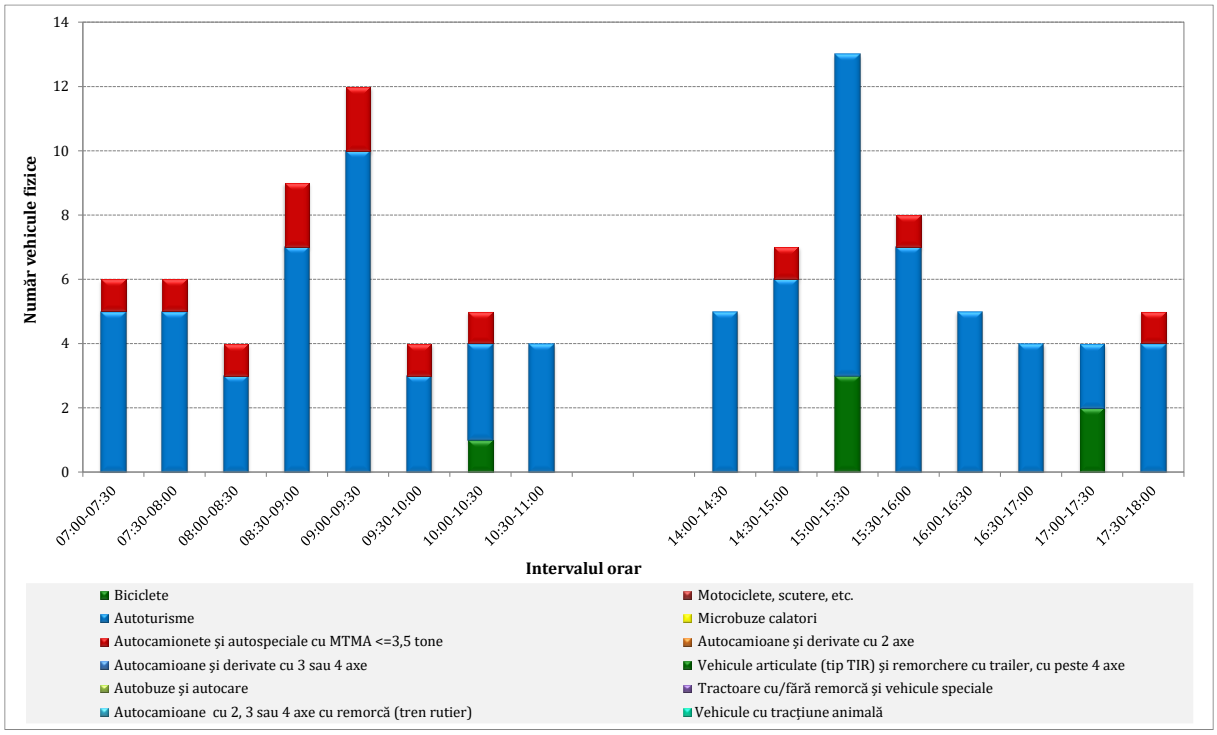


***Figure 2.14a**. The distribution of traffic volumes. Post I1, Branch – Silozului Street West, forward.*

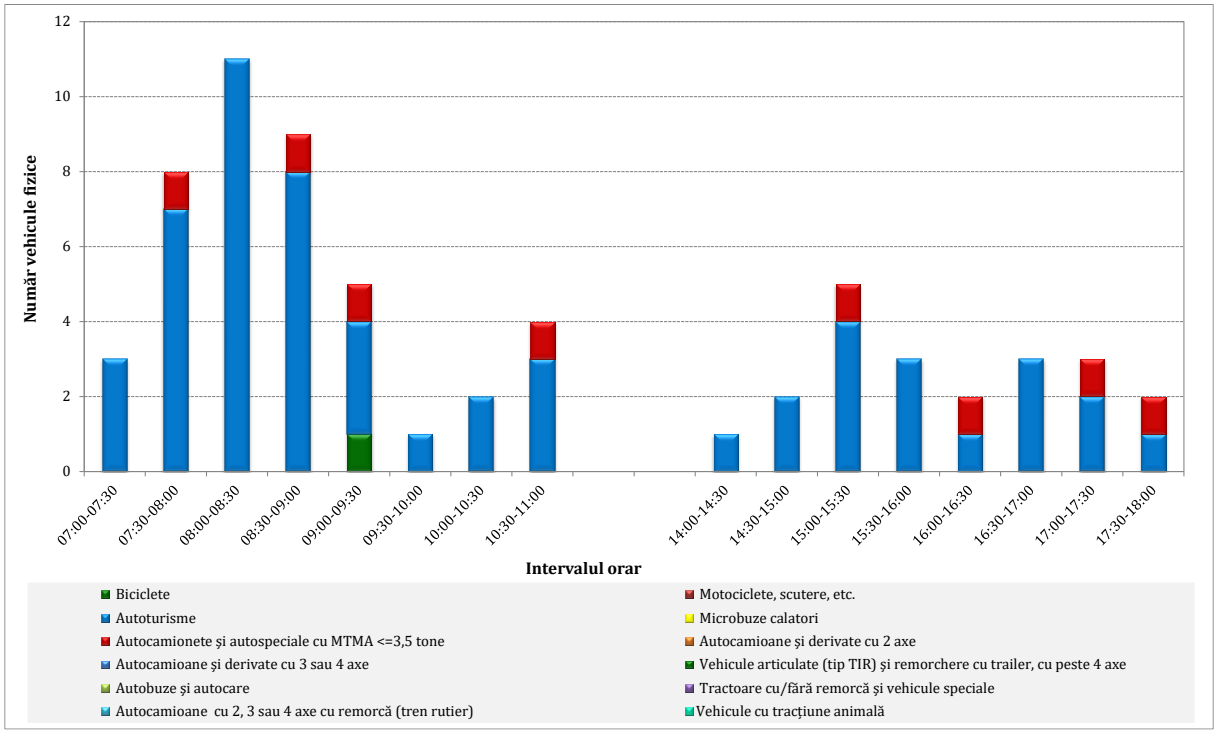


***Figure 2.14b**. The distribution of traffic volumes. Post I1, Branch – Silozului Street West, right-turn.*

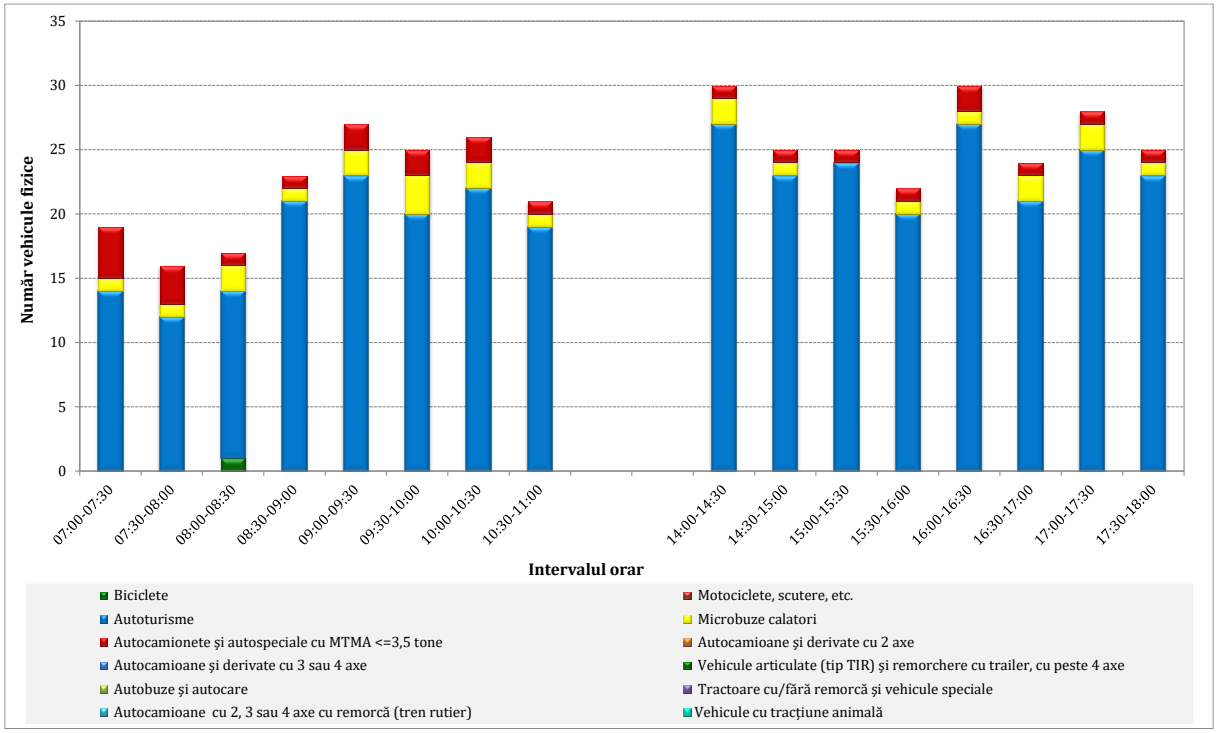


***Figure 2.15a**. The distribution of traffic volumes. Post I1, Branch – Industriei Street, left-turn.*

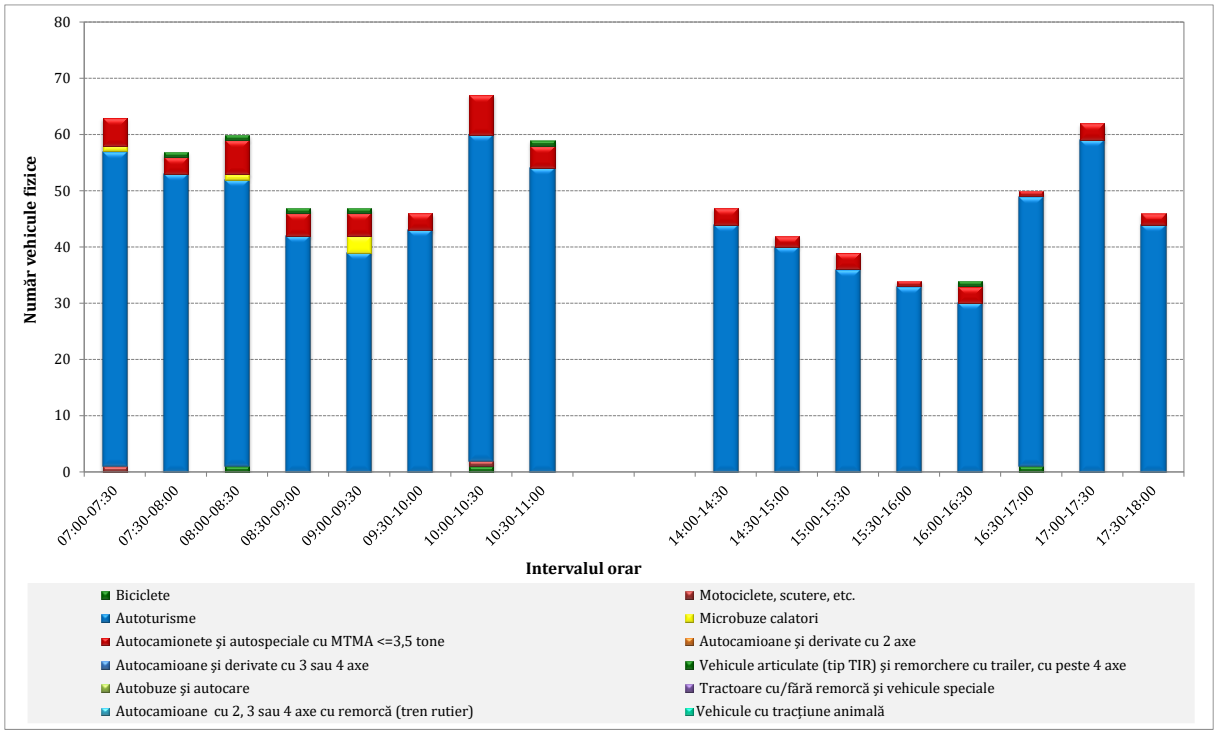


***Figure 2.15b**. The distribution of traffic volumes. Post I1, Branch – Industriei Street, right-turn.*

POST S1. Section Decebal Street (in front of City Hall)

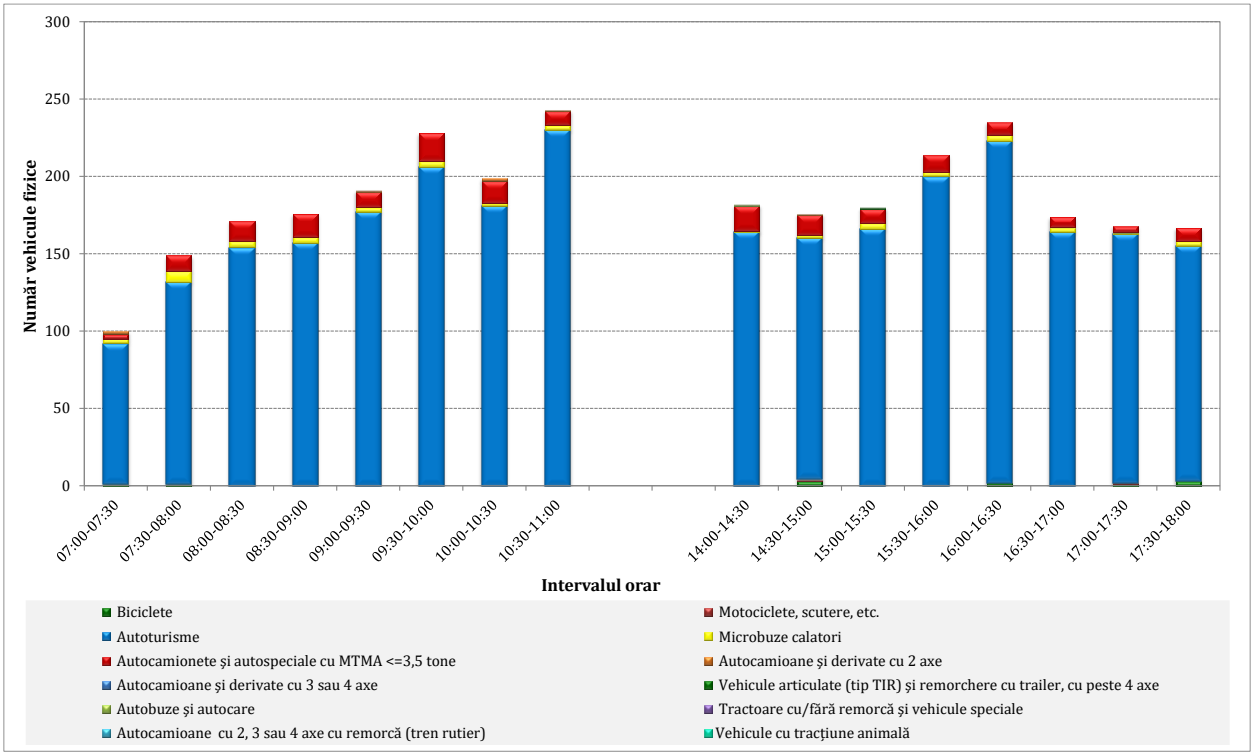


***Figure 2.16**. The distribution of traffic volumes. Post S1, Decebal Street.*

POST I1. Intersection Silozului Street – Industriei Street

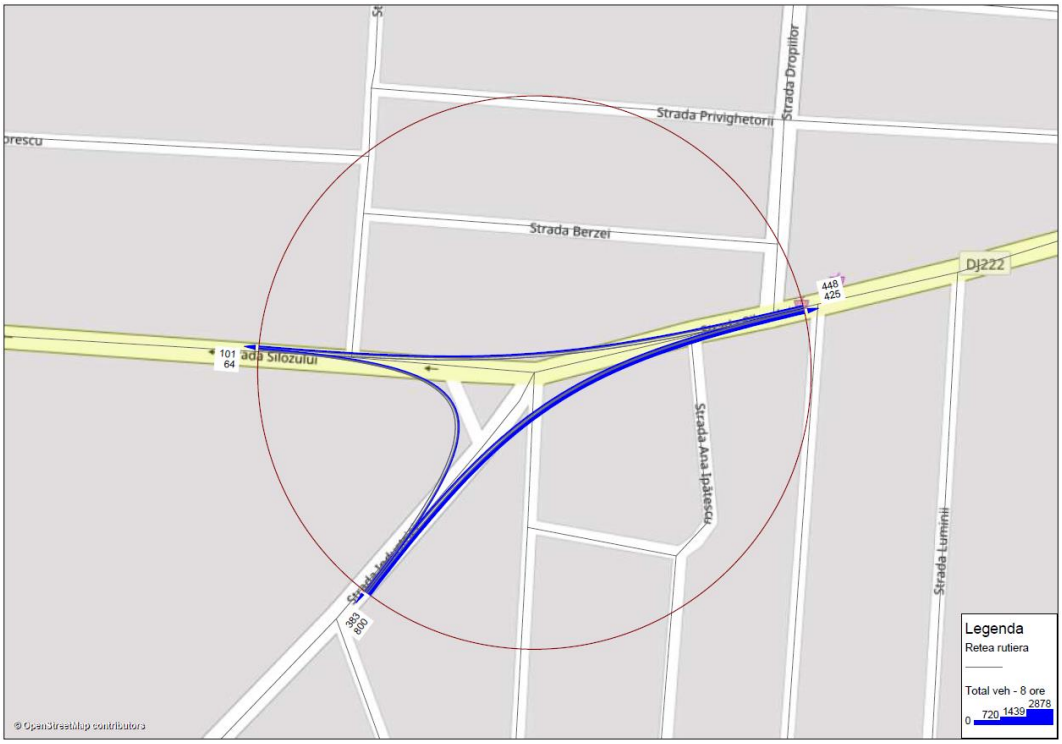


***Figure 2.17**. Measured values (physical vehicles) Post I1, 8 hours.*

POST I2. Intersection Independenţei Street – Rahovei Street – Albinelor Street

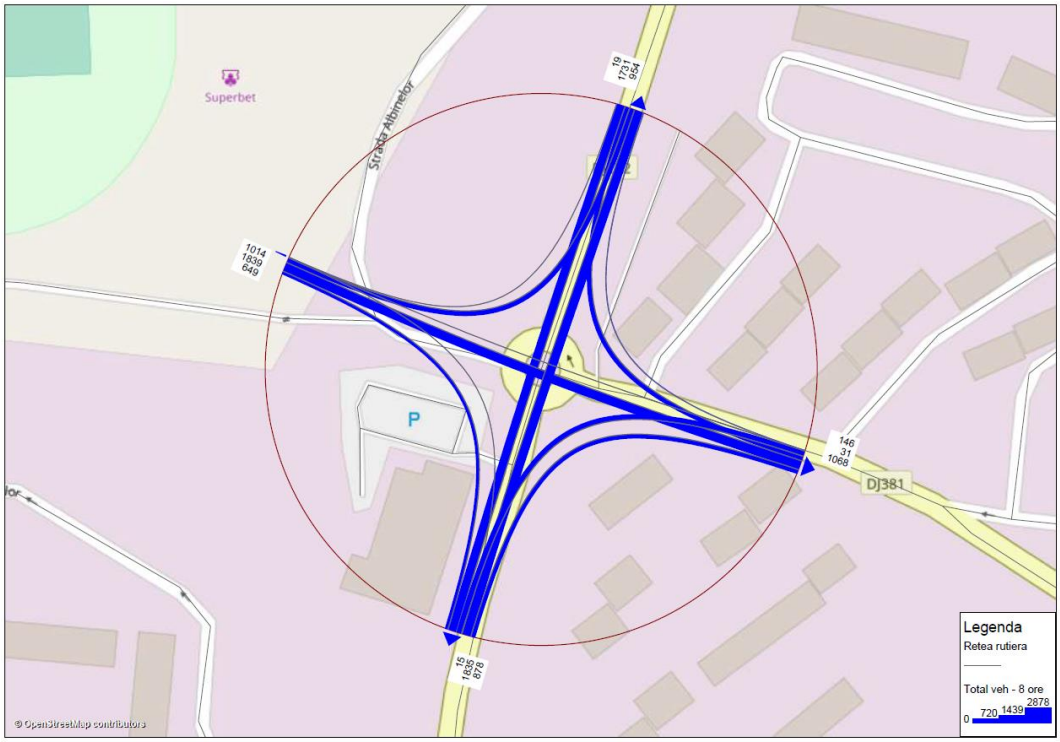


***Figure 2.18**. Measured values (physical vehicles) Post I2, 8 hours.*

POST I3. Intersection Mehmet Niazi Street – Ovidiu Street

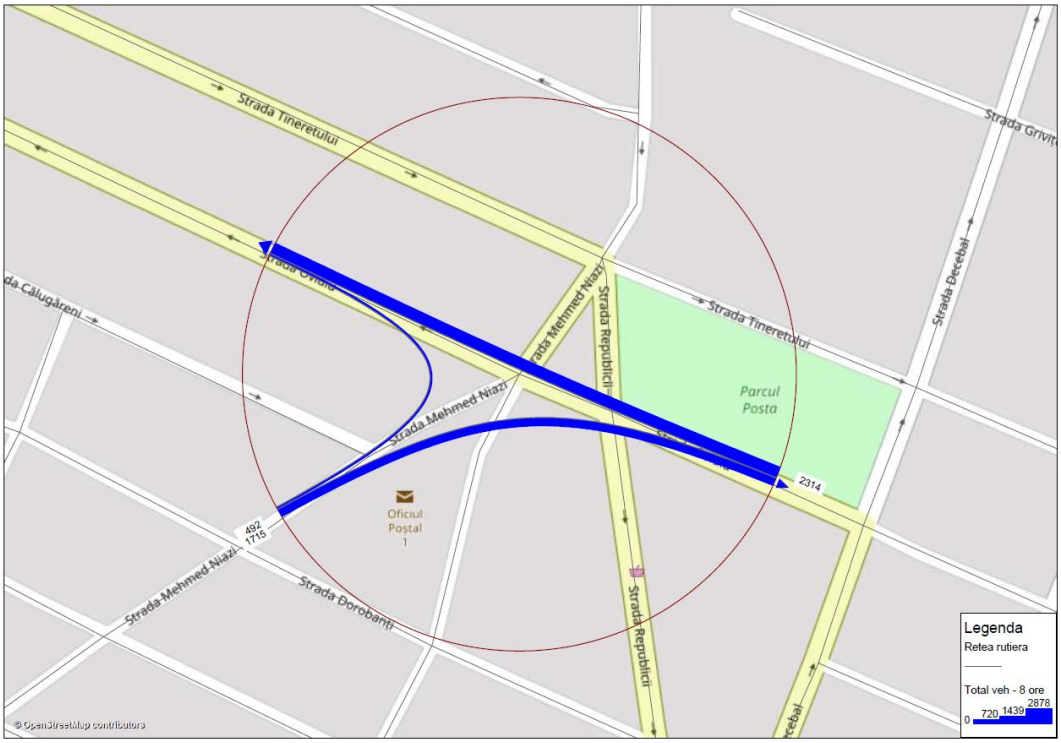


***Figure 2.19**. Measured values (physical vehicles) Post I3, 8 hours.*

POST I4. Intersection Republicii Street – Poporului Street

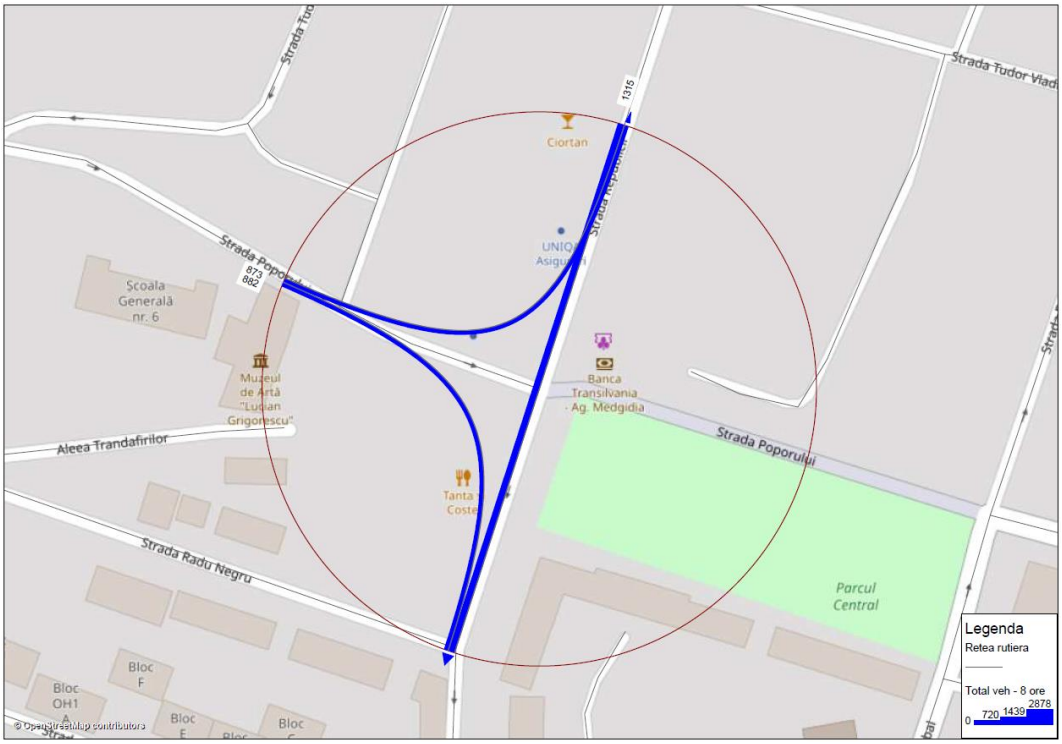


***Figure 2.20**. Measured values (physical vehicles) Post I4, 8 hours.*

POST I5. Intersection Lupeni Street – Călugăreni Street

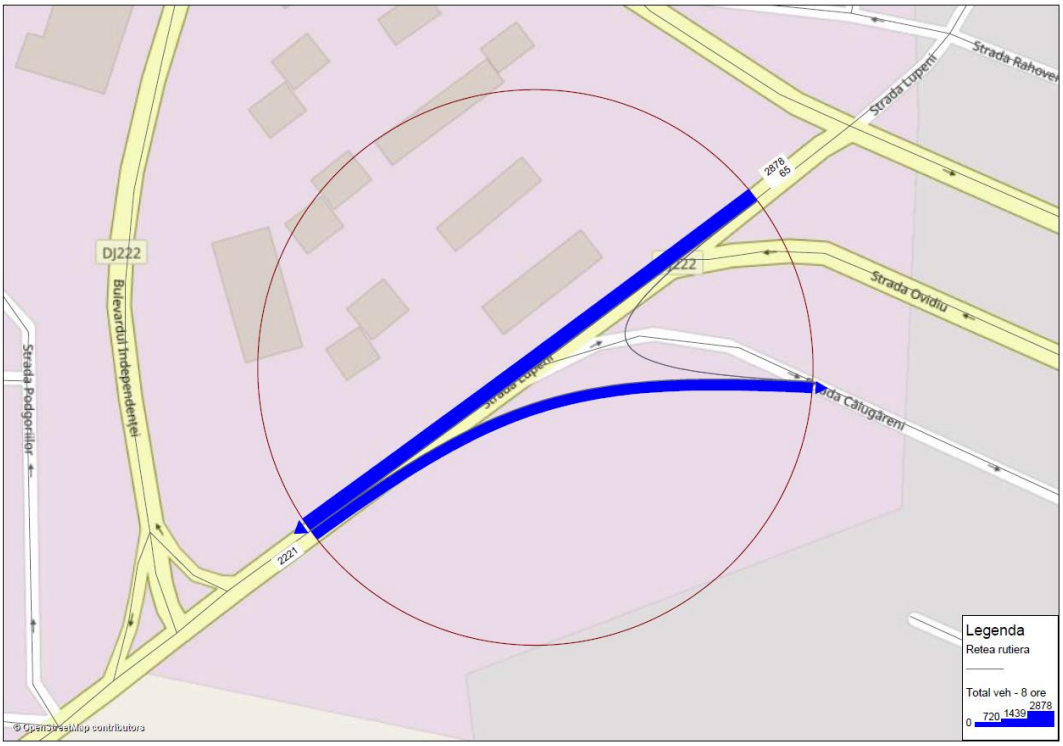


***Figure 2.21**. Measured values (physical vehicles) Post I5, 8 hours.*

2.1-B. Collecting the necessary data - Dobrich

The municipality of Dobrich has a special status (municipality - city), as it includes only one settlement - the city itself. The territory of the municipality is covered by that of the land of Dobrich, with an area of 19.4 sq. Km1. Dobrich is the second largest city in Northeastern Bulgaria and the largest settlement in Dobrich District. In the classification of territorial units for statistical purposes (NUTS) the city falls within the scope of the Northeast region of Level 2 (NUTS 2) - BG33, Dobrich District (NUTS 3) - BG332.

