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ADEQUATE ASSESSMENT STUDY

SUCEAVA - DN2H MOTORWAY and DN2H - SIRET BORDER EXPRESS ROAD

NATIONAL COMPANY OF THE ROAD INFRASTRUCTURE ADMINISTRATION (CNAIR) SA

ADEQUATE ASSESSMENT STUDY

Suceava - DN2H Motorway and DN2H - Siret Border Express Road

Beneficiary:

National Company of Road Infrastructure Administration – CNAIR SA

Provider:

Search Corporation SRL – Egis Romania SA Association

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ABBREVIATIONS AND ACRONYMS

AH	Alteration of habitat
ALP	Alpine bioregion
ANNP	National Agency for Natural Protected Areas
NEPA	National Agency for Environmental Protection
APM	Environmental Protection Agency
CF	Railroad
ClC	Maintenance and Coordination Center
CNAIR	National Road Infrastructure Administration Company
cone	The continental bioregion
AD	Communal road
OF	European road
DEM	Digital Elevation Model
DJ	County Road
DN	National road
SHE	Adequate Evaluation Study
FH	Habitat fragmentation
GIS	Geographic Information System
HG	Government decision
IO	Relative openness index
STDs	Intelligent Transport System
IUCN	International Union for Conservation of Nature
LCP	Least Cost Path
GTMP	The General Transport Master Plan
N2k	Nature 2000
OCS	Specific Conservation Objective
GEO	Emergency Ordinance
STEP	Disturbance of species activity
pH	Loss of habitat
P.M	Management Plan
PSD	Short Term Parking
Inquiry	Location Report
REP	Reduction of the population
RHYME	Environmental Impact Report
RM	Environmental Report
SKI	Site of Community Importance
SPA	Avifaunistic Special Protection Area
failed	Territorial Administrative Unit

1 GENERAL INFORMATION

This document represents the Adequate Assessment Study of the potential effects arising from the implementation of the project on the protected natural areas of community interest in its vicinity. The project officially called "Suceava - DN2H Motyorway and DN2H - Siret border Express Road" belonging to the NATIONAL COMPANY OF THE ROAD INFRASTRUCTURE ADMINISTRATION (CNAIR) SA being proposed in the GTMP.

The National Company of the Road Infrastructure Administration has submitted to the ANPM the Notice of the Request of Environmental Agreement for the project. As a result of this request, APM Suceava issued the Decision of the initial evaluation stage no. 233 of 29.09.2021 in which it was decided the need to initiate the environmental impact assessment procedure, by submitting the Presentation Report according to the framework content provided in the Annex no. 5E of the Law 292/2018.

In the continuation of the procedure, the Presentation Report was submitted, based on which the Decision of the recruitment stage no. 120 of 07.06.2023, which established that the project is subject to the environmental impact assessment procedure, the adequate assessment and the assessment of the impact on the water bodies. Next, a Guide was prepared by APM Suceava for developing the three requested documents.

The need to prepare this Adequate Assessment Study was established by the Suceava Environmental Protection Agency by applying the criteria provided in Order no. 1682/2023 for the approval of the Methodological Guide on the adequate evaluation of potential effects of the plans or projects on the natural areas protected by community interest. The Adequate Assessment Study was developed according to the requirements of the Methodological Guide regarding the appropriate assessment of potential effects of the plans or projects on the natural areas protected by community interest.

The following elements were taken into account when preparing this Adequate Assessment Study:

- Technical documentation provided by the beneficiary;
- Documents issued by the authorized institutions;
- Data and information collected during the field visits;
- Specialized literature, studies, yearbooks, monographs;
- The management plans of the analyzed sites;
- Specific conservation objectives approved by ANANP;
- Legislation in the field.

Name of the investment objective:	**Suceava - DN2H Motorway and DN2H - Siret Border Express Road**
Objective location and address:	Suceava county
Beneficiary of the works:	**National Company of the Road Infrastructure Administration SA** 38 Dinicu Golescu Bvd, Sector 1, Bucharest, 010873, Romania Phone: 021.264.32.00, fax: 021.312.09.84 E-mail: office@andnet.ro , Web: www.cnadnr.ro Contact person: General manager: Cristian PISTOL Responsible for environmental protection: Ecaterina Muscalu, Head of the Environment Department
Designer of the works	**Search Corporation SRL – Egis Romania SA Association** 65 Caderea Bastiliei, sector 1, Bucharest Phone: 316.40.18, fax: 316.52.71 E-mail:office@searchltd.ro Contact person: Ana-Maria MOLDOVEANU, Design Dep. Manager
Developer of the Environmental Impact Report	**EPC Environmental Consultancy SRL Bucharest** Registered office address: Nicolae Titulescu Road no. 16, Bl. 22, Sc. A, Et. 7, Ap. 25, Sector 1, Bucharest Work point address: 60 Calea Floreasca, et. 7, Sector 1, Bucharest Telephone / fax: 021 3355195 E-mail:office@epcmediu.ro Web: www.epcmediu.ro Contact persons: Dr. Ecologist Marius Nistorescu – General Manager, tel. 0745 084444, Eng. Alexandra Doba – Technical Director, tel. 0751 129999
Proposed execution period	30 months

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2 DESCRIPTION AND ANALYSIS OF THE PROJECT

2.1 PRESENTATION OF THE PROJECT

2.1.1 General information regarding the project, name, owner, purpose and objectives

The project provides the construction of a high-speed connection (motorway and express road) between the municipality of Suceava and DN2H and an express road sector between DN2H and Siret Border, this being part of the road project with the generic name "Drumul Siretului", indicative DX5 included in MPGT (Pascani – Suceava – Siret). These sectors are also connected near the Municipality of Suceava with the Motorway A7 (Buzău – Focşani – Bacău – Paşcani – Suceava).

The investment priority Suceava - Siret is confirmed by the MPGT, which refers to the improved mobility for the population and goods within the basic and comprehensive TEN-T network, by building a motorway and a network of express roads, which will reduce travel time, accident risks and implement sustainable economic and environmental projects.

The main objectives of the project are:

- Increasing the technical-economic efficiency of the transport network in Romania and increasing the travel speed between Suceava and Siret, thus improving regional connectivity;
- Ensuring the ability to move and the appropriate related safety conditions;
- The improvement of traffic conditions at the level of the national transport road network, also in terms of road safety, the reduction of polluting emissions, thus meeting the requirements of economic development achieved by adapting the national road network to the real demand for transport.

In addition to its national importance, this project will serve in good conditions, the national transit traffic, of goods and people from the territory of Romania and to Ukraine. Depending on the stage of rehabilitation of national roads or under rehabilitation, through them the motorway can receive and distribute road traffic through its interchanges, it will ensure the necessary traffic capacity and appropriate traffic conditions related to the TEN-T road network with minimum negative effects at the level environment and land use.

This project will generate important positive social-economic effects also by "reducing distances" and regional development by increasing the area of "gravitational" economic influence of large cities on their smaller "satellite" localities.

The purpose of the project consists of the construction of a motorway between Suceava and DN2H and an express road between the DN2H and Siret Border, part of the Pascani - Suceava - Siret road project. The project will be part of the Bucharest-Ukraine corridor, which will ensure a fast connection between the south of the country via the A7 Motorway to the north in the Moldoveni region and to the neighboring country in the north, Ukraine.

The project of the Suceava - DN2H Motorway and DN2H - Siret Border Express Road will have a total length of approx. 56 km. The permanently occupied land area is approximately 822.8 ha. The value of investment is estimated to Eur 594,017,123.

The designed speed is 100 km/h up to the vicinity of km 10+000 (from km 0+000 to km 10+000 the motorway also serves as a bypass of the municipality of Suceava), and up to km 56+000 the design speed is 120 km/h.

For the Suceava – DN2H motorway and the DN2H – Siret Border Express Road, the characteristics of the Scope of Works were established as follows:

- The proposed typical cross section is in accordance with the TEM norms for motorways with two traffic lanes on each direction, the central area, shoulders and the emergency lane, and in the case of the cross section for the express road there can be found two traffic lanes on each direction, central area, and shoulders;
- The alignment will be surrounded by a protective fence on both sides;
- Parking and service spaces will be provided along the entire alignment according to the regulations in force;
- All the intersections of the project with other public roads will be designed as grade separations;
- The railways will be crossed by underpasses;
- The necessary hydrotechnical works were designed to ensure the optimum water drainage conditions and the safety of the bridge structures.

The following figure shows the general location of the project related to the localities in the area.

