



**ADMINISTRATIVE-TERRITORIAL UNIT/
UAT NEGRU VODĂ TOWN**

**TRAFFIC MANAGEMENT STUDY
WITHIN THE PROJECT
"INCREASING ACCESSIBILITY TO THE TEN-T IN THE
BORDER AREA NEGRU VODĂ - GENERAL TOSHEVO"**



Recipient: UAT NEGRU VODĂ TOWN
Designer: **SIGMA MOBILITY ENGINEERING**
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TABLE OF CONTENTS

1. INTRODUCTION	4
1.1. <i>The aim and function of the documentation</i>	4
1.2. <i>Correlation with regional and local strategic documents</i>	6
1.3. <i>The concept of the study</i>	11
2. ANALYSIS OF THE CURRENT SITUATION	13
2.1. <i>The socio-economic context, identifying population densities and economic activities</i>	13
2.1.1. Demographic data	13
2.1.2. Economic activities	18
2.1.3. Monitoring index	23
2.2. <i>The road network</i>	25
2.3. <i>Public transport</i>	36
2.4. <i>Alternative mobility systems</i>	39
3. ROAD TRAFFIC FLOWS	42
3.1. <i>Traffic flows at the level of the baseline year 2020</i>	42
3.1.1. Traffic volume data	42
3.1.2. Travel time data	80
3.1.3. Development of the transport network	80
3.1.4. The transport demand	82
3.2. <i>Traffic flows at the level of the forecast year 2030</i>	89
3.2.1. The baseline scenario	93
4. REORGANIZATION PROPOSALS FOR FLOW TRAFFIC MANAGEMENT	98
4.1. <i>The proposed scenario for year 2030</i>	98
4.2. <i>The impact of the proposals</i>	108
5. CONCLUSIONS	111



1. INTRODUCTION

1.1. The aim and function of the documentation

The work «Traffic management study within the project "Increasing accessibility to the TEN-T in the border area Negru Vodă - General Toshevo"» aims to analyze the current situation regarding road traffic in Negru Vodă Town and to solve the problems of all the streets in the studied area.

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 the resources and a much lower impact on the environment, as set out in the "Resource-Efficient Europe" initiative presented in the Europe 2020 Strategy.

The "White Paper on Transport"¹, drawn up by the European Commission, is the key document of the European Union which addresses mobility. 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 with 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.

Considering the process of urban development, mobility has become one of the main challenges for local governments. Currently, transport covers about 20% of global energy demand, accounting for about 25% of CO₂ emissions from energy consumption. The negative effects associated with high traffic volumes, such as pollution, traffic safety

¹White Paper on Transport, European Commission, 2011.

problems and noise, are the main dysfunctions which require rapid interventions in order to improve citizens' mobility.

The project **"Increasing accessibility to the TEN-T in the border area Negru Vodă - General Toshevo"** - in which the study is conducted, aims to improve the connection to the TEN-T network for the communities of the two towns and for traffic participants in the border region.

The traffic study area is represented by the territory of the Negru Vodă Town. The analyses regarding the interaction with the major traffic network will take into account the potential associated with the national and county roads that go through the urban territory (figure 1.1).

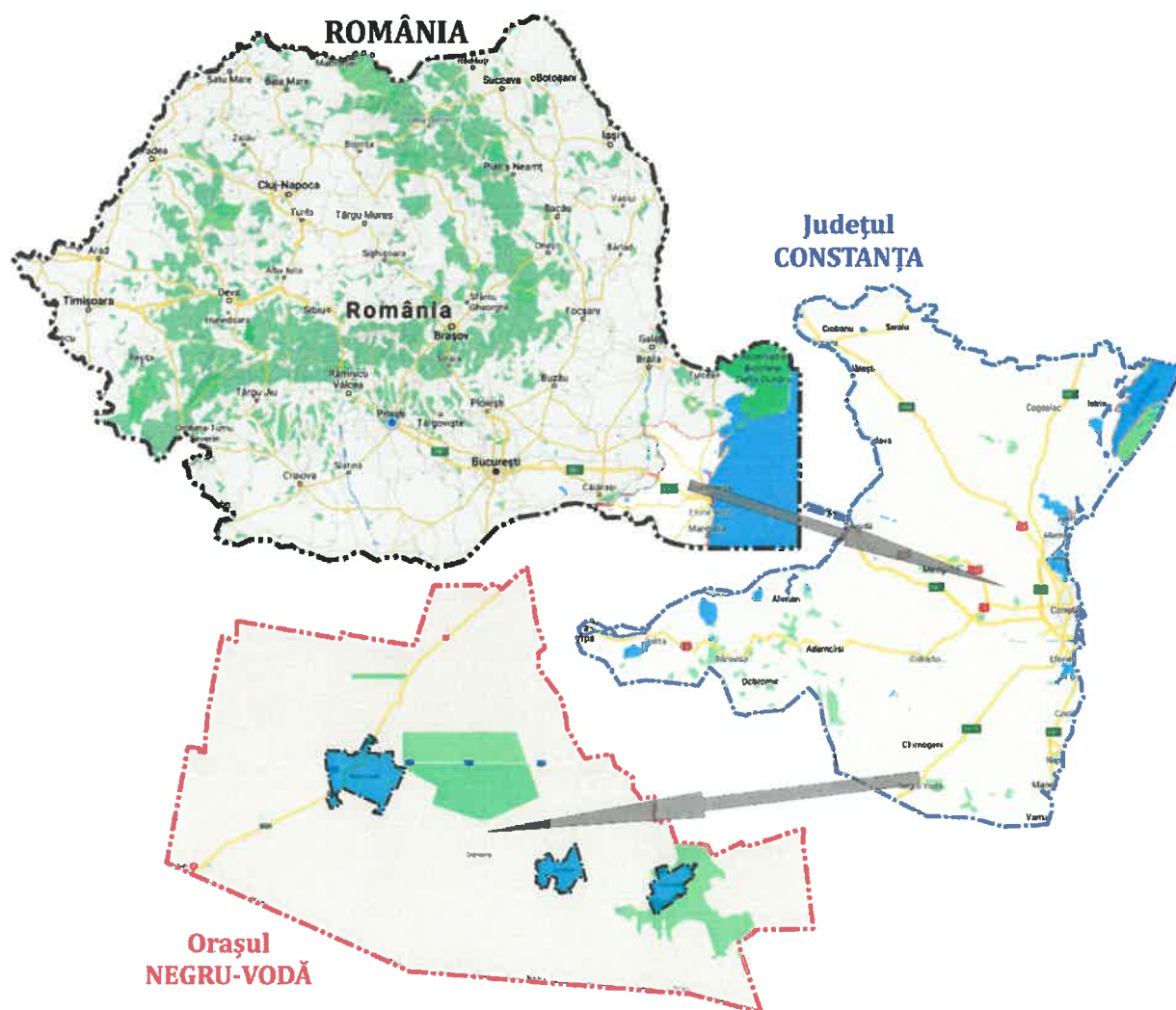


Figure 1.1. The studied area.

ROMÂNIA=ROMANIA

Județul CONSTANȚA=CONSTANȚA County



Orașul NEGRU-VODĂ = NEGRU-VODĂ Town

1.2. Correlation with regional and local strategic documents

The existing documents at regional level covering the areas related to mobility and transport are the following:

- South-East Regional Development Plan 2014-2020;
- Integrated Strategy for Sustainable Tourism Development in Constanța County 2019 - 2028.

South-East Regional Development Plan 2014-2020

The South-East Regional Development Agency elaborated in 2014 the South-East Regional Development Plan 2014-2020, aiming at regional development. The vision of the South-East Regional Development Plan is to maintain the region's attractiveness with the help of a stable economy.

The general objective at regional level is: *Promoting sustainable development and improving the quality of the population's life, so that it becomes a long-term competitive and attractive for investment region, capitalizing on environmental heritage, highly qualified human resources, creating new employment opportunities and a significant increase in regional GDP by 2020, up to 90% of the national average.*

In order to achieve the general objective, a series of specific objectives (O.S.) have been proposed, as follows:

- **O.S. 1.1.** *Increasing the attractiveness and competitiveness of urban areas in order to preserve, protect and develop the historical and cultural heritage for the development of the region;*
- **O.S. 1.2.** *Improving the living conditions, the public spaces, the quality of the environment in urban areas and developing an ecological urban public transport;*
- **O.S.2.1.** *Improving accessibility, mobility and regional connectivity, by developing a road transport system based on the principles of sustainability, innovation and security, capable of ensuring fast and efficient connections with international markets;*
- **O.S. 2.2.** *Improving accessibility, mobility and regional connectivity by developing a competitive harbour transport system;*
- **O.S. 2.3.** *Improving accessibility, mobility and regional connectivity by developing a competitive air transport system;*



- **O.S. 3.1.** *Development of RDI (Research, Development and Innovation) infrastructure and of synergies between enterprises and these centers, by using innovative products and processes;*
- **O.S. 3.2.** *Supporting the development of companies in order to increase regional competitiveness and create new jobs;*
- **O.S. 4.1.** *Increasing the level of promotion and the degree of economic capitalization of the local tourist potential (recreational, scientific, educational, hunting and fishing, balneary and treatment, cultural, oenological and gastronomic tourism, etc.);*
- **O.S. 4.2.** *Improving the specific tourism infrastructure in order to increase the attractiveness of the region as a tourist destination;*
- **O.S. 5.1.** *Efficient and sustainable capitalization of the natural heritage by creating / modernizing the necessary infrastructure in order to ensure the supply of drinking water to the population and to collect and treat wastewater in order to increase the quality of life;*
- **O.S. 5.2.** *Protecting the environment by strengthening and expanding integrated waste management systems, supporting investments that promote the prevention of waste generation, the reuse, including their use as secondary raw materials / by-products in order to increase the efficiency of natural resources' use and the decontamination of contaminated sites;*
- **O.S. 5.3.** *Preventing and reducing the impact of climate change by implementing measures to protect the environment and to prevent environmental risks and to develop and strengthen professional and voluntary emergency services and rapid response centers;*
- **O.S. 5.4.** *Conservation and restoration of natural ecosystems by maintaining / improving the state of environmental factors and by the sustainable management of protected areas;*
- **O.S. 6.1.** *Improving the energy efficiency of buildings in the residential sector and capitalizing on renewable resources for the production of electricity and thermal energy;*
- **O.S. 6.2.** *Improving the energy efficiency of buildings in the public sector and of the public lighting system and capitalizing on renewable resources for electricity and thermal energy production;*
- **O.S. 7.1.** *Increasing the participation rate of the population in the education system by improving education services and the infrastructure of the education system;*
- **O.S. 7.2.** *Increasing the quality of medical services and of the infrastructure in order to improve the health of the population;*
- **O.S. 7.3.** *Increasing the quality of social services and of the social service infrastructure in order to fight poverty and for social inclusion;*

- **O.S. 7.4.** Reducing the degree of poverty by ensuring improved living conditions for disadvantaged communities, as well as providing basic services - medical, educational, social - in order to increase employment and social inclusion;
- **O.S. 8.1.** Diversifying the rural economy by increasing the number of enterprises, including those in the non-agricultural sector, encouraging the maintenance and development of traditional activities in rural areas;
- **O.S. 8.2.** Increasing the competitiveness and sustainability of the fisheries sector;
- **O.S. 8.3.** Increasing the quality of life in rural areas through the development of rural infrastructure, including through the conservation, protection and development of historical and cultural heritage;
- **O.S. 9.1.** Improving the performance of human resources through investments in infrastructure;
- **O.S. 9.2.** Improving public services, promoting partnerships at regional / local level and creating a modern, flexible, inclusive regional labor market in order to meet the needs of the market;
- **O.S. 10.1.** Supporting the development of companies so as to implement projects in the field of cross-border and interregional cooperation in order to increase competitiveness and to create new jobs;
- **O.S. 10.2.** Reducing risks in the cross-border area by identifying, assessing, monitoring and addressing disaster risks and strengthening early warning;
- **O.S. 10.3.** Improving the capacity for cooperation and the efficiency of public administrations in the context of the CBC.

Integrated Strategy for Sustainable Tourism Development in Constanța County 2019 - 2028

The Integrated Strategy for Sustainable Tourism Development in Constanța County 2019 – 2028 Phase II was developed in 2019 by the National Institute of Research and Development in Tourism, proposing the following vision: *"In 10 years Constanța County will be a competitive tourist destination at European level, developed on sustainable principles, attractive for 365 days per year, with a wide range of attractions and tourist experiences offered, spread in a balanced manner throughout the entire area. Tourism, as a basic economic activity in Constanța county, will create new opportunities for employment and for improving the quality of life of the local population"*.