The city of Dobrich is also an administrative and socio-cultural center of the district of the same name, and on its territory are concentrated the administrations of the municipalities of Dobrich, Dobrich, district administration, regional structures of state administration, financial, cultural and educational centers, health and social facilities and others.

The Municipality of Dobrich, as part of the Northeast Region, is highly vulnerable to the challenges of development in the XXI century - globalization, demographic change, energy dependence and climate change, which determine the impact of other factors such as location, competitiveness and others.

The state of the internal and external transport connections of the Municipality of Dobrich, the development of energy and communication infrastructure, as well as the geographical location and connectivity with other territories in the region, suggest efforts to use them more fully to attract investment, economic development, its digital transformation, higher internationalization and restructuring of the business and its orientation towards Industry 4.0 and forms of the circular economy.

Within the Dobrich district, the regional relations of the city of Dobrich with the other municipalities are determined by the principles of self-government, the lack of centralized planning and market economic relations.

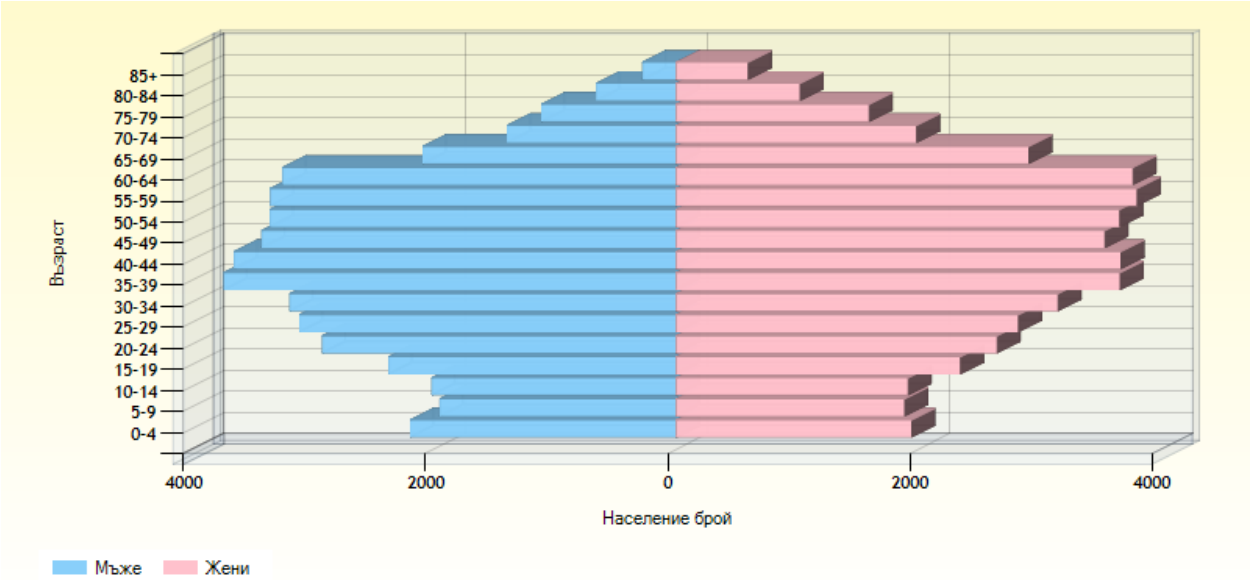
From the point of view of spatial planning, this will affect the functional-spatial structure of the city and its establishment as a zone of active influence within Dobrich District: transport isochron up to 30 minutes (for Dobrichka municipality, parts of General Toshevo and Balchik municipalities); intensive daily work and cultural trips; existing business relationships;

From the point of view of the development of the region in the context of the European Cohesion Policy for the period 2021-2027 and taking into account the scale of agricultural production in the SIR, this will support urbanization and development of the region by balancing local and regional sectoral development policies. the fair work and the exhibitions, for support and promotion of R&D and innovations in the priority thematic areas for SIR, etc.

2.1.1. Demographics

According to GRAO data, as of January 25, 2021, the population of the town of Dobrich at the current address is 91,749 people, and at the permanent address 103,631 people.

Age	Total		
	Total	Men	Women
Total	91 030	44 096	46 934
0-4	4 141	2 197	1 944
5-9	3 839	1 953	1,886
10-14	3 934	2 020	1 914
15-19	4 722	2 375	2 347
20-24	5 573	2 924	2 649
25-29	5 939	3 113	2 826
30-34	6 346	3 193	3 153
35-39	7 403	3 738	3 665
40-44	7 325	3 653	3 672
45-49	6 965	3 426	3 539
50-54	7 018	3 356	3 662
55-59	7 158	3 353	3 805
60-64	7 022	3 251	3 771
65-69	5 005	2 094	2 911
70-74	3 381	1 397	1 984
75-79	2 706	1 114	1,592
80-84	1 682	660	1 022
85+	871	279	592



The country has unfavorable demographic factors that hinder the functioning of the labor market and limit economic growth. They also have an adverse effect on foreign investment, mainly due to a shortage of skilled labor.

The consequences of the financial crisis can be traced with the unemployment rate in the country, which in the period 2010 - 2014 was over 10%, while in the last two years it has been steadily declining and in 2019 reached historically low levels of 4.2% .

According to official data from Eurostat, the unemployment rate in Bulgaria in November 2020 reached 4.9%, or 0.7% growth over the same period in 2019.

The development of the demographic processes in the municipality of Dobrich are the result of general trends in the demographic development of the country, and others - with the specific features of the historical and economic development of the municipality. The data show that for the last 10 years, the population of Dobrich municipality has decreased by 9,791 people, with an average annual rate of decrease of 1.1%. For the same period, the population in the Northeast region decreased by 0.6% and in Dobrich district by 1.3%. The two main factors (natural and mechanical growth) determining the population size have been negative throughout the analyzed period. The following figure shows the dynamics of the population in the municipality of Dobrich.

The trend in the development of the population shows the continuation of the negative processes and the related social and economic and social consequences related to the deterioration of the aging process, reduction of the working population, increasing the need for development of social services and others.

In terms of gender structure, women make up 52.4% of the population of Dobrich municipality, which is due to the higher life expectancy of women and higher mortality rates in middle-aged and older men.

Natural and mechanical growth

The reduction of the population is combined with the deterioration of the age structure and the reduction of the fertile contingent. Throughout the analyzed period, the natural increase was negative with a clear tendency of deterioration. The number of live births has decreased by 21%, while the number of deaths has increased by 12% over the last 10 years. The negative processes in the development of the population are further aggravated by the negative migration balance. For the last 10 years, 5,686 more people have moved out of the municipality than the settlers. Men of working age take an active part in migration processes.

Along with the decrease in the birth rate, there is a decrease in the fertility rate contingent with an average annual rate of 2.8%. Even more significant is the reduction of the most fertile part of the birth contingent (15-34 years), which has decreased by over 40% over the last 10 years, with a registered average annual decline of 4.3%. The negative effect of reducing the number of women of childbearing age will also affect the lower birth rate in the coming years. At the same time, the birth rate in the older age groups (30-34 years and 35-39 years) has a clear direction of increase. Given that the number of women of childbearing age is declining, the increase in the number of births is mainly due to births mainly of the second child.

The dynamics of total mortality ranges from 11.5 ‰ (2010) to 14.3 ‰ in 2019, with the trend of steady growth over the last 10 years. The overall mortality rate for men is higher than for women in as a result of an increase in the intensity of deaths in the middle and high age groups.

The dynamics of infant mortality is fluctuating, but in general there is a downward trend from 16.6 ‰ in 2010 to 4.7 ‰ in 2019. These values are close to the average for the North-West region and significantly lower than reported in Dobrich district for the same period.

Population structure

The observed trends in natural and mechanical growth in the municipality of Dobrich determine a negative change in the age structure of the population. The analysis shows a contraction of the generational pyramid at its base and expansion in the middle and high age groups.

From an economic point of view, the current profile of the age structure is characterized by the accumulation of people of working age - 64.7% of the population of the municipality, but nearly 60% of the population in this age group is aged 40-65. of the observed unfavorable trend, in the coming years a more significant reduction of the labor force in the municipality can be expected. These data show that the aging process of the population is clear. From 2011 to the end of 2019, the young population (0-14 years) decreased by 3.2%

(-377 people), while the observed population growth in the age group (65+) amounted to 27, 8% (+3 790 people).

The tendency for population growth in the older age groups is also expressed in the continuous increase of the medial age of the population in the municipality. The average age of the population in 2019 reaches over 46 years (compared to 44 in Bulgaria) and the increase is over 3 years compared to 2011.

Among the main factors that will continue to have a negative impact are the reduction of the fertile contingent in combination with an increase in the average age of the mother at birth, increasing life expectancy and negative migration flows.

The current age structure in the municipality of Dobrich is a manifestation of some factors beyond the horizon of the current analysis, but which should be taken into account - emigration processes that accelerate the aging process and low birth rates in the mid-90s. of the economic crisis. At the same time, due to the increase in total mortality and the slowdown in the growth of life expectancy, the rate of aging of the population in the municipality of Dobrich still does not put serious pressure on the socio-economic systems in the municipality.

The data show that the change in population dynamics is reflected in the distribution of the three age groups, which has a direct impact on the economic and social spheres. Within the analyzed period, the population in the working-age area decreased by 1,087 people and reached a share of 15% of the total population structure. Along with this trend, there is an increase of 3,417 people over working age, and the trend will continue in the coming years. At the same time, the working-age population is expected to decline as a result of the reduction of the fertile contingent, postponement of births to a later stage and the gradual exit of the working age population in the age group over 55.

The rapid aging of the able-bodied contingent is clearly illustrated by the demographic replacement rate, which in 2019 reached 61/100 compared to 67/100 (2011), ie only 61 people per 100 working age people going out. The data show that the municipality has stagnated in terms of population rejuvenation, which could affect the economy and opportunities for sustainable development and growth.

There is a possibility of an acute shortage of young able-bodied people in the future. The factors that will continue to negatively affect the reproductive and labor potential of the municipality of Dobrich are the emigration movements as a result of deteriorating socio-economic parameters (lack of work, low income, environment, etc.).

The period of significant increase in the age dependency ratio 13 continues, reaching 54 percent, which is an increase of 13 percentage points compared to 2011. At the same time, the ratio of dependence between the population from 0 to 14 years and the working population varies from 18% (2011) to 22% (2019). This workload is a direct consequence of the dynamics of the values of demographic substitution (60-64 years old compared to 15-19 years old).

Labor market

In recent years, in the municipality of Dobrich there have been several positive trends in the development of the labor market. At the end of 2019, the economic activity rate14 reached 70.7%, which is around the average values for the Northeast region (70.60%), but nearly 2.3 percentage points below the national average. Among the main factors are the growth of the labor force in the last three years and the declining trend of the working age population.

A similar trend is observed with regard to employment in the municipality of Dobrich. The data show an increase in the overall employment rate over the last three years, reaching 67.5% (2019), but remains below the registered record of 71.2% in 2016. Despite the positive trend over the last three years, employment remains below the national average of 70.1% (2019) and nearly 2 percentage points above the average for the Northeast region.

There are significant differences in terms of employment by gender. At the end of 2019, the employment rate for men is nearly 10% above the average for women, increasing by nine percent over the past nine years. The following graph shows the change in employment by gender.

The reported favorable trends in economic activity and employment are also reflected in the level of unemployment, which remains below the average values reported in the country and in the Northeast region. According to the Employment Agency16, at the end of 2019 unemployment in the municipality of Dobrich reached 3.05% compared to 3.59 in 2018. This is approximately 1.1 percentage points below the average levels in Bulgaria. The main contributors to the decline in unemployment were the long-term unemployed (over 1 year) and to a lesser extent those who lost their jobs in less than 1 year. Following the introduction of the state of emergency as a result of COVID-19, the data show a significant increase in the number of unemployed. By October 2020, the number of unemployed people over the age of 15 reached 2,031. The unemployment rate in the municipality is 4.5%, 1.2 percentage points higher than the same period last year, and the registered unemployed are 566 more.

Source: NSI, Municipality of Dobrich

2.1.2. Socio-economic data

The social infrastructure in the Municipality of Dobrich includes 18 social services in the community and residential type, one specialized institution for children and one specialized institution for adults with a total capacity of 878 seats, as follows:

Social services for children:

- *Accommodation center for children and youth with disabilities - 2 pcs. Family-type accommodation centers;*
- *Family-type accommodation center for children without disabilities - 3;*
- *Day center for children with disabilities - 1 pc.*
- *Center for public support - 2;*
- *Social services for adults:*
- *Accommodation center for young people with disabilities - 2 pcs. Family-type accommodation centers;*
- *Sheltered housing for adults with mental retardation - 2;*
- *Transitional housing - 1;*
- *Day center for adults with disabilities - 2;*
- *Center for Social Rehabilitation and Integration - 1;*
- *Observed dwelling - 1 pc.*
- *Home social patronage - 1;*
- *Specialized institutions:*
- *Center for comprehensive services for children with chronic diseases and disabilities - 1;*
- *Up to m for old people - 1 pc .;*

Educational infrastructure

The pre-school infrastructure in the Municipality of Dobrich at the beginning of the school year 2020/2021 covers 14 kindergartens with 88 groups and a total number of children 2172. In 7 half-day and 2 full-day groups at the schools are covered 172 children.

The municipal school infrastructure of the city of Dobrich at the beginning of the school year 2020/2021 includes: 14 all-day kindergartens, 6 primary schools, 1 united school, 2 specialized high schools and 2 vocational high schools, 5 high schools, sports school and Center for personal development support - Student dormitory.

There are also 4 state vocational high schools, 3 private schools, a Center for Special Educational Support and a Regional Center for Support of the Inclusive Education Process on the territory of the city of Dobrich. By decision № 584 / 20.08.2020 of the Council of Ministers, eight schools received the status of innovative - Sofia University "Dimitar Talev", Sofia University "St. Cl. Ohridski "Sofia University" Lyuben Karavelov "," Stefan Karadja "Primary School," Leonardo da Vinci "Primary School," Raiko Tsonchev "Primary School," Maria Montessori "Primary School and" Hristo Smirnenski "Primary School.

The number of students in municipal schools in the school year 2020/2021 is 7206, divided into 324 classes (according to the Municipality of Dobrich as of 01.12.2020).

Vocational education in the municipality is conducted in 6 vocational high schools located in different areas of the city. In the school year 2020/2021, 1655 students are taught in 71

classes. Each vocational school has a separate building and a base for practical training. The private schools are 3 with a total of 207 students who study in 36 classes.

The following higher schools also function on the territory of the city of Dobrich: College - Dobrich at the University of Shumen "Bishop Konstantin Preslavski", Higher School of Management and Dobrudzha Technological College at the Technical University - Varna.

Health infrastructure

The health care of the population on the territory of the Municipality is organized by a well-established and structured network of health care institutions. The healthcare infrastructure includes medical establishments with municipal (city) and supra-municipal (district) functions. On the territory of the town of Dobrich there are 1 hospital medical institution (MBAL Dobrich AD) and the Center for Mental Health Dr. P. Stanchev - Dobrich EOOD. Both medical institutions have supra-municipal functions and the capacity to meet the needs of the population of the district. The total number of hospital beds in the two medical hospitals is 420, of which 330 are in "Dobrich Hospital" AD and 90 - in "Center for Mental Health Dr. P. Stanchev - Dobrich" Ltd.

The medical establishments of municipal (urban) importance are the Diagnostic and Consulting Centers (DCC I Dobrich OOD and DCC II Dobrich EOOD), the Medical Centers (MC Viva Phoenix OOD; Medical Center Dobrich EOOD), the independent laboratories and etc. These should include the offices of individual and group medical practices (general practitioners and specialists).

The municipal health sector also covers:

- Three nurseries in which 430 children are raised and educated;
- Children's dairy kitchen with a capacity of 400 children;
- 39 health offices in kindergartens and schools in the Municipality of Dobrich;
- Home for medical and social care for children from 0 to 3 years of age, which performs both health and social functions.

Cultural infrastructure

The cultural infrastructure of the Municipality of Dobrich includes:

- 2 state cultural institutes: Yordan Yovkov Drama Theater and Dora Gabe State Puppet Theater;
- 2 regional cultural institutes: Dora Gabe Regional Library and Regional History Museum;
- 1 municipal cultural institute (state activity): Art gallery;

- 4 municipal cultural institutes (local activity): Bulgarian Chamber Orchestra, Professional Folklore Ensemble "Dobrudja", Brass Band, Choirs "Maestro Zahari Mednikarov" and "Dobrudzha Sounds";
- 1 Zahari Stoyanov Municipal Youth Center (local activity), organizing activities in the field of non-formal education;
- 6 Chitalishte: National Chitalishte "Yordan Yovkov - 1870", National Chitalishte "Romano Drom - 2002", National Chitalishte "Awakening - 1939", National Chitalishte "Mevlana - 2012", National Chitalishte "Bulgarian sparks - 2016 "and National Chitalishte" Dobrich - 2017 "
- numerous creative unions, private cultural associations and formations;
- over 150 amateur art groups, clubs and schools.

The city presents almost all forms of culture - visual and performing arts, books, reading and libraries, cultural heritage and culture and education. The cultural calendar of Dobrich offers a variety of events aimed at different target groups. The city also carries out active cultural exchange, and in this regard are important events of national and international importance: the National Meeting of Young Ballet Singers "Anastas Petrov", the International Youth Music Competition "Hopes, Talents, Masters"; the International Youth Festival "Folklore without borders "; The European youth pop-rock competition "Sarandev"; the Week of chamber music with international participation "Konstantin Iliev" and others.

Sports

The sports activities, developed on the territory of the Municipality of Dobrich, are organized in sports clubs and those with free access to sports facilities in the residential areas.

The first group of sports activities organized in sports clubs is carried out on the principles of high sportsmanship. For this purpose, the relevant infrastructure is used - sports halls, tennis courts, horse bases, specialized sports fields, etc. The second group of sports activities is related to the use of sports grounds and playgrounds in residential areas and others. sports facilities with free access.

There are 35 sports clubs and sports schools in Dobrich. They develop over 25 sports - football, basketball, volleyball, athletics, weightlifting, boxing and more. As a kind of "incubator" for sports clubs and schools is the Sports School in Dobrich. Together with the sports clubs mass sports and tourist events of regional, national and international character are organized.

Current state of the local economy

The economy of the city of Dobrich functions as part of the general economy of the country. It follows the general trends, changes and develops together with the regional and national economy, enjoys the common advantages and suffers from the common economic problems and their consequences.

Bulgaria's membership in the European Union is a prerequisite for the use of resources, following common policies, participation in a huge market, even for small companies in the local economy. The municipality does not have direct levers of influence, but it can create conditions, support, organize contacts and open doors for business.

It is necessary to analyze the strengths of the local economy, which have the largest share in the overall economy and have their impact on overall development.

The main indicators of economic development that have been considered include: Number of registered non-financial enterprises and their distribution by economic sectors; GDP; costs for acquisition of fixed assets, number of employees, investments in R&D and participation of enterprises in it. The development of the economy in Dobrich district and in the city of Dobrich follows the general tendencies in the country. The transition period led to the destruction of large manufacturing enterprises in the fields of mechanical engineering, electrical engineering, electronics, food and light industry. The presence of a large number of highly qualified specialists and managers who lost their jobs stimulated entrepreneurship and created numerous private companies, some of which inherited the markets and contacts of the old enterprises.

Dobrich District is trying to catch up with the average values of most indicators of economic development in the country - living standards and incomes are rising, but are still below average while poverty is declining. According to NSI data, in 2019 there was an increase in gross domestic product per capita for the district (10009 BGN) compared to 2018 (9176), but this increase is less than the average for SIR (13309 BGN).) and the national average (BGN 17,170).

GDP growth in Dobrich District is among the lowest in 2019, and the situation is identical with the growth of household income. The average annual gross salary in the district reaches BGN 10.4 thousand compared to the national average of BGN 13.8 thousand, and the income per household member increases to BGN 5,500 compared to the national average of BGN 6,013 in 2019. Regardless the lag in income and wages, poverty in the district is close to the national average. The share of the population living with material deprivation is 19.5% (against 19.9% for the country), and the share of the population living below the poverty line for the country is 22.8% (against 22.6% in the country) .

After several years of growth and decline, in 2019 economic activity in Dobrich district increased by 2.5% to 73.9% (compared to the national average of 74.3%). This increase is accompanied by an increase in employment and a decrease in unemployment, but they still remain relatively unfavorable. The employment rate for 2019 is 66.9%, compared to 70.1% in the country, and the unemployment rate - 7.0% compared to 4.2% in the country.

The educational status of the workforce remains a challenge for the local labor market. The share of university graduates in the working population is increasing to 21.1%, but lags behind the national average of 28%. The labor force with primary and lower education also increased for the second consecutive year and reached 24.8% - significantly less than the average 17.6% for the country. These factors limit the growth of the labor market and affect the development of the local economy. Business and investment activity in the district is growing slightly, but is still significantly lower than the national average. There is an increase in the relative number of enterprises and it is close but lower than the national average. An increase is reported in the costs for acquisition of fixed assets, as in 2019 they reach 2023 BGN / person of the population, at 2750 BGN / hour. n. average for the country.

The analysis of the data on investments and the economy in Dobrich district shows a lag in terms of the indicators "Volume of production / person per capita" and "Foreign direct investment / person per capita" compared to the national average. The production continues to grow in absolute value, but due to the low base it reaches only BGN 14.8 thousand / person, compared to BGN 25.9 thousand / person in the country. FDI is also growing, reaching 1,793 euros / person in 2019, which is almost twice lower than the national average of 3,560 euros / person.

As of June 15, 2020, the value of the paid grants under the operational programs for the district is BGN 1,525 / person (compared to BGN 1976 / person in the country). Most European funds were paid in the Municipality of Dobrich, while in all other municipalities the funds paid were less than BGN 1,000 / person.

The condition of the infrastructure in Dobrich district is far from the national average. The location of the district on the outskirts of the country explains the relatively low density of road and railway networks. The share of motorways and first-class roads in the district in 2019 is almost twice lower than the average - 10% compared to the national average of 19%. However, the quality of the roads is relatively good - 46.7% of the road surface in the district is in good condition compared to 41.7% for the country.

The share of households with Internet access has increased significantly over the last decade, but in 2019 decreased to 70% (from 75.1% for the country).

The level of local taxes is low in 2020 as well. When reviewing local tax rates, only the one on property transfer is higher in the district than the national average. The average tax in the municipalities in the district on motor vehicles is equal to the national average. The levels of taxes on retail trade, real estate of legal entities and taxi transport are significantly lower than the national average. On average for the municipalities in the district, the annual retail tax remains at BGN 8.71 / sq.m. at BGN 12.93 / sq.m. for the country. The rate on the non-residential real estate of legal entities is 1.55% (against 2.01% for the country), and on the taxi transport - BGN 300 / year against BGN 498 for the country. The self-assessments of the local administrations for the development of e-government and the provision of one-stop-shop administrative services in the district will decrease in 2020 as well, and are already lower than the national average.

The assessment of transparency in the work of the local administration (76.2%) remains higher than the national average (70.7%). The municipalities of Dobrich (city) and Krushari have the highest rating in the district

The leading industries are industry, services and transport. The data for 2019 show that in the indicator "Produced products" the industry sector is leading (BGN 495,560 thousand), while in the indicator "NPP" it lags significantly behind the sector "Services". Employment in these two sectors is almost the same - 5,215 employees in Industry and 5,942 in Services. This means that sales in the Industry sector have lower added value than in the Services sector. From the presented data it is necessary to conclude that in structural terms the leading sector for the economy of Dobrich is the Services Sector, followed by Industry and Transport.

In the secondary sector of the economy of the city of Dobrich (processing industry and construction) in 2019 are engaged 33.80% (6 832) of employees, and in the tertiary sector (services) - 66.20% (13379).

Development of the primary sector of the economy

The primary sectors of the economy (agriculture, forestry and fisheries) have a rather complementary role in the municipal economy. According to the Ministry of Agriculture, Food and Forestry, the usable agricultural land in the Municipality of Dobrich for 2018 is about 96,096 decares, and the arable land - 95,400 decares.

Development of the Industry sector

In 2019, 1,073 companies are operating in the Industry Sector. The net sales revenues for these enterprises amount to a total of BGN 565,939 thousand, or 27.83% of the total realized NPP for the territory of the Municipality.

The number of employees in this sector is 8,013 people, or 39.65% of the average number of employees in 2019.

The city of Dobrich plays an important economic role in the Northeast Planning Region, as the second largest economic center with a developed diversified economy. The structure-determining branch for the municipality is the food industry. The region has a highly developed agriculture. This determines the predominant nature of the processing industry in Dobrich: over 50% of the volume of the urban industry is the production of food related to the processing of primary agricultural products; production of equipment for the food industry, agricultural machinery and other industries serving the agricultural sector.

Dobrich produces high quality products that are competitive on both domestic and foreign markets. The share of light industry in the overall economy of the city is significant.