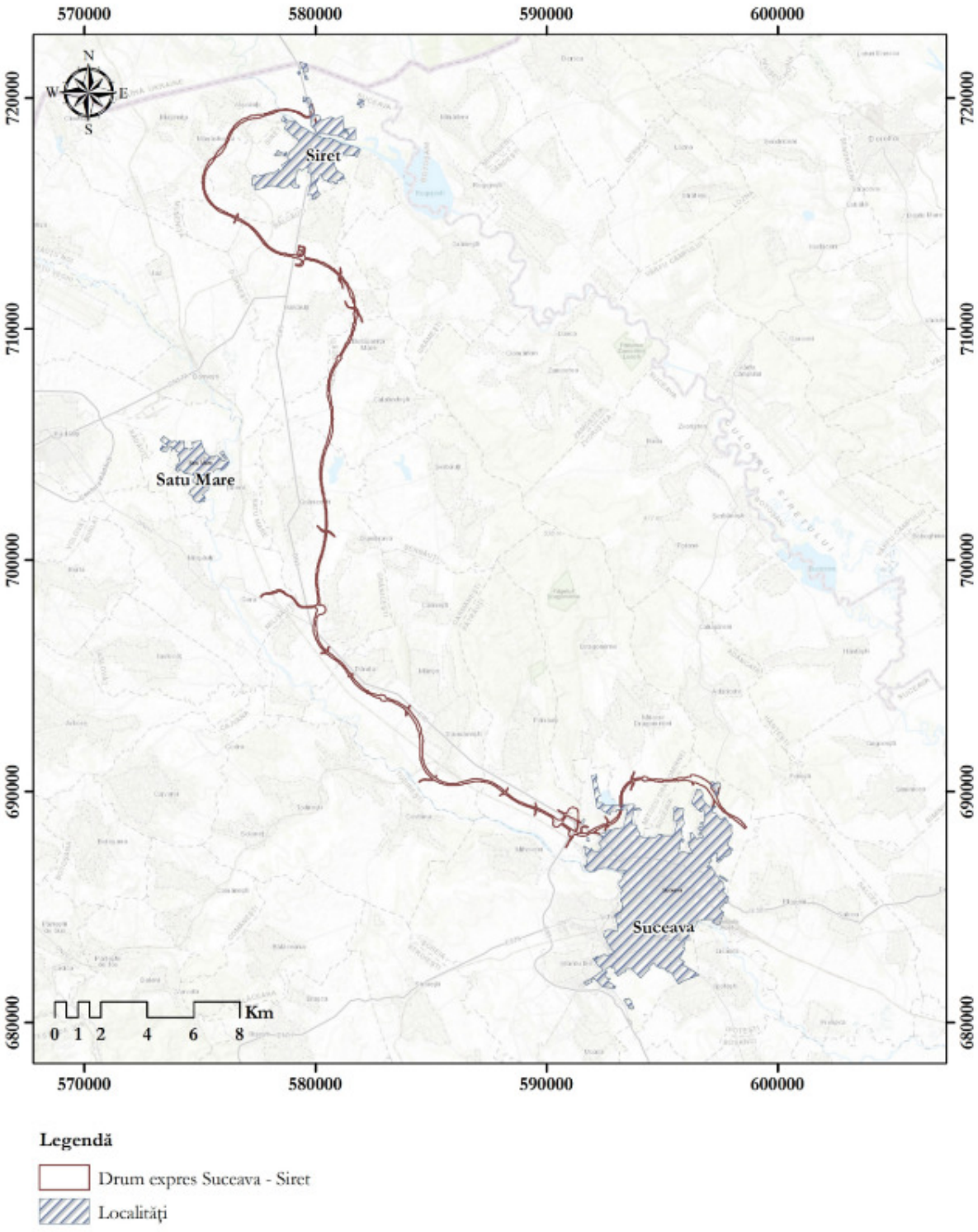


Figure no.2-1 Placement of the project

2.1.2 Geographical and administrative location

The Suceava - DN2H Motorway and DN2H - Siret Border Express Road cross the administrative territory of several UATs in Suceava county, respectively: Suceava (km 0+000), Mitocul Dragomirnei (km 3+700), Suceava (km 7+100), Pătrăuți (km 9+050), Dărmănești (km 14+370), Grăniceşti (km 23+554), Milisauti (km 26+357), Calafindeşti (km 33+775), Bălcăuți (km 39+250), Siret (km 46+100), Muşeniţa (km 48+075), Siret (km 49+350), Museniţa (km 51+000), Siret (km 53+730).

The designed speed is 100 km/h until around km 10+000 (from km 0+000 to km 10+000 the motorway also serves as a bypass of Suceava), and up to km 55+700 the design speed is 120 km/h.

The motorway alignment is crossed by main roads within the national and European network, at the following kilometer positions:

- DN2 (E85) - runs parallel to the project along its entire length, intersecting the project at several points;
- DN2H – intersects the project at km 25+555;
- DN29A – intersects the project at km 1+862;
- DJ178B – intersects the project at km 31+520;
- DJ208D – intersects the project at km 5+810;
- DJ208T – intersects the project at km 1+160;
- DJ209D – intersects the project at km 16+495, km 39+400 respectively at km 41+250.;
- DJ 291A – intersects the project at km 49+813.

At the same time, the expropriation corridor of the project intersects 7 bodies of surface water and 8 registered surface water courses, located in the Siret Hydrographic Basin.

The Suceava - DN2H Motorway and DN2H - Siret Border Express Road does not cross Natura 2000 sites, the closest being located at a distance of approximately 0.5 km from the project site.

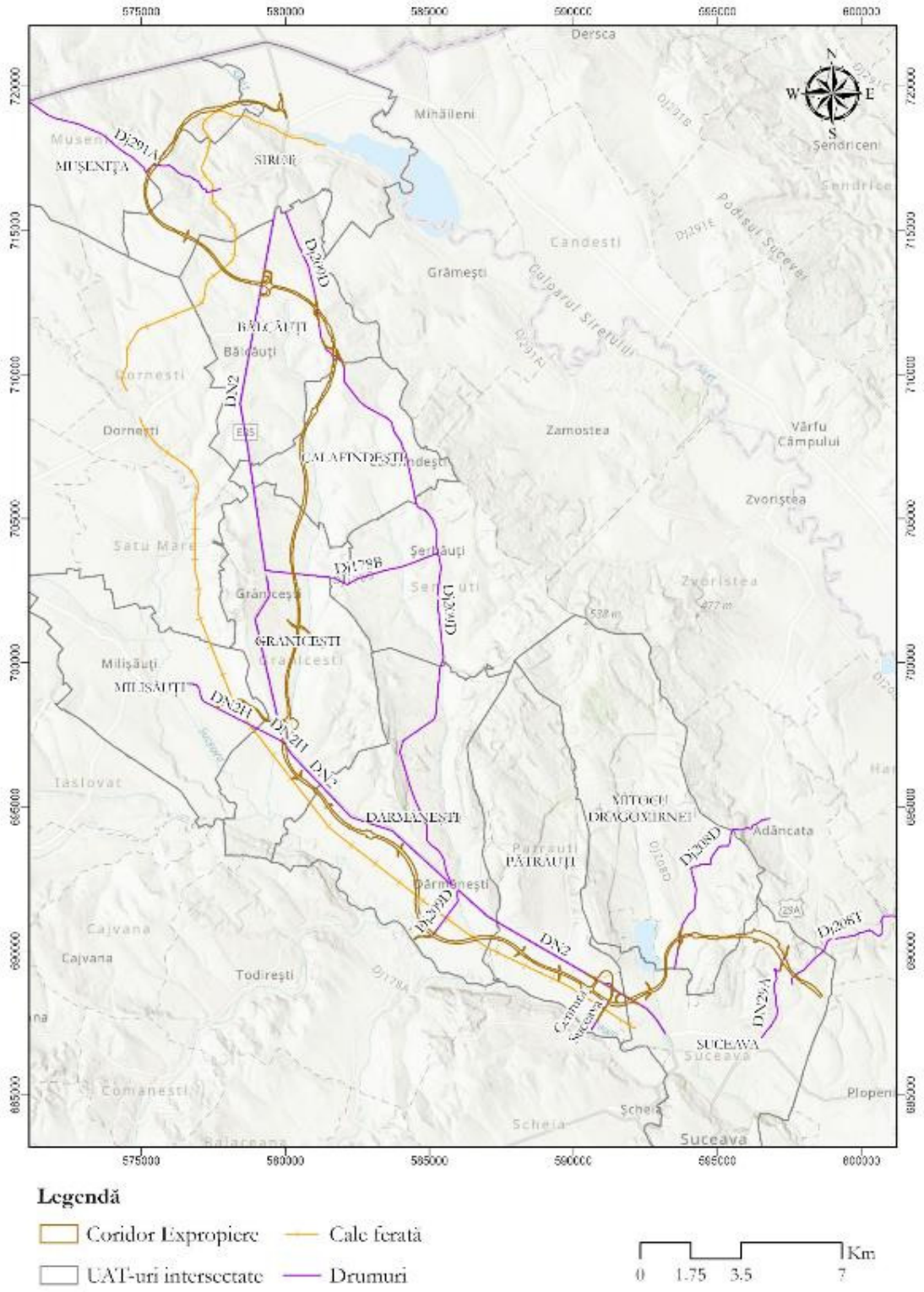


Figure no.2-2 The territorial administrative units intersected by the project and its connection with the other components of the road infrastructure in the area

2.1.3 Justification of the need for the project

Given that transport is the engine of the economy, at the national and European level, it is desired to support a sustainable economic development starting from the provision of an appropriate infrastructure.

The general objective is to improve the economic competitiveness of Romania by developing the transport infrastructure, thus contributing to the development of the internal market with the aim of creating the conditions for increasing the volume of investments, promoting sustainable transport and cohesion in the European road network.

In addition to its national importance, this project will serve in good conditions, the national transit traffic, of goods and people from the territory of Romania and to Ukraine. Depending on the national roads stage of rehabilitation or under rehabilitation, through them the motorway can receive and distribute road traffic through its interchanges, it will ensure the necessary traffic capacity and appropriate traffic conditions related to the TEN-T road network with minimum negative effects at the environment level and land use.

Traffic conditions will be improved at the level of the national transport road network, including in terms of road safety, polluting emissions will be reduced, operating costs will be reduced, thus meeting the requirements of economic development realized by adapting the national road network to the real demand for Transport.

This project will generate important positive social-economic effects, also by "reducing distances" and regional development by increasing the area of "gravitational" economic influence of large cities on their smaller "satellite" localities.

The project aims to create a motorway sector between the municipality of Suceava and DN2H and an express road between DN2H and Siret Border, this being part of the road project with the generic name "Drumul Siretului", indicative DX5 included in the MPGT (Pascani - Suceava - Siret). The Paşcani-Suceava motorway also connects in Paşcani Municipality with the A7 motorway (Buzău – Focşani – Bacău – Paşcani).