The specific principles for the sustainable development of tourism in Constanța County are:

- *Tourism development brings economic and social benefits to the local community;*
- *Tourism development contributes to the conservation, rehabilitation and capitalization of cultural heritage and has a minimal negative impact on local culture;*
- *The development of tourism contributes to maintaining a clean natural environment, and tourism activities have a minimal negative impact on it;*



- *Tourism development meets the needs of tourists.*

The general objectives for the development of tourism are:

- I. Reducing tourism seasonality and positioning of Constanța County as a 365-day tourist destination;
- II. Territorially balanced tourist development at county level so that the economic benefits generated by tourism spread from the coast to the interior of the county;
- III. Improving the tourism attractiveness of the destination in order to increase the competitiveness of the tourism product.

In order to achieve the 3 general objectives, the following specific objectives were identified:

- *O.S. 1. Improving the management-marketing tourist activity at the destination level by creating specific structures and instruments;*
- *O.S. 2. Improving accessibility, in order to increase the mobility of visitors towards and within the tourism destination;*
- *O.S. 3. The restoration, protection and sustainable capitalization in tourism of the cultural and natural heritage of Constanța county;*
- *O.S. 4. The creation / modernization of the tourism infrastructure in order to increase the attractiveness and competitiveness of the destination;*
- *O.S. 5. The development of a varied palette of tourism products, attractive for different segments of tourists, which would contribute to the improvement of the tourist experience, the diminution of the seasonality and the directing of the tourist flows towards the interior of the county;*
- *O.S. 6. Ensuring labor resources in the tourism sector of Constanța county, both in terms of quantity and of quality;*
- *O.S. 7. Increasing the degree of satisfaction and safety of tourists, offering a quality tourism product, recognized as such and reducing the negative impact that economic activities in tourism and related activities have on the environment, cultural and natural heritage;*
- *O.S. 8. Consolidating the image of the destination and achieving a unitary promotion of the destination.*

The sectoral strategic document at local level is **the Sustainable Development Strategy 2015-2020 of Negru Vodă Town.**

The Sustainable Development Strategy 2015-2020 of Negru Vodă Town was drawn up within the project "Developing the capacity for strategic planning at the level of local public administration authorities of cities in Romania, SMIS code 27520", having as general objective: *Strengthening the administrative capacity of central and local public administration authorities.*



With regard to the transport sector, a series of projects have been identified within the strategy, as follows:

- Establishment and execution of sidewalks in NegruVodă town and Darabani and Vâlcelele villages;
- Increasing the accessibility to the TEN-T network in the cross-border area (asphalt work on 13 km of the streets in NegruVodă town and the DC 14 road which connects NegruVodă town and Vâlcelele village);
- Asphalt work on streets in Darabani and Vâlcelele villages;
- Execution of NegruVodă town's ring road for the diversion of heavy traffic at the border with the Republic of Bulgaria;
- Asphalt work on streets belonging to Darabani's Section.

For the next programming period, it is proposed that cohesion policy interventions in the 2021-2027 period should focus on five investment objectives, as follows:

- **A smarter Europe**– innovative & smart economic transformation, with the following investment objectives:
 - *enhancing research and innovation capacities and the uptake of advanced technologies;*
 - *reaping the benefits of digitalization for citizens, companies and governments;*
 - *enhancing competitiveness of SMEs.*
- **A greener, low-carbon Europe**, with the following investment objectives:
 - *promoting energy efficiency measures and renewable energy;*
 - *climate change adaptation, risk prevention and disaster resilience;*
 - *sustainable water management;*
 - *transition to a circular economy;*
 - *enhancing biodiversity, green infrastructure in the urban environment, and reducing pollution.*
- **A more connected Europe** – regional mobility and ICT² connectivity, with the following investment objectives:
 - *sustainable, climate resilient, smart, and intermodal Trans-European transport networks, including ensuring improved access to Trans-European transport networks, national, regional and cross-border mobility;*
 - *promoting multimodal urban mobility;*
 - *enhancing digital connectivity.*
- **A more social Europe** – implementing the European Pillar of Social Rights, with the following investment objectives:

²ICT - Information and Communications Technology.



- *improving access to the labor market through active policies in the field of the labor market, anticipating skills needs and supporting the transitions and mobility of the labor market;*
- *improving the quality, effectiveness and relevance of education and training systems for the labor market;*
- *fostering active inclusion, in order to promote the socio-economic integration of the Roma community, to strengthen access to quality services, to tackle material deprivation and to invest in housing, healthcare and long-term care infrastructure.*
- **A Europe closer to citizens**– sustainable and integrated development of urban, rural and coastal areas through local initiatives, with the following investment objectives:
 - *promoting integrated development in urban areas, especially in the county seat cities;*
 - *supporting local integrated social, economic, cultural and environmental development and security.*

In carrying out this study, the investment objectives mentioned were taken into account, as well as the planned guidelines, in particular those related to the development of transport networks and the fostering of sustainable urban mobility.

1.3. The concept of the study

In the strategic context presented above, the traffic management study will address the prospects for the evolution of road traffic taking into account the development of the Trans-European TEN-T transport network and road traffic in the area, given that the region is a key point for the transit of goods coming from Asia (via Turkey), arriving in Bulgaria, General Toshevo locality, then crossing Kardan and being transported to Romania, via Negru Vodă, then following the route to the A2 motorway in order to be distributed throughout the country. This ensures the connection with the European 4 PAN corridor: Dresden / Nürnberg– Prague - Vienna - Bratislava - Győr - Budapest - Arad - Bucharest - Constanța / Craiova - Sofia - Thessaloniki / Plovdiv - Istanbul.

From the point of view of road traffic and systematization, the results of the study will be highlighted both in terms of the analysis stage of the current situation (year 2020) and in the forecast stage (year 2030) and in the proposals.

To this end, a traffic model has been created which is based on a division of the analyzed territory into traffic areas. This involves grouping different attraction- traffic generating centers from the modeled territory into traffic areas.



The advantages of using a traffic model at the level of the road network are:

- the possibility to manage the data and the results of the simulation of the traffic flows according to the objective pursued at adequate levels of detail of the studied road network. Providing the necessary details for the micro-modeling required at different stages of the study;
- the adaptability of the traffic model to the subsequent needs to update the study during its development.

The traffic intensity between the tertiary nodes within the TEN-T network represented by the towns of Negru Vodă and General Toshevo is analyzed based on the traffic volumes recorded in the DN 38 connecting arteries on the territory of Romania and II-29 on the territory of Bulgaria.



2. ANALYSIS OF THE CURRENT SITUATION

2.1. The socio-economic context, identifying population densities and economic activities

2.1.1. Demographic data

The demographic variation in the territorial profile recorded in the last 18 years (since the 2002 population census) highlights the reduction by 4.3% in the number of inhabitants with permanent residence in Negru Vodă Town, a variation trend similar to the one recorded at national level (- 2.5%), however a much more pronounced one.

Figure 2.1 shows the variation in the number of inhabitants in the 2002 - 2019 period for Romania, Constanța county and the urban localities in this county. The extreme values are given by the increase in the population by 17.5% in Eforie Town, respectively the pronounced decrease recorded in Mangalia Municipality (-8.3%). During this period, in the Municipalities of Constanța and Medgidia decreases in the number of inhabitants by 6.6%, respectively 7.9% have been recorded.

The data regarding the total number of inhabitants available for 2019 are presented in table 2.1.

Table 2.1. The number of inhabitants, year 2019.

Locality	Number of inhabitants	Source
Negru Vodă Town	5,704	National Institute of Statistics/INS, TEMPO On-line
	5,620	Directorate for Persons Record and Databases Management, Ministry of Internal Affairs

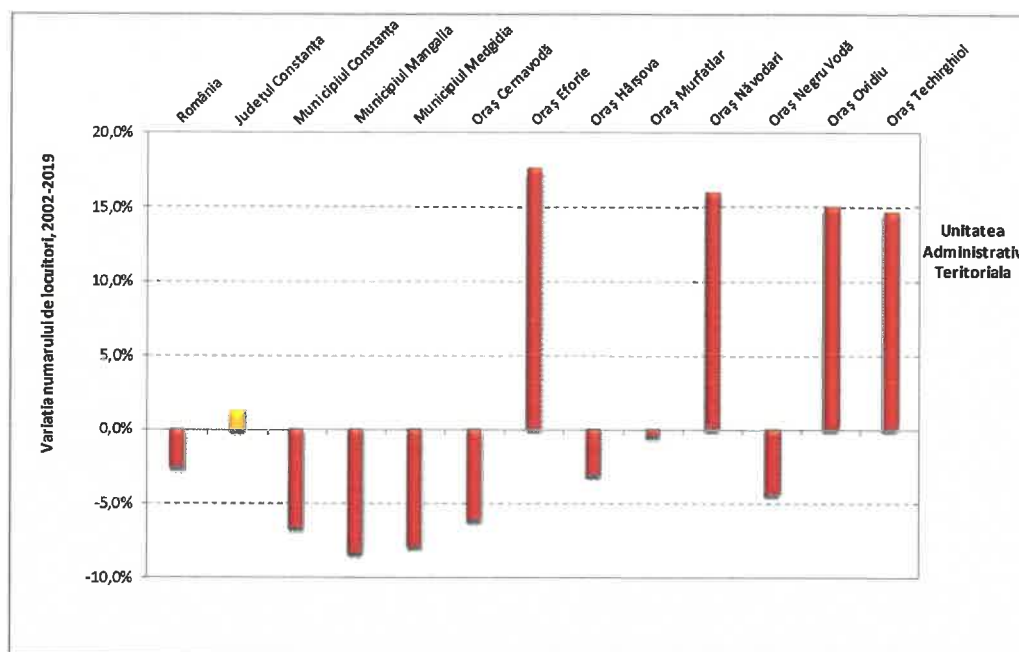


Figure 2.1. The variation in the number of inhabitants in the 2002 – 2019 period, Constanța County's built-up areas.

Data source: INS, TEMPO On-line.

Variația numărului de locuitori, 2002 – 2019 = The variation in the number of inhabitants, 2002 – 2019

România=Romania

Județul Constanța=Constanța County

Municipiul Constanța=Constanța Municipality

Municipiul Mangalia=Mangalia Municipality

Municipiul Medgidia=Medgidia Municipality

Oraș Cernavodă=Cernavodă Town

Oraș Eforie=Eforie Town

Oraș Hârșova=Hârșova Town

Oraș Murfatlar=Murfatlar Town

Oraș Năvodari=Năvodari Town

Oraș Negru Vodă= Negru Vodă Town

Oraș Ovidiu= Ovidiu Town

Oraș Techirghiol= Techirghiol Town

Unitatea Administrativă Teritorială=Administrative-Territorial Unit

The analysis of the distribution of the annual shares represented by the main age groups during the analyzed period (figure 2.2) reveals a 28% decrease in the share of the young population, aged between 15 and 24, simultaneously with the sharp increase in the percentage of the inhabitants over the age of 65 (by 41%), an aspect which reflects the phenomenon of population ageing. In general, these persons are characterized by a reduced mobility, requiring facilities related to the increase in the accessibility of the transport system.

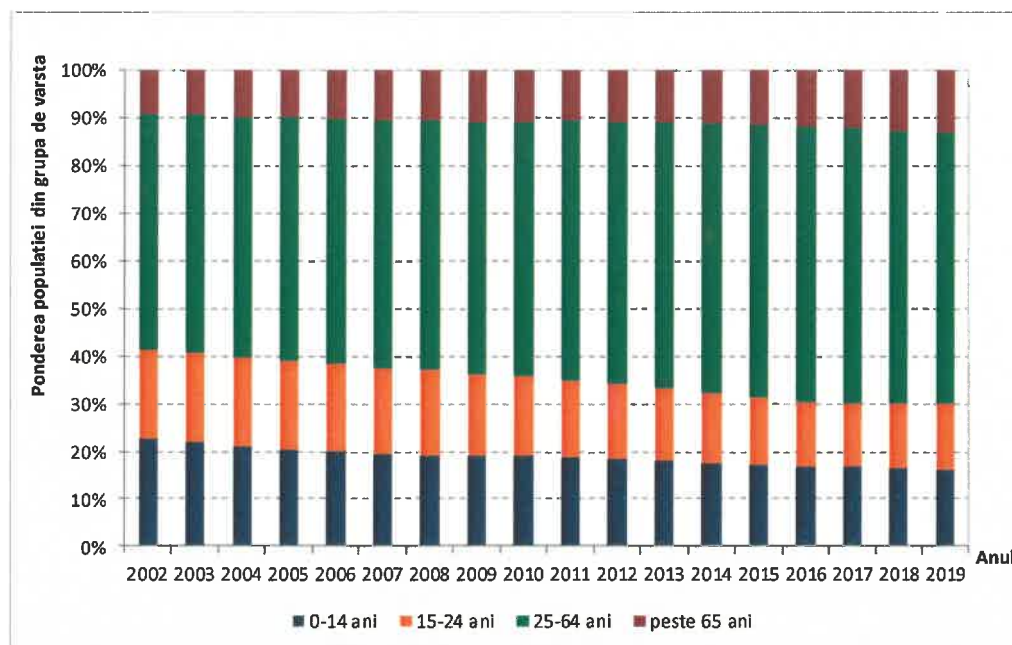


Figure 2.2. The share of the population from the main age groups, 2002-2019 period.
Data source: INS, TEMPO On-line.