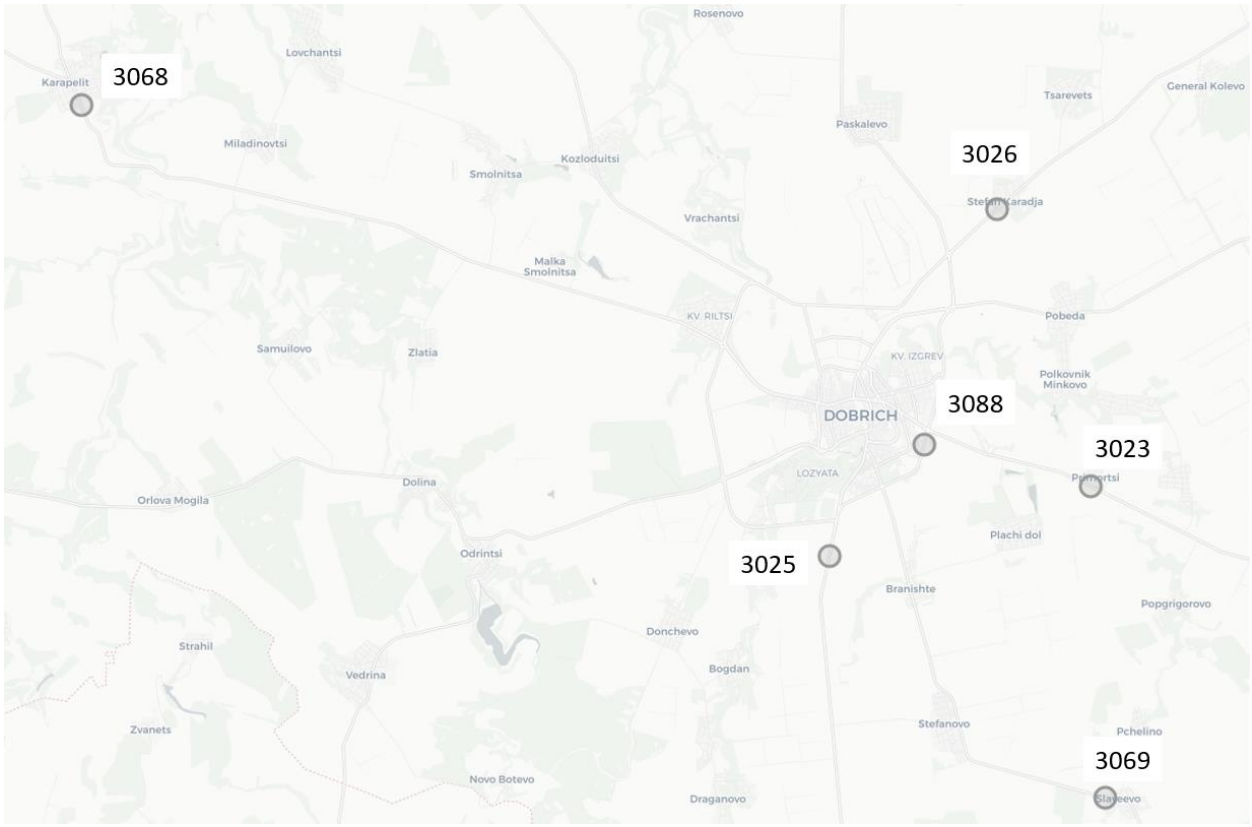
Source: NSI, Municipality of Dobrich

2.1.3. Traffic data

Traffic intensity data

Country roads

Data on the intensity of traffic on national roads in Dobrich District we found out from RIA. The data are SDGI (average daily annual intensity) from 2015 to 2018, 2019 or 2020 for individual census points, depending on their state of operation for the respective years. Also from data were taken from "ALBUM MEDIUM-DAY ANNUAL ANNUAL INTENSITY OF MOTOR TRAFFIC ON REPUBLICAN ROADS FOR 2015", where "in addition to the automated counting points are included

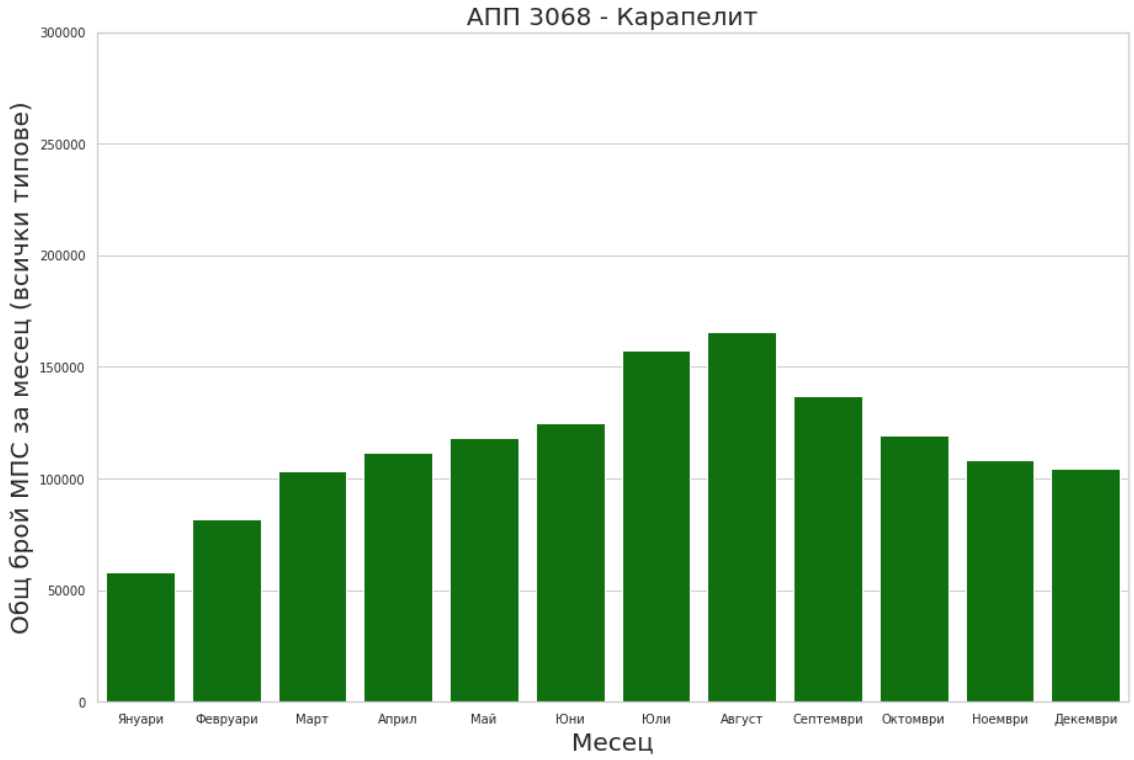


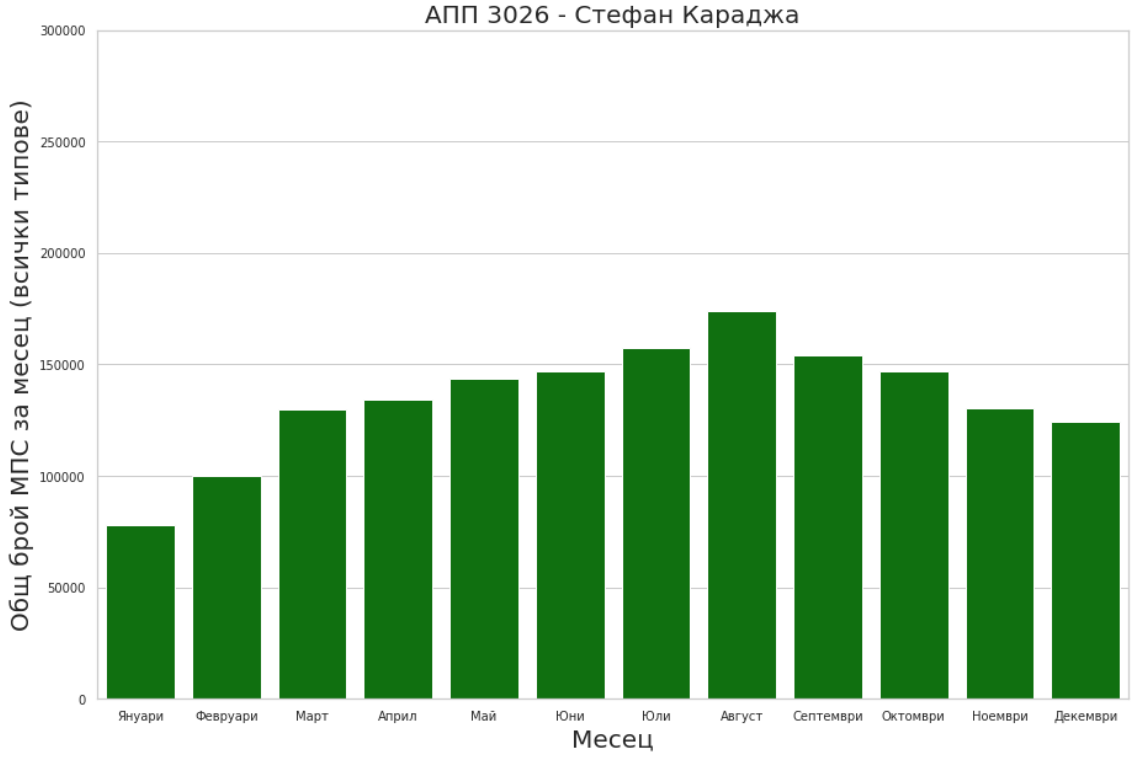
Automatic counting points on the territory of Dobrich District

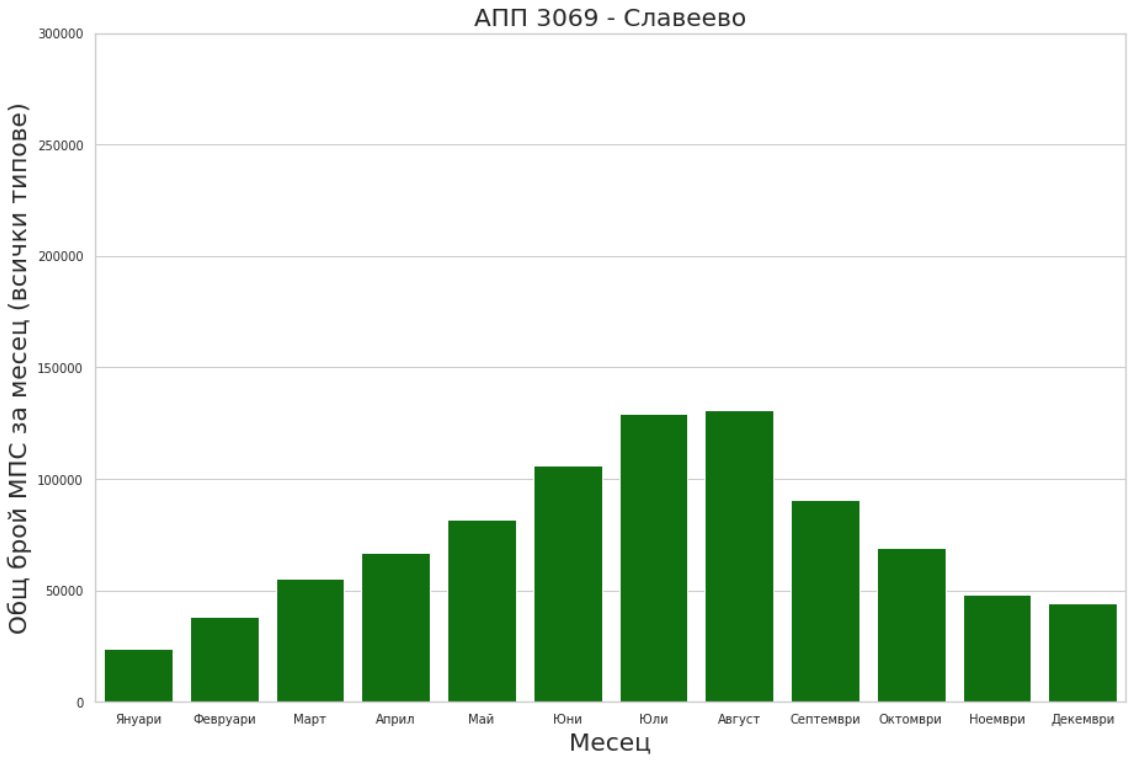
The lack of consistency in the volume and quality of the data makes the analysis extremely difficult, and the extraction of correct development trends in recent years impossible.

As expected, the busiest road in the district is the section II-29 between Varna and Dobrich. The most significant change in the intensity between 2015 and 2019 is observed in this section, as the increase is by almost 20% for cars. There is also the highest percentage of trucks - about 13%. SDGI is gradually decreasing at the ring road of Dobrich and on the way to the border with Romania. On the section to the border the freight traffic is about 8%.

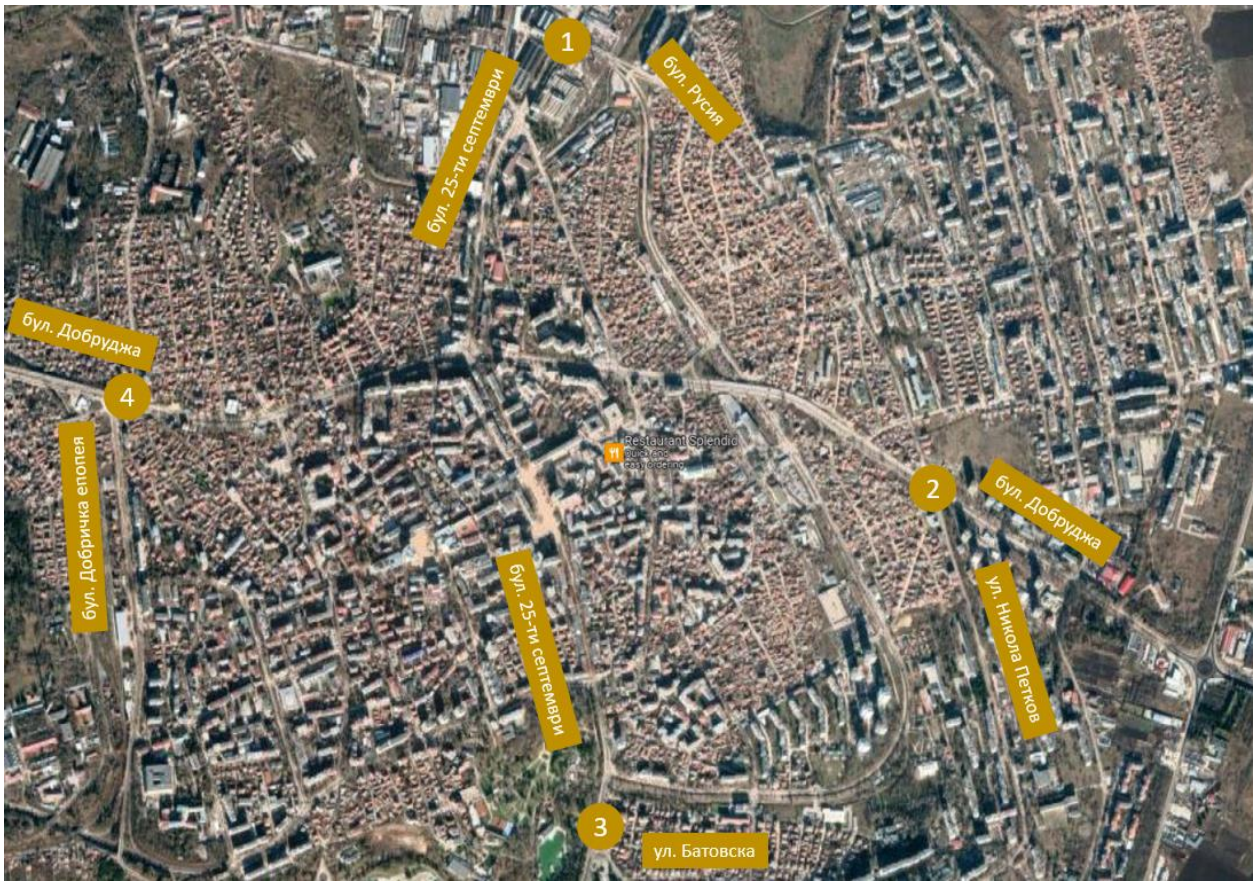
The following graphs show the monthly distribution of the number of vehicles passing through the automatic counting points for 2017. Only for these four points the data were complete. The peaks in the summer season are clearly marked and the intensity decree the winter months.







Crossroads in the city



Within the project, a traffic census was conducted at four main intersections in the town of Dobrich. They were selected so that we could simultaneously obtain information about the

traffic on the main boulevards and the intensity of the incoming and outgoing traffic flows. The intersections are:

1 25th of September Blvd. - Russia Blvd.

2 Dobrudzha Blvd. - N. Petkov St.

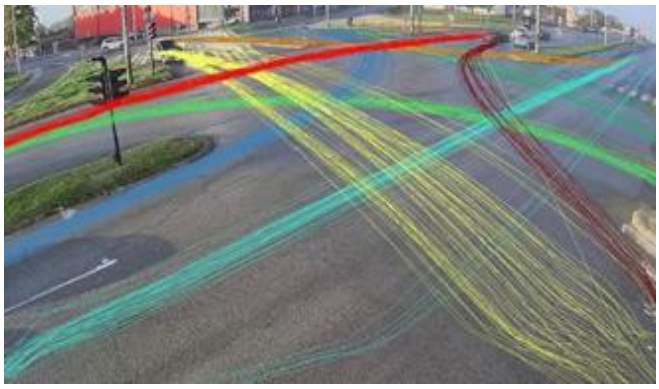
3 25th of September Blvd. - Batovska St.

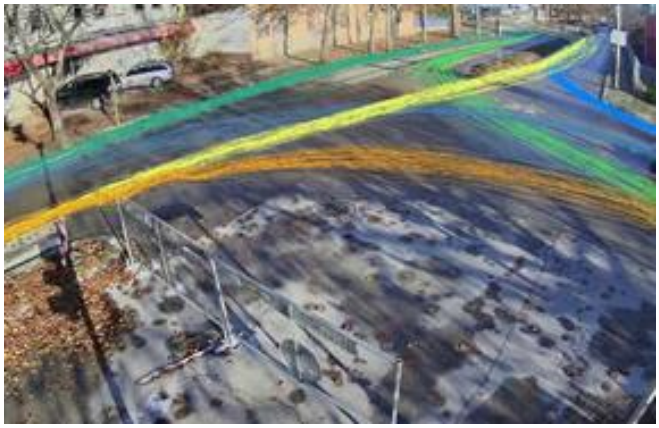
4 Dobrudzha Blvd. - Dobrich Epic Blvd.

For the purposes of the census, cameras were used, which are mounted on a suitable pole at a height of about 5 m, so as to record the movement through the intersection of all streams.

The recordings were made between 08.11.2021 and 10.112021. To obtain information on the unevenness of the intensity of traffic during the day, the censuses included the following periods: 07:30 - 09:30, 13:00 - 14:00 and 16:30 - 18:30.

For the counting, software was used that uses specially prepared models of neural networks, through which objects in the picture are recognized and tracked. The algorithm processes each frame, and the result represents the trajectories of passage through the intersection of road users. The following images show sample trajectories for a 15 minute interval.





If necessary, the counts from the algorithm are supplemented with counts performed by a member of the team based on the videos. This is due to some limitations of the algorithm's capabilities - objects are too small or visibility is poor due to low light or rain.

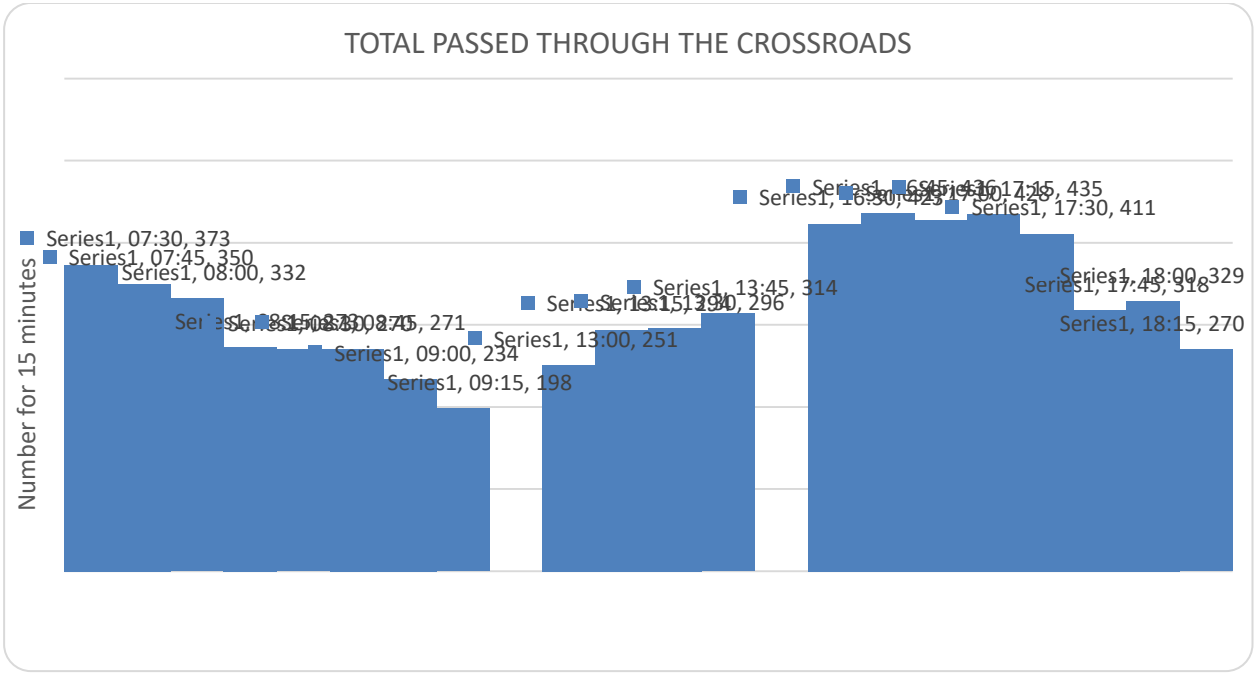
Crossroads of 25th of September Blvd. - Russia Blvd.

At the time of the census, the intersection was temporarily organized, with traffic at the southern branch of 25th of September Blvd.

The total load at the intersection has two distinct peak periods - between 7:45 and 08:15 in the morning and between 16:45 and 17:30 in the evening. In the morning the flow from Russia Blvd. to September 25 Blvd. (towards the exit from the city) is the most intense, and in the evening the opposite situation is observed - the intensity is higher towards the city center. Peak intensities are limited to short periods (maximum 30 minutes).

From the results it can be concluded that the intensity of traffic far from reaching the capacity of the intersection. The observed queues, which were formed by those turning left from 25 September Blvd. to Russia Blvd., were caused mainly by the turning off of the traffic lights.

		A		B		C	
		B	C	A	C	A	B
7:30	7:45	33	25	88	27	43	9
7:45	8:00	22	38	125	63	66	19
8:00	8:15	28	43	121	34	49	22
8:15	8:30	44	34	67	26	43	32
8:30	8:45	23	41	43	30	40	22
8:45	9:00	27	44	43	17	36	22
9:00	9:15	35	34	32	20	37	17
9:15	9:30	29	45	39	17	37	19
13:00	13:15	41	43	49	18	32	21
13:15	13:30	42	50	48	20	28	18
13:30	13:45	38	44	42	25	45	33
13:45	14:00	29	41	50	18	40	20
16:30	16:45	87	57	36	20	36	24
16:45	17:00	101	68	65	21	36	47
17:00	17:15	149	101	51	19	30	63
17:15	17:30	82	74	50	25	37	66
17:30	17:45	75	43	31	37	46	43
17:45	18:00	60	49	31	18	36	41
18:00	18:15	64	52	34	19	38	29
18:15	18:30	39	41	27	18	20	24

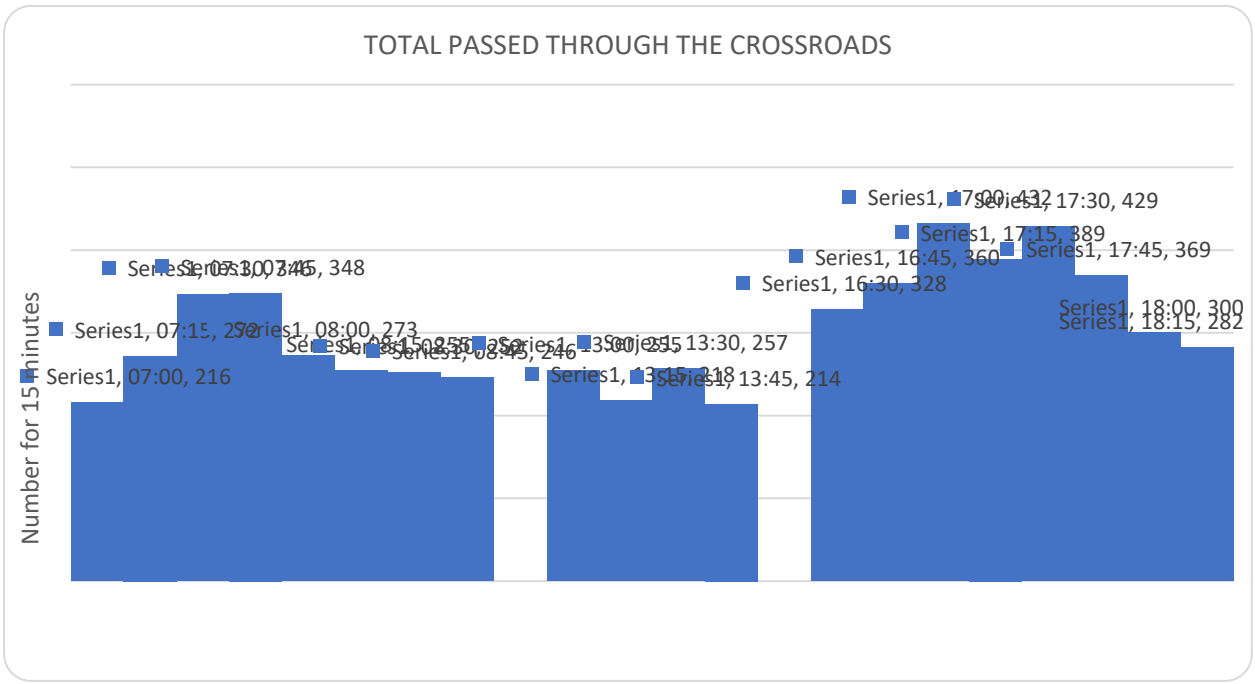


Crossroads of Dobrudzha Blvd. - Dobrichka Epopeya Blvd.

The results show that this intersection is more intensively loaded during the afternoon peak period. However, the capacity of the intersection is not reached at any time and queues are not observed in any of the directions.

At this crossroads it is interesting that the most intense flow is of those turning left from Dobrudzha Blvd. to the south along Dobrichka Epopeya St.

		A			B			C			D		
		B	C	D	A	C	D	A	B	D	A	B	C
7:00	7:15	24	11	8		24	29	32	14	9	19	35	11
7:15	7:30	24	11	9		53	41	46	12	10	23	34	9
7:30	7:45	27	19	13		58	45	58	20	14	29	40	23
7:45	8:00	24	27	15		62	41	76	18	10	19	35	21
8:00	8:15	23	19	13		45	35	44	17	11	13	34	19
8:15	8:30	24	15	11		47	33	44	14	7	10	33	17
8:30	8:45	24	17	12		28	20	41	19	13	18	45	15
8:45	9:00	26	21	14		31	26	33	18	11	6	44	16
13:00	13:15	23	41	11		36	27	37	16	9	19	20	16
13:15	13:30	18	32	12		29	26	32	15	7	12	18	17
13:30	13:45	32	30	10		40	37	33	18	10	15	16	16
13:45	14:00	21	27	9		27	26	38	17	6	16	14	13
16:30	16:45	51	29	12		42	44	31	19	16	22	43	19
16:45	17:00	61	34	9		49	20	40	22	9	24	62	30
17:00	17:15	71	48	11		75	46	48	18	12	19	55	29
17:15	17:30	55	40	10		64	35	32	20	19	22	61	31
17:30	17:45	25	55	15		74	38	52	23	21	28	64	34
17:45	18:00	22	52	4		83	30	34	19	17	20	64	24
18:00	18:15	20	40	5		81	32	25	19	15	15	31	17
18:15	18:30	22	37	5		71	20	28	14	16	10	40	19

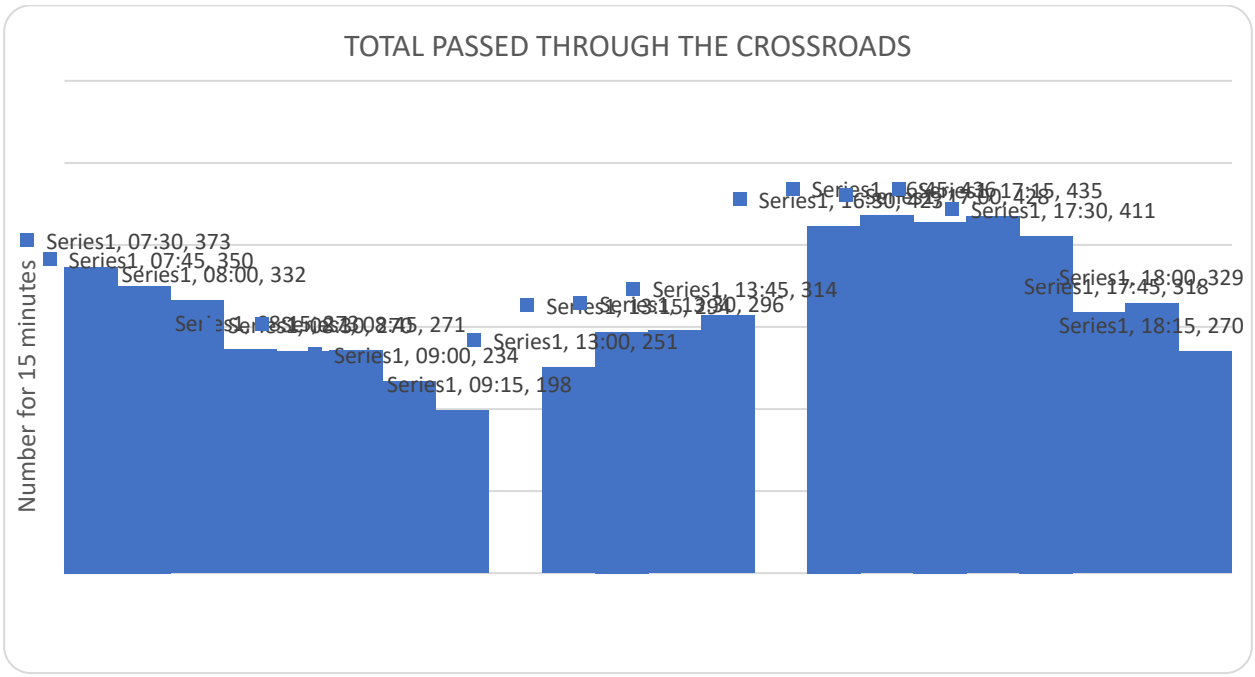


Crossroads of 25th of September Blvd. - Batovska St.