2.1.4 Description of the life cycle of the project (construction, operation, decommissioning) and the interventions and activities associated with each stage, as well as the project duration of construction, operation, decommissioning and phasing of the project implementation period

2.1.4.1 Works during the construction period

2.1.4.1.1 Road earthwork

The cross section of the motorway has a platform width of 28.00 m out of which:

- carriageway (2 lanes per direction): 4 x 3.75 m = 15.00 m;
- central area (waterproofed): 3.00 m;
- emergency stationing lane, one for each direction of traffic: 2 x 2.50 m = 5.00 m;

- shoulders: 2 x 0.50 m = 1.00 m;
- guiding lanes: 4 x 0.50 m=2.00 m;
- space for parapets (outside the platform): 2 x 1.00 m.

The cross section of the motorway and express road has a platform width of 23.50 m out of which:

- carriageway (2 lanes per direction): 4 x 3.50 m = 14.00 m;
- central area (waterproofed): 3.00 m;
- shoulders: 2 x 1.50 m = 3.00 m;
- guiding lanes: 2 x 0.75 m = 1.50 m;
- space for parapets (outside the platform): 2 x 1.00 m = 2.00 m.

The cross section of the loops and link roads has the following characteristics:

- for loops and unidirectional link roads: the 6.00 m platform, including 4.00 m carriageway and two shoulders of 1.00 m each, out of which 0.25 m is the framing lane. Two areas of 1.00 m each are added to the platform, areas where the protective parapets are located;
- for bidirectional loops and link roads: the 10.50 m platform, including 7.00 m carriageway and two 1.00 m shoulders, out of which 0.25 m is the framing lane. Two areas of 1.00 m each are added to the platform, areas where protective parapets are located.

Taking into account the local characteristics of the project, the edges of the platform were arranged in different solutions to allow the placement of water collection and evacuation devices, safety devices.

2.1.4.1.2 Road pavement

The road pavement was proposed in accordance with the norms regarding the design of road pavements as well as those regarding the hot asphalt mixtures, and for its performance the raw materials and natural resources provided in the present study will be used.

Thus, the semi-rigid road pavement, consisting of the following materials, is provided for the motorway and the interchange link roads:

- wearing asphaltic concrete;
- chipping binder;
- asphalt mixture;
- natural aggregates stabilized with cement;
- ballast;
- soils stabilized with hydraulic binders.

The middle area is waterproofed and made of the following materials:

- wearing asphalt concrete;

- natural aggregates stabilized with cement;
- ballast;
- capping layer of stabilized soil.

The following materials are provided for parking platforms (CIC, PSD):

- road cement concrete;
- ballast stabilized with cement;
- ballast foundation;
- capping layer.

2.1.4.1.3 Road interchanges

The connection between the existing road network and the project is made through a system of road interchanges. The location and type of interchange was proposed according to the results of the Traffic Study.

5 road interchanges were designed on the road alignment, respectively those in the table below.

Table no.2-1 The road junctions provided in the project

No.	Name	Interval provided for the performance of work		Observations	Distance to the nearest protected natural area (km)	Other information
1.	Interchange 1 – DN29A Suceava North	1+150	3+200	It ensures the connection with DN29A and serves as a bypass option for the Municipality of Suceava	ROSCI0075 Pătrăuți Forest (3.4 km)	It intersects the forest
2.	Interchange 2 – DN2-DN2P Suceava West	8+875	11+250	It provides the connection with DN2 (E85), DN2P and access road to the Municipality of Suceava	ROSCI0075 Pătrăuți Forest (1.5 km)	-
3.	Interchange 3 – DN2H Rădăuți	25+500	26+900	It provides the connection with DN2 (E85) and DN2H and access road to the locality of Rădăuți (Suceava county)	ROSCI0379 Suceava River (2.9 km)	It intersects the Horait River
4.	Interchange 3 – DN2 South Siret	42+275	43+625	It ensures the connection with DN2 (E85) and access road to the locality of Siret (Suceava county)	ROSPA0110 Rogojești – Bucecea (4.8 km)	-
5.	Interchange 5 – DN2 Connection	55+150	55+700	It ensures the connection with DN2 (E85) between the	ROSPA0110 Now. Rogojești – Bucecea	-

No.	Name	Interval provided for the performance of work		Observations	Distance to the nearest protected natural area (km)	Other information
	DN2 North Siret			locality of Siret (Suceava county) and the border with Ukraine	(0.5 km)	

The following figure shows the road interchanges included in the project.

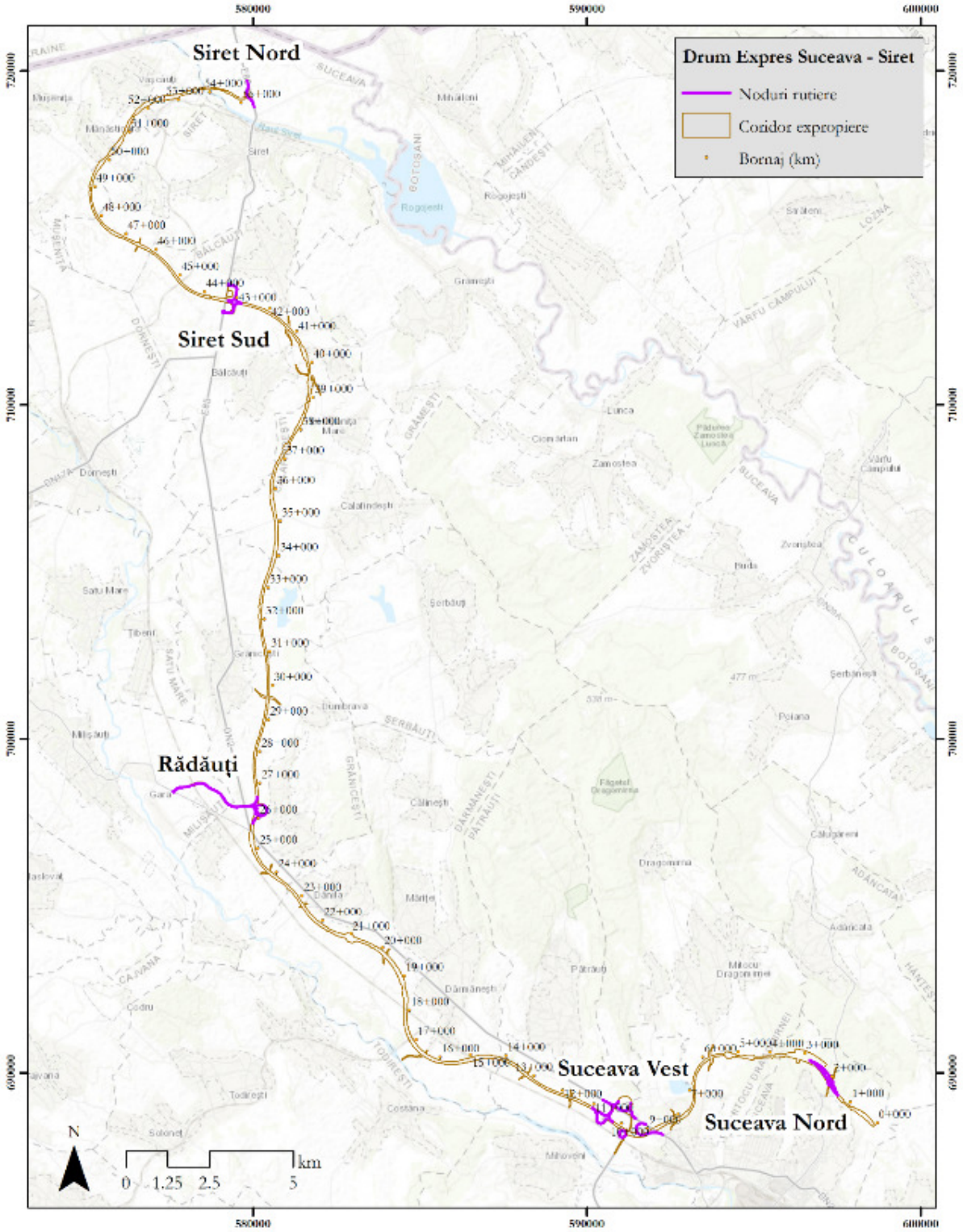


Figure no.2-3 The road junctions proposed for the Suceava– DN2H Motorway and DN2H – Siret border Express Road

2.1.4.1.3.1 Suceava North road interchange (1+862)/ intersection DN29A

This road interchange is proposed at the intersection with DN29A at the exit from Suceava municipality to the north. DN29A connects Suceava to Dorohoi and further to Darabani and Rădăuți-Prut, a locality placed on the border with the Republic of Moldova, near the town of Lipcani, and through the construction of this road interchange, access of the mentioned localities to the new motorway will be ensured.

The Suceava Nord road interchange is of "roundabout" type. It ensures all the connections with the neighboring towns and at the same time allows the return. The longitudinal profile of the motorway in the area of the interchange shows a slope of - 2.4% (towards Siret), at the same time the red line is found in a cutting with H_{max} of approx. 15 m, which leads to the possibility of lowering the red line of the national road (at the moment, the national road is found in a convex connection) and to ensure its access to the roundabout it will be locally relocated. The proposed roundabout will be located at the new level of the national road and will cross the express road by means of two overpasses ensuring the clearance on the express road. Therefore, the DN29A will remain "at level", and the motorway will pass to a lower level.

At the same time, through the location of this road interchange, the project will also fulfill the role of bypassing the municipality of Suceava.

Access will be achieved by means of four unidirectional link roads related to each individual path, according to the information in the table below.

Table no.2-2 One-way link roads provided within the road interchange

Path	Direction	Element	Run inclination		Design speed and geometric elements
			ramp	slope	
1.	exit	link road	X		V=60km/h, R=260m, i=4.5%
	entrance	link road		X	Alignment
2.	exit	link road	X		V=60km/h, R=260m, i=4.5%
	entrance	link road		X	V=60km/h, R=450m, i=2.5%

2.1.4.1.3.2 Suceava West Road Interchange (9+690)/ intersection between DN2 – DN2P

This road interchange is proposed at km 9+690 of the motorway, west of the municipality of Suceava, which will ensure the connection with the existing road interchange between the DN2 and DN2P by means of a connecting road.