Pondereapopulației din grupa de vârstă=The share of the population from the age group

Anul=Year

0-14 ani=0-14 years

15-24 ani=15-24 years

25-64 ani=25-64 years

Peste 65 ani=over 65 years

Following the request from Negru Vodă Town, the Directorate for Persons Record and Databases Management (DEPABD) within the Ministry of Internal Affairs made available the situation of the total number of inhabitants with permanent residence and non-residents in Negru Vodă Town recorded at the end of 2019. The data have been broken down by address (street, number, block of flats).

Since for the development of the transport model (Chapter 3), within the travel generation stage, it is necessary to divide the population according to traffic areas¹, from now on the values provided by the Directorate for Persons Record and Databases Management will be taken into account. The distribution by age groups of these data (figure 2.3) has been made respecting the proportion held by each group in 2019, according to the data published by the National Institute of Statistics.

¹Within the transport model pertaining to the mobility plan (Chapter 3), the territory has been divided into 31 traffic areas, 26 internal areas and 5 external areas representing the travel potential of the localities they serve in relation to the national, county and communal road studied area which cross this territory.

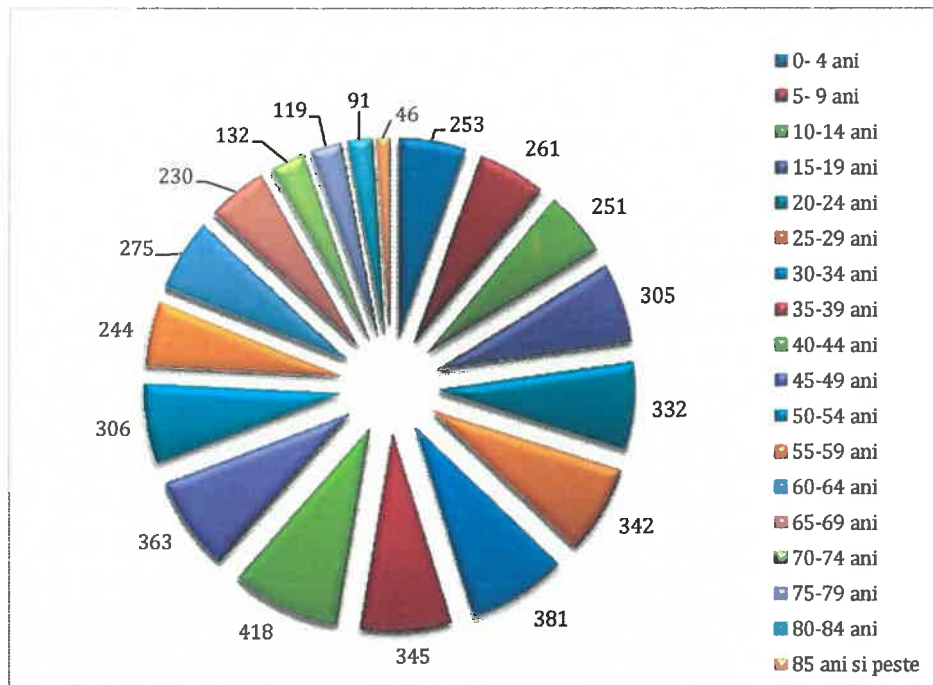


Figure 2.3. Distribution of the population recorded in 2019 by age groups, Negru Vodă Town.
Data source: DEPAD; INS, TEMPO On-line.

0-4 ani=0-4 years
 5-9 ani=5-9 years
 10-14 ani=10-14 years
 15-19 ani=15-19 years
 20-24 ani=20-24 years
 25-29 ani=25-29 years
 30-34 ani=30-34 years
 35-39 ani=35-39 years
 40-44 ani=40-44 years
 45-49 ani=45-49 years
 50-54 ani=50-54 years
 55-59 ani=55-59 years
 60-64 ani=60-64 years
 65-69 ani=65-69 years
 70-74 ani=70-74 years
 75-79 ani=75-79 years
 80-84 ani=80-84 years
 85 ani și peste=80 years and more

According to the current statistical data (National Institute of Statistics, TEMPO On-line), the territory within the built-up area of Negru Vodă Town is 633 ha. From the total number of inhabitants in relation to the surface of the territory within the built-up area it follows that the population density at the level of 2019 is 901 persons / km².

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*.

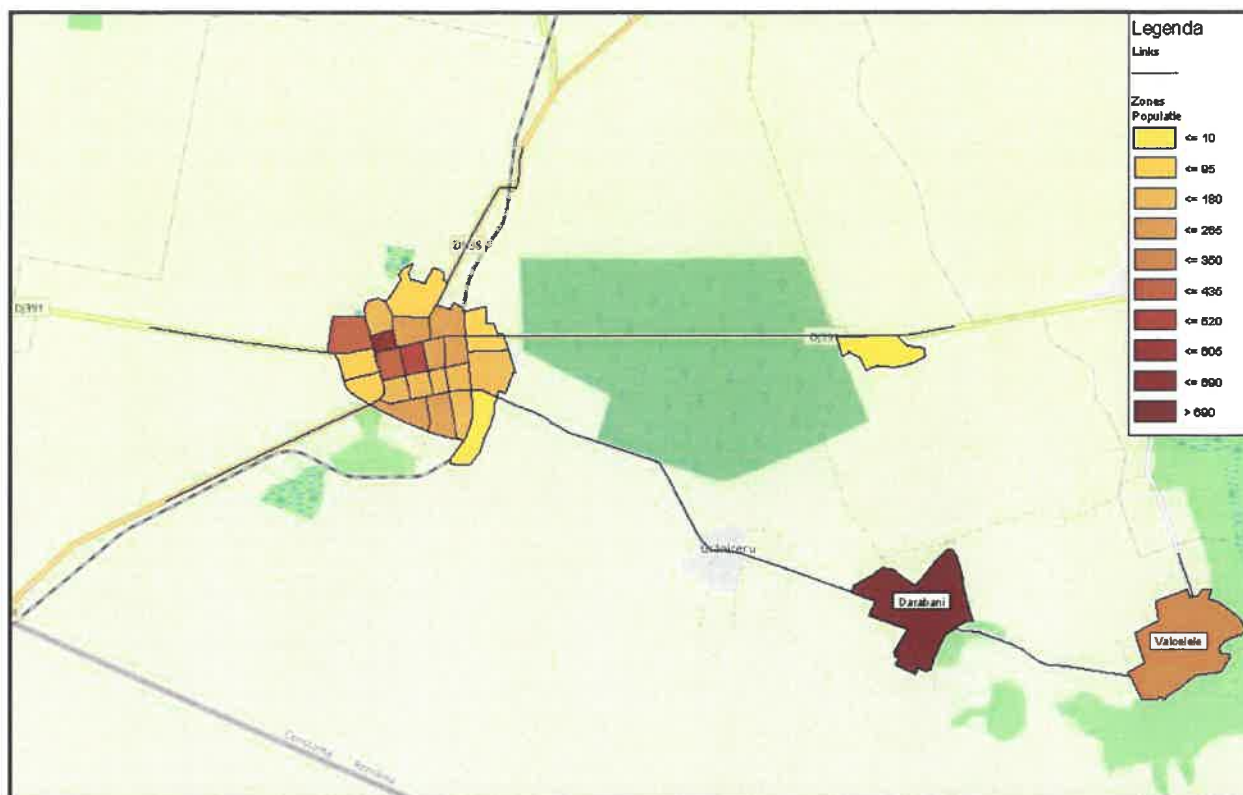


Figure 2.4. Territorial distribution of the population. Data source: DEPABD

Legenda=Annotation; Populație=Population

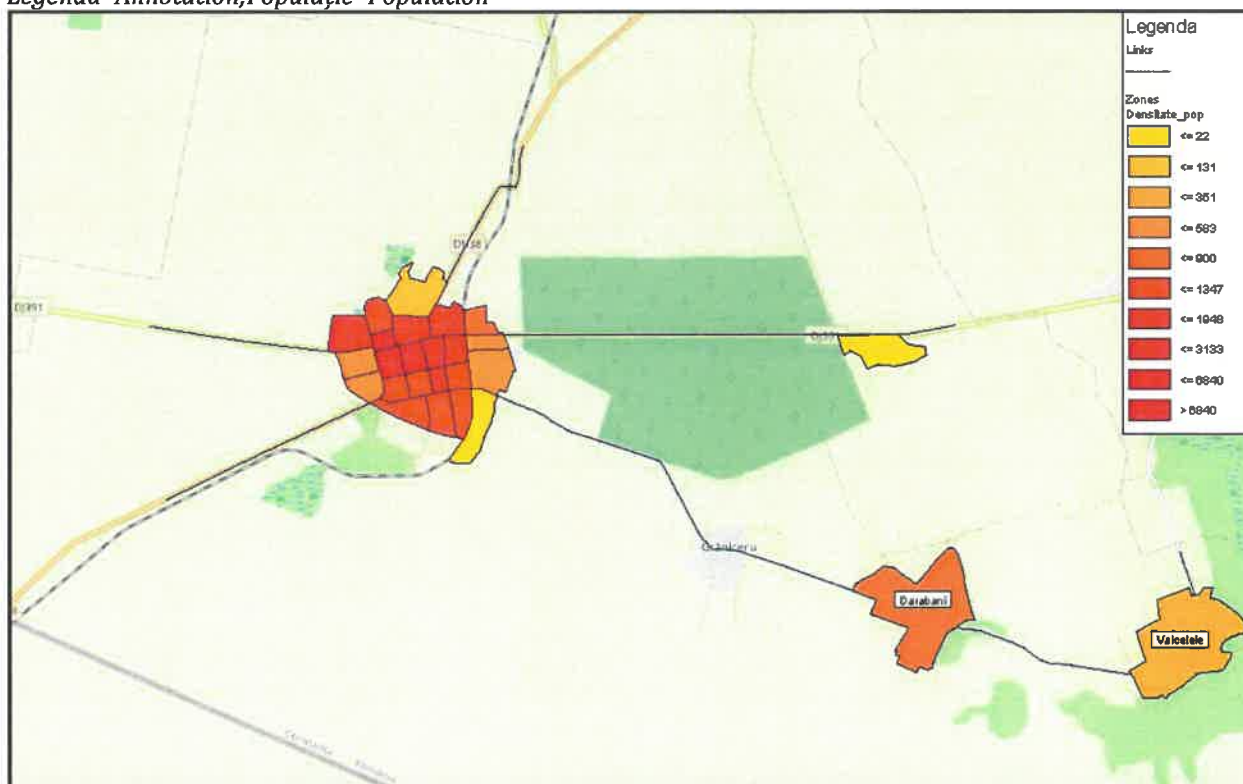


Figure 2.5. Population density at the level of traffic areas (inhabitants / km²). Data source: DEPABD

Legenda=Annotation; Densitatepopulație= Population density



General Toshevo Town is part of the district bearing the same name, which is part of Dobrich county. According to the data provided by General Toshevo Town Hall, 7,176 inhabitants are recorded in the locality.

2.1.2. Economic activities

Performing economic activities involves the need for travel with an important share in the case of both passenger transport and freight transport (by ensuring the flow of raw materials, finished materials and products).

According to the current statistical data, in 2018 (the most recent - published by the National Institute of Statistics, TEMPO On-line database), in Negru Vodă Town 655 active employees were recorded, working in public institutions and in the 236 economic units based in this locality.

At the level of the analyzed territory, the share of the employed population represents 11% of the total number of inhabitants, while at the county level this indicator's value is 23% (table 2.2).

Table 2.2. Share of the employed population, year 2018. Data source: INS, TEMPO On-line.