		A		B		C	
		B	C	A	C	A	B
7:30	7:45	78	95	99	0	100	1
7:45	8:00	83	71	86	1	109	0
8:00	8:15	99	62	64	1	104	2
8:15	8:30	66	44	84	1	77	1
8:30	8:45	69	40	76	1	83	1
8:45	9:00	66	46	56	0	101	2
9:00	9:15	54	35	61	2	81	1
9:15	9:30	38	30	56	1	72	1
13:00	13:15	51	52	56	1	90	1
13:15	13:30	50	73	71	0	99	1
13:30	13:45	58	53	76	1	105	3
13:45	14:00	85	71	58	2	97	1
16:30	16:45	92	111	107	1	110	2
16:45	17:00	100	105	104	2	122	3
17:00	17:15	122	83	95	2	124	2
17:15	17:30	123	100	80	2	129	1
17:30	17:45	102	99	80	2	127	1
17:45	18:00	81	78	65	1	91	2
18:00	18:15	81	81	74	1	91	1
18:15	18:30	74	57	69	1	69	0

At this intersection, the intensity of traffic is higher during the afternoon peak interval. The peak period lasts about 1 hour to about 17:45.

The capacity of the intersection successfully serves the traffic flows. At certain moments there are queues at the left turn from 25th of September Blvd. to Batovska St., and this is most pronounced in the afternoon peak interval, when the oncoming conflict flow (from C to A) is also very intense.

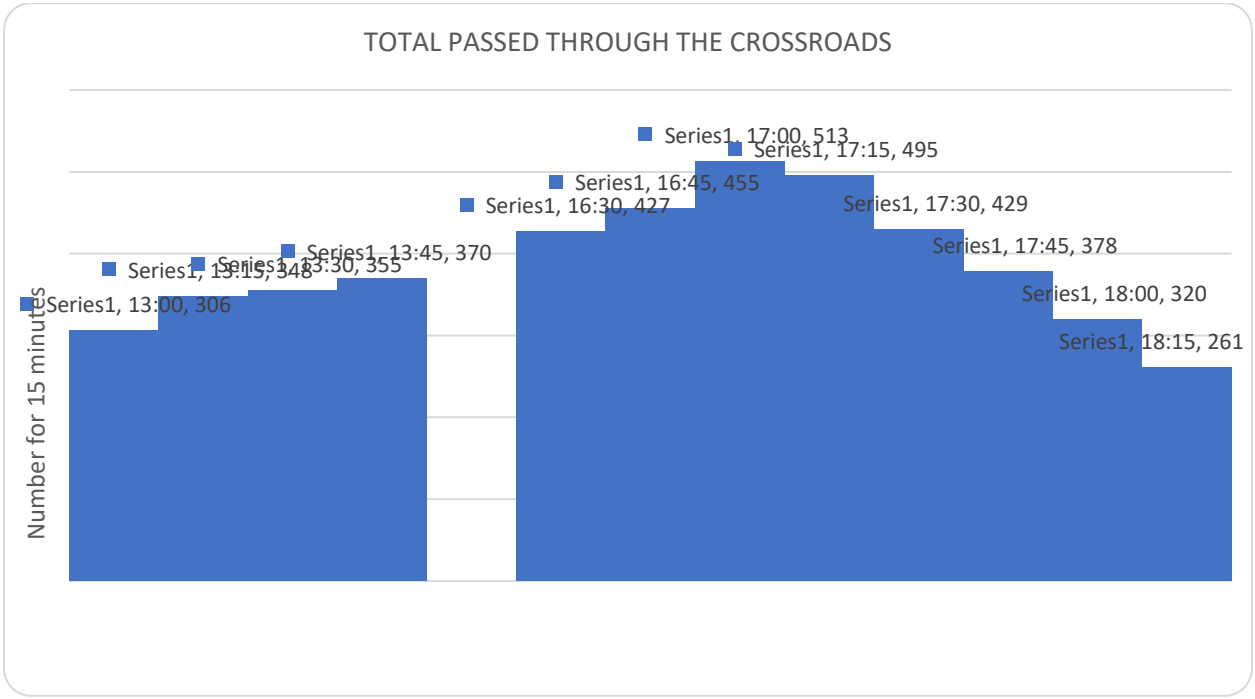


Crossroads of Dobrudja Blvd. - N. Petkov Str

During the processing of the videos, it was established that the recording for the morning period was damaged and for this reason the corresponding censuses were missing. From the obtained results it can be seen that this crossroads is the most intensively loaded of the examined ones. Driving straight on Dobrudja Blvd. is a major part of traffic at the crossroads.

The main flow during the afternoon peaks is in the direction of the exit from the city. It should be noted that peak intensities are reported over a long period of 1.5 hours. During this period the capacity of the junction in the loaded directions is reached and the formation of queues is observed.

		A			B			C			D		
		B	C	D	A	C	D	A	B	D	A	B	C
7:30	7:45												
7:45	8:00												
8:00	8:15												
8:15	8:30												
8:30	8:45												
8:45	9:00												
9:00	9:15												
9:15	9:30												
13:00	13:15	9	6	3	8	24	69	13		10	35	107	22
13:15	13:30	8	11	7	12	22	101	6		18	40	103	20
13:30	13:45	7	10	4	13	14	106	9		21	35	124	12
13:45	14:00	7	7	6	9	25	88	15		6	52	127	28
16:30	16:45	14	22	9	7	30	102	18		23	47	114	41
16:45	17:00	5	18	10	7	27	111	20		24	36	156	41
17:00	17:15	12	25	10	11	31	115	21		20	43	169	56
17:15	17:30	6	15	7	15	32	127	14		22	45	167	45
17:30	17:45	4	14	9	17	28	95	18		17	49	145	33
17:45	18:00	5	14	6	4	14	81	7		11	48	145	43
18:00	18:15	6	9	7	3	17	55	8		11	38	144	22
18:15	18:30	4	6	2	3	11	44	14		17	31	99	30



2.2-A. Analysis of the current situation of road safety measures - Medgidia

The traffic safety was analyzed in relation with the accidents registered at the level of the transport network in the period 2016-2020, data existing in the database of the Police of Medgidia Municipality, obtained at the request of Medgidia City Hall.. Starting with 2017, there is a gradual reduction in the number of accidents. The annual variation of the number of accidents can be found in figure 2.22. During the entire analysis period, 21 people lost their lives in traffic accidents, the highest value being registered in 2017, when there were 10 deaths as a result of involvement in traffic accidents. Compared to the situation encountered in 2016, at the end of the analysis period there was a decrease of 50%, registering a number of 2 deaths. This further motivates the implementation of actions leading to the reduction of victims associated with urban traffic

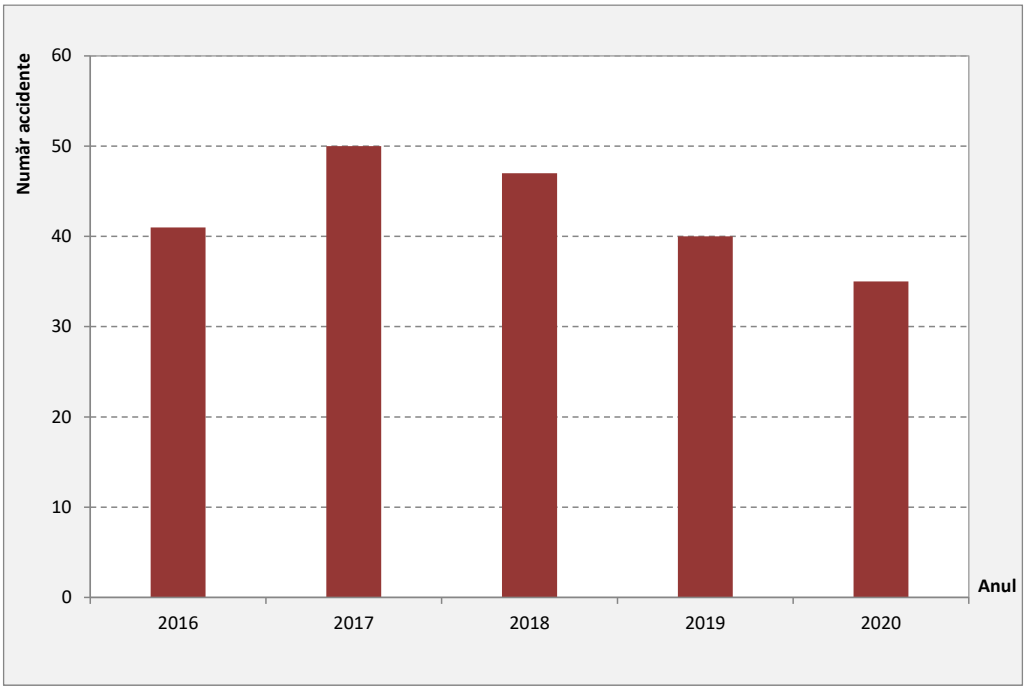


Figure 2.22. *Variation in the number of accidents, 2016-2020.*
Data source: Medgidia Municipality Police.

Other categories in which the victims of accidents are classified, depending on the severity, are those of minor injuries and serious injuries. The annual variation of the two categories of victims follows the trend manifested in the variation of the number of accidents, the maximum value reaching in 2019 to 64 cases (figure 2.23).

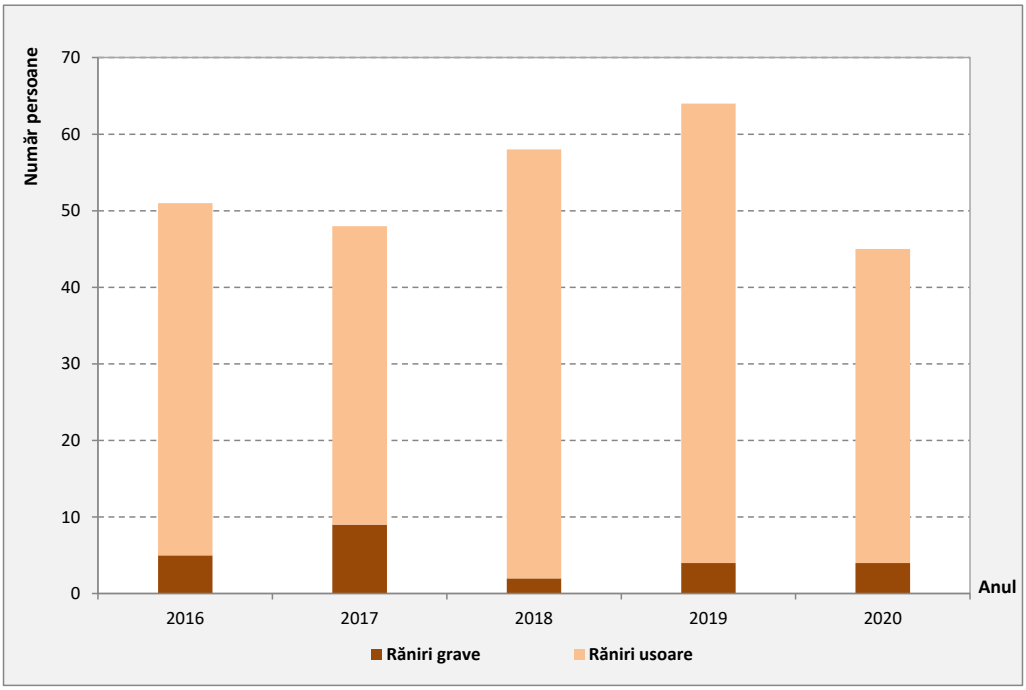


Figure 2.23. *Variation in the number of victims, 2016-2020. Data source: Medgidia Municipality Police.*

The statistics of the number of annual accidents according to the causes of their occurrence are centralized in table 2.5. It is noted that the lack of priority for vehicles and pedestrians, and the illegal crossing of pedestrians are the main causes of accidents.

Table 2.5. *The causes of accidents in Medgidia, during 2016 - 2020.*
Data source: Medgidia Municipality Police.

The cause of the accident	Number of cases				
	Year 2016	Year 2017	Year 2018	Year 2019	Year 2020
Offenses of carts drivers or animal drivers			1		
Offenses of cyclists	1				
Offenses of passengers / travellers / companions		1			
Fall asleep at the wheel	1				
Other offenses of pedestrians			1		
Other offenses committed by drivers	3	1	1		1
Other activities that distract the attention in traffic		5	4	5	
Circulation in the opposite direction			1		1
Driving without a license	1			3	
Driving under the influence of drugs		1			
Driving under the influence of alcohol		1		2	2
Technical malfunctions of vehicle		1			
Irregular overtaking	1	2	1		1
Lack of traffic safety devices			1		
Not giving priority to pedestrians	5	4	7	2	5
Medical infirmities or conditions					
Not giving priority to vehicles	11	15	8	9	6
Irregular return				1	
Uninsurance when changing direction	3	1		1	2
Uninsurance when going back	1		5	2	
Uninsurance when changing lanes				1	1
Failure to respect the distance between vehicles	1	6	5	4	2
Non-supervision of minors				4	
Pedestrians on the road	5	3	2		2
Irregular pedestrian crossing	5	6	9		7

The cause of the accident	Number of cases				
	Year 2016	Year 2017	Year 2018	Year 2019	Year 2020
Speed not adapted to road conditions	1	2		5	5
Irregular speed	2	1	1	1	

The extent to which the city as a whole is accessible to all its residents, including people with disabilities, the elderly, people with low incomes or who are accompanied by children, largely characterizes mobility. Mobility optimization is directly dependent on the location in the territory of various functions (housing, trade, jobs, leisure, etc.), the type and characteristics of infrastructure, traffic safety. Thus, taking into account the above mentioned, the inhabitants opt for the mode of transport with which they make their trips.

Cities, especially those where frequent short journeys are made, are a conducive environment to the use of non-motorized modes of transport, thus contributing to sustainable mobility. In this period of modal relocation of travel, in which the culture of citizens towards sustainable development is formed, the offer on the use of non-motorized modes of transport that is made available to them is essential. In this sense, it is necessary to arrange the public space in a way that will attract the citizens to travel on foot or by bicycle, ensuring them:

- → generous pedestrian spaces;
- → marking / indicating the pedestrian routes to the main points of interest;
- → road safety (public street lighting, signaling pedestrian crossings, arranging uneven passages);
- → accessibility for people with disabilities (semi-buried curbs at pedestrian crossings, access ramps, tactile marking at pedestrian crossings, acoustic signals at traffic lights);
- → arranging bicycle tracks to ensure road safety;
- → bicycle parking in the vicinity of the main points of interest (extra-urban public transport stations, shopping centers, public institutions, schools, leisure places).

The road transport network of Medgidia Municipality is provided with sidewalks for pedestrian traffic. In recent years, these infrastructure elements have been improved in the same time with the rehabilitation of streets. In the current situation, in Medgidia we find sectors of the pedestrian network that encourage the use of this mode of travel (figure 2.24), respectively wide sidewalks, with surface layer in very good technical condition, which ensures accessibility and safety for all categories of citizens, including those with mobility problems, but also sectors that have a high degree of deterioration or are missing (figure 2.25).

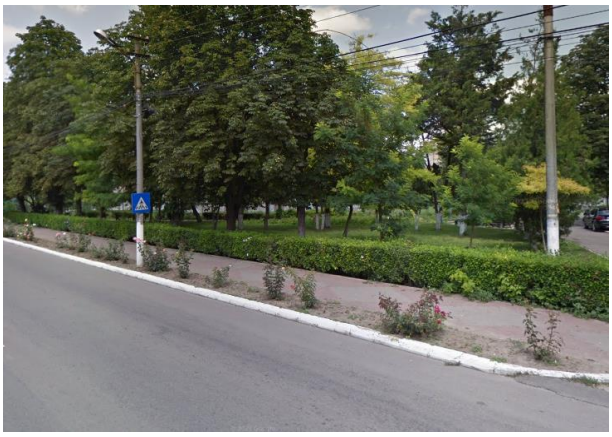



Figure 2.24. *Sidewalks in good condition (examplification).*


Figure 2.25. *Improper or missing sidewalks (examplification).*

Regarding the pedestrian infrastructure in crowded areas, the main problem is generated by the lack of parking spaces, which produces negative consequences on the accessibility and safety of pedestrian movements. Sidewalks are often used for parking vehicles, and pedestrians are forced to travel on the road or slip through vehicles. The figure below illustrates such situations.

Another common situation is in the residential area with houses, where cars are parked at the gate, on the sidewalk, in which case pedestrians are forced to move on the road, causing traffic safety problems.

Returning public space to citizens is possible by applying aggressive policies to penalize irregular parking violations, a feasible measure only if it offers an alternative for those who currently park vehicles on spaces with another destination – parking spaces arranged so that the impact on space public to be minimal.

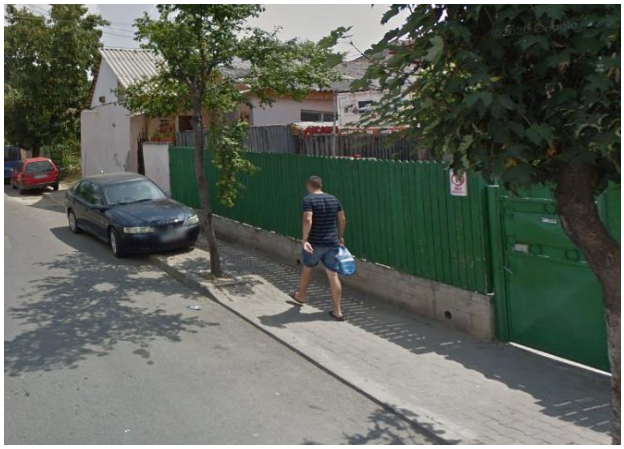



Figure 2.26. *Monopolized sidewalks of parked vehicles.*

With regard to facilitating the movement of people with reduced mobility (people with disabilities, the elderly, people with children, etc.), at the level of the transport network, areas have been identified areas where solutions are implemented to improve accessibility (buried or semi-buried borders at pedestrian crossings) - figure 2.27. At the same time, in the current situation, there are still areas with accessibility deficiencies of the urban space - high curbs that make it difficult for people with reduced mobility or people accompanied by prams / shopping carts (figure 2.28), but it should be mentioned the positive start of actions to make pedestrian areas accessible.

In residential neighborhoods, especially in those of collective housing, there is a lack of quality community spaces, designed exclusively or with priority for pedestrians. Public spaces are largely organized to meet the demand for traffic and parking of private vehicles, which makes them impoverished by the landscape and environmental quality necessary for good quality housing.

Traffic safety at the level of the pedestrian network was analyzed by refering the number of victims of traffic accidents in the last 5 years. The statistical analysis showed that pedestrians were involved in 30% of the total number of accidents. The main cause of road accidents involving pedestrians is "irregular pedestrian crossing". In order to reduce these negative aspects, in addition to creating an integrated traffic management system, it is recommended to carry out information and communication campaigns for all traffic participants on the preventive use of spaces dedicated to public traffic and for orientation towards sustainable modes of transport (pedestrian, bicycle).

Figure 2.27. *Accessible urban areas (exemplification).*

Figure 2.28. *Hard accessible pedestrian crossings (exemplification).*

At present, the Municipality of Medgidia has a transport system dedicated to cycling, but there are also situations in which bicycle traffic takes place on the roadway, on lanes dedicated to vehicles or on sidewalks, which endangers traffic safety for all road users.

The arrangement of intersections in the urban environment has direct consequences on the quality level of the services offered by the transport infrastructure, conditioning the flow of traffic and the safety of traffic participants - pedestrians, cyclists, drivers and passengers in vehicles. Regulations on the organization and control of traffic in urban intersections fall into two main categories: regulations based on priority indicators and regulations by traffic lights. Currently, the systematization of traffic at the level of the street network of the Municipality of Medgidia is achieved through systems falling into the two categories mentioned above. At the level of the network, two roundabouts and a traffic light are arranged (figure 2.29).

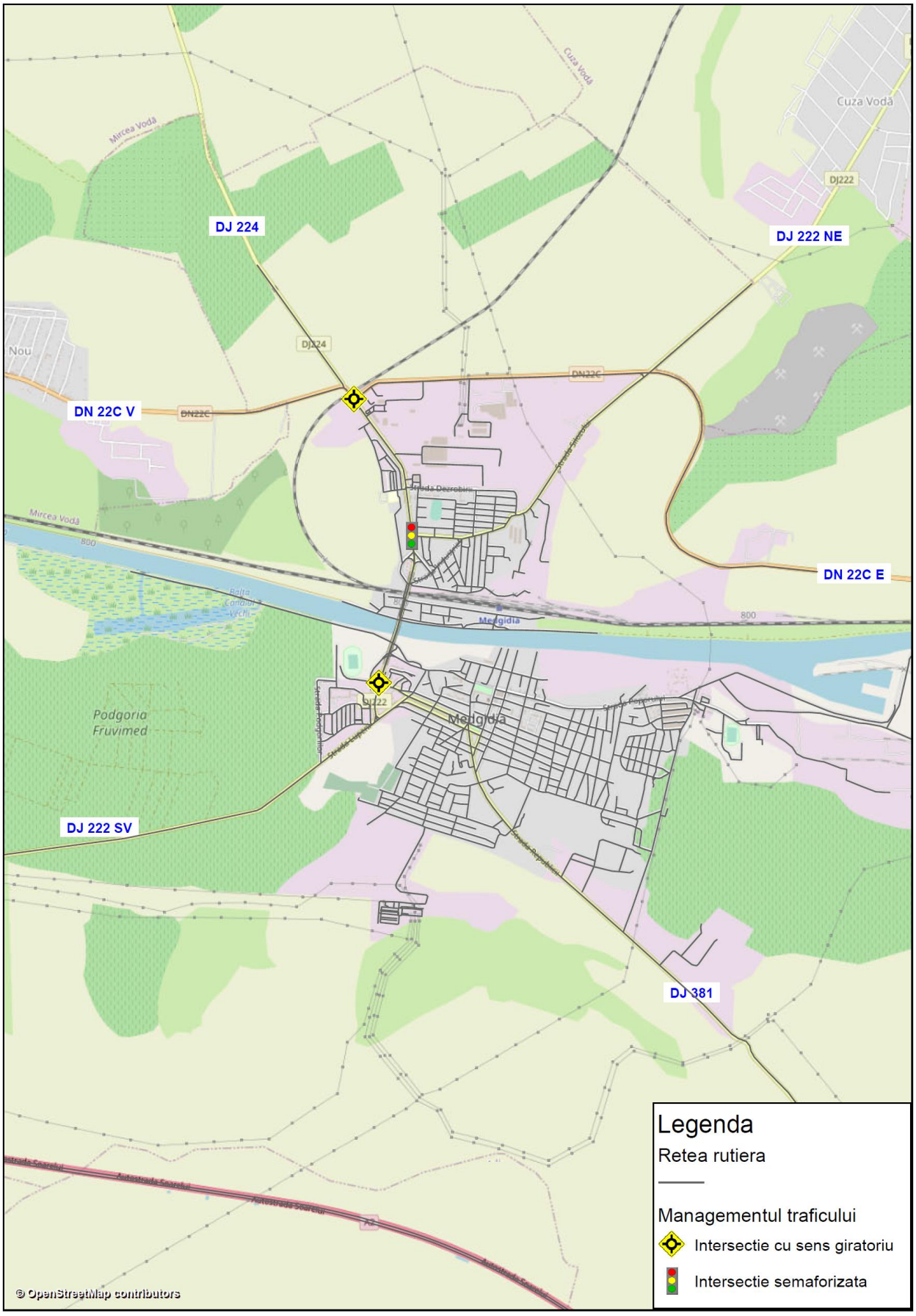


Figure 2.29. *Traffic management systems – the current situation.*

The speed of vehicles is one of the factors with a significant influence on traffic safety, and setting limit values according to the specifics of the area (land use function, categories of people frequenting the territory, technical characteristics of road infrastructure) are aspects related to traffic management. The specialised studies show that reducing speed limits lowers the rate of accidents and their victims. Pedestrians are more likely to survive if they interact with vehicles traveling at speeds of up to 30 km/h compared to situation in which their speed exceeds this value. Thus, it is necessary to limit the speed on the sections of infrastructure whith significant number of pedestrians and where there are no special arrangements for them. At the level of the street network of Medgidia Municipality there are zones where the maximum traffic speed is limited to 30 km/h, especially around shopping centers and educational units. It is further recommended to intensify the implementation of such traffic safety solutions, especially in residential areas and in those with high values of pedestrian flows. Also, the proposal of smart solutions for signaling pedestrian crossings in crowded areas will be considered.

At the level of the road network of the Municipality of Medgidia, the signaling for traffic regulation is present, the signaling and orientation indicators are properly located and are in good condition (figure 2.30).

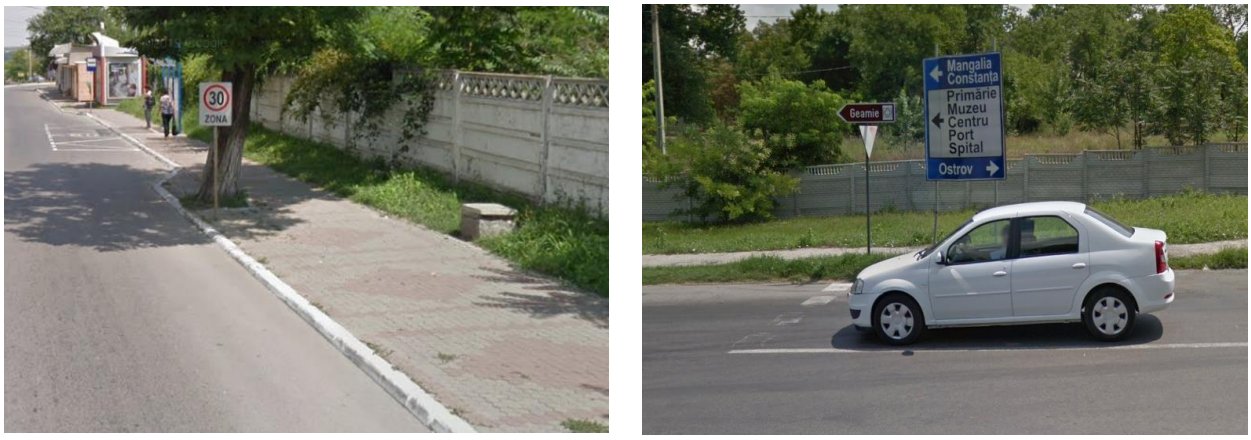


Figure 2.55. *Traffic regulation signage (exemplification).*

From an institutional / organizational point of view, the Local Council of Medgidia Municipality has attributions regarding the provision of the necessary framework for the provision of public services of local interest regarding the community services of public utility.

2.2-B. Analysis of the current situation of road safety measures - Dobrich

Country roads

For the purposes of the study, the team traveled by car on road II29 from the ring road with the ring road of Dobrich to the border with Romania. The trips were made both during the day and at night.