Similar to the previously presented road interchange, the motorway section up to it, together with the connecting road up to the intersection with DN2P, will also be able to have the role of bypass variant, thus also completed on the east, north-east, north and west of the town of Suceava.

The Suceava West road interchange is a T "trumpet" type with flow entrance loop. It is found between the DN2 and the CFR500 Motorway (the loop is at a distance of approx. 50 m from it). It ensures the connections in all directions with the connecting road and implicitly with the existing road interchange (DN2-DN2P), conditioned by the connection of the connecting road by reconfiguring the existing loop and completing the interchange with a direct link on the Suceava-Motorway connection.

The longitudinal profile of the motorway in the interchange area presents a concave connection (the radius that also ensures optical comfort) composed at the entrance, by a slope of -1.26% and 0.5% at the exit, at the same time the red line is found on embankment with H_{max} of approx. 2.4 m.

The connecting road crosses the motorway by means of an overpass, it has a length of approx. 1.5 km, and the design speed for this sector is 60 km/h (all the geometric elements respecting this speed).

The modernization and completion of the existing road interchange will be minimumly invasive, with the preservation of the existing accesses - DN2-DN2P (municipality of Suceava-DN2P), DN2P-DN2 (DN2P - Rădăuţi), but also the overpass, as well as changing the direction of the existing loop (from two-way traffic to one-way traffic - Suceava municipality-DN2P).

Access will be achieved by means of two unidirectional link roads, a loop, respectively a sequence of loop-link road related to each path, for which the design speed is 60km/h.

Table no.2-3 One-way link roads provided within the road interchange

Path	Direction	Elements	Run inclination		Design speed and geometric elements
			ramp	slope	
1.	exit	Link road		X	V=60km/h, R=155m, i=5% (k=2.66)
	entrance	Link road	X		V=60km/h, R=155m, i=5% (k=2.66)
2.	exit	loop		X	V=60km/h, R=230m, i=5%
	entrance	Link road	X		V=60km/h, R=125m, i=6% (k=2.78)

The design speeds of the existing interchange link roads (trumpet type) are 30-40 km/h.

At the same time, in order to avoid the decrease in the traffic capacity of the entire interchange and to remove certain flows from it, as well as to shorten the access distances to the express road, a number of 4 direct link roads are proposed on some connections, respectively those in the table below.

Table no.2-4 One-way link roads provided within the road interchange

Path	Direction	Elements	Connection		Design speed and geometric elements
			Road	Locality	
1.	exit	Link road	DN2	Suceava	V=60km/h, R=155m, i=5% (k=2.66)
	entrance	Link road	DN2	Radauti	V=60km/h, R=155m, i=5% (k=2.66)
2.	exit	Link road	DN2	Suceava	V=60km/h, R=230m, i=5%
	entrance	loop	DN2P	Suceava	V=50km/h, R=105m, i=5% (k=2.75)

Between the loop of entrance and the exit link road of the path 2 a sorting sector of approx. 770 m is provided.

2.1.4.1.3.3 Rădăuţi road interchange (km 26+375.65)

This road interchange is proposed near the town of Românești to the west of it and approx. 12 km from the town of Rădăuţi, which intersects DN2H through a connection road of approx. 2.3 km in length.

This road interchange, T-type "trumpet" with the flow entry loop, ensures all the connections with the local road network and implicitly with the localities in the area, like the road interchange presented previously.

The proposed connecting road has the geometric elements for the design speed of 80km/h. It crosses both the motorway and DN2, crosses a local stream, then continues parallel to it, going on to cross the CFR500 Motorway. At the end of this connecting road, a turn (Rint=15m) is provided at the level at the intersection with DN2H. To avoid the roundabout, a direct link road is proposed before this (in the direction of Motorway-DN2H Rădăuți) with a design speed of 30 km/h.

By making this connection, the crossing of the CFR500 Motorway for the important traffic flow will be grade separated (in the current phase, DN2H crosses the Motorway at level).

The passage over DN2 is proposed to be built for 4 traffic lanes in order to ensure and connect with the "perspective" connecting road between the Motorway and the Rădăuți Ring Road.

Access will be achieved by means of two unidirectional link roads, a loop, respectively a sequence of the loop-link road related to each path for which the design speed is 60km/h.

Table no.2-5 One-way link roads provided within the road interchange

Path	Direction	Elements	Run inclination		Design speed and geometric elements
			ramp	slope	
1.	exit	Link road		X	V=60km/h, R=155m, i=5% (k=2.66)
	entrance	loop		X	V=60km/h, R=230m, i=5%
2.	exit	Link road	X		V=60km/h, R=230m, i=5%
	entrance	Link road		X	V=60km/h, R=155m, i=5% (k=2.78)

2.1.4.1.3.4 Siret Sud Road Interchange (km 43+320)

This road interchange is proposed at the intersection of the Express Road (km 43+320) with DN2 at approx. 3 km from the town of Siret, respectively at a distance of approx. 12 km from Rădăuți municipality (via the national road DN17A and DN2).

The Siret Sud road interchange (DN2) is of the "simple diamond" type. It ensures all the connections with DN2. The longitudinal profile of the motorway in the interchange area is found in a concave connection formed by two slopes of -1.2% and 2% respectively, while the red line is found in a cutting with H_{max} approx. 10 m, which leads to the possibility of lowering the red line of the national road (at the moment the national road DN2 is found in a convex connection). The four link roads of the road interchange, by means of two connecting roads, lead to DN2, at the intersections with it, two roundabouts (Rint=20m) at level are proposed. For right-hand traffic, before the turns (both from the express road and from the DN2), four link roads are proposed (V=40km/h, R=90m, i=5% for k=1.79) connected to the exit and entry points respectively flow in order to increase traffic capacity and avoid roundabouts.

In the space between DN2 and the connecting road to the north of the express road, the location of a maintenance and control center is proposed, with access from the DN2 alignment. This, through the two roundabouts, will be able to provide service to both lanes of the motorway, but also to both directions of the DN2 national road.

Access to and from the motorway will be achieved through four ramps. At the same time, in order to increase the traffic capacity, on the direction Rădăuți-Motorway lane 2 and Suceava-Motorway lane 1, two direct link roads with R=90 m and R=140 m respectively, are proposed in order to avoid entering the turn in these directions.

Table no.2-6 One-way link roads provided within the road junction

Path	Direction	Elements	Run inclination		Design speed and geometric elements
			ramp	slope	
1.	exit	Link road		X	V=60km/h, R=155m, i=5% (k=2.66)
	entrance	Link road		X	V=60km/h, R=155m, i=5% (k=2.66)
2.	exit	Link road		X	V=60km/h, R=155m, i=5% (k=2.66)
	entrance	Link road	X		V=60km/h, R=155m, i=5% (k=2.66)

2.1.4.1.3.5 Siret Nord road interchange – DN2 connection (km 55+203.22)

This link is proposed at the intersection of the Express Road (km 55+300) with DN2 near the city of Siret, north of it and approx. 1.5 km from Siret Customs. At the same time, it also represents the "end interchange" or end of the Suceava-Siret section.

The connection of the express road with DN2 is made at level by means of a curve (C31 left), having a radius of 250m and the speed of 60km/h. For the continuation of DN2 and to avoid intersections of traffic flows, DN2 grade separately crosses the express road by means of a one-way link roads (Vama Siret-loc. Siret), with a sequence of 3 curves and an underpass (over the express road) with the design speed of 60km/h.

At the same time, provision of th econnectivity of the path 1 of the express road with the town of Siret can be done through the roundabout proposed at km 481+540 of DN2.

The roundabout intersection at km 481+540 (inner radius of 20m), has the roles of:

- calming the traffic before the PTF Siret-Porubne;
- the connectivity of the Siret industrial area;
- ensures the connectivity of the express road with the town of Siret (both directions).

DN2, between km 480+340 (km 55+700 DX5 - end of LOT 3 project) and km 481+540 (the roundabout proposed to be built within lot 3 is kept within the existing situation, there is no intervention on this section of the DN with new, additional works. The connection between the express road and DN2 is ensured by means of a roundabout with R_{int}=45 m. All the connections with the DN2 (to the city of Siret and to the border point) are met, as well as with the access to the proposal for the location of a S3 type service space (located on the right side of DN2 with access from the roundabout). The longitudinal profile of the motorway in the interchange area is found in a declivity of -0.65%.

2.1.4.1.4 Bridges

On the alignment of the Suceava-DN2H Motorway and the DN2H-Siret Border Express Road, a series of bridges were designed, which are presented in the following table.