Administrative-Territorial Unit	Number of employees	Number of inhabitants	The share of the employed population
Negru Vodă Town	655	5,747	20%
Constanța County	175,863	768,049	31%

The main employers, a category in which those with more than 10 employees are considered, make up 49% of the total number of jobs occupied at the locality level (table 2.3). The main employers are engaged in agriculture (cultivation of cereals, legumes and oilseed plants).

Table 2.3. The main employers, year 2019. Data source: www.topfirme.com.

Employer	Main object of activity	Type of ownership	Number of active employees
S.C. LEGAM AGRO S.R.L.	Cultivation of cereals (excluding rice), leguminous plants and oilseed plants	Private	19
S.C. GABRIS IMPEX S.R.L.	Retail sale in non-specialized stores, mainly selling food, beverages, and tobacco	Private	18
S.C. TISGAL S.R.L.	Other support service activities for enterprises n.e.c./not elsewhere classified	Private	15
S.C. RINOLTSAND S.R.L.	Cultivation of cereals (excluding rice),	Private	13

Employer	Main object of activity	Type of ownership	Number of active employees
	leguminous plants and oilseed plants		
S.C. AVIA-AGRO-PLANT S.R.L.	Cultivation of cereals (excluding rice), leguminous plants and oilseed plants	Private	11

Figure 2.8 shows that most jobs are concentrated in the Center area of the urban territory (on both sides of DN 38). The concentration of jobs in compact areas implies mobility problems, i.e. the creation of poles that attract and generate travel.

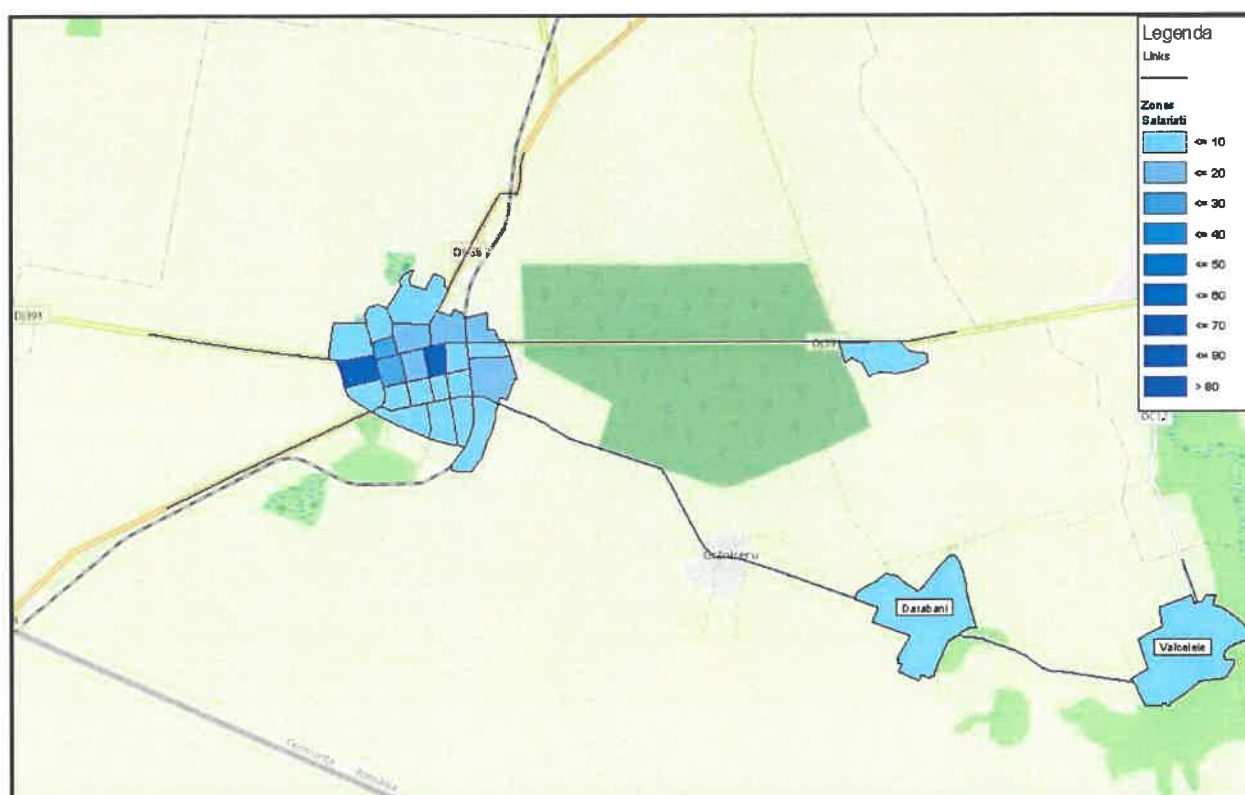


Figure 2.6. Territorial distribution of jobs. Data source: ITM Constanța

Legenda=Annotation;
Salariați= Employees

Based on the current statistical data, the dynamics of the number of employees at local and county level in the last 17 years has been studied (figures 2.7 and 2.8). The results indicate an insignificant decrease in the share of the number of employees in Negru Vodă Town from the total number of those recorded at county level, from 0.5% in 2002 to 0.4% in 2018.

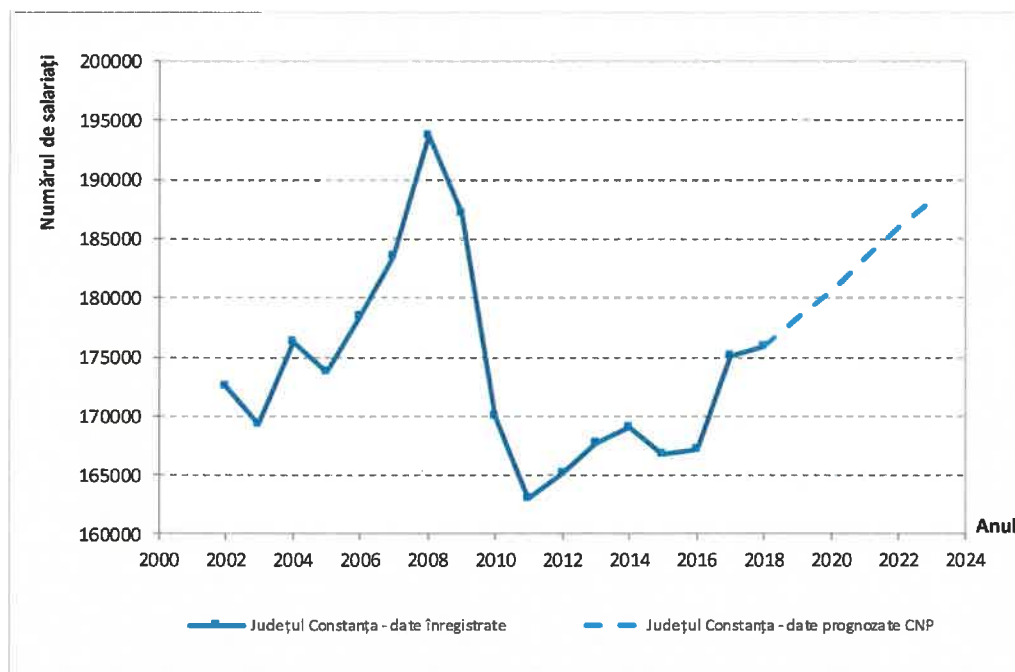


Figure 2.7. Variation in the number of employees - Constanța County, period 2002-2018; 2019-2023.

Data source: INS, TEMPO On-line; National Forecast Commission (CNP).

Număr de salariați=Number of employees

Județul Constanța - date înregistrate=Constanța County - recorded data

Județul Constanța - date prognozate CNP=Constanța County - forecast data CNP

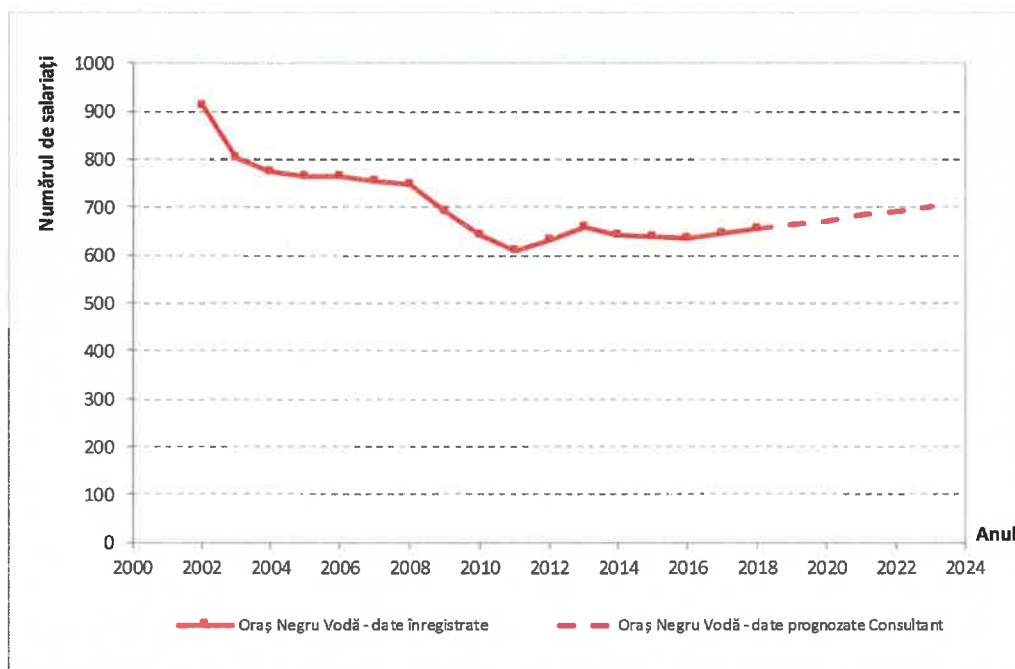


Figure 2.8. Variation in the number of employees - Negru Vodă Town, period 2002-2018; 2019-2023.

Data source: INS, TEMPO On-line; National Forecast Commission (CNP).

Număr de salariați=Number of employees

Oraș Negru Vodă - date înregistrate=Negru Vodă Town - recorded data

Oraș Negru Vodă - date prognozate Consultant= Negru Vodă Town - Consultant forecast data

Knowing the historical data about the number of employees recorded at county and local level in the last 17 years and the forecast data² of this indicator for Constanța county (National Forecast Commission), the annual number of employees in Negru Vodă Town in the 2019-2023 period has been estimated. One can observe an increasing trend, which leads to a 7% increase in the number of employees in Negru Vodă Town in 2023 compared to the value recorded in 2019.

Moreover, the analysis has processed data regarding the variation in the number of the unemployed recorded at the level of Negru Vodă Town, which has shown, in the analyzed 2010-2019 period (the one for which statistical data are published), a decreasing trend in the number of people in this category (figure 2.9). 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 domicile to workplace.

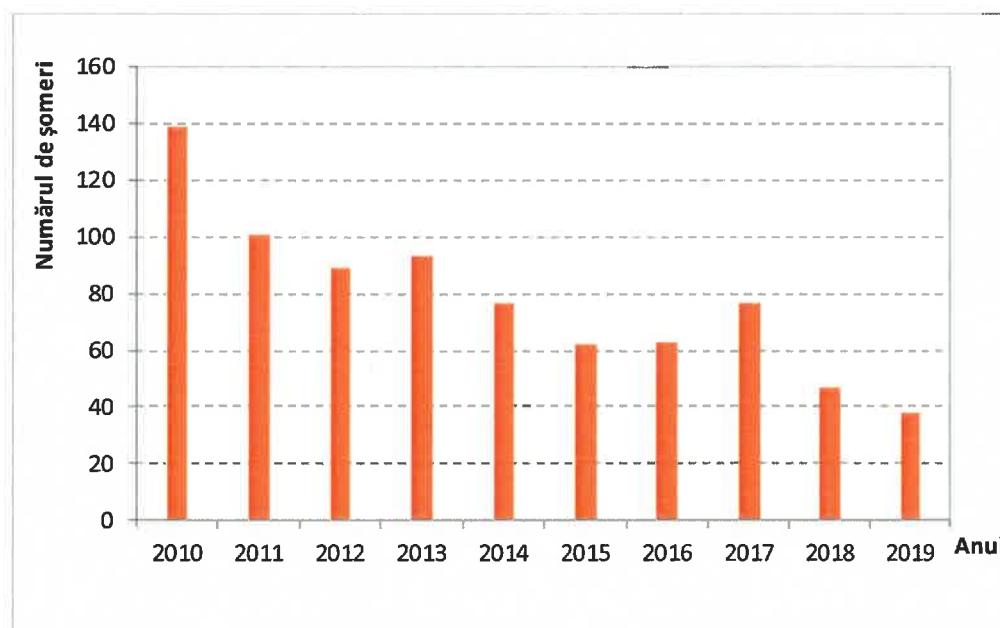


Figure 2.9. Variation in the number of unemployed, 2010-2019 period.