The trips were filmed with a camera mounted on the windshield of the car. The records were then reviewed and analyzed in detail. The team monitors and monitors for defects in pavement, road signs and markings, as well as defects in restraint systems, banquets and in the range of the road. Visibility of road signs and horizontal road markings is observed during night trips. Defects in the visibility of the horizontal marking shall be noted only in sections where the road marking has a brightness coefficient for dry pavement below the minimum values for the respective road class, in accordance with the table.

The road was divided into sections and an inspection was made for each section. The results are filled in the table in Annex 1.

Section 1 is from the roundabout at the exit from the town of Dobrich to the village of Stefan Karadja. In this section the main problems are related to the lack or poor quality of the road markings - middle and end line, as well as stop lines. These problems are even more serious in the dark part of the day, when visibility is extremely low. Cracks are noticeable almost throughout the section, but at the moment there is no significant damage to the road surface. Due to the lack of end lines, the edges of the road are unrecognizable to the driver. The road signs are worn out and in the dark hours of the day their visibility is not at the required level.

Section 2 is in the village of Stefan Karadja. Here again, the main problem is the missing or severely worn road markings. Particularly critical is the condition of the footpaths, which need to be seen from a great distance so that pedestrians can cross safely. There is also a lack of road signs (road sign B2) or their closure by vegetation. No significant disturbance of the road surface was observed. The night inspection further confirmed the poor quality of the road markings, and in some places even the lack of them. Despite the presence of street lighting, visibility in the village in the dark part of the day is very poor.

Section 3 is from the village of Stefan Karadja to the town of General Toshevo. Here again, the main problem is the missing or severely worn road markings. There are serious irregularities, tracks and potholes in this section. At the overpass of the railway line there is a significant difference in the level of the pavement in the areas of the expansion joints. At a large number of intersections there are no signs B2 "Stop! Stop!" Skip on the road with priority! "In some sections there are road signs with reduced visibility due to unmaintained vegetation along the road. For horizontal curves marked with road signs A1 or A2 for danger, no additional C7" Directional signs "are used.

The night inspection further confirmed the poor quality of the road markings, and in some places even their lack of them.

Section 4 is in the town of General Toshevo. Here again, the main problem is the missing or severely worn road markings. Particularly critical is the condition of the footpaths, which need to be seen from a great distance so that pedestrians can cross safely. There are serious irregularities, tracks and potholes in this section. The night inspection further confirmed the poor quality of the road markings, and in some places even the lack of them. Some road signs did not show enough visibility in the dark part of the day. It should be noted that the street lighting was not in accordance with the trees and their crowns and there are areas where the lighting does not work effectively and the visibility of the road is extremely low. In other areas where there are no trees along the street, the lighting works well.

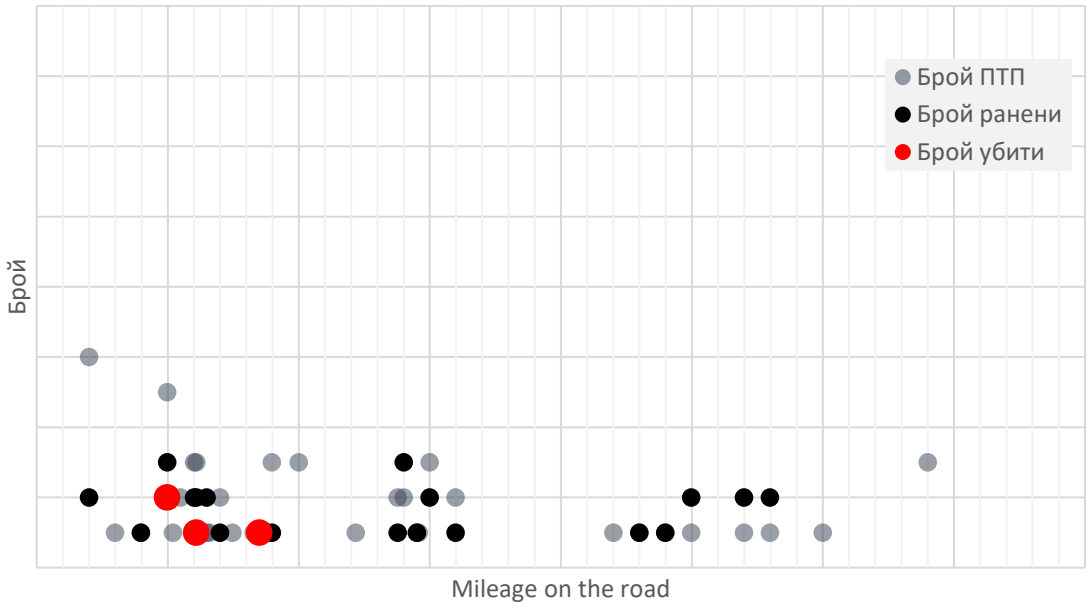
Section 5 is between the town of General Toshevo and the village of Kardam. The site is under repair and for this reason, the inspection was not carried out.

Section 6 is in the village of Kardam. Here again, the main problem is the missing or severely worn road markings. Particularly critical is the condition of the footpaths, which need to be seen from a great distance so that pedestrians can cross safely. Serious irregularities, tracks and potholes are observed on the road surface. In some areas, street lighting does not work effectively.

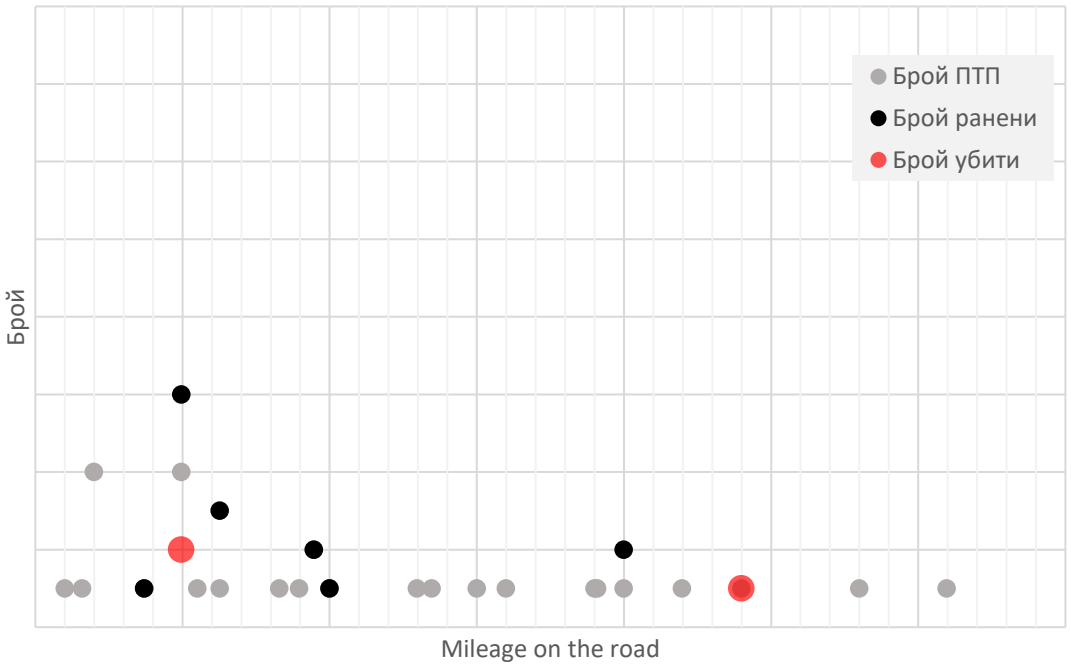
Section 7 is between the village of Kardam and the border with Romania. In this section the road surface is in the worst condition, as in large sections there are irregularities and potholes that make the trip dangerous and uncomfortable. Here again there is a serious problem with the quality and visibility of road markings. Damaged and dangerous steel guardrails have been identified and are apparently of very poor performance.

From the OD of the Ministry of Interior we received data on accidents on the main roads connecting the town of Dobrich with Romania - I-9 / E87, III-293 and II-29. The data are visualized in the following graphs. The type and level of detail of the data provided do not allow a more in-depth analysis of the causes of accidents and their consequences.

II-29


Брой ПТП
Брой ранени
Брой убити
Брой
Mileage on the road

III-293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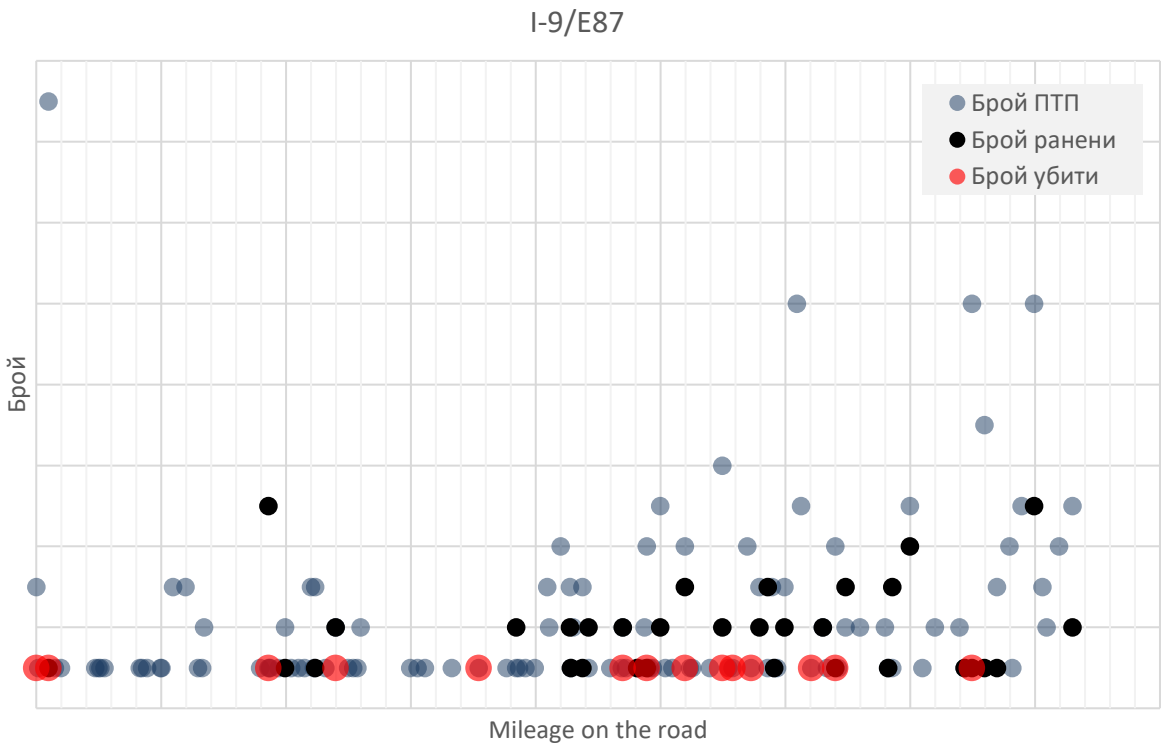


Streets and crossroads in the city

For the purposes of the study, the team traveled by car along the main roads of the city - Dobrudzha Blvd., 25th of September Blvd. and Russia Blvd. The trips were filmed with a camera mounted on the windshield of the car. The records were then reviewed and analyzed in detail. As with the inspection of suburban roads, the team monitored the condition of the road surface, road signs and markings. In urban conditions, the condition of the sidewalks and their proper use is extremely important.

We received data on road accidents in the town of Dobrich from the OD of the Ministry of Interior. The data are for 2018 and 2019, as these were the last years that I was not affected by the pandemic. Accidents are divided by several criteria:

- by place: crossroads, straight section, parking, etc.
- by type of participant: driver, passenger, pedestrian, etc.
- by type of collision: in a pole, in a tree, in a pedestrian, etc.

The general nature of the data provided does not allow a more specific and detailed analysis of the reasons for their occurrence. There are also a large number of accidents that are in the statistics, but cannot be accurately classified even by these basic criteria. However, conclusions can be drawn about the overall state of road safety in the city:

- there is no change in the level of injuries and the number of accidents in the city;

- the number of minor road accidents is slightly higher than the number of road accidents, although the sum of the lengths of the road sections is significantly higher than that of the road junctions;
- there were no casualties in the areas of the intersections, only in the road section between the intersections;
- a significant number of accidents occur at intersections, but they do not lead to severely injured or killed road users;
- in minor accidents, the drivers of the cars were the main victims;
- in both years considered there is one pedestrian killed;
- in both years the largest number of serious accidents are of the type "Pedestrian collision";
- almost all accidents involving pedestrians involve side effects - injuries or death;
- there is a large number of accidents in the collision of vehicles at an angle or side - intersections;

2.3-A. Highlighting weaknesses and dysfunctions - Medgidia

From the analysis of the previously treated indicators, the following weaknesses and dysfunctions were identified:

- → *The downward trend of the population of Medgidia Municipality in the period 2010 - 2020 (from 47,992 inhabitants in 2010, to 44,647 in 2020);*
- → *Aging population;*
- → *Decrease of the share of the number of employees in Medgidia Municipality from the total of those registered at county level, from 4.4% in 2010, to 3.6% in 2019*
- → *The increase in the number of unemployed by 14% in 2020 compared to the previous year;*
- → *Low presence / poor technical condition of priority areas for pedestrians, pedestrians or shared use (semi-pedestrian, shared-space);*
- → *Existence of solutions to increase the accessibility of pedestrian spaces (reducing the level difference between sidewalk and road in the area of pedestrian crossings, etc.) in the case of recently modernized streets;*
- → *Limiting the accessibility of pedestrians and endangering their safety by illegally parked vehicles on sidewalks;*
- → *The existence of traffic safety problems associated with pedestrian modes of transport, the main cause of accidents being "irregular pedestrian crossing";*

- → *Lack of public infrastructure required for the use of electric vehicles (energy charging points);*
- → *Existence of areas where the reduction of the traffic speed to a maximum of 30 km/h is not established;*
- → *Lack of a traffic management system, which ensures the optimization of traffic at the level of the road network;*
- → *Lack of a real-time traffic monitoring system.*

2.3-B. Highlighting weaknesses and dysfunctions - Dobrich

During the analysis, the team encountered a serious problem, which certainly does not allow the effective removal of hazardous elements and sections of the road network. The problem was the quality of the data collected on accidents and access to them.

In order to direct the efforts of the Municipality of Dobrich and RIA to specific dangerous situations, accident data must first be available to designers and road safety auditors and secondly contain the exact location (coordinates) and detailed information about the accident.

The main weaknesses in extra-urban road infrastructure are:

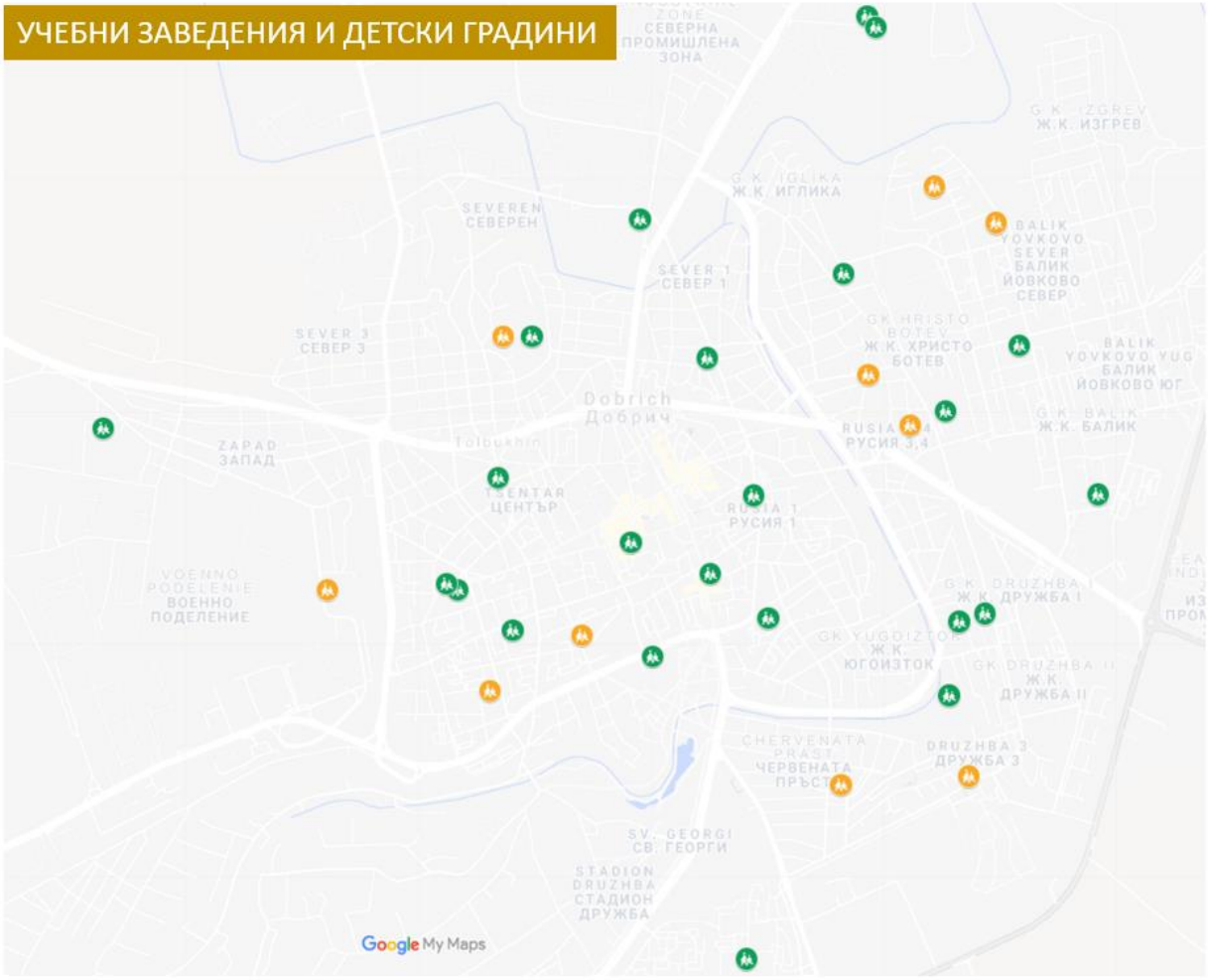
- Road markings - this stands out as the main disadvantage of the considered road sections;
- Condition of the road surface;
- Lack of additional signaling for dangerous horizontal curves;
- Lack of road signs;

The main weaknesses in urban road infrastructure are:

- Road markings;
- Street lighting;
- a number of non-signaled footpaths (or signaled only by a running pedestrian) at which 6 lane streets are crossed at a relatively high speed;

List of destinations in the municipality of Dobrich that require special road safety measures

The street network around schools is critical to the safety of children in Dobrich. The next map shows the kindergartens and schools where the Municipality should concentrate its efforts.



2.4. Creating the list of objectives in the Municipality of Medgidia that require special road safety measures

2.4.1. Educational units

The educational units represent poles of attraction / generation of trips at the level of a locality, to which special attention must be paid from the point of view of accessibility and traffic safety. In total, in the Municipality of Medgidia there are 22 pre-university education units (high school - 4, middle school - 7, preschool - 11) in which 6,202 students and preschoolers are enrolled. Another education and training institution is the Medgidia School Sports Club. The location in the study area of the educational units centralized in table 2.6 is found in figure 2.31.

Table 2.6. *Educational units at the level of Medgidia Municipality.*

No.	Educational unit with legal personality	Address
Preschool education		
1.	KINDERGARTEN WITH NORMAL PROGRAM "PITICOT" MEDGIDIA	Mihai Bravu Street, 25
2.	KINDERGARTEN WITH NORMAL PROGRAM NO. 1 MEDGIDIA - BILINGUAL (ROMANIAN-TURKISH)	Mărgăritarului Street
3.	KINDERGARTEN WITH NORMAL PROGRAM NO. 11 MEDGIDIA	Republicii Street, 65
4.	GRĂDIN KINDERGARTEN WITH NORMAL PROGRAM NO. 12 MEDGIDIA	Dezrobirii Street, 1
5.	KINDERGARTEN WITH NORMAL PROGRAM NO. 7 MEDGIDIA	Alexandru cel Bun Street, 22
6.	KINDERGARTEN WITH NORMAL PROGRAM NO. 8 MEDGIDIA	Poporului Street, 1
7.	KINDERGARTEN WITH NORMAL PROGRAM NO. 9 MEDGIDIA	-
8.	KINDERGARTEN WITH NORMAL PROGRAM VALEA DACILOR	County Road 381, 36
9.	KINDERGARTEN WITH EXTENDED PROGRAM "ION CREANGĂ" MEDGIDIA	Rahovei Street
10.	KINDERGARTEN WITH EXTENDED PROGRAM "LUCIAN GRIGORESCU" MEDGIDIA	Aleea Spitalului Street, 10
11.	KINDERGARTEN WITH EXTENDED PROGRAM NO. 3 MEDGIDIA	Ion Creangă Street, 17
Primary and secondary education		
12.	PRIMARY SCHOOL "IULIU PRODAN" VALEA DACILOR	County Road 381, 36
13.	PRIMARY SCHOOL "CONSTANTIN BRÂNCUŞI" MEDGIDIA	Kemal Agi Amet Street, 26
14.	SECONDARY SCHOOL "I.L. CARAGIALE" MEDGIDIA	Independenței Street, 65A
15.	SECONDARY SCHOOL "LUCIAN GRIGORESCU" MEDGIDIA	Trandafirilor Alley, 2A
16.	SECONDARY SCHOOL "MIHAIL SADOVEANU" MEDGIDIA	Siretului Street, 94
17.	SECONDARY SCHOOL "MIRCEA DRAGOMIRESCU" MEDGIDIA	Vaii Street
18.	SECONDARY SCHOOL "SPIRU HARET" MEDGIDIA	Aman Theodor Street, 44
High school		
19.	NATIONAL COLLEGE "KEMAL ATATURK" MEDGIDIA	Română Street, 2
20.	TECHNOLOGICAL HIGH SCHOOL "DRAGOMIR HURMUZESCU" MEDGIDIA	Poporului Street
21.	TECHNOLOGICAL HIGH SCHOOL "NICOLAE TITULESCU" MEDGIDIA	Dezrobirii Street, 1
22.	HIGH SCHOOL "NICOLAE BĂLCESCU" MEDGIDIA	Scarlat Varnav Street, 2
Other education and training institutions		
23.	MEDGIDIA SCHOOL SPORTS CLUB	Trandafirilor Street, 2A

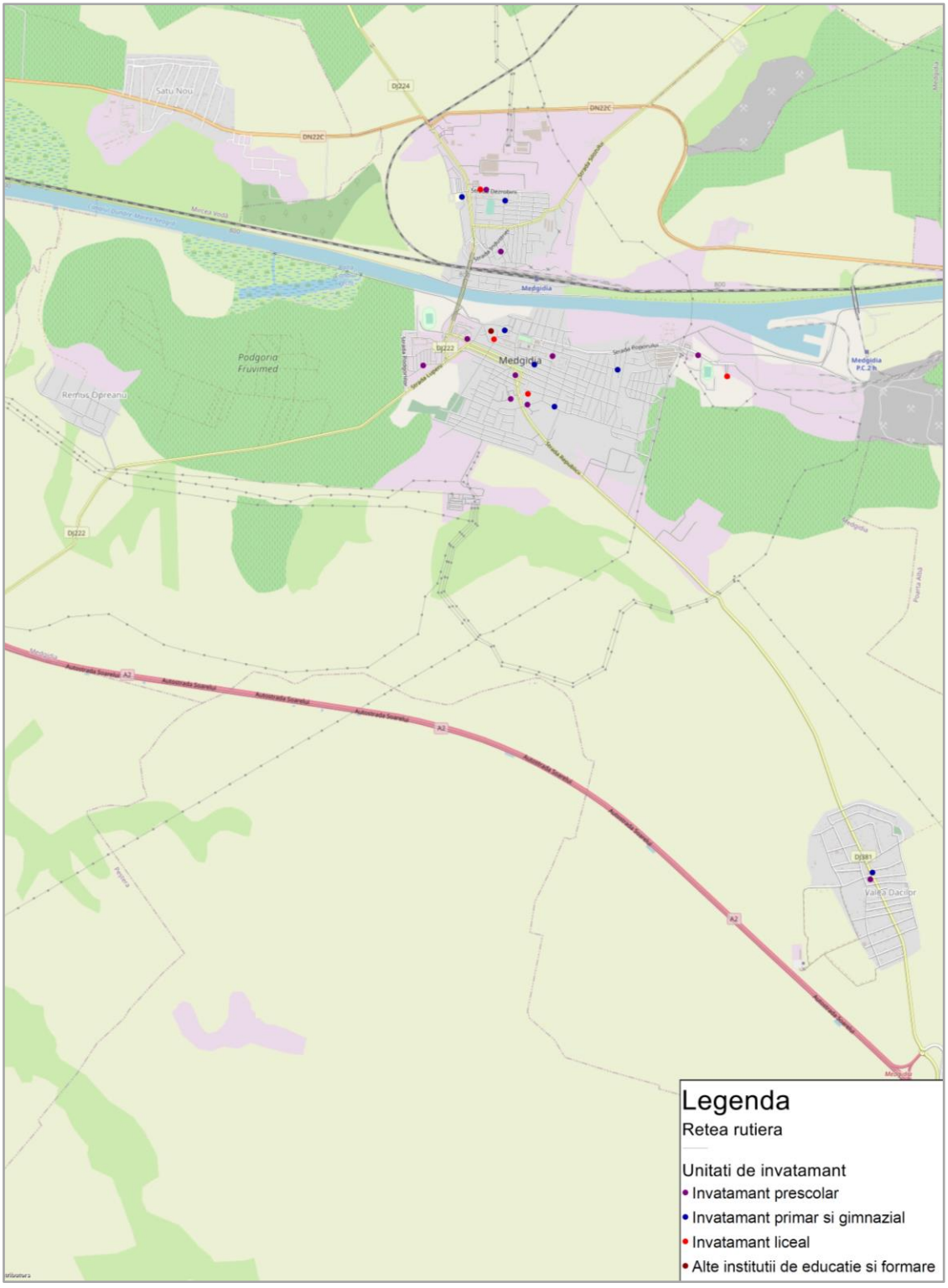


***Figure 2.31**. Location of educational units on the territory of Medgidia Municipality.*

The analysis of the school population, based on existing statistics, reveals a reduction in the number of students in preschool (37%), middle school (13%) and high school (34%), while post-secondary education increased by more than 4 times higher in 2020 compared to 2010. Increases were also recorded in the case of primary and vocational education students (figure 2.32).

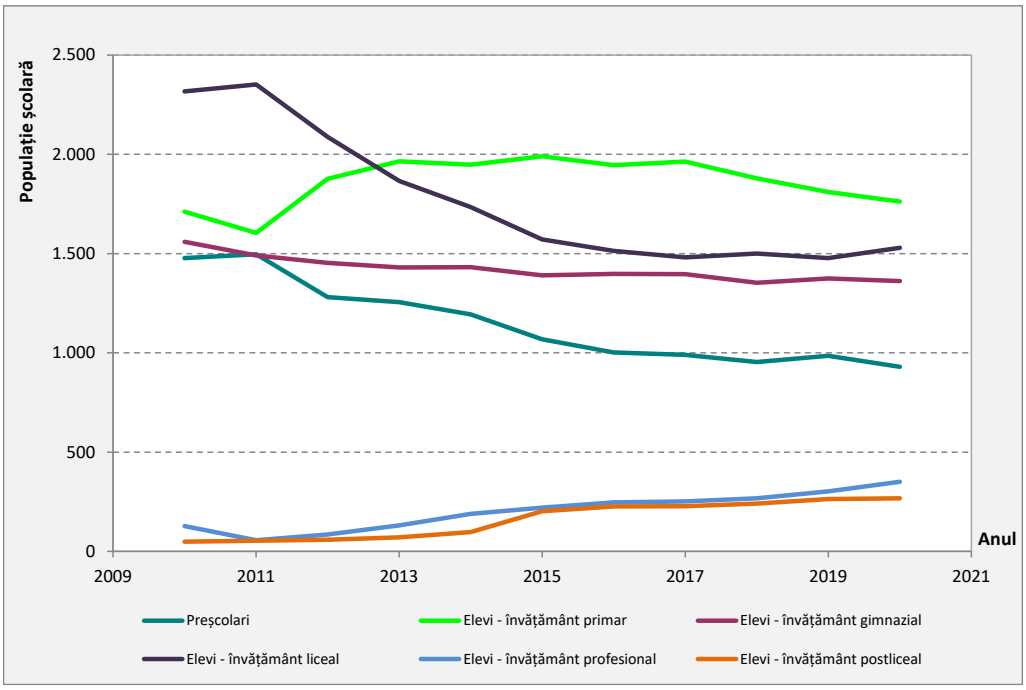


***Figure 2.32**. Variation of the school population in Medgidia, 2010-2020.*

Data source: NIS, TEMPO On-line.