Table no.2-7 The bridges proposed within the project

No	Name	Interval provided for the completion of work		Obstacle	The distance from the nearest protected natural area		Other observations
		Starting Km	Ending Km		[km]	Name	
1.	Bridge over the Mitocul river Km 4+940	4+740	5+140	Mitocul River	3.2	ROSCI0075 Pătrăuți Forest	The river has connectivity with the otter corridor
2.	Bridge over the Dragomirna river Km 7+990	7+910	8+070	Dragomirna River	2.5	ROSCI0075 Pătrăuți Forest	The river has connectivity with ROSCI0075 Pătrăuți Forest
3.	Bridge over the river Patrăuţeanca Km 11+605	11+530	11+680	Patrăuţeanca River	2	ROSCI0075 Pătrăuți Forest	The river has connectivity with ROSCI0075 Pătrăuți Forest
4.	Bridge over the canal Km 12+440	12+360	12+520	Canal and relocated DE	2.1	ROSCI0075 Pătrăuți Forest	-
5.	Bridge over Hatnuta river tributary Km 14+370	14+300	14+440	Hatnuţa river tributary	2.9	ROSCI0075 Pătrăuți Forest	-
6.	Bridge over the Hatnuţa river and CF 300 Km 14+961	14+850	15+070	Raul Hatnuţa and CF300	3,4	ROSCI0075 Pătrăuți Forest	The tributaries of the river reach ROSCI0075 Pătrăuți Forest
7.	Bridge on DEX over the valley Km 20+315	20+240	20+390	Nameless valley	2.9	ROSCI0075 Pătrăuți Forest	-
8.	Bridge on DEX over the Sărghiesti river Km 22+193	22+110	22+280	The Sârghiesti River	4.2	ROSCI0075 Pătrăuți Forest	-
9.	Bridge over the Dănilă stream Km 22+995	22+920	23+070	Dănila Stream	4.6	ROSCI0075 Pătrăuți Forest	-
10.	Bridge over the river Dănilă Km 23+554	23+480	23+630	Danila River	4.9	ROSCI0075 Pătrăuți Forest	-
11.	Bridge over Horaiţ River (Grăniceşti) Km 25+212	25+130	25+290	Raul Horait (Granicesti)	5,6	ROSCI0379 Suceava River	-
12.	Bridge over the river Săcari Km 27+920	27+830	28+000	Săcari River	4.3	ROSCI0379 Suceava River	-
13.	Bridge over the valley Km 28+590	28+510	28+670	Nameless valley	4.4	ROSCI0379 Suceava River	-
14.	Bridge over the river Văduvul Km 30+375	30+300	30+450	The Widow River	4.5	ROSCI0379 Suceava River	-
15.	Bridge over the pârâul cel Adânc Km 30+975	30+900	31+050	Deep Stream	4.2	ROSCI0379 Suceava River	-
16.	Bridge over the stream of Fântânilor Km 32+535	32+460	32+610	Fountain Stream	3.7	ROSCI0379 Suceava River	-
17.	Bridge over the Calina stream Km 33+520	33+440	33+600	Călina Stream	3.7	ROSCI0379 Suceava River	-
18.	Bridge over the Horaiţ River Km 35+120	35+040	35+200	Horaiţ River	3.8	ROSCI0379 Suceava River	-
19.	Bridge over Horaiţ river	35+950	36+090	Horaiţ river	3.8	ROSCI0379	-

No	Name	Interval provided for the completion of work		Obstacle	The distance from the nearest protected natural area		Other observations
		Starting Km	Ending Km		[km]	Name	
	tributary Km 36+020			tributary		Suceava River	
20.	Bridge over the Horaiţ river Km 36+575	36+500	36+650	Horaiţ River	4.2	ROSCI0379 Suceava River	-
21.	Bridge over the Rudeşti stream Km 42+100	42+020	42+180	Rudeşti stream	4.5	ROSPA0110 Accumulations Rogojesti - Bucecea	The river intersects the otter habitat corridor and the ROSPA0110 site Rogoje accumulations you - Bucecea
22.	Bridge over the Balcauti stream Km 43+750	43+610	43+890	Bălcăuţi Stream and DL (Negostina village - Dornești commune)	4.8	ROSCI0379 Suceava River	-
23.	Bridge over the Siret river Km 54+030	53+490	54+570	DL (Văscăuţi village - Siret); Siret river	1.2	ROSPA0110 Accumulations Rogojesti - Bucecea	The river crosses the site ROSPA0110 Rogojeşti Accumulations - Bucecea
24.	Bridge over the Siret stream Km 55+115	55+040	55+190	Siret stream	0.8	ROSPA0110 Accumulations Rogojesti - Bucecea	The river crosses the site ROSPA0110 Rogojeşti Accumulations - Bucecea
25.	Bridge on Br.2 Km 2+985 over the Horoit river (Nod3-DN2-DN2H)	2+910	3+060	Raul Horoit	5.3	ROSCI0379 Suceava River	-
26.	Bridge on Br.2 Km 3+466 over the Horoit River (Nod3-DN2-DN2H)	3+400	3+540	Raul Horoit	5.3	ROSCI0379 Suceava River	-

2.1.4.1.5 Overpasses

The overpasses proposed in the project are presented in the following table.

Table no.2-8 The overpasses proposed in the project

No	Name	Extended interval provided for performance of the work		Obstacle	The distance from the nearest protected natural area		Other information
		Starting Km	Ending Km		[km]	Name	
1.	Overpass crossing DC57 Km 8+120	8+050	8+190	Relocation Lipoveni Street (DC 57)	2.4 km	ROSCI0075 Pătrăuţi Forest	-
2.	Overpass crossing DL Km 11+700	11+630	11+770	DL relocation (com Pătrăuţi)	2 km	ROSCI0075 Pătrăuţi Forest	-

No	Name	Extended interval provided for performance of the work		Obstacle	The distance from the nearest protected natural area		Other information
		Starting Km	Ending Km		[km]	Name	
3.	Overpass crossing DE km 14+070	14+000	14+140	Relocation OF	2.6 km	ROSCI0075 Pătrăuți Forest	-
4.	Overpass crossing DJ209D Km 16+495	16+420	16+570	DJ209D	4 km	ROSCI0075 Pătrăuți Forest	-
5.	Overpass crossing CF 513 Km 17+130	17+050	17+210	DE and CF 513 Darmăneşti-Mouth of Humor	5.2 km	ROSCI0075 Pătrăuți Forest	-
6.	Overpass crossing DE Km 17+550	17+480	17+620	Exploitation road	3 km	ROSCI0075 Pătrăuți Forest	-
7.	Overpass crossing CF 500 Km 18+030	17+950	18+110	CF500 bus	4 km	ROSCI0075 Pătrăuți Forest	-
8.	Overpass crossing DL Km 21+950	21+ 880	22+020	DL (Sârghiesti village - Măriţei village)	4 km	ROSCI0075 Pătrăuți Forest	-
9.	Overpass crossing DC38C Km 22+770	22+700	22+840	DC38C (Dănila village)	4.6 km	ROSCI0075 Pătrăuți Forest	-
10.	Overpass crossing DC40B Km 24+200	24+130	24+270	DC 40B (Iacobeşti village)	5.4 km	ROSCI0075 Pătrăuți Forest	-
11.	Overpass crossing DN2H and DN2 Km 25+555	25+460	25+650	DN 2H and DN2	6 km	ROSCI0075 Pătrăuți Forest	-
12.	Overpass crossing DC39 Km 35+063	34+990	35+130	DC 39 (Calafindeşti commune - DN2)	3.8 km	ROSCI0379 Suceava River	-
13.	Crossing over CF 518 Siret - Domneşti Km 44+817	44+730	44+900	CF 518 (Dornesti - Siret) - closed	5.8 km	ROSCI0379 Suceava River	-
14.	Passage for wildlife crossing Km 51+000	50+930	51+070	-	3.8 km	ROSPA0110 Accumulations Rogojesti - Bucecea	-
15.	Passage on DE over Motorway Km 0+250	0+190	0+310	Suceava – DN2H Motorway and DN2H -Siret Express Road	4.7 km	ROSCI0380 Suceava Liţeni River	-
16.	Overpass crossing the Motorway Km 3+500	3+450	3+550	To protect the fauna	3.2 km	ROSCI0075 Pătrăuți Forest	-
17.	Passage on DJ208D over Motorway Km 5+810	5+750	5+870	Suceava – DN2H Motorway and DN2H -Siret Express Road	2.3 km	ROSCI0075 Pătrăuți Forest	-
18.	Passage on DN2 over DEX Km 8+833.20	8+770	8+900	Suceava – DN2H	2.4 km	ROSCI0075 Pătrăuți Forest	-

No	Name	Extended interval provided for performance of the work		Obstacle	The distance from the nearest protected natural area		Other information
		Starting Km	Ending Km		[km]	Name	
				Motorway and DN2H -Siret Express Road			
19.	Passage on DE over Motorway Km 13+220	13+160	13+280	Suceava – DN2H Motorway and DN2H -Siret Express Road	3 km	ROSCI0075 Pătrăuţi Forest	-
20.	Passage on the DL over the Motorway Km 19+790	19+730	19+850	Suceava – DN2H Motorway and DN2H -Siret Express Road	2.6 km	ROSCI0075 Pătrăuţi Forest	-
21.	Passage on DC 40C over DEX Km 29+650	29+590	29+710	Suceava – DN2H Motorway and DN2H -Siret Express Road	4.6 km	ROSCI0379 Suceava River	-
22.	Passage on DJ178B over DEX Km 31+520	31+460	31+580	Suceava – DN2H Motorway and DN2H -Siret Express Road	3.9 km	ROSCI0379 Suceava River	-
23.	Passage on DC35 over DEX Km 40+473.10	40+410	40+540	Suceava – DN2H Motorway and DN2H -Siret Express Road	4.3 km	ROSCI0075 Pătrăuţi Forest	-
24.	Passage on DJ209D over DEX Km 41+250.35	41+190	41+320	Suceava – DN2H Motorway and DN2H -Siret Express Road	4 km	ROSPA0110 Accumulations Rogojesti - Bucecea	-
25.	Passage on DE over DEX Km 46+530	46+470	46+590	Suceava – DN2H Motorway and DN2H -Siret Express Road	3.1	ROSCI0379 Suceava River	-
26.	Passage on DJ 291A over DEX Km 49+813.65	49+750	49+880	Suceava –	3.1 km	ROSCI0379 Suceava River	-