Data source: INS, TEMPO On-line.

Numărul de șomeri = Number of unemployed
Anul = Year

Regarding the causes of unemployment in Negru Vodă Town, 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 layoffs, being persons who have lost the job due to a restricted activity) and the specific requirements of the jobs that make up the offer, the ratio between the minimum wage level for which the population is willing to work and the level of social benefits provided by the state. In order to support the development of economic activities, an action which brings social benefits as a result of

²National Forecast Commission, *Projection of the main economic and social indicators in the TERRITORIAL PROFILE until 2023*, December 2019.

reducing unemployment in the analyzed area, measures will be proposed to improve the accessibility and efficiency of the urban transport system.

The areas where commercial activity takes place represent poles of interest for local travel. These objectives are connected to the main traffic arterial street - Constanței Road.

The educational institutions represent poles of attraction / generation of travel 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, 865 pupils and preschoolers are enrolled in the educational institutions of Negru Vodă Town (Figure 2.0).

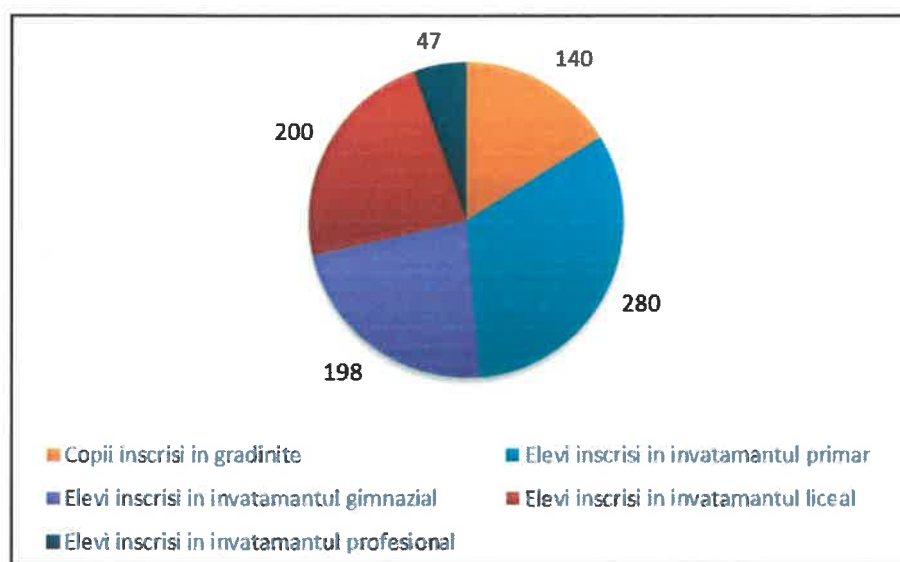


Figure 2.10. School population by education levels - Negru Vodă Town, 2018

Copii înscriși în grădinițe = Children enrolled in kindergartens

Elevi înscriși în învățământul gimnazial = Pupils enrolled in middle school education

Elevi înscriși în învățământul profesional = Pupils enrolled in vocational education

Elevi înscriși în învățământul primar = Pupils enrolled in primary school education

Elevi înscriși în învățământul liceal = Pupils enrolled in high school education

The analysis of the school population, based on current statistics, reveals a reduction in the number of pupils. A special situation is encountered in the case of vocational education, which was dissolved in 2006 and which would resume in 2017. During the analyzed period, a sharp reduction is recorded among middle school education pupils (figure 2.11).

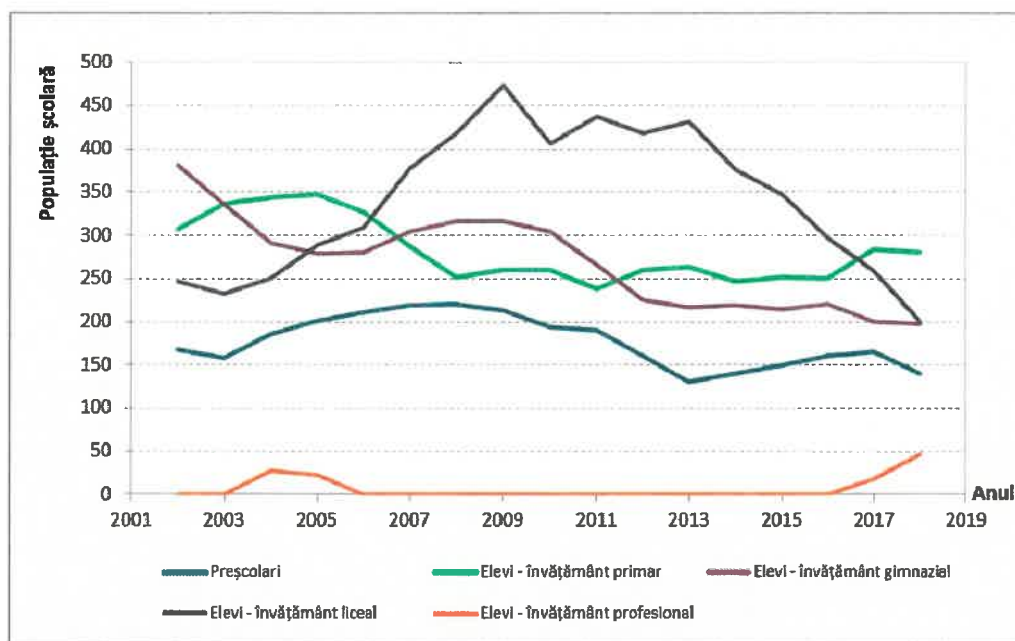


Figure 2.11. Variation of school population in NegruVodă Town, 2002-2018.

Populația școlară = School population

Preșcolari = Preschoolers

Elevi-învățământ liceal = Pupils-high school education

Elevi-învățământ primar = Pupils-primary school

Elevi-învățământ profesional = Pupils-vocational education

Elevi-învățământ gimnazial = Pupils-middle school

Anul = Year

Knowing the variation trend in the number of pupils, based on historical data recorded in the 2002-2018 period and taking into account the forecast of population's evolution at national level by 2060³ (a forecast based on the stable population according to sex and age groups recorded in the October 2011 census and the demographic phenomena: birth rate, death rate and external migration from the current statistics), short-term decreases in the number of pupils in the pre-university education have been estimated.

2.1.3. Monitoring index

The monitoring index represents an indicator used in the assessment of the economic development of an administrative-territorial unit. Its value expresses the number of vehicles owned by groups of 1,000 inhabitants. Figure 2.12 shows the value of the monitoring index recorded in 2019 in NegruVodă Town, Constanța County and at national level.

³National Institute of Statistics, *Designing the Romanian population by 2060*, ISBN: 978-606-8590-01-1, 2013.

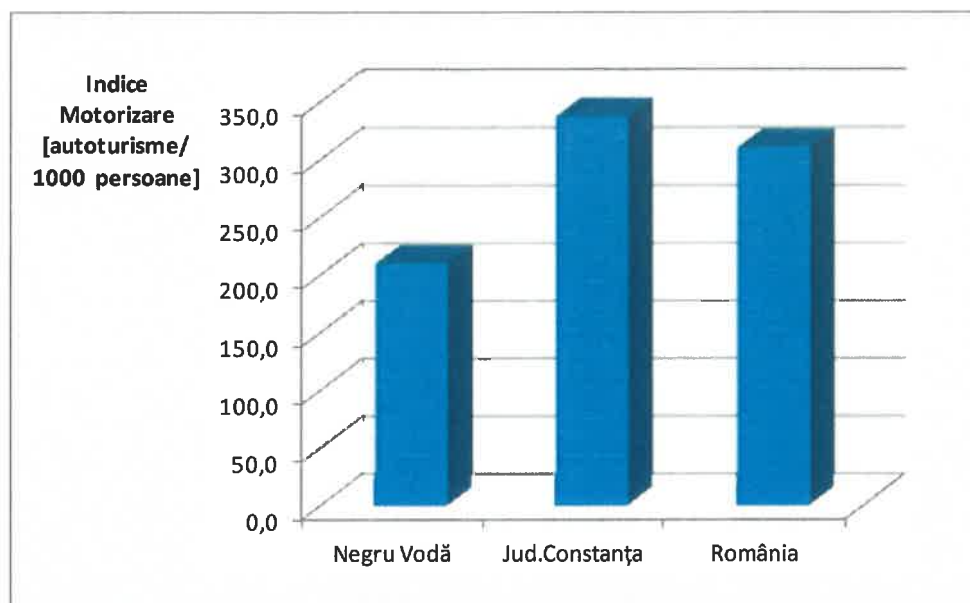


Figure 2.12. Monitoring index, 2019. Data source: DRPCIV, INS, TEMPO On-line.

Indice Monitorizare (autoturisme/1000 persoane) Monitoring Index (vehicles / 1,000 people)
Jud. Constanța=Constanța County
România=Romania

One can notice that the number of vehicles owned by 1,000 inhabitants of Negru Vodă Town is 38% lower than the national average value, respectively 32% lower than the county average value. The low availability of vehicles in Negru Vodă Town can be offset by the use of environmentally friendly modes of transport - pedestrian and bicycle.

Of the total number of vehicles, 54.5% are powered by diesel and 45.5 by petrol (figure 2.13). In the last 5 years, the number of diesel-powered vehicles has increased by 170%.

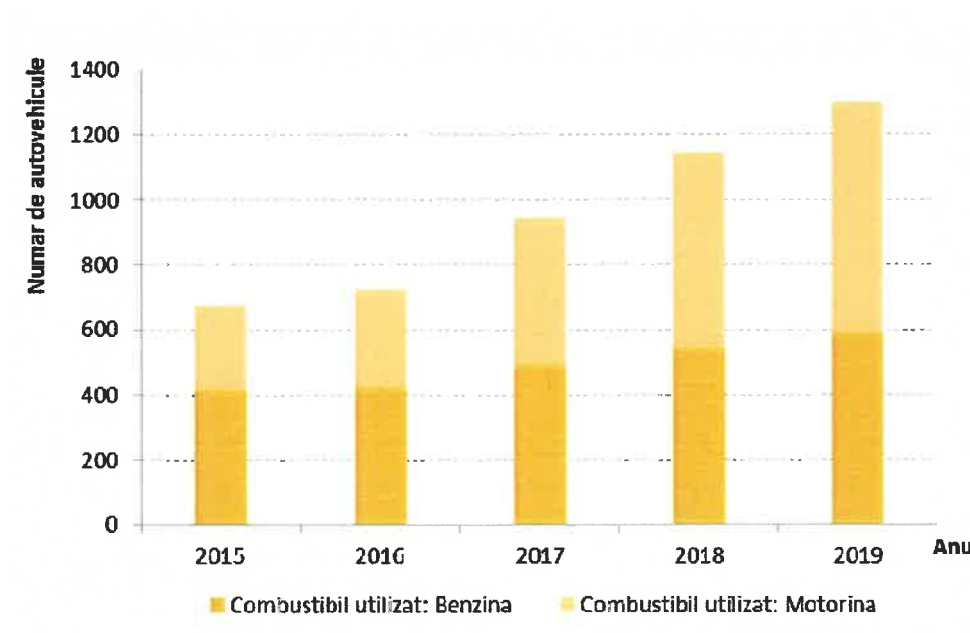


Figure 2.13. The situation of the car fleet inventory according to the fuel used.



Data source: Directorate for Driving Licenses and Car Registration, Bucharest.

Număr de autovehicule=Number of vehicles
Combustibil utilizat: Benzina = Fuel used: Petrol
Combustibil utilizat: Motorina=Fuel used: Diesel
Anul=Year

The distribution of vehicles by age groups reveals that 67% of the means of transport registered in Negru Vodă Town are over 15 years old. Vehicles younger than 5 years represent only 4.4% of the total fleet (figure 2.14).