Knowing the trend of variation of the number of students, based on historical data recorded in the period 2010-2020 and taking into account the forecast of population evolution at national level by 2060[2] (forecast based on stable population by sex and age groups recorded in the October 2011 census and demographic phenomena (birth rate, mortality and external migration from current statistics), on short-term increases in the number of students in pre-university education were forecast.

[2] National Institute of Statistics, *Projecting the Romanian population on the horizon of 2060*, ISBN: 978-606-8590-01-1, 2013.

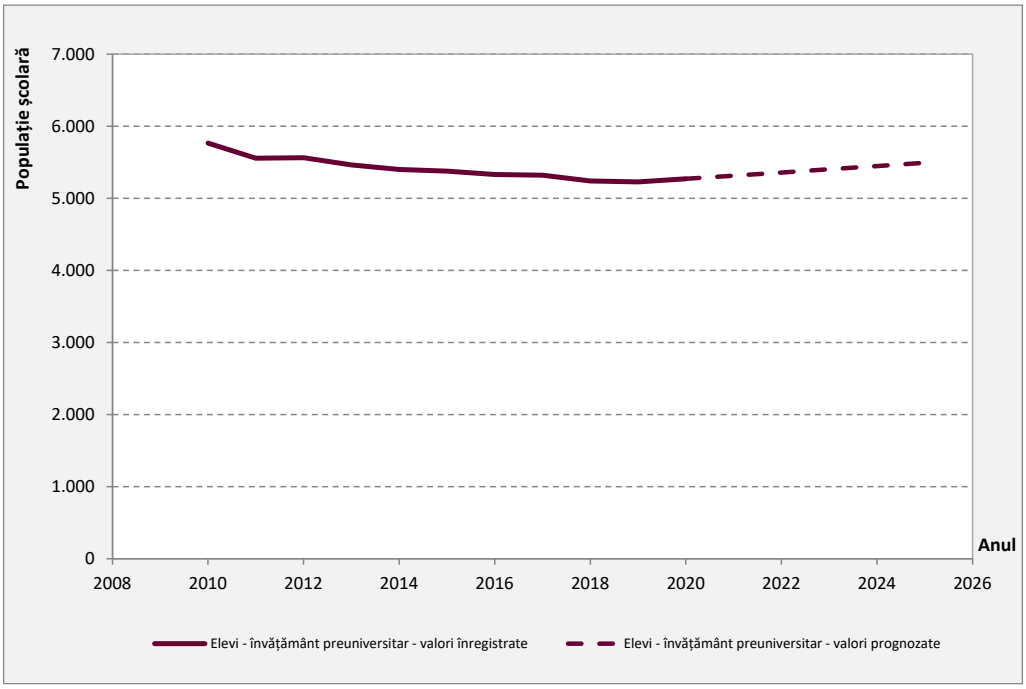


Figure 2.33. *Variation of the school population in Medgidia - forecast data.*

2.4.2. Hospital units

The medical infrastructure and health services provided to the population have a direct impact on the quality of life of the inhabitants. The public health infrastructure at the level of Medgidia Municipality includes 1 hospital, 1 medical dispensary, 3 school medical offices, 1 pharmacy and 5 medical laboratories. From the analysis of the existing statistical data it is observed that in the private sector in the last years the network of specialized medical offices and the civil medical society has developed. The evolution of sanitary units by forms of ownership in the period 2010-2019 is presented in the following table.

Tabelle 2.7. *Health infrastructure - Medgidia Municipality, period 2010 - 2019.*
Data source: NIS, Tempo online.

Sanitary units		Year									
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Hospitals	Public property	1	1	1	1	1	1	1	1	1	1
Medical dispensaries	Public property	1	1	1	1	1	1	1	1	1	1
Working points of dialysis centers	Private property	-	-	-	-	-	-	-	-	1	1
General practice offices	Private property	3	3	3	3	1	1	1	1	1	1

School medical offices	Public property	1	2	3	3	3	3	3	3	3	3
Family medical offices	Private property	22	24	23	23	17	17	12	15	15	15
Civil medical society	Private property	-	-	-	-	-	2	2	2	4	5
Dental practices	Private property	19	20	20	20	29	29	27	36	29	16
Specialized medical offices	Private property	19	19	19	19	22	24	27	27	31	34
Specialized medical civil society	Private property	-	1	1	1	1	1	1	2	1	1
Pharmacies	Public property	1	1	1	1	1	1	1	1	1	1
	Private property	13	10	10	10	15	11	12	12	14	14
Medical laboratories	Public property	3	4	5	5	5	5	5	5	5	5
	Private property	1	-	-	-	2	3	3	3	3	1
Dental equipment laboratories	Private property	1	1	1	1	-	-	-	-	1	1

Medgidia Municipal Hospital is a medical unit with legal personality that provides medical assistance for the inhabitants of the municipality and the surrounding communes with the following sections:

- → General Surgery;
- → Internal Medicine;
- → Obstetrics and Gynecology;
- → Pediatrics;
- → Anesthesia and Intensive Care;
- → Emergencies;
- → Specialty Outpatient Clinic;
- → Orthopedics and Traumatology;
- → Physical Medicine and Recovery Department;
- → Sterilization block.

The location of the Medgidia Municipal Hospital within the study area is represented in figure 2.34.

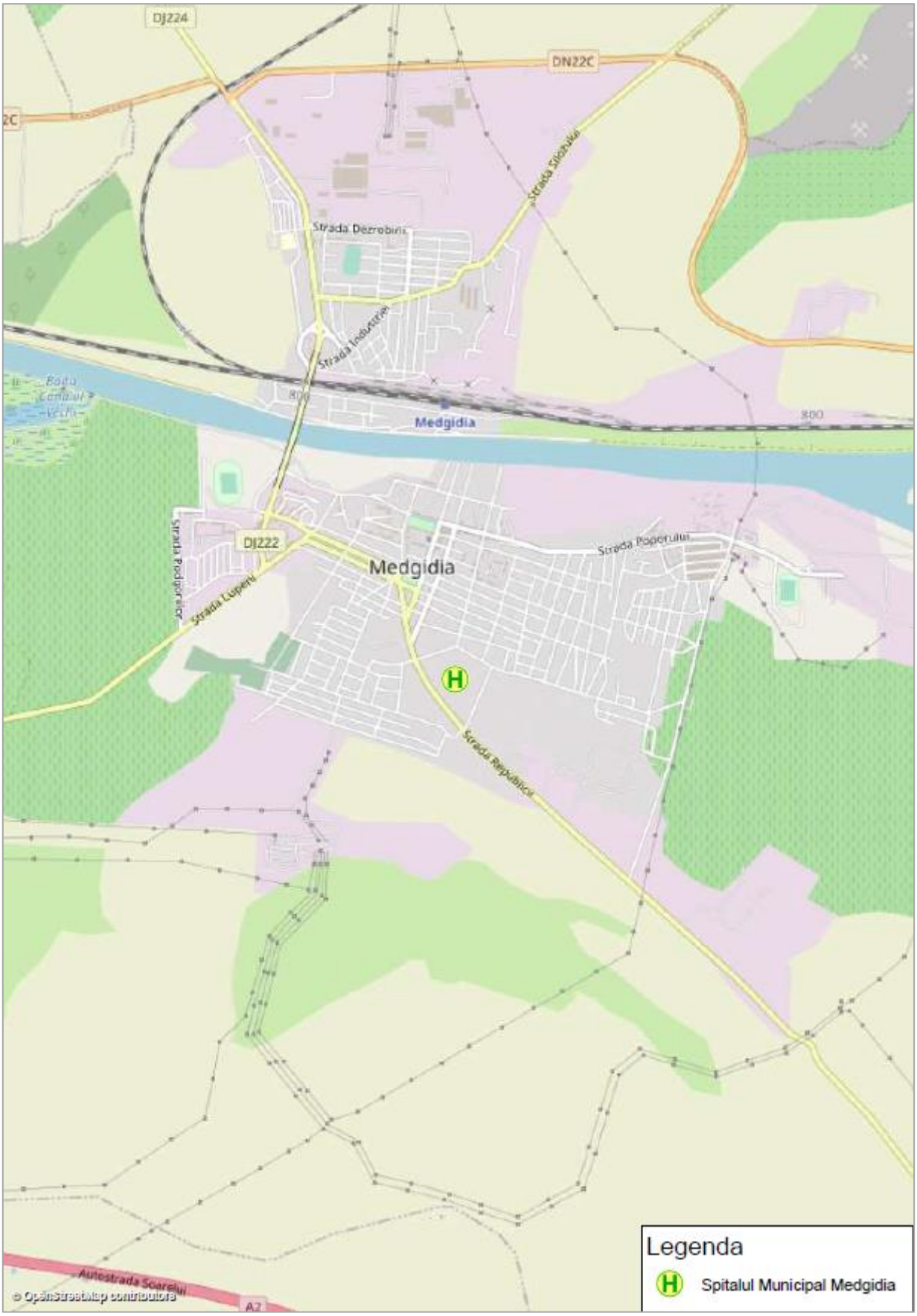


Figure 2.34. *Location of Medgidia Municipal Hospital.*

Regarding the medical staff, in the period 2010–2019 the number of doctors working in the public health system in the Municipality of Medgidia increased by 18%, reaching the value of 45. In the same period, the average medical staff decreased by 11% (figure 2.35). It is noted that after the period 2013 - 2015, in which the public health system operated with the minimum number of doctors, the situation began to recover.

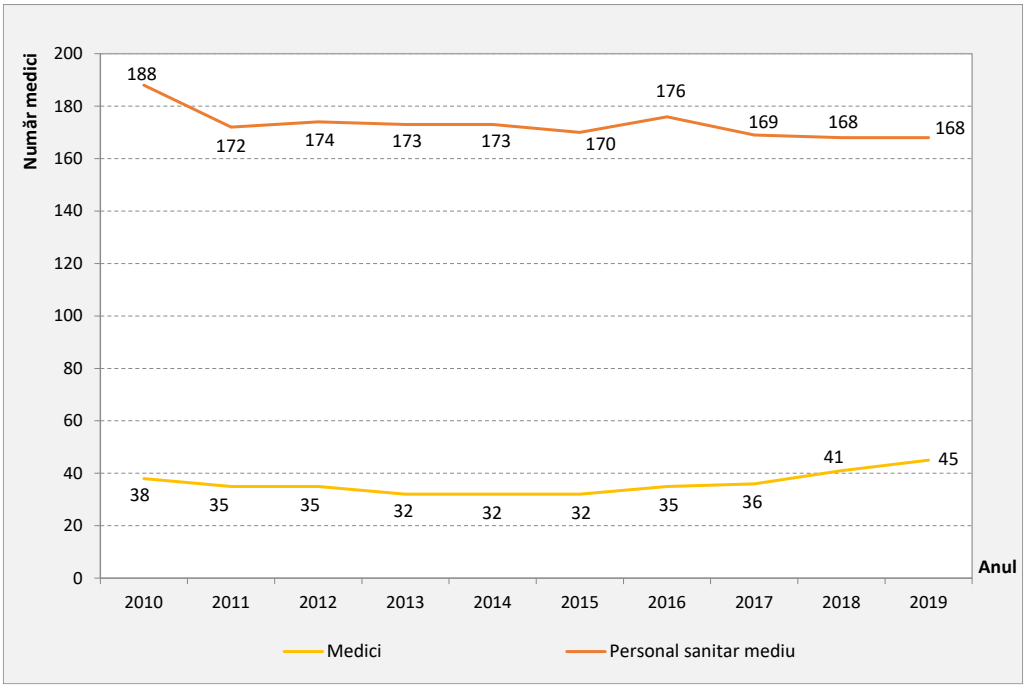


Figure 2.35. *Variation of medical staff - Medgidia Municipality, period 2010 - 2019. Data source: NIS, Tempo online.*

With 1.0 doctors/1,000 inhabitants and 3.7 nurses/1,000 inhabitants, Medgidia Municipality is worse situated compared to Constanța County in terms of the number of doctors (1.6 doctors/1,000 inhabitants), but better situated in terms of concerns the number of assistants (3.6 assistants / 1,000 inhabitants).

Compared to the specific values of these indicators at regional (0.8 doctors/1,000 inhabitants; 3.4 assistants/1,000 inhabitants) and national (1.8 doctors/1,000 inhabitants and 4.3 assistants/1,000 inhabitants) level, a deficit is found in providing medical staff at the local level. The following table summarizes the values of these indicators for 2019.

Table 2.8. *Medical staff, year 2019. Data source: NIS, Tempo online.*

Territory	No. of doctors	No. of average medical staff	Population	Doctors / 1000 inhabitants	Average medical staff / 1000 inhabitants
Medgidia Municipality	45	168	45.022	**1,0**	**3,7**
Constanța County	1.219	2.778	766.205	1,6	3,6
South - East Region	3.118	11.035	1.851.125	1,7	6,0
România	40.647	96.204	22.204.507	1,8	4,3

From the analysis of the service level of the population, it is observed that in recent years the situation has improved compared to 2015 when the minimum value of 0.7 doctors / 1,000 inhabitants was registered (figure 2.36).

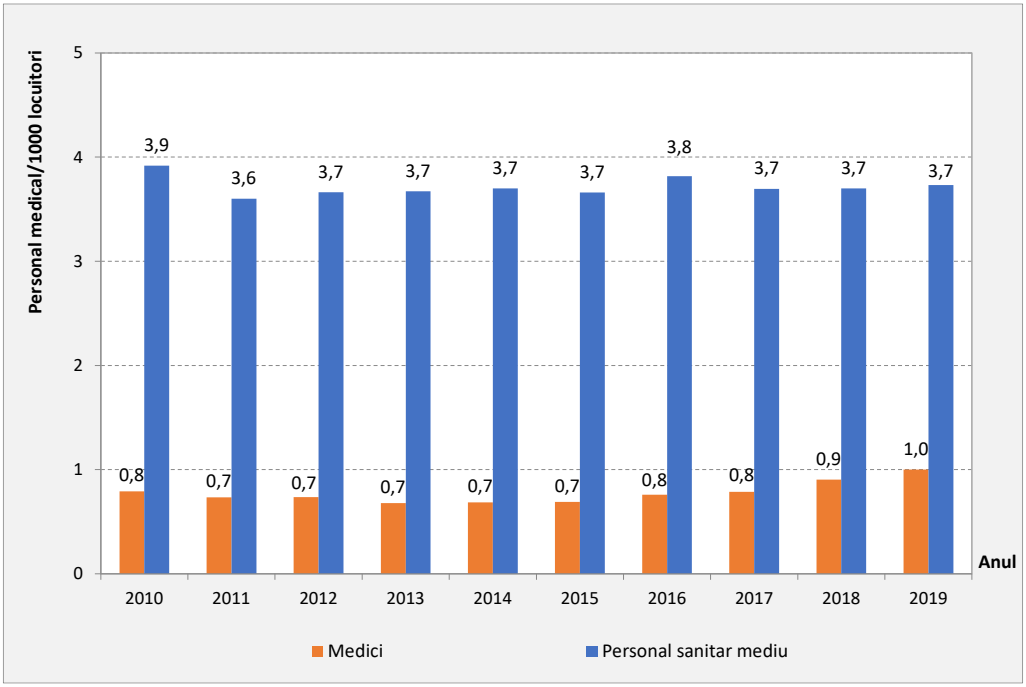


Figure 2.36. *Medical staff per 1000 inhabitants - Medgidia Municipality, period 2010 - 2019. Data source: NIS, Tempo online.*

2.4.3. Crowded places

The complexity of functional areas in terms of sustainable mobility was analyzed following aspects such as: (i) the demand for public transport, (ii) the density of pedestrians, (iii) the parking of vehicles used for private transport, (iv) safety and security of citizens in public space.

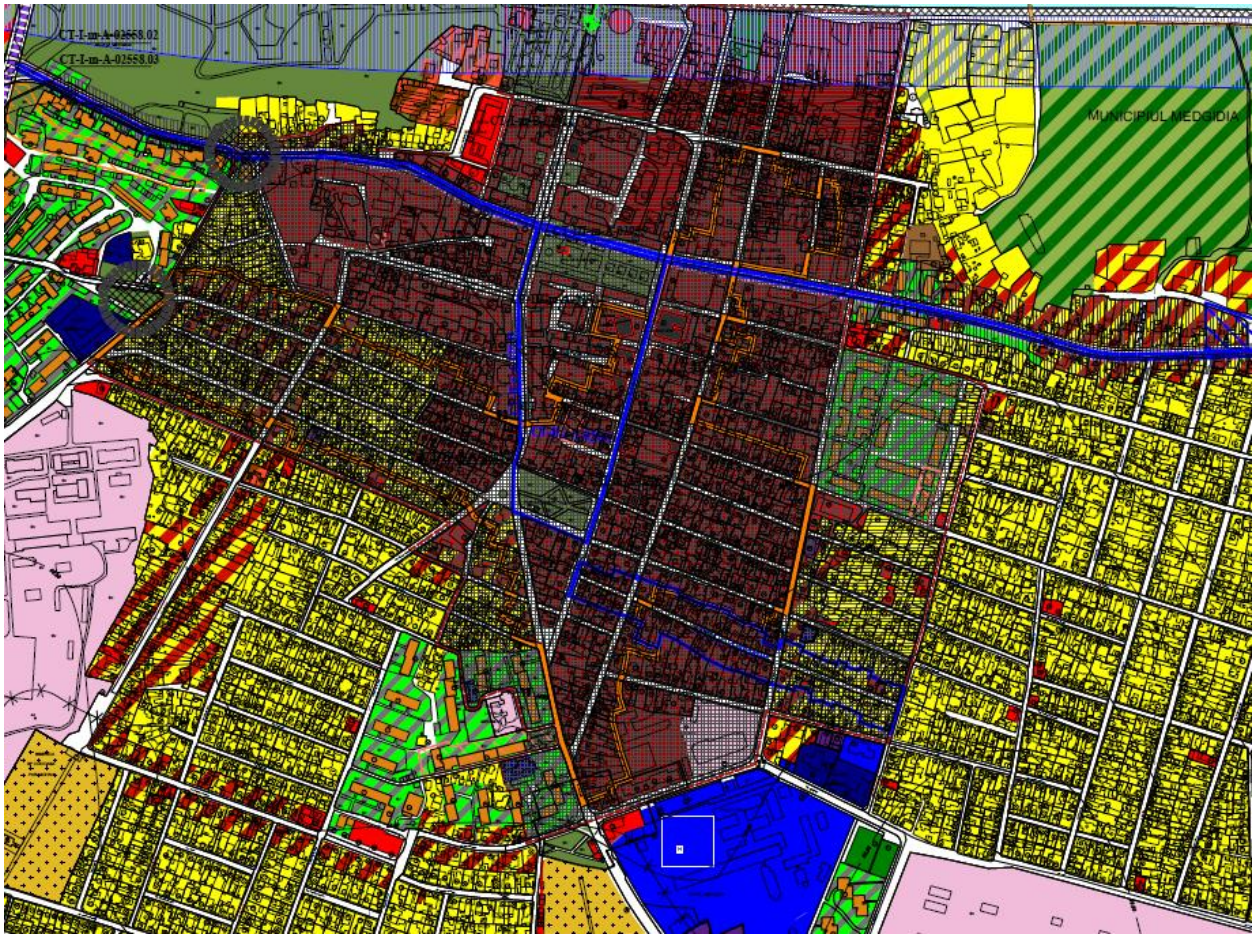
Central Zone

According to the General Urban Plan, the area identified as having high mobility complexity represents the central zone, located in the southern part of the municipality (figure 2.37). The area is mixed-construction type, consisting of residential buildings and other buildings complementary to housing or buildings of culture, administration, trade and services.

This area contains mixed functions, bringing together objectives with historical, cultural, educational value (College "Kemal Ataturk", Secondary school "Lucian Grigorescu"), administrative (Medgidia City Hall) and recreational (Great Park, Medgidia Cliff).

Inside the central area there are a series of architectural monuments inscribed in the list of historical monuments[3]: CT-II-m-B-02903, CT-II-m-B-02905, CT-II-m-B-02906, CT-II-m-B-02911, CT-II-m-B-02912, Houses from the 19th - 20th centuries; CT-II-m-A-02904 Mosque 1857-1865, Decebal Street, 10; CT-II-m-B-02907 House Murad G. Ali 1906, Street Kemal Agi Amet 24; CT-II-m-B-02908 Former Turkish bath, end of the 19th century, Street Poporului 36A; CT-II-m-B-02909 Urban site, bertween Streets Poporului, Griviţei, Rahova, Împăratul Traian, Tineretului, Ovidiu, Bălcescu Nicolae, Republicii, Decebal, Kemal Agi Amet, Olteniei; CT-II-m-B-02910 Muslim seminary, end of the 19th century, Street Poporului 36A; CT-III-m-A-02955 The statue "Woman with harp" 1933, Decebal Plaza; CT-I-s-B-02697 Settlement 9th - 11th centuries, Early medieval era, between Streets Nicolae Bălcescu, Republicii, Poporului and Decebal; CT-I-s-B-02699 Settlement 9th - 11th centuries, Early medieval era, Street Dumbrava Roşie, on either side of it.

The axes of the central area are represented by Street Republicii and Street Decebal. The high density of pedestrian flows in the area of analysis requires special attention in terms of mobility.



[3] Ministry of Culture, List of Historical Monuments in Constanţa County, The Official Monitor of Romania, Part I, No. 113Bis / 15.02.2016.

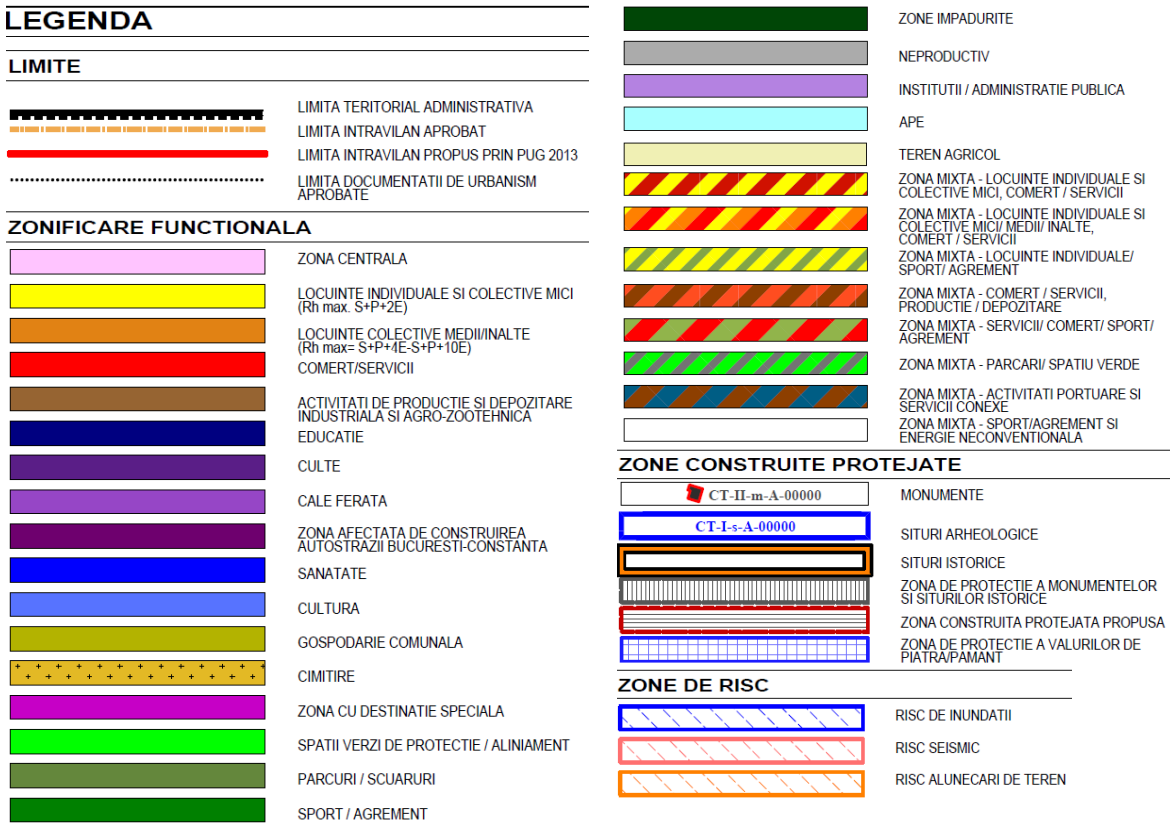


***Figure 2.37**. Central zone. Source: General Urban Plan of Medgidia Municipality.*

The implementation of measures for the development of the central area in order to increase pedestrian accessibility is an essential step in supporting sustainable urban mobility in the Municipality of Medgidia. Future actions in the field of mobility must lead to a reduction in car traffic values in the central area, in particular through the implementation of a parking policy.

Railway station

In the central-northern area of the locality is located the Medgidia railway station, with access from Vasile Lupu Street (figure 2.38).

According to the train schedule in force, during one day 31 trains have a stopping point in Medgidia station (departures / arrivals).

According to the Reference Document of the C.F.R. Network, Annex 9, version 11.0.4 updated on 25.08.2021, Medgidia station has the following characteristics: first degree station, located on the interoperable traffic section, open to passenger and freight traffic.

According to the General Urban Plan of the Municipality of Medgidia, the building of the railway station, which dates from 1860/1920, is found in the *List of buildings proposed for classification as historical monuments.*

The interventions at the building proposed as a monument and the construction in the proposed protection area are made on the condition of obtaining the approval of the Directorate for Culture and National Heritage of Constanța County, similar to the procedure applicable to classified monuments.

***Figure 2.38**. Medgidia railway station..*

2.4.4. Places with medium and high frequency of road accidents

The traffic safety was analyzed in relation to the accidents registered at the level of the transport network in the period 2016-2020, data existing in the database of the Police of Medgidia Municipality, obtained at the request of Medgidia Municipality.

The sectors of the road network characterized by high incidence of traffic accidents and their associated victims (figures 2.39-2.42) are located on the main road arteries, where high values of traffic flows are found. Independenței Street, part of the routes County Road 222 and County Road 224 on the territory of the locality, represents the segment in which the maximum number of accidents (34) resulted with 41 people slightly injured, 3 seriously injured and 3 dead. It crosses the area where most jobs are concentrated. Other areas with traffic safety problems are National Road 22C, Poporului Street, Republicii Street and Română Street.