No	Name	Extended interval provided for performance of the work		Obstacle	The distance from the nearest protected natural area		Other information
		Starting Km	Ending Km		[km]	Name	
				DN2H Motorway and DN2H -Siret Express Road			
27.	Passage on DL over DEX Km 50+325.35	50+260	50+400	Suceava – DN2H Motorway and DN2H -Siret Express Road	4.2 km	ROSPA0110 Accumulations Rogojesti - Bucecea	-
28.	Passage on DC 52 over DEX Km 51+878.36	51+810	51+940	Suceava – DN2H Motorway and DN2H -Siret Express Road	3.3 km	ROSPA0110 Accumulations Rogojeşti-Bucecea	-
29.	Passage on DN29A over Motorway km 1+862 (Nod1-DN29A)	1+810	1+920	Interchange1 - DN 29A	4.2	ROSCI0075 Pătrăuți Forest	-
30.	Motorway passage Km 9+690 over VO 2P (Interchange 2 - DN2 - DN2P)	9+610	9+770	VO 2P (Suceava Ring-road)	2.4	ROSCI0075 Pătrăuți Forest	-
31.	Passage on Br.10 over the Motorway Km 10+451.36 (Interchange 2 - DN2-DN2P)	10+390	10+520	Suceava – DN2H Motorway and DN2H -Siret Express Road	1.7	ROSCI0075 Pătrăuți Forest	-
32.	Passage on Link road 10 Km13+460.37 over DN2 (Interchange 2 - DN2 - DN2P)	13+390	13+540	DN2	2.2	ROSCI0075 Pătrăuți Forest	-
33.	Passage on link road 2 over the Motorway Km 26+357.65 (Interchange 3-DN2-DN2H)	26+290	26+420	Suceava – DN2H Motorway and DN2H -Siret Express Road	5	ROSCI0379 Suceava River	-
34.	Passage on link road 2 Km 0+612 over CF 500, (Interchange 3-DN2-DN2H)	0+540	0+710	CF 500 motorway	3.1	ROSCI0379 Suceava River	-
35.	Passage on link road 2 Km 1+960 over the channel and relocated DL (Interchange 3-DN2-DN2H)	1+900	2+020	Canal and DL relocated	2.9	ROSCI0379 Suceava River	-

No	Name	Extended interval provided for performance of the work		Obstacle	The distance from the nearest protected natural area		Other information
		Starting Km	Ending Km		[km]	Name	
36.	Passage on link road 2 Km 2+463 over DN2 (Interchange 3-DN2-DN2H)	2+380	2+540	DN 2 (E85)	2.9	ROSCI0379 Suceava River	-
37.	Passage on DN 2 over DEx Km 43+320 (Interchange 4-Siret S)	43+260	43+380	Suceava – DN2H Motorway and DN2H -Siret Express Road	5.1	ROSCI0379 Suceava River	-
38.	Passage on DN2 over DEx Km 55+203.22 (Interchange 5-Siret N)	55+140	55+270	Suceava – DN2H Motorway and DN2H -Siret Express Road	0.4	ROSPA0110 Accumulations Rogojești-Bucecea	-

2.1.4.1.6 Viaducts

The proposed viaducts within the project, located on the Suceava-DN2H motorway alignment and DN2H-Siret border express road are presented in the following table.

Table no.2-9 Box structures proposed in the project

No	Name	Interval provided for the completion of the work		Obstacle	Distanceto the nearest protected natural area		Other observations
		Starting Km	Ending Km		[km]	Name	
1.	Viaduct Km 1+035	0+790	1+280	Adâncata Valley - Suceava; DJ208T	4.6 km	ROSCI0380 Suceava Liţeni River	-
2.	Viaduct Km 4+255	3+890	4+620	DE and Mitoc Lake runoff channel 2	3.6 km	ROSCI0075 Pătrăuți Forest	The river crosses the site ROSCI0075 Pădurea Patrăuți
3.	Viaduct Km 38+840	38+720	38+960	Nameless valley	3.2 km	ROSCI0075 Pătrăuți Forest	-
4.	Viaduct Km 39+790	39+570	40+010	Relocation DJ 209D and Nameless Valley	3.6 km	ROSCI0075 Pătrăuți Forest	-
5.	Viaduct Km 48+910	48+770	49+050	Nameless valley	2.5 km	ROSCI0379 Suceava River	-

2.1.4.1.7 Culverts

The following table shows the culverts provided for in the project Suceava-DN2H Motorway and DN2H-Siret Border Express Road. The following table also includes the culverts on the CIC, short-term parking lots and service spaces.

Table no.2-10 Box culverts provided on the motorway/express road

No.	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)	Other information
			starting km	ending km		
1.	5	2.6	3+585	3+595	ROSCI0075 Pătrăuți Forest (3.2 km)	The Podul Vatafului River
2.	2	1.2	5+435	5+445	ROSCI0075 Pătrăuți Forest (2.1 km)	-
3.	2	1.2	6+100	6+110	ROSCI0075 Pătrăuți Forest (2.1 km)	-
4.	2	1.2	6+605	6+615	ROSCI0075 Pătrăuți Forest (2 km)	-
5.	2	1.2	7+055	7+065	ROSCI0075 Pătrăuți Forest (2.2 km)	-
6.	5	2.6	7+822	7+832	ROSCI0075 Pătrăuți Forest (2.5 km)	-
7.	3	2.6	9+405	9+415	ROSCI0075 Pătrăuți Forest (2.5 km)	-
8.	2	1.2	9+770	9+780	ROSCI0075 Pătrăuți Forest (2.3 km)	-
9.	3	2.6	10+185	10+195	ROSCI0075 Pătrăuți Forest (2.1 km)	-
10.	2	1.2	10+410	10+420	ROSCI0075 Pătrăuți Forest (2 km)	-
11.	4	1.4	10+522	10+532	ROSCI0075 Pătrăuți Forest (2 km)	-
12.	5	2.6	12+920	12+930	ROSCI0075 Pătrăuți Forest (2.1 km)	-
13.	2	1.2	14+020	14+030	ROSCI0075 Pătrăuți Forest (2.6 km)	-
14.	2	1.2	14+770	14+780	ROSCI0075 Pătrăuți Forest (2.9 km)	-
15.	5	2.6	15+245	15+255	ROSCI0075 Pătrăuți Forest (3.3 km)	-
16.	3	2.6	15+809	15+819	ROSCI0075 Pătrăuți Forest (3.6 km)	-
17.	2	1.2	16+020	16+030	ROSCI0075 Pătrăuți Forest (3.7 km)	-
18.	3	2.6	16+285	16+295	ROSCI0075 Pătrăuți Forest (3.7 km)	-
19.	2	1.2	16+395	16+405	ROSCI0075 Pătrăuți Forest (3.7 km)	-
20.	2	1.2	16+645	16+655	ROSCI0075 Pătrăuți Forest (3.7 km)	-
21.	5	2.6	16+915	16+925	ROSCI0075 Pătrăuți Forest (3.6 km)	-
22.	2	1.2	17+370	17+380	ROSCI0075 Pătrăuți Forest (3.5 km)	-
23.	2	1.2	17+745	17+755	ROSCI0075 Pătrăuți Forest (3.2 km)	-
24.	4	2.6	18+195	18+205	ROSCI0075 Pătrăuți Forest (2.8 km)	-
25.	3	2.6	21+445	21+455	ROSCI0075 Pătrăuți Forest (3.7 km)	-
26.	5	2.6	21+795	21+805	ROSCI0075 Pătrăuți Forest (4 km)	-
27.	2	1.2	24+045	24+055	ROSCI0075 Pătrăuți Forest (5.3 km)	-
28.	2	1.2	25+645	25+655	ROSCI0379 Suceava River (5.3 km)	-
29.	2	1.2	27+095	27+105	ROSCI0379 Suceava River (4.7 km)	-
30.	5	2.6	27+495	27+505	ROSCI0379 Suceava River (4.4 km)	-
31.	2	1.2	28+945	28+955	ROSCI0379 Suceava River (4.4 km)	-
32.	3	2.6	29+175	29+185	ROSCI0379 Suceava River (4.5 km)	-
33.	3	2.6	29+555	29+565	ROSCI0379 Suceava River (4.5 km)	-
34.	5	2.6	29+920	29+930	ROSCI0379 Suceava River (4.7 km)	-
35.	4	2.6	31+320	31+330	ROSCI0379 Suceava River (4 km)	-
36.	3	2.2	31+655	31+665	ROSCI0379 Suceava River (3.9 km)	-
37.	5	1.4	32+235	32+245	ROSCI0379 Suceava River (3.7 km)	-
38.	2	1.2	32+955	32+965	ROSCI0379 Suceava River (3.8 km)	-
39.	2	1.2	35+015	35+025	ROSCI0379 Suceava River (3.7 km)	-
40.	5	4.5	35+970	35+980	ROSCI0075 Pătrăuți Forest (3.8 km)	Domestic animal crossing
41.	5	5	36+055	36+065	ROSCI0075 Pătrăuți Forest (3.7 km)	Domestic animal crossing
42.	5	2.2	37+520	37+530	ROSCI0075 Pătrăuți Forest (3.3 km)	-
43.	5	2.2	37+732	37+742	ROSCI0075 Pătrăuți Forest (3.3 km)	-
44.	5	2.6	38+570	38+580	ROSCI0075 Pătrăuți Forest (3.1 km)	-
45.	3	2.6	40+745	40+755	ROSPA0110 Rogojești – Bucecea accumulations (4.2 km)	-
46.	3	2.6	41+702	41+712	ROSPA0110 Rogojești – Bucecea	-