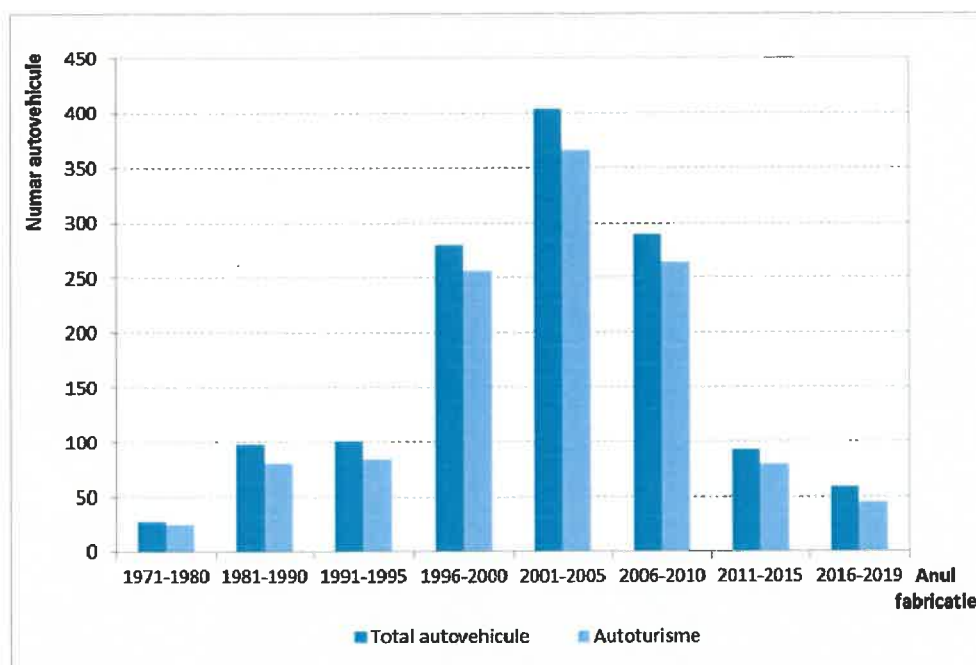


Figure 2.14. The structure of the car fleet according to the manufacturing year, 2020.
Data source: Directorate for Driving Licenses and Car Registration, Bucharest.

Număr autovehicule=Number of vehicles
Total autovehicule= Total vehicles
Autoturisme=Cars
Anul fabricației= Manufacturing year

In the partner Town, General Toshevo, 6,930 vehicles are registered, of which 5,858 are owned by natural persons and 1,072 by legal entities.

2.2. The road network

At the level of the global road transport network, Negru Vodă Town is connected by DN 38 (E675) to the Trans-European Main Transport Network (TEN-T Core) (figure 2.15).

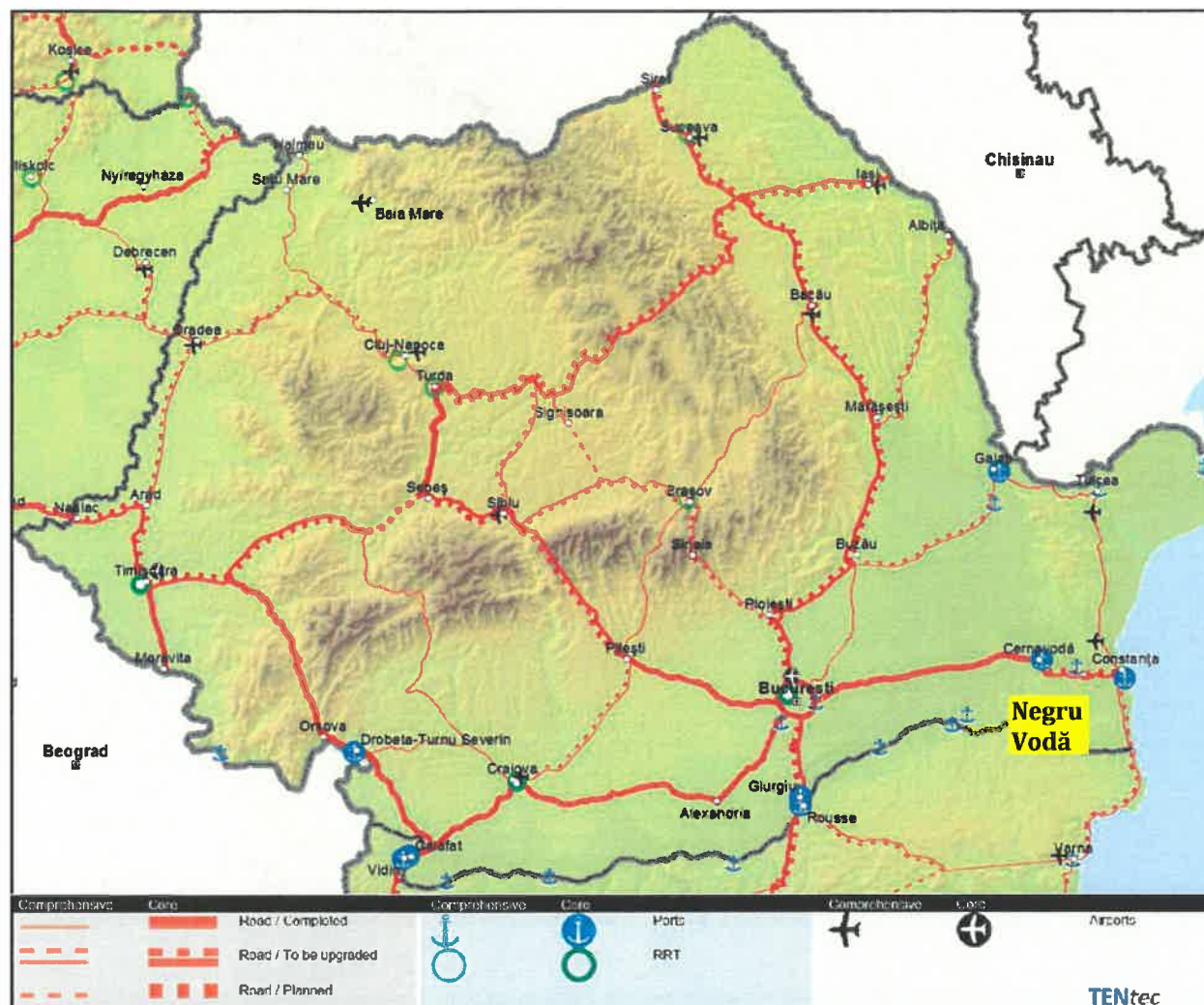


Figure 2.15. The TEN-T road network in NegruVodă Town's area.

Source: European Commission, 2020.

The major road infrastructure in the analyzed area consists of the routes of national and county roads which ensure the connection with the neighboring territory (table 2.4, figure 2.16). The road sections which are also a part of county road routes are the most strained in terms of traffic and, at the same time, those on which traffic events resulting in victims are frequently recorded.

Table 2.4. The road network which ensures the connection to the neighboring territory.

Road	Origin	Destination	Route
DN 38	Km 0+000, Agigea (DN 39)	Km 53+817, Bulgaria Border	Agigea (DN 39) - Techirghiol - Movilița - Topraisar - NegruVodă - Bulgaria Border
DJ 391	Km 0+000, DN 39	Km 129+000, Tuzla	Albești - CotuVăii - NegruVodă - Cerchezu - Viroaga - Negrești - Cobadin - Ciobănița - Osmancea -



Road	Origin	Destination	Route
			Mereni – Topraisar – Biruința

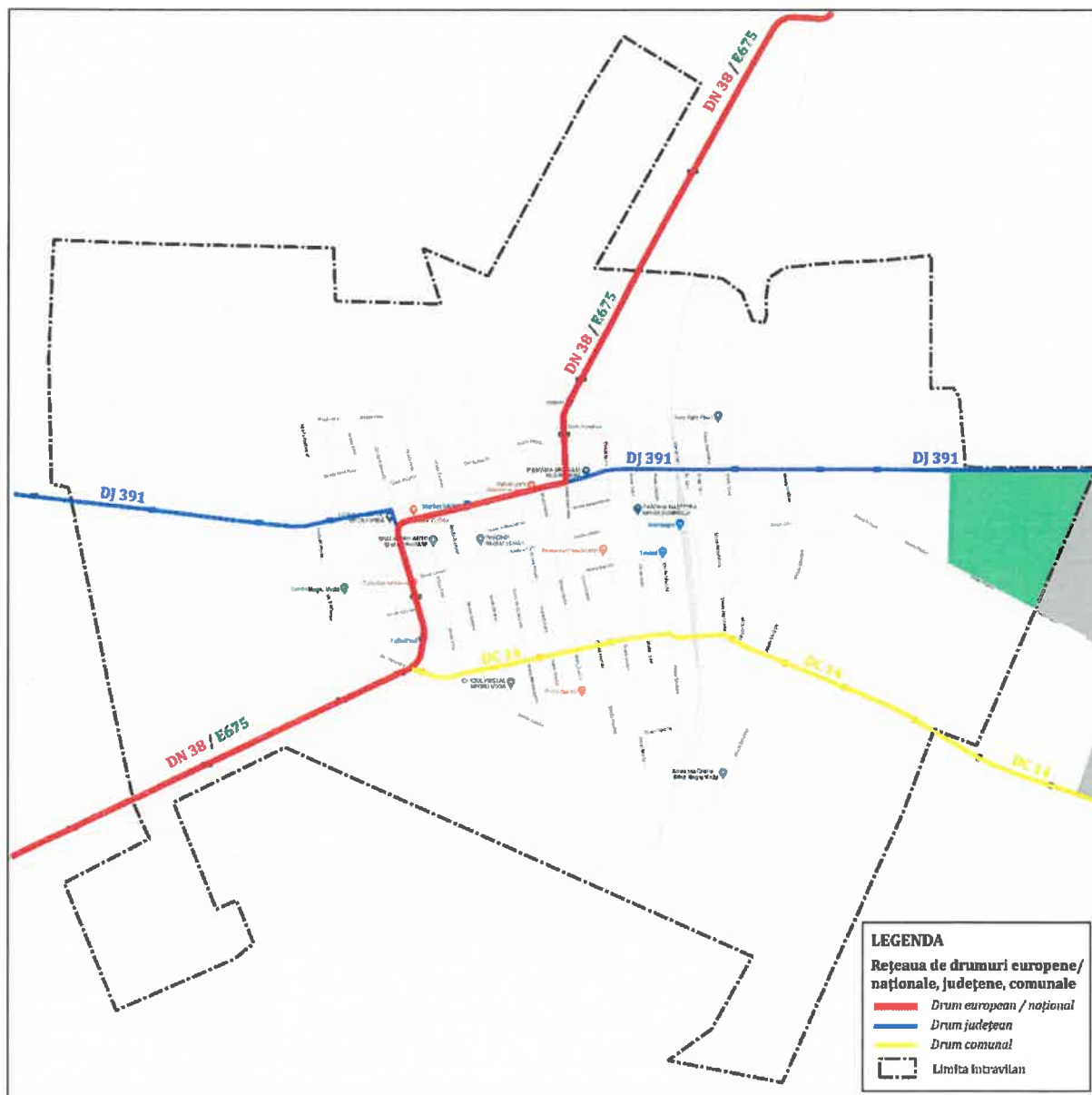


Figure 2.16. The major traffic network in the studied area.

Legenda=Annotation;

Rețeaua de drumuri europene/naționale, județene, comunale= European / national, county, communal road network

Drum European/national= European / national road

Drum județean= County road

Drum communal= Communal road

Limita întravilan= Built-up area limit

The major deficiency of the road network in the area of Negru Vodă Town is generated by the lack of a detour road, which would lead to the total elimination of transiting goods



vehicles from the urban traffic network, thus reducing the externalities borne by the residents.

The railway network sections the built-up territory of Negru Vodă Town on the East side, leading to the reduction of the connectivity of the urban road network (the number of possible connections between the nodes of the road network) on the East-West relations. DJ 391, which ensures the connection with the neighboring localities and with Mangalia Municipality and DC 14 (Cerealelor Street), which ensures the connection with the adjacent Darabani and Vâlcele villages, is performed at the same level, being characterized by the very poor quality of the crossing infrastructure.

According to the current data in the INS Tempo Online database, the road network of Negru Vodă Town has a length of approximately 38 km.

Lately, the improvement of the technical condition of the road surface has been a local objective to which special attention has been given. The project "**Increasing accessibility to the TEN-T in the border area Negru Vodă - General Toshevo**" was implemented - the component related to Negru Vodă town which had as objective the modernization of 33 streets within Negru Vodă town and of the communal road DC14. The total length of the modernized roads and communal road is 17.50 km. The infrastructure sections in this category are centralized in table 2.5. Their graphic representation is found in figure 2.17.

Table 2.5. Roads modernized within the project "Increasing accessibility to the TEN-T in the border area Negru Vodă - General Toshevo". Data source: Negru Vodă Town Hall.