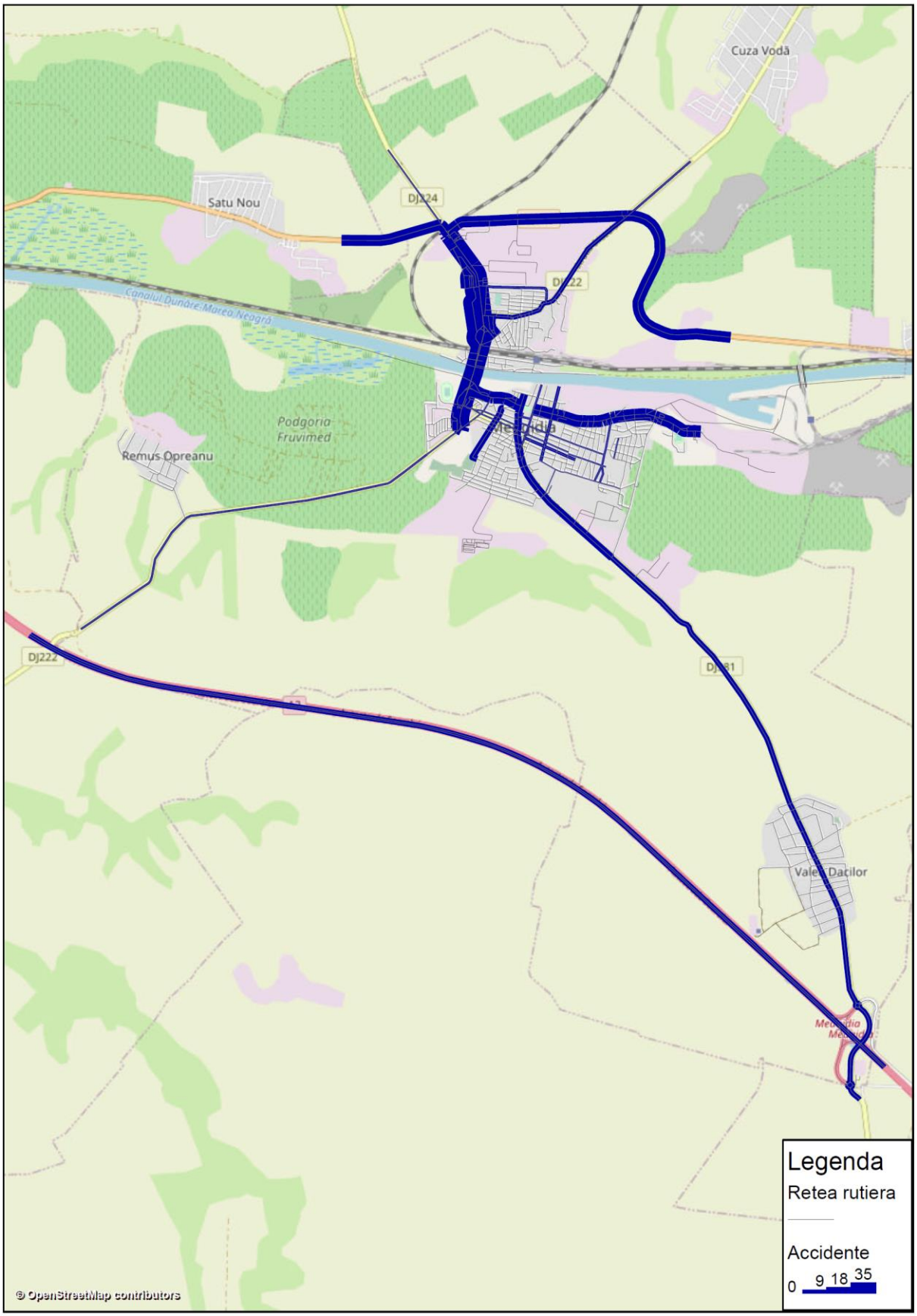


Figure 2.39. *Spatial distribution of accidents, 2016-2020. Data source: Medgidia Municipality Police.*

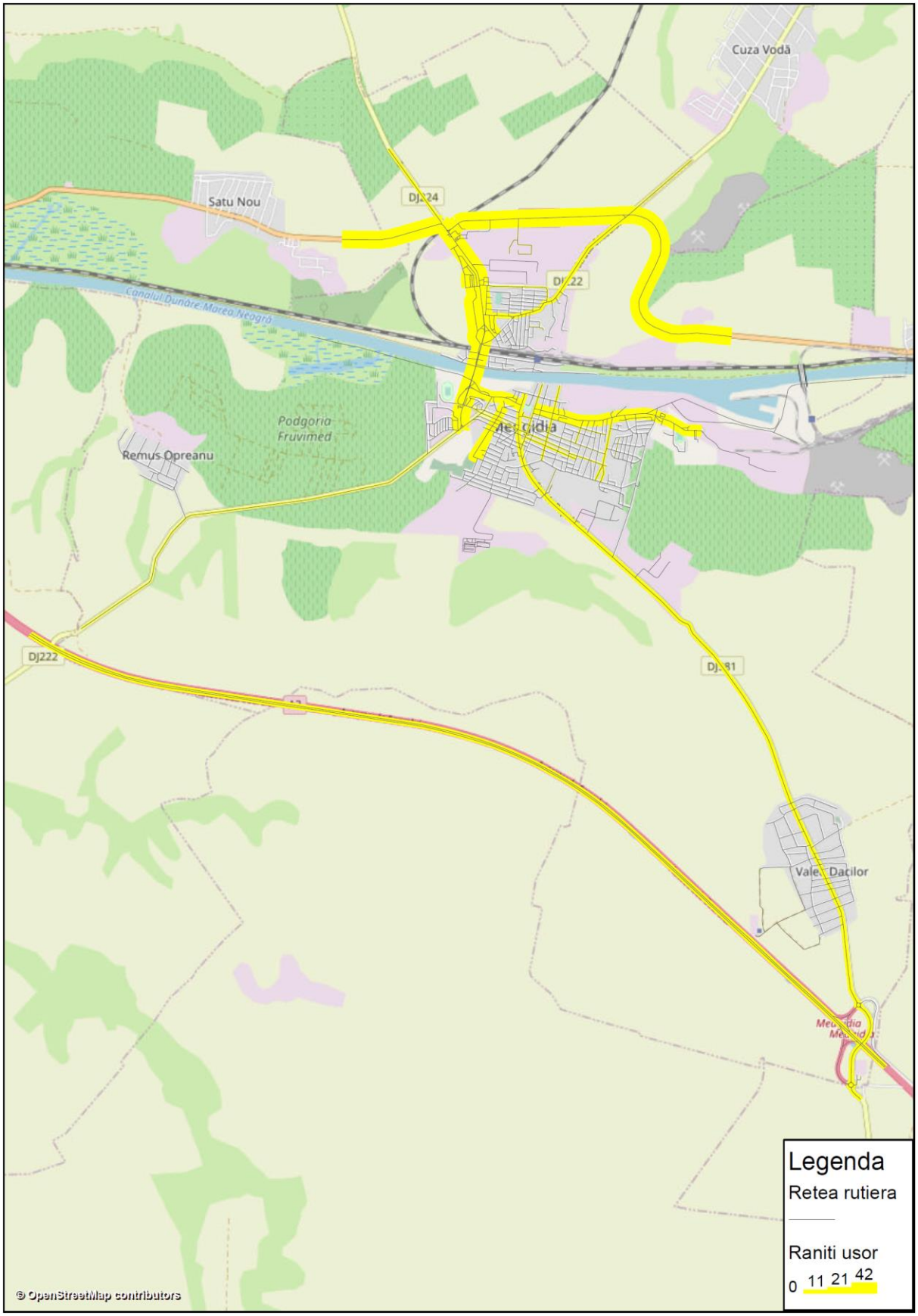


Figure 2.40. *Spatial distribution of minor injuries, 2016-2020. Data source: Medgidia Municipality Police.*

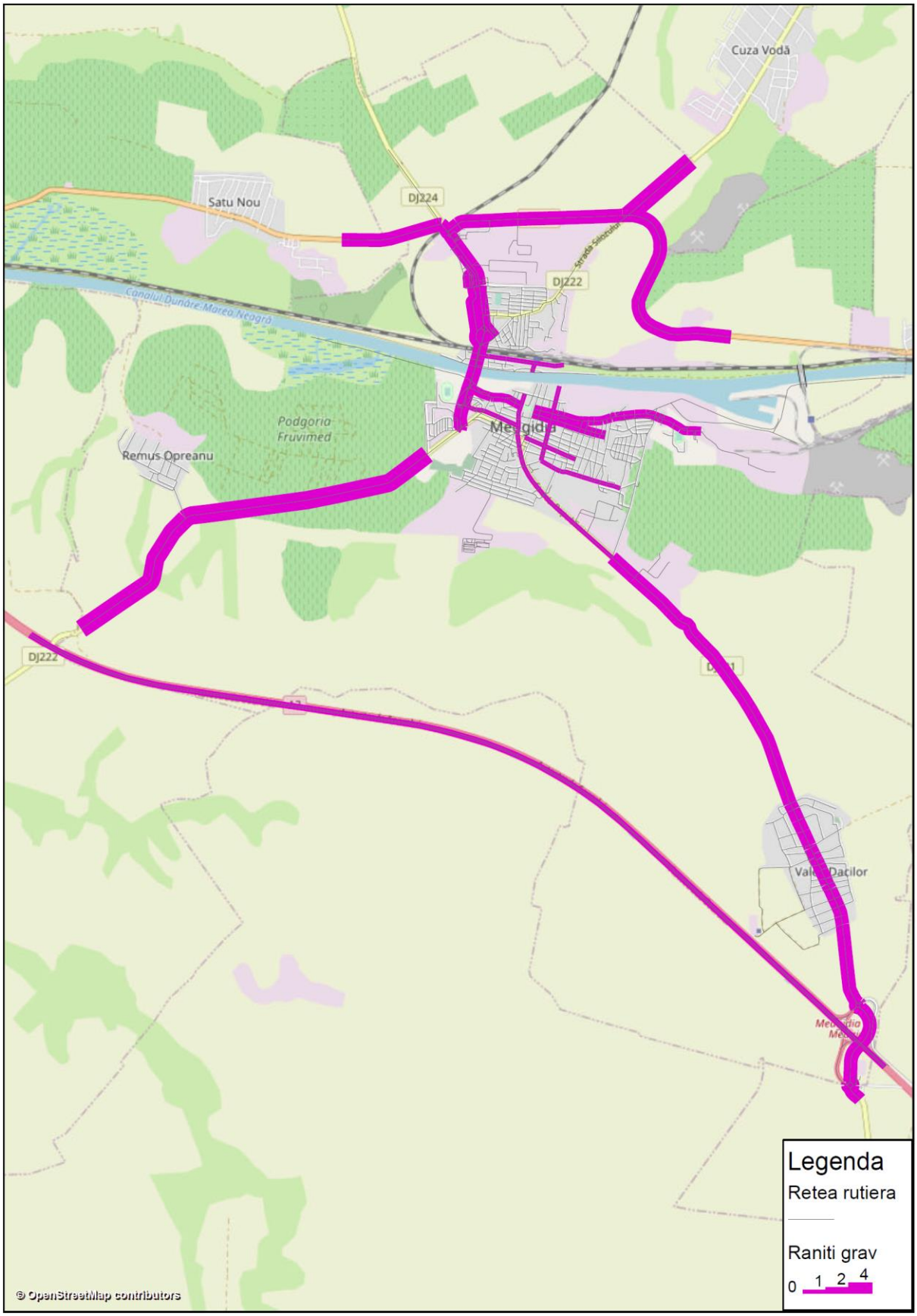


Figure 2.41. *Spatial distribution of severe injuries, 2016-2020. Data source: Medgidia Municipality Police.*

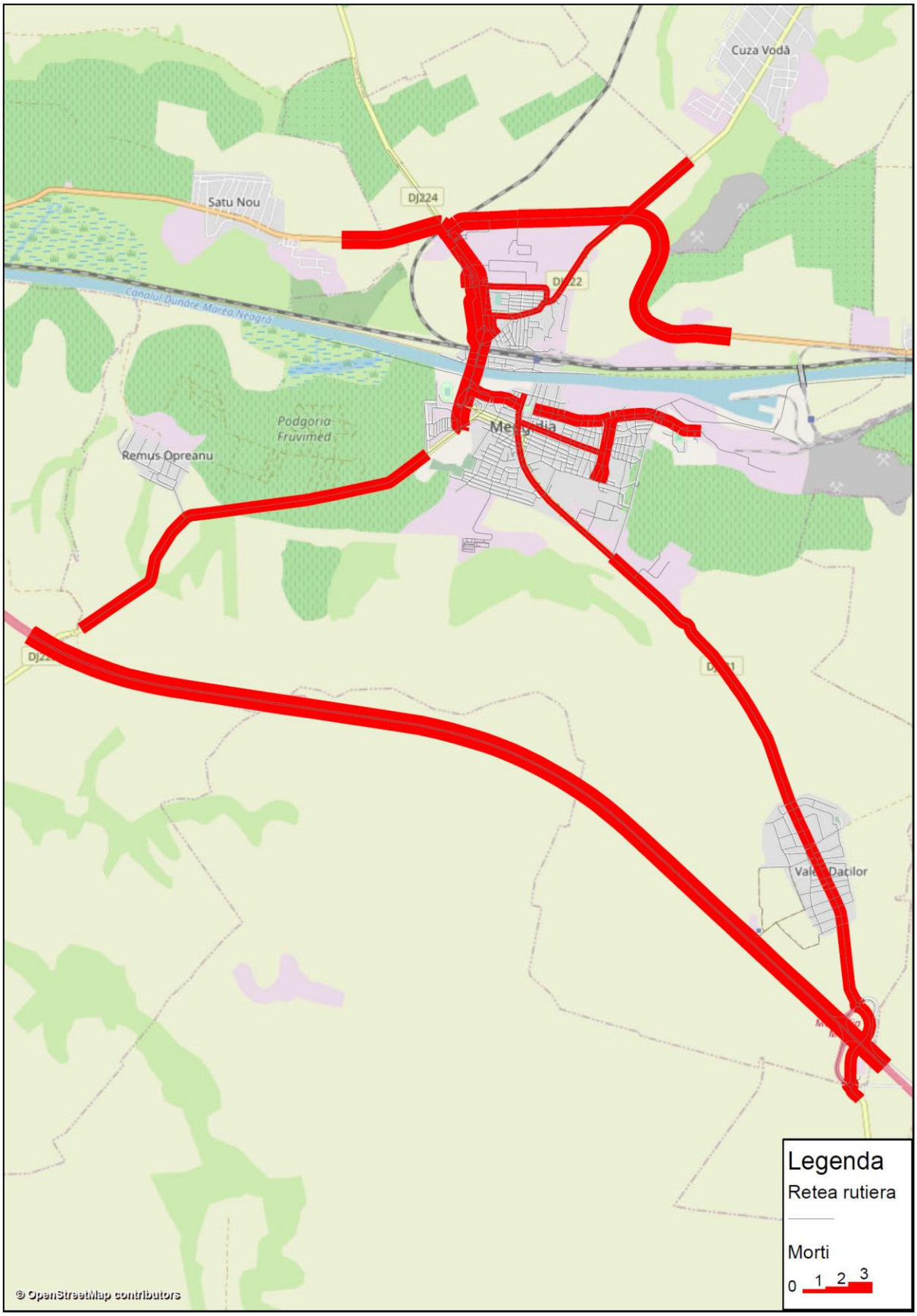


Figure 2.42. *Spatial distribution of deaths, 2016-2020. Data source: Medgidia Municipality Police.*

3-A. FORMULATION OF PROPOSALS FOR IMPROVING ROAD SAFETY - MEDGIDIA

3.1. Vertical signaling

Properly designed and executed vertical signaling devices may perform, in addition to their basic functions (hazard warning; priority regulation; prohibition or restriction; mandatory; special regulation; information, guidance or service; pre-signaling; traffic directions, position or mileage indicators; additional information) as well as the function of increasing road safety.

Vertical signaling must be an unequivocal tool for clear communication between road traffic participant.

Signs and warning markings must warn the traffic participant of the presence of a potential danger in the direction of traffic. Vertical signage is used in specific situations, such as changing the direction of the road, approaching an intersection, etc.

The location of the vertical signs is also very important, as they must provide the appropriate information from the appropriate distance (not too large, so that the ones to whom it is addressed "to forgets" the presence or significance of the indicator, but not too short, so that they do not have time to act accordingly).

They must be clear, easy to understand for all road users and not contain elements that could mislead them.

Their positioning in relation to other elements present is very important, especially in relation to the vegetation that can cover them totally or partially.

Signs must be visible at all times, including at night or in adverse weather conditions, so reflective materials must be used in their manufacture. In urban areas it is recommended to use illuminated indicators from its own source or from outside.

In order to maintain their visibility properties, the reflectors must be of good quality and cleaned regularly.

The recommended measures to improve vertical signage in order to increase the level of safety are the following:

- *The use of reflective materials in the manufacture of road signs:*
  - the use of materials with higher class reflection, at least for the indicators "Pedestrian crossing", "Pedestrian crossing pre-signalization", "Attention, children ahead", "Stop and give way", "Give way" (figure 3.1.).

Figure 3.1. *Road signs with superior class of reflection.*

  - the use of orange lanes to show a higher degree of danger, on the respective street / road sectors;

- *The use of Variable Message Signs (VMS) (figure 1.2),* for the following purposes:
  - traffic speed control;
  - warning signaling;
  - informing the violations of the rules at the pedestrian crossings;
  - accident warning;
  - traffic jam warning;
  - etc.

Figure 3.2. *Use of indicators with variable messages.*

- *In order to be efficient, the state of viability must be ensured, by:*
  - current maintenance and whenever is necessary;
  - repairing / reconditioning;
  - disassembly and relocation;

– checking the visibility of colors.

3.2. Horizontal signaling

Horizontal signaling means (road markings) play a particularly important role in ensuring an increased level of road safety, by guiding drivers and providing the necessary information for the correct approach to points of conflict on the road network.

Road markings must provide relevant information through the use of different types and colors. The "Stop and give way" and "Give way" crossing lines at intersections will help to position the vehicle correctly on the road, in order to minimize the risk of accidents.

Continuous marking lines in the middle of road arteries are of great importance, being used to indicate that overtaking is dangerous and prohibited. Also, the lines on the side of the road warn about changes in alignment and the danger of leaving the road, being much more effective the variants with audible warning.

As with vertical signage, in order to increase visibility at night and raise the level of road safety, it is advisable to use reflective materials to draw horizontal markings.

In order to increase their efficiency, it is recommended that the marking lines separating the road lanes and indicating the roadside be executed with thermoplastic paints, with vibration effect (sound warning strips), in order to improve the level of road safety.

In order for horizontal road markings to properly fulfill their role as a safety feature, the condition of the roads to which they apply must be good and very good. Defective condition (characterized by various defects, potholes, dirt, etc.) can make it difficult to apply and last the marking, as well as its quality and visibility.

The measures recommended to improve the horizontal signaling in order to increase the level of safety are:

– the use of reflective materials (powders) for applying road markings (figure 3.3);
– durable materials for road markings (cold plastic, thermoplastic paint, prefabricated strips) (figure 3.4);
– delineators;
– reflective road buttons (figure 3.5);
– audible warning tapes marked or dug in road surface layer, etc.
– markings with prefabricated products for areas with high complexity, etc.
– markings of road signs on road pavement (figure 3.6).

Figure 3.3. *Example of reflective road marking.*

Figure 3.4. *Example of marking made with thermoplastic paint.*

Figure 3.5. *Reflective road buttons.*

Figure 3.6. *Road signs drawn on the road pavement.*

- *In order to be efficient, the state of viability must be ensured, by:*

– repairing / reconditioning;
– cleaning the marking.

3.3. Other measures

In order to increase traffic safety in the city, attention must be paid not only to improving the technical condition of roads and streets. Given the direct link between the number of vehicles and the distance traveled by them with the number of accidents, measures should be implemented to encourage citizens to use other alternative modes of transport, especially short distances: pedestrian journeys, bicycle use, vehicles of public transport, etc.

Changing urban design can also play a decisive role in creating a safer city in terms of road traffic. The specific measures have as main purpose the obligation of drivers to reduce the speed of travel, especially in vulnerable areas, where based on historical statistics it has been found that the incidence of traffic accidents is higher (so-called black spots). Reducing

travel speed reduces the risk of impacting pedestrians, cyclists, other vehicles, etc. because it can brake on a smaller space. Moreover, even if the impact occurs, its consequences can be greatly diminished, in the case of vulnerable road users often making the difference between a minor injury and a fatal one.

The speed limit measures will provide a safer and easier-to-use road network for pedestrians in Medgidia Municipality, encouraging them to opt for this mode of travel.

Statistical data and specialized studies have shown that in the case of traffic accidents involving motor vehicles, the risk of death decreases considerably, if the speed before travel is less than 30-35 km/h. Moreover, in areas where vehicles travel at low speeds, there is a natural balance between the means of transport that make up traffic flows, being encouraged to travel on foot, by bicycle and other non-motorized ways, thus increasing the level of safety.

Traffic calming measures usually involve redesigning the streets, while improving urban aesthetics, and mainly aim at physically changing the appearance or geometry of the streets in order to force them to reduce, directly or indirectly, travel speeds.

These measures need to be implemented especially in the city areas of interest, which attract and generate greater flows of passengers, as well as in those areas characterized by a higher frequency of accidents and which require special measures.

These measures are particularly important around areas with a high level of complexity: educational institutions, medical units, shopping centers, markets, parks, gyms, stadiums, places of worship, recreational areas, etc., mentioned in the previous chapter.

In the following there are described the recommended measures to be implemented in the Municipality of Medgidia, in order to increase the overall level of road safety for all traffic participants, especially for the vulnerable ones.

3.3.1. Installation of elevated pavement speed limiters

This type of limiter represents an elevated pavement arranged transversely on the street, its height and length determining the speed limit with which the vehicle can cross it (figure 3.7). They must be designed and executed for different target speeds, being applicable to all types of streets, not only to those with low traffic values. Ideally, these devices allow vehicles to travel at a constant speed throughout a road, and it is not preferable for the driver to slow down and accelerate before and after each limiter.

Figure 3.7. *Elevated pavement speed limiter.*

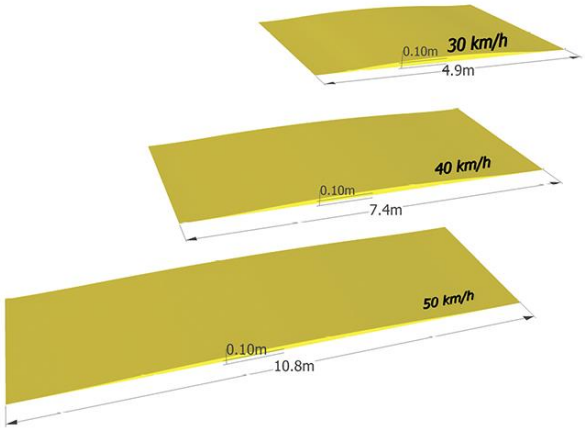


Figure 3.8. *Example of installation in order to reduce speed at pedestrian crossings.*

➢ *Constructive and use characteristics:*

– The geometry of the limiter will determine the speed at which the traffic will be limited, as follows: the higher the height/surface ratio, the more pronounced the speed reduction effect (figure 3.8);
– The length of the limiter usually varies between 3.70 and 4.25 meters, and the height between 0.075 and 0.100 meters;
– They can be placed in a series at distances of 100 - 170 meters between them;
– Limiters must be positioned in such a way as to encourage constant low-speed driving and not sudden acceleration and braking after or before each device.

➢ *Benefits:*

– Increasing the level of safety in areas with high complexity by reducing the speed of vehicles;
– Protecting the safety of pedestrians and cyclists;
– Reduced costs;
– Requires low maintenance.

➢ *Applicability:*

– Must be used in areas of high complexity, but also on any road arteries, including residential areas;
– Must not be used if their visibility is restricted or on streets with a high longitudinal inclination;
– In the areas of pedestrian crossings, can be executed as a raised passage, in this case the surface being flat;
– It can be considered as part of a more comprehensive traffic calming measure at the level of an entire area with high complexity;
– They must be pre-marked with at least a "Uneven road" warning sign placed before the first limiter.

3.3.2. Installation of vulcanized rubber speed limiters

These speed limitation devices have the same utility as the previous ones. From a constructive point of view, they are made of black vulcanized rubber, with segments of yellow reflective tape (figure 3.9).

Figure 3.9. *Vulcanized rubber speed limiter.*

3.3.3. Arranging chicanes

These are artificially created turns in order to force the drivers to reduce speed in traffic. It is achieved by reducing the width of the road, either on one side or on both sides or built in a zig-zag pattern, in order to force drivers to move in a slight turn, not in a straight line, reducing travel speed (figure 3.10).

Figure 3.10. *Speed limitation by chicanes.*

They can materialize on both one-lane and two-lane streets.

- *Benefits:*
- Forces drivers to slow down and become more careful in areas at high risk of accidents;

- Proper landscaping can contribute to the growth of green space, their integration leading to the improvement of the street landscape and the urban environment in general;
- The negative impact on the comfort of vehicle occupants is lower compared to vertically uneven speed limiters.

➢ *Applicability:*
- They are useful on arteries in residential or mixed areas that require safer speeds;
- For the circulation of bicycles, a separate path can be arranged next to the sidewalk.

3.3.4. Narrowing of the roadway in vulnerable areas

The proposed measure consists in extending the curb to the roadway, by widening the sidewalk, planting green spaces, arranging parking lots, etc., in order to force to reduce the speed of travel and provide more space for pedestrians (figure 3.11).

Figure 3.11. *Narrowing of the roadway.*

They can be applied symmetrically on both sides of the street, but also asymmetrically (by narrowing more to one side). In areas of high complexity, it is recommended to apply the measure by reducing the width of traffic from two lanes to one, requiring drivers to reduce speed and give way to the entrance to the narrow area. The width of the lane must be 3.50 - 3.75 meters to allow safe traffic circulation, but for only one vehicle. In the spaces left free, green areas, urban design elements, parking lots, bicycle rental stations, etc. can be arranged.

➢ *Benefits:*
- The lower speeds of vehicles on the lane in the middle of the street frame improves safety when pedestrians cross;
- Reducing the length of the pedestrian crossing by reducing the width of the roadway;

- Increasing the space for sidewalks and other facilities, as mentioned above;
- Calming heavy traffic.

➢ *Applicability:*

- They have a higher applicability on the streets with lower traffic volumes;
- As a precautionary measure, it must be taken into account that street furniture and other arrangements in the remaining available spaces do not affect the visibility of drivers on pedestrians;
- Care must be taken that the narrowing does not affect the free passage of special vehicles that have to intervene in emergency situations.

3.3.5. Extension of the boundary of the curbs in intersections

The proposed measure consists in extending the sidewalk, usually at intersections, in order to improve pedestrian visibility and reduce crossing distances (figure 3.12).

Extending the curb on the roadway (usually for parking) for a limited portion of the road (either at an intersection or between two consecutive intersections) requires reducing the travel speed at which vehicles turn in the intersection and providing increased protection for pedestrians.

Figure 3.12. *Extension of curbs towards the road.*

The width of the curb extension should usually be slightly smaller than the width of the parking lane. When the newly created space allows, various functional urban elements can be arranged, such as rest benches, bicycle parking lots or other facilities.

The new geometry of the intersection must allow eye contact between turning vehicles and vulnerable users: cyclists and pedestrians.

➢ *Benefits:*

– Calming the traffic by physically and visually narrowing the road;
– Forces to reduce the turning speed of vehicles, shortens the crossing distance, reducing pedestrian exposure and minimizing signal time at intersections driven by traffic lights;
– Creates new space that can be used for other arrangements: street furniture, bicycle parking, etc .;
– Physically eliminates the possibility of illegal parking near intersections and pedestrian crossings.

➢ *Applicability:*

– They have a greater applicability on the streets where there is a parking lane and near the public transport stations;
– It offers the possibility to shorten pedestrian crossings, reducing the time in which they are exposed to the risk of being hit by vehicles.

3.3.6. Rising the elevation in the area of intersections and pedestrian crossings

The proposed measure is to increase the elevation of the road in the area of intersections and/or pedestrian crossings, in order to force oncoming vehicles to reduce speed (figure 3.13).

Figure 3.13. *Rising of the elevation in the area of intersections and pedestrian crossings.*

The area of the intersection must be raised to the same level as the surrounding pavement. This measure can be combined with widening the sidewalk as well as placing bollards on the sidewalk to separate pedestrian and vehicular areas.