No.	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)	Other information
			starting km	ending km		
					accumulations (4.2 km)	
47.	3	2.6	42+715	42+725	ROSPA0110 Rogojești – Bucecea accumulations (4.3 km)	-
48.	3	2.6	44+117	44+127	ROSCI0379 Suceava River (4.1 km)	-
49.	2	1.2	44+970	44+980	ROSCI0379 Suceava River (3.9 km)	-
50.	3	2.6	45+785	45+795	ROSCI0379 Suceava River (4 km)	-
51.	3	2.6	47+045	47+055	ROSCI0379 Suceava River (3 km)	-
52.	3	2.6	47+385	47+395	ROSCI0379 Suceava River (2.5 km)	-
53.	5	2.6	47+936	47+946	ROSCI0379 Suceava River (2.3 km)	-
54.	5	2.6	50+070	50+080	ROSCI0379 Suceava River (3.3 km)	-
55.	5	2.6	51+270	51+280	ROSPA0110 Rogojești – Bucecea accumulations (3.7 km)	-
56.	5	2.6	51+470	51+480	ROSPA0110 Rogojești – Bucecea accumulations (3.6 km)	-

Table no.2-11 Culverts provided on the road interchanges

No.	Section	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)	Other information
				starting km	ending km		
Road interchange Suceava West							
1.	Link road 4	2	1.2	0+220	0+230	ROSCI0075 Pătrăuți Forest (1.3 km)	-
2.	Link road 5	2	1.2	0+250	0+260	ROSCI0075 Pătrăuți Forest (1.3 km)	-
3.	Link road 6	2	1.2	0+315	0+325	ROSCI0075 Pătrăuți Forest (1.3 km)	-
4.	Link road 6	2	1.2	0+465	0+475	ROSCI0075 Pătrăuți Forest (1.3 km)	-
5.	Link road 8	2	1.2	0+195	0+205	ROSCI0075 Pătrăuți Forest (1.3 km)	-
6.	Link road 9	2	1.2	0+265	0+275	ROSCI0075 Pătrăuți Forest (1.3 km)	-
7.	Link road 10 and DN2P	2	1.2	13+630	13+640	ROSCI0075 Pătrăuți Forest (1.3 km)	-
8.	Link road 10 and DN2P	2	1.2	14+030	14+040	ROSCI0075 Pătrăuți Forest (1.3 km)	-
9.	Link road 10 and DN2P	2	1.2	14+460	14+470	ROSCI0075 Pătrăuți Forest (1.3 km)	-
Road interchange Radauti							
10.	Link road 1	2	1.2	0+245	0+255	ROSCI0379 Suceava River (2.9 km)	-
11.	connection road	2	1.2	0+145	0+155	ROSCI0379 Suceava River (3.9 km)	-
12.	connection road	2	1.2	0+845	0+855	ROSCI0379 Suceava River (3.9 km)	-
13.	connection road	2	1.2	1+445	1+455	ROSCI0379 Suceava River (3.9 km)	-
14.	Link road 3	2	1.2	0+120	0+130	ROSCI0379 Suceava River (3.9 km)	-
15.	Link road 4	2	1.2	0+260	0+270	ROSCI0379 Suceava River (3.9 km)	-
Siret Suf road interchange							
16.	Link road 1	2	1.2	0+235	0+245	ROSCI0379 Suceava River (5.1 km)	-
17.	Link road 1	2	1.2	0+295	0+305	ROSCI0379 Suceava River (5.1 km)	-
18.	Link road 1	2	1.2	0+585	0+595	ROSCI0379 Suceava River (5.1 km)	-
19.	Link road 3	2	1.2	0+015	0+025	ROSCI0379 Suceava River (5.1 km)	-
Siret Nord road interchange							
20.	Ring-road DN2 Km 55+203.22	2	1.2	0+555	0+565	ROSPA0110 Rogojești – Bucecea accumulations (0.5 km)	-

Table no.2-12 Box culverts provided for the relocation of local roads

No.	Name	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)	Other information
				starting km	ending km		
1	Relocation - DJ 209D km 39+790	2	1.2	0+625	0+635	ROSCI0379 Suceava River (4.1 km)	-
2	Relocation -DJ 209D km 41+250.35	2	1.2	0+480	0+490	ROSPA0110 Rogojești – Bucecea accumulations (4.1 km)	-
3	Relocation -DJ 209D km 41+250.35	2	1.2	0+754	0+764	ROSPA0110 Rogojești – Bucecea accumulations (4.1 km)	-
4	Relocation DN2 km 43+320	2	1.2	473+809	473+819	ROSPA0110 Rogojești – Bucecea accumulations (5 km)	-

108 culverts were provided on the maintenance roads, 54 bridges on each side of the motorway and express road.

Table no.2-13 Floors provided for maintenance roads

No.	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)	Other information
			starting km	ending km		
1	5	2.6	3+585	3+595	ROSCI0075 Pătrăuți Forest (5 km)	-
2	2	1.2	5+435	5+445	ROSCI0075 Pătrăuți Forest (2.7 km)	-
3	2	1.2	6+100	6+110	ROSCI0075 Pătrăuți Forest (2.1 km)	-
4	2	1.2	6+605	6+615	ROSCI0075 Pătrăuți Forest (2 km)	-
5	2	1.2	7+055	7+065	ROSCI0075 Pătrăuți Forest (2.2 km)	-
6	5	2.6	7+822	7+832	ROSCI0075 Pătrăuți Forest (2.2 km)	-
7	3	2.6	9+405	9+415	ROSCI0075 Pătrăuți Forest (2.5 km)	-
8	2	1.2	9+770	9+780	ROSCI0075 Pătrăuți Forest (2.3 km)	-
9	3	2.6	10+185	10+195	ROSCI0075 Pătrăuți Forest (2.3 km)	-
10	2	1.2	10+410	10+420	ROSCI0075 Pătrăuți Forest (1.9 km)	-
11	4	1.4	10+522	10+532	ROSCI0075 Pătrăuți Forest (1.9 km)	-
12	5	2.6	12+920	12+930	ROSCI0075 Pătrăuți Forest (2.1 km)	-
13	2	1.2	14+020	14+030	ROSCI0075 Pătrăuți Forest (2.5 km)	-
14	2	1.2	14+770	14+780	ROSCI0075 Pătrăuți Forest (3 km)	-
15	5	2.6	15+245	15+255	ROSCI0075 Pătrăuți Forest (3.3 km)	-
16	3	2.6	15+809	15+819	ROSCI0075 Pătrăuți Forest (3.7 km)	-
17	2	1.2	16+020	16+030	ROSCI0075 Pătrăuți Forest (3.7 km)	-
18	3	2.6	16+285	16+295	ROSCI0075 Pătrăuți Forest (3.8 km)	-
19	2	1.2	16+395	16+405	ROSCI0075 Pătrăuți Forest (3.8 km)	-
20	2	1.2	16+645	16+655	ROSCI0075 Pătrăuți Forest (3.7 km)	-
21	5	2.6	16+915	16+925	ROSCI0075 Pătrăuți Forest (3.6 km)	-
22	2	1.2	17+370	17+380	ROSCI0075 Pătrăuți Forest (3.5 km)	-
2. 3	2	1.2	17+745	17+755	ROSCI0075 Pătrăuți Forest (3.5 km)	-
24	4	2.6	18+195	18+205	ROSCI0075 Pătrăuți Forest (2.9 km)	-
25	3	2.6	21+445	21+455	ROSCI0075 Pătrăuți Forest (3.7 km)	-
26	5	2.6	21+795	21+805	ROSCI0075 Pătrăuți Forest (4 km)	-
27	2	1.2	24+045	24+055	ROSCI0075 Pătrăuți Forest (5.3 km)	-
28	2	1.2	25+645	25+655	ROSCI0379 Suceava River (4.3 km)	-
29	2	1.2	27+095	27+105	ROSCI0379 Suceava River (4.7 km)	-
30	5	2.6	27+495	27+505	ROSCI0379 Suceava River (4.4 km)	-
31	2	1.2	28+945	28+955	ROSCI0379 Suceava River (4.5 km)	-
32	3	2.6	29+175	29+185	ROSCI0379 Suceava River (4.5 km)	-
33	3	2.6	29+555	29+565	ROSCI0379 Suceava River (4.5 km)	-
34	5	2.6	29+920	29+930	ROSCI0379 Suceava River (4.7 km)	-

No.	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)	Other information
			starting km	ending km		
35	4	2.6	31+320	31+330	ROSCI0379 Suceava River (4 km)	-
36	3	2.2	31+655	31+665	ROSCI0379 Suceava River (3.8 km)	-
37	5	1.4	32+235	32+245	ROSCI0379 Suceava River (3.7 km)	-
38	2	1.2	32+955	32+965	ROSCI0379 Suceava River (3.6 km)	-
39	2	1.2	35+015	35+025	ROSCI0379 Suceava River (3.8 km)	-
40	5	2.2	37+520	37+530	ROSCI0075 Pătrăuți Forest (3.3 km)	-
41	5	2.2	37+732	37+742	ROSCI0075 Pătrăuți Forest (3.3 km)	-
42	5	2.6	38+570	38+580	ROSCI0075 Pătrăuți Forest (3.1 km)	-
43	3	2.6	40+745	40+755	ROSPA0110 Rogojești – Bucecea accumulations (4.3 km)	-
44	3	2.6	41+702	41+712	ROSPA0110 Rogojești – Bucecea accumulations (4.3 km)	-
45	3	2.6	42+715	42+725	ROSPA0110 Rogojești – Bucecea accumulations (4.8 km)	-
46	3	2.6	44+117	44+127	ROSCI0379 Suceava River (4.5 km)	-
47	2	1.2	44+970	44+980	ROSCI0379 Suceava River (3.9 km)	-
48	3	2.6	45+785	45+795	ROSCI0379 Suceava River (3.6 km)	-
49	3	2.6	47+045	47+055	ROSCI0379 Suceava River (2.9 km)	-
50	3	2.6	47+385	47+395	ROSCI0379 Suceava River (2.6 km)	-
51	5	2.6	47+936	47+946	ROSCI0379 Suceava River (2.3 km)	-
52	5	2.6	50+070	50+080	ROSCI0379 Suceava River (3.3 km)	-
53	5	2.6	51+270	51+280	ROSPA0110 Rogojești – Bucecea accumulations (3.8 km)	-
54	5	2.6	51+470	51+480	ROSPA0110 Rogojești – Bucecea accumulations (3.5 km)	-

2.1.4.1.8 Motorway facilities

For the Suceava - DN2H Motorway and DN2H - Siret Border Express Road, the following facilities were proposed:

- Maintenance and Coordination Center (CIC);
- Short-term parking (PSD);
- S1 type Service spaces.