Current no.	Street name	Length (m)	Observations
1.	1 Sănătății Street	843	
2.	2 Sănătății Street	482	2 Sănătății Street is made up of: - Sănătății Street 2.1 with a length of 388 m - Sănătății Street 2.1 with a length of 94 m
3.	Morii Street	841	Morii Street is made up of: - 1 Morii Street with a length of 107 m - 2 Morii Street with a length of 737 m
4.	Morii Access road	85	
5.	Depozitelor Street	1,176	Depozitelor Street is made up of: - 1 Depozitelor Street with a length of 313 m - 2 Depozitelor Street with a length of 700 m - 3 Depozitelor Street with a length of 163 m
6.	1 Depozitelor Access road	43	
7.	2 Depozitelor Access road	73	
8.	Gării Street	628	Gării Street is made up of: - 1 Gării Street with a length of 308 m - 2 Gării Street with a length of 320 m



Current no.	Street name	Length (m)	Observations
9.	Gării Access road	87	
10.	1 Neighborhood road	135	
11.	Mangaliei Access road	42	
12.	Cerealelor Street	796	Cerealelor Street is made up of: - 1 Cerealelor Street with a length of 434 m - 2 Cerealelor Street with a length of 370 m
13.	Triunghiului Street	433	
14.	Scurtă Street	185	
15.	Fundăturii Street	116	
16.	Teilor Street	1,377	Teilor Street is made up of: - 1 Teilor Street with a length of 556 m - 2 Teilor Street with a length of 718 m - 3 Teilor Street with a length of 63 m
17.	Merilor Street	1,036	
18.	Prunilor Street	848	
19.	Crinului Street	1,324	Crinului Street is made up of: - 1 Crinului Street with a length of 218 m - 2 Crinului Street with a length of 340 m - 3 Crinului Street with a length of 313 m - 4 Crinului Street with a length of 336 m - 5 Crinului Street with a length of 117 m
20.	Pieței Street	975	Pieței Street is made up of: - 1 Pieței Street with a length of 41 m - 2 Pieței Street with a length of 113 m - 3 Pieței Street with a length of 444 m - 4 Pieței Street with a length of 377 m
21.	Platformei Street	1,187	Platformei Street is made up of: - 1 Platformei Street with a length of 747 m - 2 Platformei Street with a length of 440 m
22.	Școlii Street	297	Școlii Street is made up of: - 1 Școlii Street with a length of 182 m - 2 Școlii Street with a length of 115 m
23.	Văii Street	668	Văii Street is made up of: - 1 Văii Street with a length of 422 m - 2 Văii Street with a length of 246 m
24.	Viilor Alley	218	
25.	Viilor Street	881	Viilor Street is made up of: - 1 Viilor Street with a length of 533 m - 2 Viilor Street with a length of 348 m



Current no.	Street name	Length (m)	Observations
26.	Stadionului Street	146	
27.	Nordului Street	126	
28.	Salcâmilor Street	90	
29.	Constanței Road	315	
30.	Platformei Alley	111	
31.	Constanței no. 1 Access road	187	
32.	Gladiolelor Alley	95	
33.	Constanței 2 Road	20	
34.	DC 14	1,600	

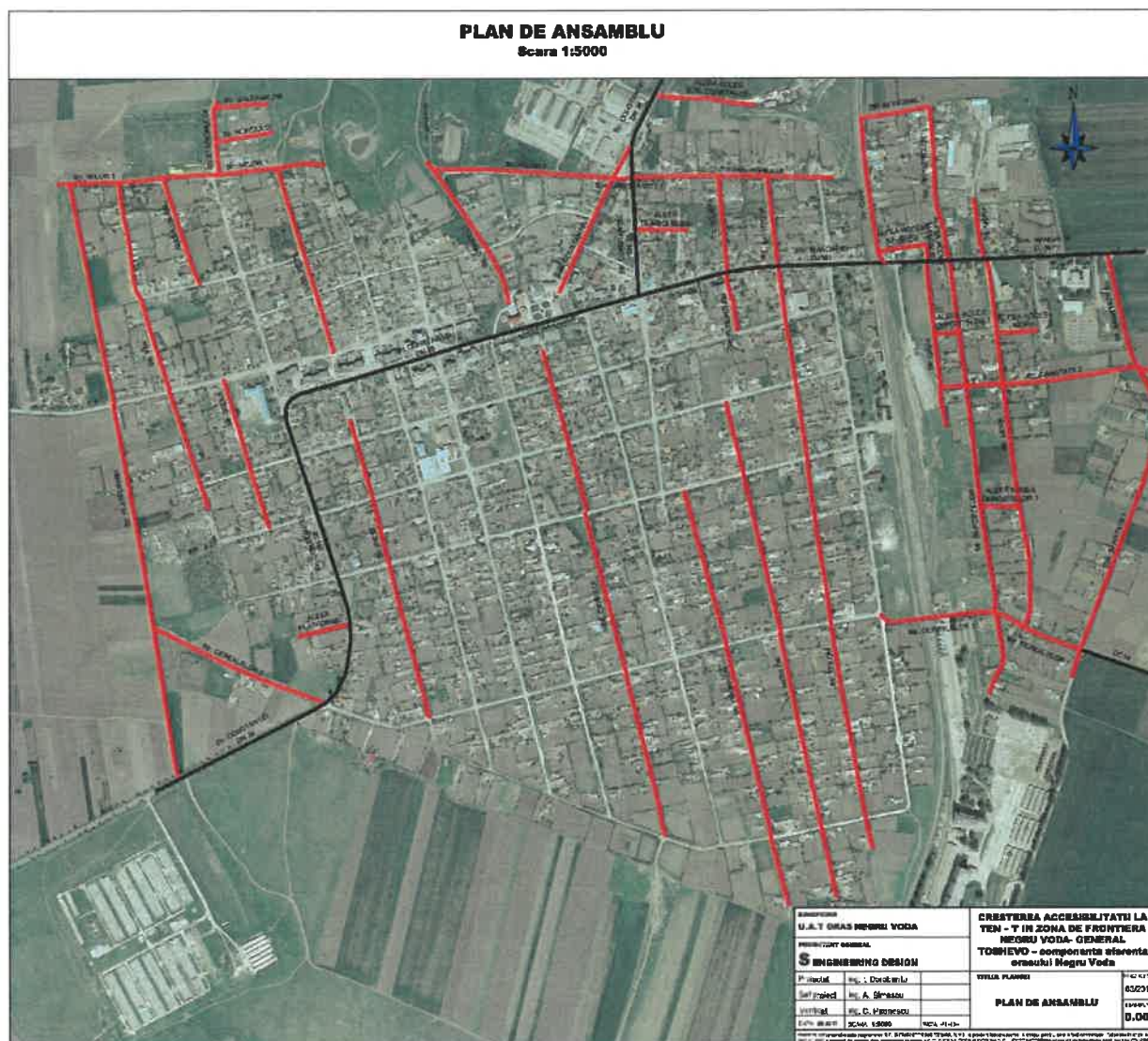


Figure 2.17. Modernized roads. Data source: NegruVodă Town'sTown Hall.



Plan de ansamblu=Overall plan

Scara=Scale

Beneficiar U.A.T. ORAȘ NEGRU VODĂ=Beneficiary Administrative-Territorial Unit Negru Vodă Town

PROIECTANT GENERAL=GENERAL ENGINEERING DESIGNER

Proiectat=Designed

Șef proiect=Project manager

Verificat=Certified

Data=Date

Ing.=Eng.

*CREȘTEREA ACCESIBILITĂȚII LA TEN-T ÎN ZONA DE FRONTIERĂ NEGRU VODĂ - GENERAL
TOSHEVO=INCREASING ACCESSIBILITY TO THE TEN-T IN THE BORDER AREA NEGRU VODĂ - GENERAL
TOSHEVO*

Componenta aferentă orașului Negru Vodă=The component related to Negru-Vodă Town

Titlul Planșei=Sheet title

Following the implementation of the project with a very high coverage of the road network, there is a significant improvement in the quality of the urban environment. In the figure below Florilor Street and Cerealelor Street are presented comparatively, before and after being modernized. Similar situations are encountered on most of the streets which have been modernized within the project.



Județul Constanța=Constanța County

Anul 2012=Year 2012



Figure 2.18. Modernized Florilor Street.

Anul 2020=Year 2020



Anul 2012=Year 2012



Figure 2.19. Modernized Cerealelor Street.

Anul 2020=Year 2020

Traffic safety has been analyzed in relation to the accidents recorded at the level of the transport network in the 2014-2018 period, data found in the database of NegruVodă Town, obtained at the request of NegruVodă Town. In 2018, there was a reduction in the number of accidents compared to the previous year. The annual variation in the number of accidents is found in figure 2.20. During the entire analyzed period, 32 people lost their lives in traffic accidents, the highest value being recorded in 2017, when there were 8 deaths as a result of being involved in traffic accidents. Compared to the situation encountered in 2014, at the end of the analyzed period there was a 29% decrease, with 5 deaths being recorded. This further motivates the actions for reducing the number of victims associated with urban traffic. Another category in which the victims of accidents are classified, depending on seriousness, is that of the injured. The annual variation related to this category of victims follows the trend manifested in the variation in the number of accidents, the maximum value reaching 14 cases in 2015 (figure 2.21).

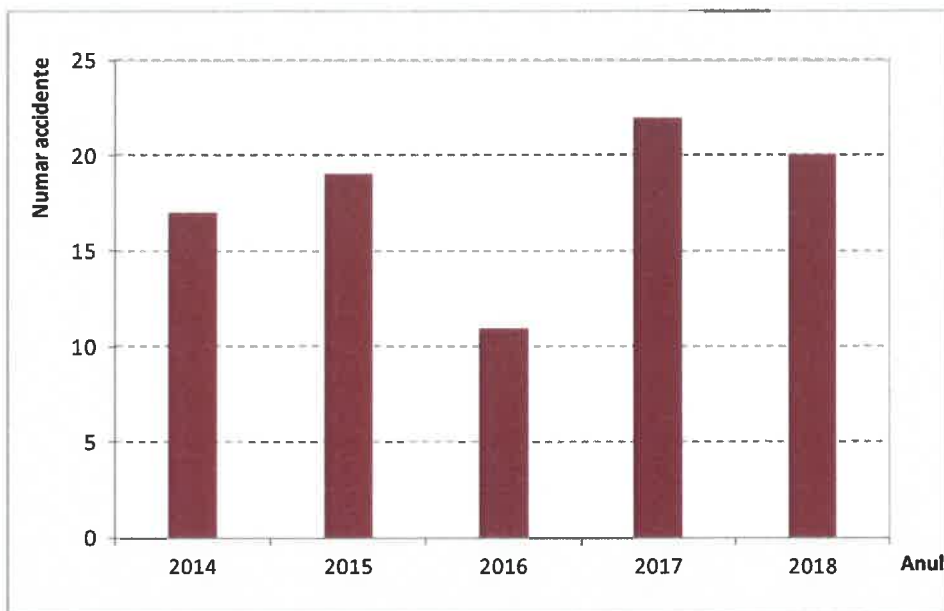


Figure 2.20. Variation in the number of accidents, 2014-2018.

Data source: Negru Vodă Town's Police.

Număr de accidente=Number of accidents

Anul=Year

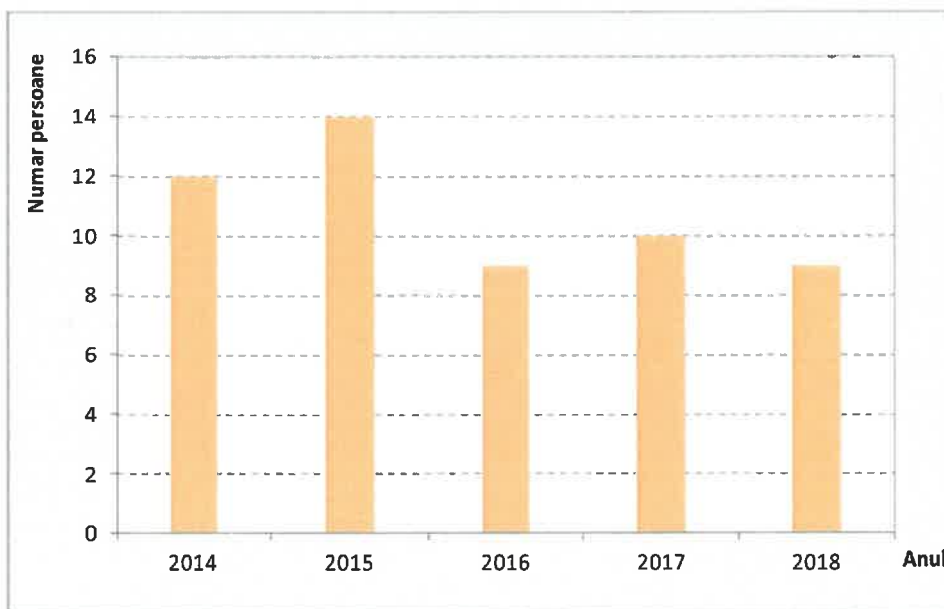


Figure 2.21. Variation in the number of victims, 2014-2018.