The inclination angle of the entrance ramps for motorized traffic can be higher or lower, depending on the target speed desired to be achieved. The top should be up to the vertical level of the adjacent border.

Prior to this, appropriate warning signs and horizontal markings must be installed to draw attention to the approach of the deceleration element.

- *Benefits:*

– The main purpose of this measure is to reduce the speed of the vehicle, increasing the safety of pedestrians crossing;
– Raises drivers' awareness of the presence of pedestrian crossings;
– Visually transforms the intersection into a pedestrian-oriented area;
– It is friendly to bicycle users.

- *Applicability:*

– The system finds its best applicability in the intersections guided by vertical signals ("Give way" or "Stop and give way"), characterized by large volumes of pedestrians, inside or near residential, commercial areas, educational units, etc .;
– It is also applicable to controlled stop intersections with a high rate of pedestrian accidents.

3.3.7. Arrangement of central islands in intersections (mini roundabouts)

The proposed measure consists of arranging circular central islands in the middle of an intersection, in order to force drivers to change the direction of travel and speed to avoid the island, creating a circular flow in one direction (figure 3.14). This measure will also eliminate the need to place traffic lights and/or traffic signs to regulate traffic at the intersection.

The central islands must be adapted and designed according to the particular specifics and geometry of each intersection, without affecting the ability of all vehicles to make up the flow of traffic, regardless of size.

The radius of the island must be adapted to meet the following requirements: be large enough to force vehicles entering the intersection to slow down and change direction, but not to significantly change the route for pedestrians and cyclists.

It is preferable to install traffic signs that clearly indicate that the intersection operates according to roundabout rules.

Figure 3.14. *Arrangement of central islands in intersections.*

- *Benefits:*

– They are effective for reducing the speed of traffic at intersections, as well as for reducing the number and severity of accidents;
– It has greater applicability for streets with a one-way traffic lane;
– If installed in series, this type of measures also offers a general traffic calming effect along the entire street corridor;
– Increase the level of service in intersections where there are a large number of left turns;
– Contributes to the improvement of the urban landscape.

- *Applicability:*

– Increased applicability for small intersections and low capacity;
– Applicability for areas with a rectangular street network;
– They are suitable for the intersections of traffic arteries where the roadway intended for motor vehicles is shared with bicycle lanes.

3.3.8. Arranging roundabouts

Arranging the intersections in the city in this way will be very efficient to increase the level of road safety, because it will force to reduce the speed of travel, while reducing the number of possible points of conflict at the intersection (figure 3.15).

Figure 3.15. *The arrangement of a roundabout.*

The traffic through the intersection will be regulated to run in a trigonometric direction, around a circular island of traffic placed in the center.

The roundabout is suitable for intersections in the municipality characterized by high traffic volumes, but must not have more than two lanes.

These intersections will be dimensioned so that the geometry and arrangement allow the passage of vehicles with large dimensions (buses, trucks, etc.), which require a larger turning radius.

When designing and executing them, the needs of vulnerable users (pedestrians and cyclists) must also be taken into account, such as: elevated crossings, clear markings, protections for cyclists, etc.

- *Benefits:*

- They will provide a more efficient and safer management of road traffic in large, complex intersections and/or with more than four entering branches into the intersection;
- It will be obtained the reduction of the speed of circulation of the vehicles, of the number of accidents and, in the situation in which nevertheless they will occur, the severity will be much diminished;
- Reducing the points of conflict at the intersection, by eliminating left turns, which is a major cause of accidents;
- It will increase the safety in case the return in the intersection is desired ("U" turn);
- Pedestrian safety will be improved when the arrangement also includes pedestrian crossings;
- Green and/or floral spaces can be arranged in the central island, thus contributing to the improvement of the urban landscape and the increase of the carbon dioxide retention capacity emitted by motor vehicles.

➢ *Applicability:*

– Roundabouts are generally not suitable in situations where the volume of road and pedestrian traffic is very high;
– Requires more space than the situation of arranging the intersection in the classic version;
– The widths of the streets and/or available space must be sufficient to allow a proper roundabout to be designed;
– They are also applicable to intersections that have stop control on all turns or at least three of them, characterized by a large volume of vehicles that have to make turns, especially on the left.

3.3.9. Arranging islands in mid street for pedestrian refuge

The pedestrian refuge islands will be specially arranged places in the form of short segments used at the pedestrian crossings for the pedestrian refuge (figure 3.16).

Figure 3.16. *Arrangement of a median island as refuge for pedestrians.*

The width of these infrastructures must be large enough (1.5 - 1.8 meters) to provide sufficient space for shelter at pedestrian crossings. In order to highlight these islands in order to increase their visibility by drivers, it is recommended that they be illuminated or signaled with indicators.

The height of the islands must be at street level and protected from it by bollards or curbs. The movement of people with disabilities must also be facilitated.

➢ *Benefits:*

– It will improve safety at pedestrian crossings, allowing them to approach the crossing of each direction of traffic at a time;

- The pedestrian crossing distance will be reduced, the speed of vehicles will be reduced and drivers' attention will be stimulated on the existence of a pedestrian crossing;
- They will calm traffic, especially for left-hand drive vehicles, by narrowing the road in the intersection area.

➢ *Applicability:*

- The solution may be combined with the extension of the curbs, chicanes or other measures of those described above;
- Where applicable, access of bicycles must be maintained;
- They prove to be very useful for unmarked crossings.

3.3.10. Arrangement of traffic light intersections with controlled signal

The proposed measure consists in controlling traffic signals at intersections, in order to separate flows on different lanes, leading to improved safety of vehicles and pedestrians at intersections (figure 3.17). The signal can be controlled in time (phase change after a certain time, regardless of the traffic volume) or intelligently, depending on the volume of the vehicle flow. The possibility must be offered for pedestrians and cyclists to operate the system to obtain the green light traffic when crossing.

Figure 3.17. *Arrangement of a traffic light intersection with controlled signal.*

The green phase for pedestrians must give them enough time to complete the crossing (considering that the pedestrian speed is 4.3 - 4.5 km/h). Increasing the frequency of green phases will lead to a decrease in the number of crossings on the red color of the traffic light. The green phases for the left turn will reduce conflicts, but they should be applied carefully,

as pedestrians can cross during this phase. Turns to the right may be allowed when the forward signal is red, but this measure must be applied with caution, based on the analysis of each situation and depending on the traffic volumes crossing the intersection.

To optimize the control of travel speeds, the signals of the various traffic lights located in an area must be coordinated.

In the case of the variant that allows the activation of the green wave for pedestrians by pressing a button or by presence sensors, the waiting time after actuation must be minimized.

- *Benefits:*

– Improving pedestrian safety by signaling their crossing, provided that the waiting time is properly addressed;
– The controlled signal system is also used to give priority to public transport and bicycles;
– It can also give the green signal offbeat, namely to pedestrians and cyclists a few seconds (minimum 3) before the flow of vehicles moving in the same direction.

- *Applicability:*

– The solution has increased applicability and greater potential to increase safety at intersections with high traffic flows.
– An exclusive phase for pedestrians and/or cyclists or a priority green shift for pedestrians will improve crossing conditions for these vulnerable users;
– Setting a red signal time for all vehicle flows can further increase pedestrian safety.

3.3.11. Arranging safe sidewalks

Sidewalks and pedestrian areas are parts of the street bounded by curbs and buildings, intended for use by pedestrians (figure 3.18). A well-equipped sidewalk combines the utility for pedestrian use with street furniture, as well as landscaping elements, including lighting systems, signs, fire hydrants, benches, mailboxes, newspaper boxes, parking meters, trash cans, etc.

Sidewalks must be leveled or sloped in such a way as to allow the movement of people with disabilities. It must provide adequate space for pedestrian movement and activity (minimum 1.5 - 1.8 meters wide for low volume areas and minimum 2.5 meters wide for higher volume areas). If the pedestrian area is adjacent to the curb, the minimum width of the sidewalk must be 2.10 meters.

Figure 3.17. *Proper arrangement of the sidewalk – delimited by the areas where vehicles can be parked.*

To be attractive, sidewalks must be equipped with trees, shrubs, vegetation, trash cans, benches, tables, delimitation bollards and/or additional spaces. In the places of passage, systems with partially or totally buried curbs must be used, to allow the passage of wheelchairs, those of children, etc.

The main benefit is the separation of pedestrian traffic from that intended for motor vehicles, avoiding potential conflicts between these categories of road users.

3.3.12. Arranging shared spaces

The proposed measure consists in arranging spaces dedicated to traffic in common of all categories, but in which the priority is foe pedestrians (figure 3.18). Roads with such traffic are designed to dramatically limit the speed of vehicles, by using brick pavements, planters, curbs and other facilities, in order to promote safety and awareness by all users that pedestrians have priority.

Sidewalks or curbs are generally not delimited on shared spaces. Different types of pavements, alternating pavers and different types of street furniture can be used.

Vegetation and landscaping should be implemented in these spaces to increase the attractiveness of the area and encourage walking.

The speed of the vehicles must be limited to a maximum of 15 km/h.

Figure 3.18. *Example of arranging a shared space.*

3.3.13. Implementation of automatic display systems for exceeding the legal speed

These are electronic systems that display a symbol and/or a message when triggered by speeding vehicles (figure 3.19). They are normally intended to supplement rather than replace traditional signs and markings, with the aim of raising awareness in order to increase the level of safety.

Figure 3.19. *Systems of automatic display the exeeding the legal speed.*

They must be used strategically, in areas with a high incidence of accidents, where the expected effect is maximum. They should not be introduced on a large scale, because simply "another traffic sign" would cause drivers to become accustomed to them and their effect would diminish.

3.3.14. Implementing smart pedestrian crossings

The proposed measure is a way to increase the level of road safety in the area of pedestrian crossings, by installing LED strips in asphalt in crowded areas of the city. The lanes must colored green or red, the meanings of the colors being similar to those of the classic traffic light, and guide pedestrians distracted by the use of smartphones in crossing the street.

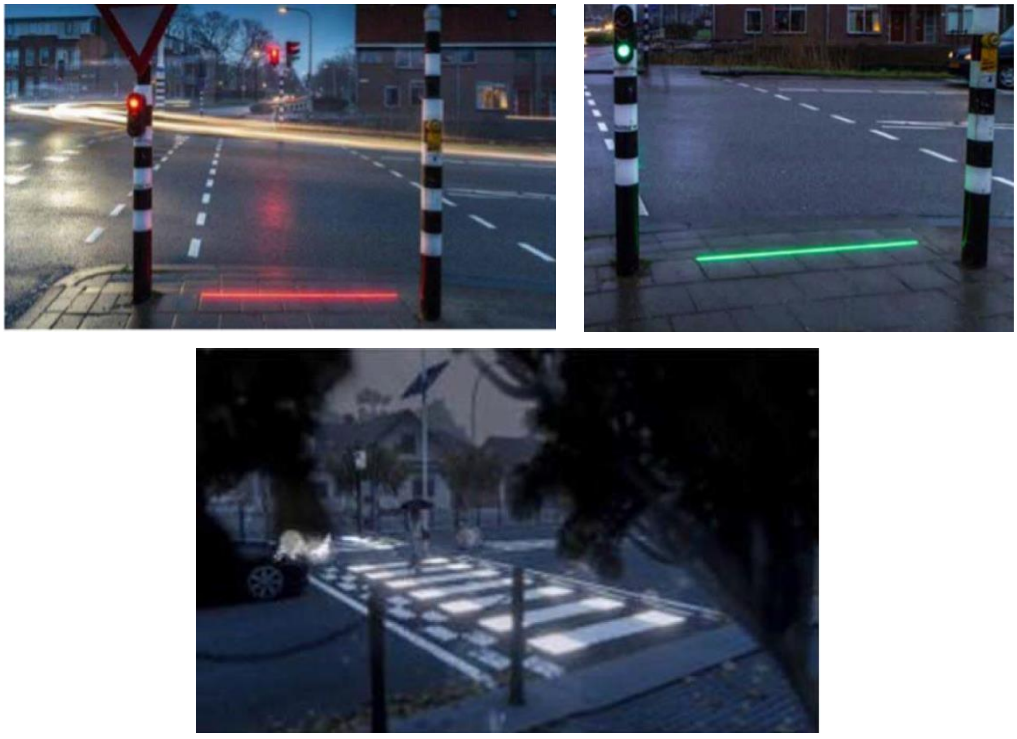


Figure 3.20. *Smart pedestrian crossing.*

By implementing the proposed measure, road safety will be strengthened, especially for pedestrians who are distracted by smartphones.

The lighting can be intelligent, ie when detecting a pedestrian who intends to cross, the light integrated in the pedestrian crossing and the upper lighting will be activated automatically, thus alerting drivers to the existence of a pedestrian crossing.

3-B. FORMULATION OF PROPOSALS FOR IMPROVING ROAD SAFETY - DOBRICH

Measures to improve road safety can be divided into three main types - engineering measures, measures related to the rules and their control, measures related to training. In this part of the report, we will focus on the first two types of measures.

It is extremely important for the responsible institutions to act constantly and proactively with regard to road safety, and not to start activities only after a serious accident.

The proposals are divided depending on the location of their application - in or outside the city, as well as depending on their nature - technological or infrastructural.

In addition, useful policies and considerations are proposed for the streets around the schools in Dobrich.

3.1. Proposals for road safety measures

3.1.1. Suggestions for rural roads

Technological measures

Speed control

There are several types of speed control, each with different characteristics and expected effects that make them appropriate in one situation or another. The main types are:

- Fixed technical means
- Mobile technical means
- Medium speed control

The following table presents the important considerations to consider when choosing a speed control technology.

	Fixed	Mobile	Average speed
Long-term problems in certain locations	X	X	-
The problems are all over the road network	-	-	X
Drivers decrease only around the control point	-	X	X
For streets / roads with more than 2 lanes in one direction	X	-	X

In order to have the maximum positive effect, speed control must have the approval of the community, and this can be achieved by correctly introducing the permitted speed according to the characteristics of the road sections, as well as by purposeful selection of places and methods of control.

Meteorological stations and notification in case of icing

Sensors are used to measure in real time the temperature of the pavement, the amount and type of precipitation, wind, fog, etc. This information can be provided to travelers along the way through warning signs with variable content, a mobile application or messages on radio stations.

Infrastructure measures

Road markings

Road markings are key to ensuring safe movement on the road. A single continuous line for delineating the edges of the roadway should be 25 cm (even if it is not motorways, expressways, urban motorways and roads with more than three lanes). This would improve the orientation of drivers, especially during the dark periods of the day and would reduce accidents by leaving the road.

The same positive effects can be expected from the use of embossed marking - both for the end lines and the central one.

At intersections regulated with priority for those moving on the main road, writing a STOP at a certain distance before the stop line will increase the attention of drivers and warn them of the upcoming intersection.

The use of a wider intermediate strip on extra-urban two-way roads has been shown to be effective in improving road safety.

Coefficient of friction of the pavement

The coefficient of friction is a key characteristic of the road surface with an extremely important role in road safety. Good pavement quality is especially important on wet pavement in horizontal curves and at intersections. Constantly check the quality of the road surface and, if necessary, take measures to improve friction.

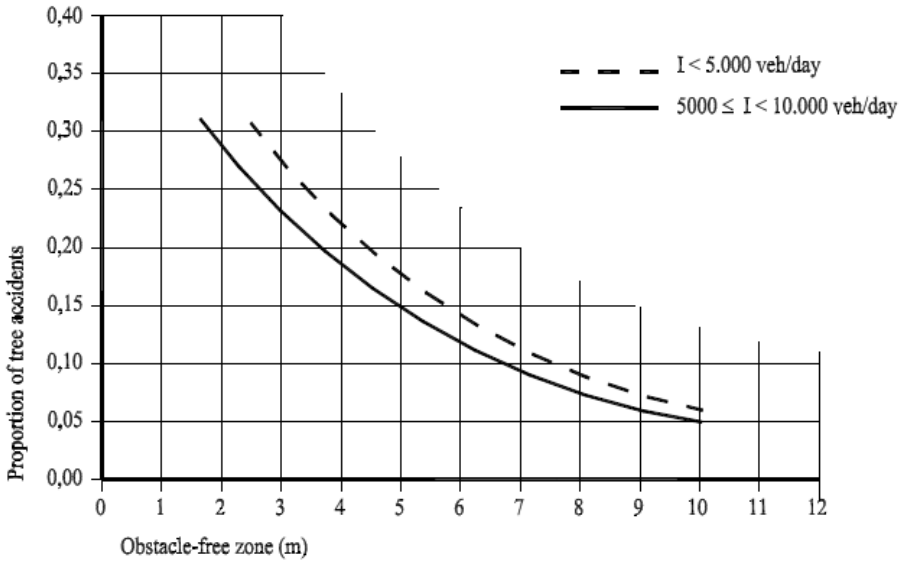
Road signs

At intersections regulated with a Stop sign, place warning signs at a distance before the stop line so that drivers receive information about the approaching intersection and the need to stop. To increase the attention of drivers to these signs can be additional warning lights.

In order to increase the visibility of the road dimensions during the dark part of the day, it is recommended to use C7 signs at the horizontal curves, and along the entire length of the suburban roads - C1 guide posts.

Unsecured sites around the road

When a car leaves the road, the severity of the accident depends to a large extent on the safety of the objects around the road, as well as their distance from the edge of the road. The following graph shows the relationship between a collision with a tree and the width of the safe area on the side of the road. It can be seen that the use of steel fences in the presence of trees or other objects (billboards) less than 6 m from the end of the road will significantly reduce the likelihood of a serious accident.



3.1.2. Suggestions for city streets

Technological measures

It is recommended that there is no footpath that crosses more than 2 lanes in the direction or a total of 4 lanes, without a three-section traffic light to regulate traffic, of course at low pedestrian traffic and if the traffic light is not included in the coordination ("Green wave") buttons must be used to request a pedestrian phase.

At traffic light intersections on streets with 2 or less lanes in one direction, a completely pedestrian phase may be used. This completely eliminates conflicts between pedestrians

and cars. Such a policy would demonstrate that pedestrians are just as important a participant in traffic as cars.

The overtaking pedestrian green signal also has a positive effect on pedestrian safety at traffic light-regulated intersections. This means that the green signal for pedestrians starts 1 to 3 seconds before the start of the green signal for parallel cars.

One of the most serious accidents at a traffic light regulated intersection occurs when passing a red signal. There are many systems that can automatically control this violation and fine violators. Typically, systems include one or more cameras at the entrance to the intersection, capturing the offense itself, the color of the traffic light section, and the number of the vehicle that committed the offense.

Speed control systems are also applicable in urban conditions. Their main characteristics were described in item 2.1.1.

There are already technologies that can be used for legal analysis of potential conflicts at all types of intersections. Again, video is used (50-70 hours) and through the same models for object recognition and tracking in the image, data on driver behavior, trajectories, speed, etc. can be extracted characteristics. Using these data, experts can assess the likelihood of certain types of accidents and accordingly propose specific measures to prevent them.

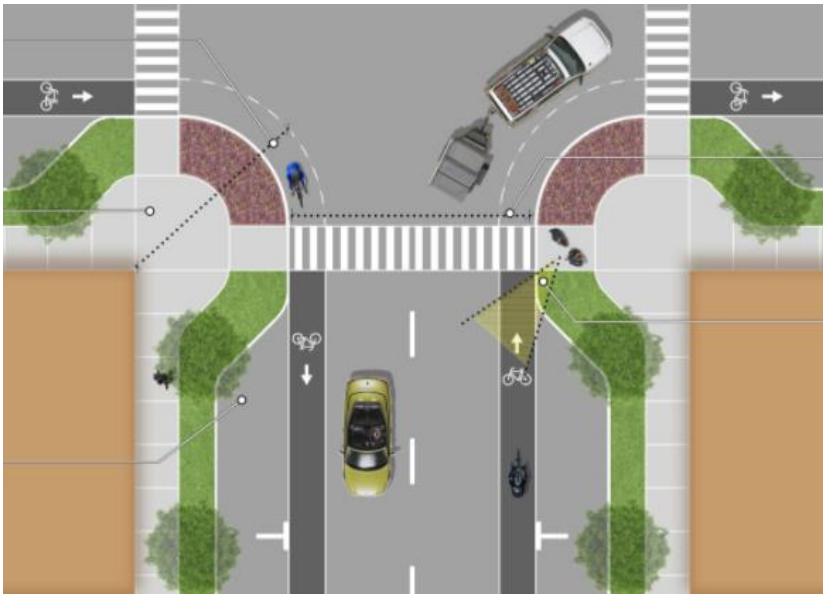
Infrastructure measures

Road signs and road markings must be kept in good condition at all times. They are especially important for the disciplined behavior of drivers in the city.

For the most vulnerable road users, it is extremely important that street lighting is also constantly maintained. In order to save operating costs for street lighting, modern systems for regulating the operation of lighting can be used. The presence of participants in the

movement around the respective pole is registered by detectors and the LED lighting is activated.

One of the main principles for reducing accidents in urban areas is to reduce the share of travel by car, at the expense of travel by public transport, walking or cycling / scooters. To achieve this, the municipality must demonstrate that these ways of moving are more important than cars, and the main streets of the city must be provided with the necessary area for safe movement of non-motorized road users. The main way to achieve this is to narrow the lanes and overall reduce the area used by cars.



The saved street area can be organized and used in different ways:

- Wider sidewalks;
- Bicycle lanes or bicycle lanes;
- Bead strips;
- Parallel parking;
- And others.

In the design process in the future, look for a reduction in the length of footpaths that pedestrians have to cross.

At intersections, this is achieved by widening the pavement in the areas of horizontal curves. In this way, two positive effects are achieved - pedestrians are in the field of view of oncoming drivers and the speed of turns is reduced due to the smaller radius of the horizontal curves.

Rubber stoppers or delineators can be used for intersections with serious conflicts between drivers (left or right) and pedestrians, as shown in the following photos. These measures have been used relatively recently in the United States, but have shown good results in reducing the speed of cars when turning and thus reducing the risk of pedestrians and cyclists.

The construction of roundabouts also has a positive effect on road safety. When designing them, a detailed analysis of traffic flows must be made and their intensity must be taken into account. It is not recommended to apply roundabouts with more than two lanes. It is also extremely important to properly and safely organize the movement of pedestrians and cyclists through the roundabout.

In order to better organize traffic, one-way streets can be introduced. Such a change affects the whole area and its implementation should be based on a complete project for a group of streets or an entire neighborhood. In one-way streets, an increase in the speed of traffic

is observed and therefore, after their introduction, measures must be taken to calm the traffic.

3.1.3. Suggestions for the areas around the schools

Children are among the most vulnerable participants in the movement and therefore their needs and specific behaviors should be at the heart of designing and organizing areas around schools.

The following basic principles are recommended to ensure the safe movement of children around schools:

- Access to schools should be on small neighborhood streets, not on main streets, where speeds are generally much higher;
- The allowed speed should be 30 km / h - as this speed should not be simply entered by a sign, but the organization of the street and sidewalks should contribute to the observance of low speed;
- Sufficient parking spaces must be provided and properly organized to allow children to be left and picked up safely;
- Sufficiently wide sidewalks must be provided immediately around the school, as well as on the way to / from public transport stops;
- At intersections and places where children cross, extra attention must be paid to their visibility by drivers;
- The places where children cross should be well selected and well marked with signs;

3.2. Defining an implementation methodology (required resources, permits, permits, etc.)

To work on the development of a model of financing of technical means for control of traffic rules. The costs for this type of systems are significant and if the Municipality is not able to finance them through its budget, a model should be sought for rescheduling the costs and financing from the received fines.

3.3. Integration of road safety measures for the Bulgarian side to finalize the common mechanism

- To improve the quality of travel on the routes of some of the public transport lines, providing quick access to important sites for the district - the largest health institution Dobrich Hospital, Territorial Customs Administration, Geo Milev Language High School, Stefan Karadja Primary School , Center for Mental Health "Dr. P. Stanchev", Regional Health Inspectorate and others, through the rehabilitation of Dobrichka Epopeya Blvd.
- To improve the quality of the road arteries leading in the direction of border crossings - "Kardam", "Durankulak" and "Severnyak";

- Protecting the environment by improving the characteristics of vehicles serving three lines of public transport - replacement of diesel vehicles with new, environmentally friendly electric buses;
- To improve the safety of the environment by renovating the stops primarily on Dobrichka Epopeya Blvd., the busy stops on the lines served by electric buses and the stops with heavy passenger traffic in the central part of the city;
- Improve traffic safety by replacing the obsolete and depreciated traffic light system with modernized means of regulating traffic at intersections in order to give priority to public urban transport, emergency vehicles, reducing transport delays, facilitating traffic , adjustment according to the seasonal periodicity of the load;
- To improve the quality of transport services by implementing an electronic information system at the stops in the central part of the city and controlling the movement of all vehicles of the mass urban public transport (MGOT).
- Expansion of the built infrastructure for bicycle transport and establishment of separate bicycle lanes with two-way traffic outside the central part of the city.
- Regarding the main roads leading to the border with the Republic of Romania:

- To renovate the road markings on the main road routes to the border checkpoints - "Kardam", "Durankulak" and "Krushari", as well as to bring in line with the basic regulatory requirements. In more places of the suburban network, the road markings are only the main line, and those that outline the edges of the lane are completely missing, which makes it difficult to assess the location of the banquet, and poses a serious risk of accidents.

- To renovate the guardrails next to the roads, in many places there are no safety ones or they are visibly depreciated;

- Most road signs are in poor condition or completely missing, it is necessary to renovate road signs and put new ones where they are missing;

- The road surface is compromised in places, which poses a risk of accidents.

- Regarding the urban part:

  - The road surface is significantly outdated and the surface layer is compromised, which requires timely action to prevent further deterioration;
  - Street lighting is outdated and does not meet modern standards for lighting. In places of the city network there are many damaged poles that do not work;
  - Road markings have faded and are difficult for drivers to notice, especially in the evening, which is a prerequisite for serious accidents;
  - In most of the city cars are parked on the sidewalks and green areas around the blocks, there are no special places to provide the necessary conditions for parking personal cars and eliminate violators;
  - It is necessary to expand the network of bike lanes and to encourage the use of alternative methods of transportation in the urban area;
  - With regard to the tourist sites in the city, it is necessary to introduce signposts indicating their location, as well as to provide the necessary infrastructure for the movement of tourists in the city, including organized ones by bus;
  - In the vicinity of public buildings such as schools, kindergartens, community centers, gyms, parks and tourist sites, it is necessary to review and update all signs,

markings and speed limiters to reduce the possibility of accidents and improve the conditions for the use of alternative ways of getting around.

Over the last 15 years, there has been a reduction of over 20% in the use of public transport as a form of transport, at the expense of personal car transport. The share of bicycle traffic is insignificant due to the lack of appropriate, safe infrastructure. Walking remains with a constant share (10%) due to the insecurity of sidewalks and places of movement.

Accidents directly depend on the current organization of traffic, most of which are fatal for pedestrians. Critical places are bus stops, footpaths and places to cross pedestrian flows near administrative, commercial and health facilities. This requires special attention to the safety of areas with active pedestrian traffic near sites of citywide importance, as well as rethinking the entire Scheme / Plan for traffic organization.

3.4. Conclusions

In preparing this report, the team collected data on traffic intensity and accidents. The three main roads from Dobrich to the border with Romania - I-9 / E87, III-293 and II-29, as well as the main roads within the city - Dobrudja Blvd., 25th of September Blvd. and Blvd. Russia.

Even during the collection of the available data, one main problem was identified - the lack or insufficient detail of the data, both for the intensity and for the accident. This significantly reduces the ability to perform detailed and effective analyzes in order to identify specific problems and implement the right measures to solve them.

From the conducted inspections several main problems can be distinguished: the condition of the road markings, the road signs and the road surface. Problems with street lighting were also observed in certain sections of the examined settlements.

The report proposes a number of measures to be taken into account in the future planning and implementation of road infrastructure reconstructions.

In order to support the financing of automatic traffic control systems, it is recommended that the institutions work together so that fines are used purposefully.