Data source: Negru Vodă Town's Police.

Număr persoane=Number of persons

Anul=Year

Of the total number of accidents, those involving pedestrians and cyclists account for 22% of them (figure 2.22). Pedestrians and cyclists are high-vulnerability traffic participants who should be given major priority in the traffic safety improvement proposals. These accidents are mainly caused by not granting priority to pedestrians by the drivers and the reckless behavior of pedestrians and cyclists (jaywalking).

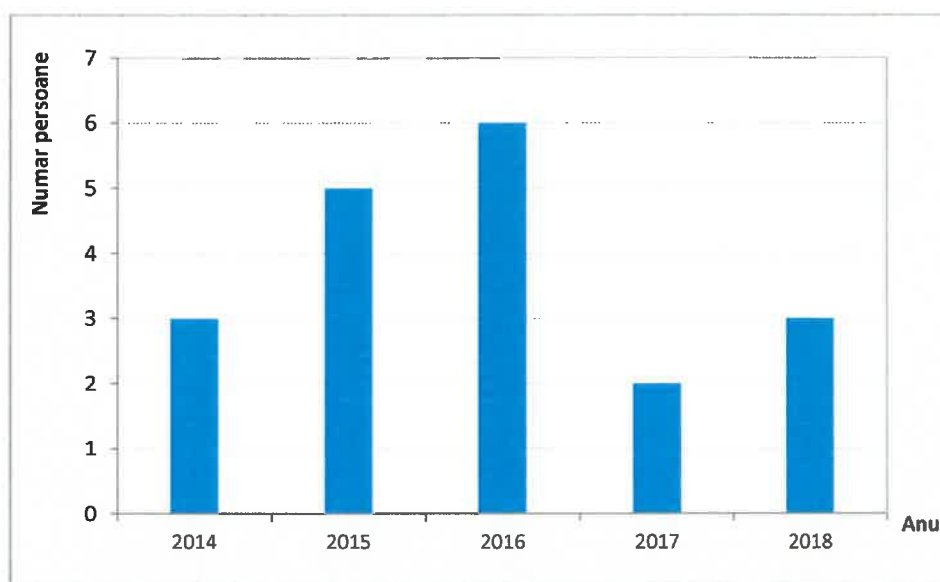


Figura 2.22. Variation in the number of pedestrians and cyclists involved in traffic accidents, 2014-2018. Data source: Negru Vodă Town's Police.

Număr de persoane=Number of persons
Anul=Year

The segments of the road network characterized by a high frequency of traffic accidents are represented by the main arterial streets, where there are high values of traffic flows, especially during peak hours (Chapter 3).

The overlapping road sections along the DN 38 route, where traffic safety issues are concentrated, are transited, on average, during a working day, by approximately 280 heavy goods vehicles and 190 light goods vehicles.

Traffic flow problems are associated with the interaction between pedestrians, cyclists and heavy goods vehicles, especially in the central area (Constanța Road, the section between Stadionului Street and Mangaliei Road), where vehicles parked on the roadside or in its vicinity are also found.

The freight transport on the road network of Negru Vodă locality takes place without restrictions on the arterial streets overlapping the routes of the national, county and communal roads. In the absence of a detour road, which would take over the transit traffic, respectively the penetration traffic, which is associated with serving the areas where grain storage spaces are set up (silos, receiving warehouses), in the urban Negru Vodă area one comes across the situation where heavy goods vehicles cross residential neighborhoods and vulnerable areas, such as the central area, where we find a high density of pedestrians and cyclists, therefore constituting a negative aspect in terms of the quality of life (figure 2.23).

The presence of goods vehicles generates severe negative effects, such as air and noise pollution, CO₂ emissions, increases in travel time and related to traffic safety. Moreover, the

circulation of heavy goods vehicles on the streets whose road structure has not been sized for this purpose leads to the rapid degradation of the road surface.



Figure 2.23. Presence of heavy goods vehicles in the central area.

The organization and control of the traffic at the level of the road network of Negru Vodă Town is done based on horizontal and vertical signaling. The signage for the regulation of traffic is present, the signaling and orientation indicators are properly located and are in good condition, especially on the network sections which have recently been rehabilitated / modernized (figure 2.24).

Smart traffic management systems are not used at the level of the studied area, and traffic data cannot be recorded automatically in real time. There is a center for monitoring the public space, including the traffic, but it does not have traffic management functions.



Figure 2.24. Traffic regulation sign (Exemple).

2.3. Public transport



In the studied area, public passenger transport is provided by the county public transport through regular services. From 2018, the rail transport has been suspended.

The county public transport system through regular services is found within the analyzed territory operating rides that have their origin / destination in NegruVodă Town. This public transport service is managed by Constanța Municipal Council, having private operators.

According to the transport program published by Constanța Municipal Council for the 2014 – 2019 period, during a working day the total number of rides serving the transport demand generated / attracted by NegruVodă Town is 41, distributed between 6 routes (table 2.6).

Table 2.6. County public transport routes. Data source: Constanța Municipal Council.

Current no.	Route code	Locality of origin	Intermediate locality	Destination locality	Route's length [km / direction]	No. Rides/day	Minimum transport capacity [seats]
1	029	Mangalia	Albești	NegruVodă	38	19	≤22
2	030	Mangalia	NegruVodă	Independenței	62	3	≤22
3	064	Constanța	NegruVodă	Dumbrăveni	90	3	≤22
4	065	Constanța	Chirnogeni	NegruVodă	67	4	≤22
5	066	Constanța	Tătaru	NegruVodă	67	4	≤22
6	067	Constanța	Comana	NegruVodă	60	8	≤22

From the data presented in the table above, one can notice that the most frequently circulated routes are Mangalia - Albești- **NegruVodă** and Constanța - Covasna - **NegruVodă**.

The hourly distribution of the transport offer provided on these routes on working days is shown graphically in figures 2.25 and 2.26. One can notice that the highest frequency is of 4 vehicles per hour, an offer found between 05:00-08:00 along the Mangalia - Albești - **NegruVodă** route.

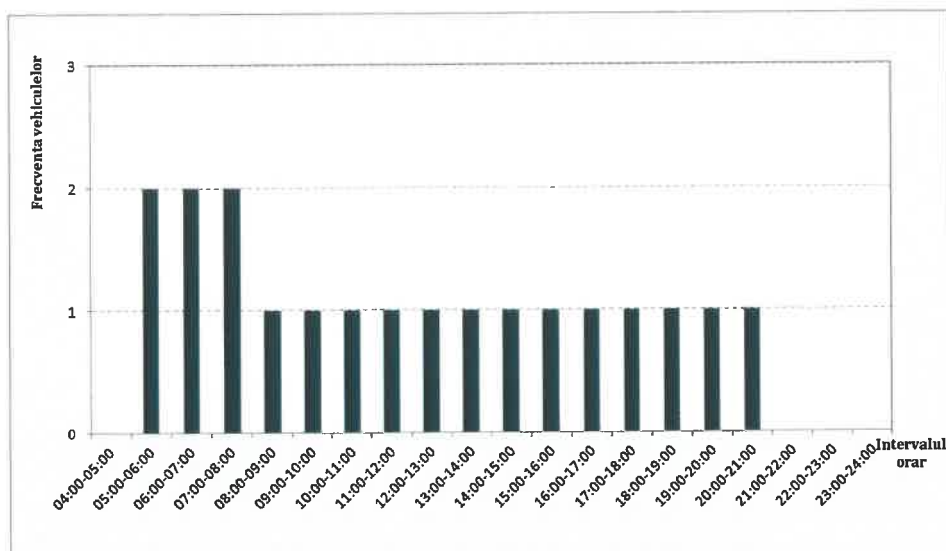


Figure 2.25. Number of rides per hour, route Mangalia - Albești - Negru Vodă.
Data source: Constanța Municipal Council.

Frecvența vehiculelor = Vehicle frequency
Intervalul orar = Timeline

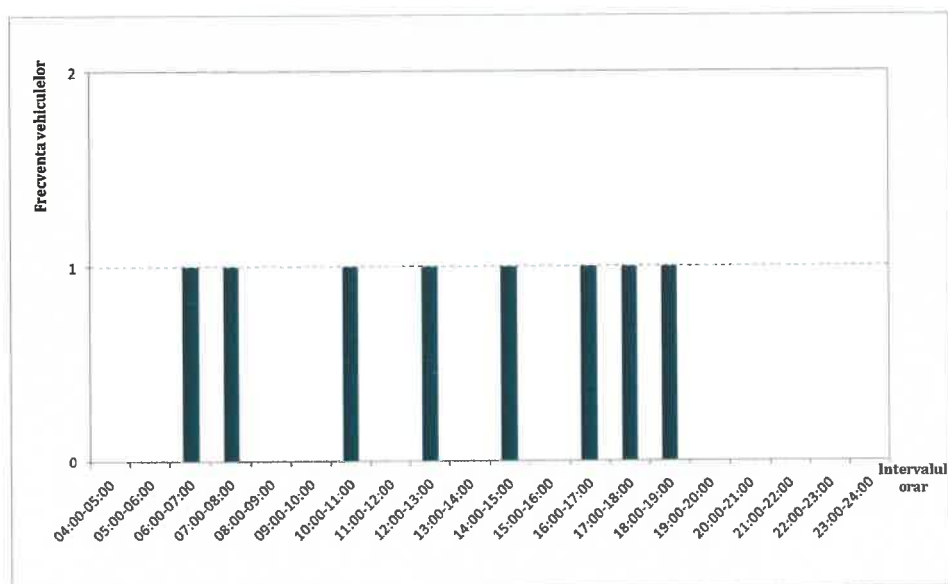


Figure 2.26. Number of rides per hour, route Constanța - Comana - Negru Vodă.
Data source: Constanța Municipal Council.

Frecvența vehiculelor = Vehicle frequency
Intervalul orar = Timeline

According to the data received from the Constanța Municipal Council, the routes included in the County Transport Program transiting Administrative-Territorial Unit Negru Vodă are served by the following transport operators:

- S.C. Darocrim S.R.L. for routes 029 and 030;
- S.C. Emanuel Trading S.R.L. for routes 064, 065, 066, 067.

Public transport infrastructure is deficient. There are stations set up, but they do not correspond to the current needs (figure 2.27).



Figure 2.27. County public transport station which is not set up / improperly set up.

Deficiencies in public transport infrastructure are also found in the adjacent villages.

2.4. Alternative mobility systems

Towns, especially those where frequent short trips are made, are an environment conducive to the use of non-motorized modes of transport, thus contributing to a sustainable mobility. In this sense, it is necessary to set up the public space in a way that encourages citizens to travel on foot or by bicycle, ensuring:

- *generous pedestrian spaces;*
- *marking / indicating the pedestrian routes towards the main points of interest;*
- *road safety (public street lighting, signaling pedestrian crossings, setting up uneven passages);*
- *accessibility for people with disabilities (semi-buried curbs at pedestrian crossings, access ramps, tactile marking at pedestrian crossings);*
- *setting up bicycle lanes to ensure travel safety;*
- *bicycle parking in the vicinity of the main points of interest (extra-urban public transport stations, commercial areas, public institutions, schools, recreational areas).*

In the current situation, in Negru Vodă Town there are deficiencies regarding the pedestrian infrastructure. On the local function streets, the sidewalks are missing (figure 2.28), and on the main arterial street there are accessibility problems (figure 2.29). Such

situations make it difficult for people with reduced mobility to travel (people with disabilities, the elderly, people with children, etc.).



Figure 2.28. Lack of sidewalks (Example).



Figure 2.29. Improper, difficult to access sidewalks (Example).

With regard to bicycle infrastructure, no such set up is currently identified. At the locality level, there is a demand for this mode of travel, the circulation of bicycles taking place on the roadway, on the traffic lanes intended for vehicles, an aspect which endangers traffic safety for all traffic participants (figure 2.30).



Figure 2.30. *Bicycle traffic on the roadway (Example).*