These facilities will be carried out in accordance with the provisions of the Norm regarding the Design of Extraurban Motorways - PD 162-2002, correlated with the document TEM 2001 - TEM Standards and Recommended Practices, Third Edition, December 4-6, 2001.

The optimum location with respect to the existing networks (water supply and sewerage networks, electricity networks, telephone networks, common road networks, etc.) was followed.

The table below shows the positions of these facilities.

Table no.2-14 The locations of the proposed facilities

No.	Section	Name	Location	Km position	Distance to the nearest protected natural area (km)	Other information
1.	Suceava Siret border	Short-term parking	Left Right	5+100-5+450	ROSCI0075 Pătrăuți Forest (approx. 2.7 km)	-
2.		S1 type Service Space	Left	20+730-21+170	ROSCI0075 Pătrăuți Forest (approx.	-

No.	Section	Name	Location	Km position	Distance to the nearest protected natural area (km)	Other information
					3.2 km)	
3.		S1 type Service Space	right	21+800-21+250	ROSCI0075 Pătrăuți Forest (approx. 3.2 km)	-
4.		Short term parking	Left Right	37+150-37+500	ROSCI0075 Pătrăuți Forest (approx. 3.3 km)	-
5.		Maintenance and coordination center	right	43+050-43+310	ROSPA0110 Rogojești-Bucecea accumulations (approx. 5 km)	-

The following map shows the location of the CIC and the short-term car parkings of the motorway/express road.

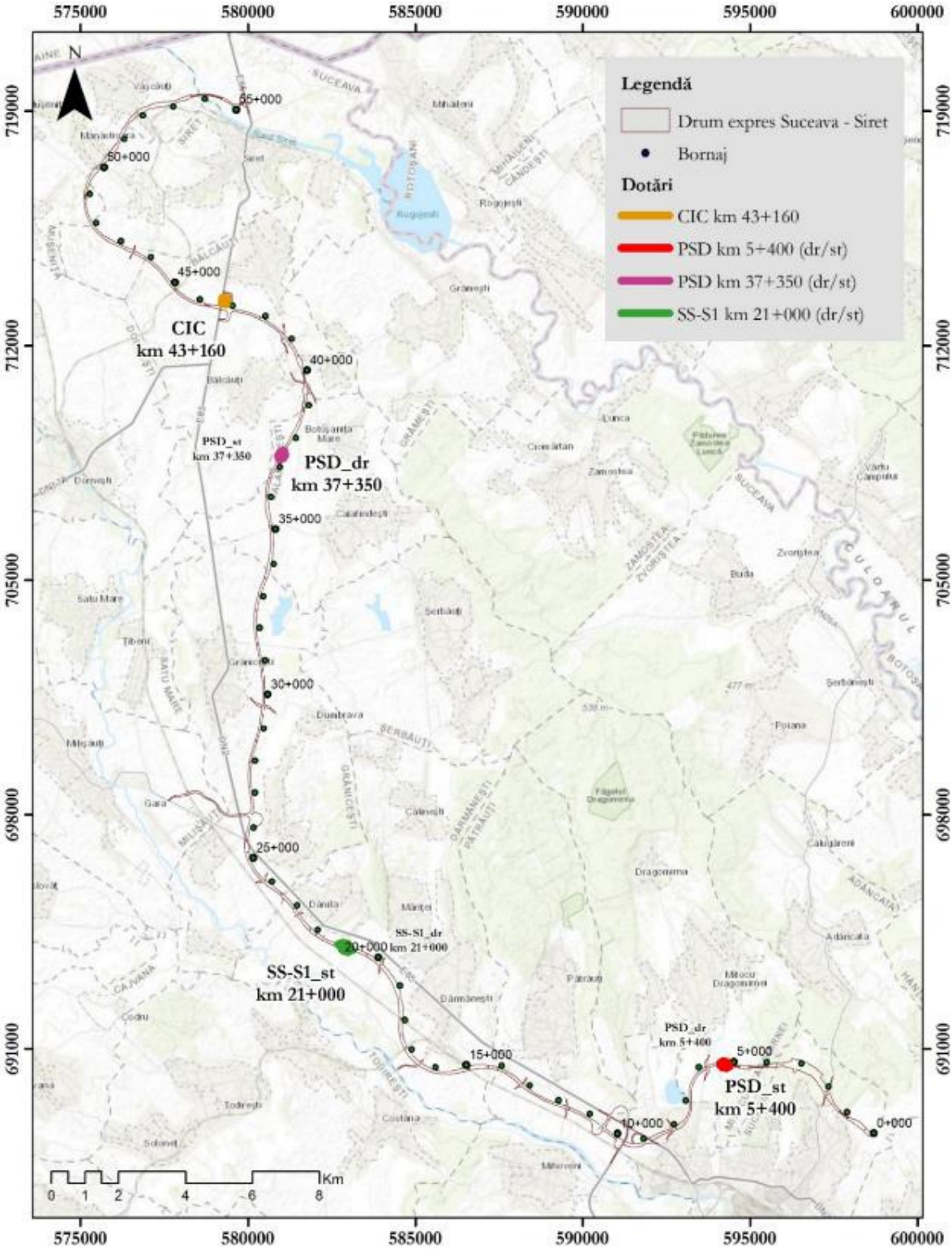


Figure no.2-4 CIC (Maintenance and Coordination Center) and short-term parking (PSD) locations

2.1.4.1.8.1 Maintenance and Coordination Centers

The Maintenance and Coordination Center is a service unit for a motorway sector with the role of maintaining the motorway in proper operating condition and ensuring the safety of road traffic in the area, supporting the repair of equipment. It also has functions of coordination of the activity of support points and permanent supervision of the inclusion of the motorway in the performance criteria according to "Regulations for the maintenance of motorways based on performance criteria" ind. AND 596/2009 equipped with specific measurement and control equipment.

The Maintenance and Coordination Center is a technical complex that also has a series of tasks grouped as follows:

- traffic supervision, influence of meteorological factors on the traffic;
- providing first aid in case of accidents;
- maintenance of the motorway on the relevant section, of the service spaces, markings, lighting installations and telecommunications installations;
- restorations and repairs after accidents or natural calamities;
- collection of taxes and fines;
- fuel supply of maintenance equipment;
- maintenance of equipment, etc.

To achieve the tasks described above, constructions with different functions were designed. These constructions are:

- Operational building P+1E;
- Car garage;
- Above ground fuel tanks;
- Fencing sanitary protection area;
- Water tank with pumping group;
- Drilled well;
- Washing ramp;
- Cabin gate;
- Drainable sealed basin;
- Treated water collection tank;
- Sludge and hydrocarbon interceptors;
- Rainwater pumping station;
- CaCl preparation plant (silo, tank, mixing basin);
- Outdoor platforms for material storage;
- Fuel tank for fire engines;

- Metallic gates;
- Wire mesh fences;
- Substation and electrical connection;
- Waste storage platform;
- Generator set;
- Covered parking for cars with a capacity of 12 places;
- Covered electric car parking for 4 electric car charging positions with 2 pcs. charging equipment to which 2 pcs of electric cars can be simultaneously connected.

2.1.4.1.8.2 Short-term parking lots

Short-term parking is a space physically separated from the motorway, which allows users to stop when they need rest and relaxation. It is recommended that these areas offer a change from the monotony of the motorway, in belview points.

The actual parking platform has a protection zone of min. 10 m width from the edge of the motorway carriageway. Each parking platform will be arranged for both heavy vehicles and cars.

Access to and from the parking platform will be made only on special entrance and exit ramps, so that vehicles can re-enter traffic in complete safety.

These short-term parking lots are located along the motorway, in principle both on the right and on the left side, symmetrical to the axis of the road, according to the motorway layout plans.

Rainwater coming from the premises of the objective will be collected through drains with siphon and deposit. The water thus collected will be gravity channeled through simple concrete pipes to the two sludge and mineral oil separators (one on the left side and one on the right side of the motorway). Also, the rainwater from the parking areas will be treated in the hydrocarbon interceptor and will be sent to the caissons of the wastewater pumping stations.

The thermal source is the thermal plant located in the WC building and will be equipped with a boiler operating with electricity, a closed expansion tank and a line pump for the circulation of the thermal agent.

The compensation of the exhausted air is done by means of the transit grids mounted on the lower part of the access doors.

Each left or right location contains:

- Public sanitary group;
- Drilled well;
- Drainable sealed basin;
- Rainwater pumping station and buffer tank;
- Weighing platform;
- External fencing of wire mesh panels;

- Covered tables;
- Protection spaces;
- Substation transformer;
- Fencing drilled well;
- Water tank with pumping group;
- Waste storage platform;
- Car parking - 29 places;
- Covered electric car parking for 6 electric car charging positions with 3 pcs. charging equipment to which 2 pcs of electric cars can be simultaneously connected.
- Bus parking - 2 places;
- Heavy vehicle parking - 15 places;
- Parking for people with disabilities - 4 places.

2.1.4.1.8.3 Service spaces (type S1)

The S1 type Service Space is intended for longer-term parking and standing, having as additional equipment than short-term parking a fuel filling station and a commercial space with public food. The space will be concessioned in order to place the mentioned facilities.

Each S1 type service space will be equipped with the following:

- Public sanitary group;
- Water connection pipe to the network in the area/drilled well;
- Drainable sealed basin;
- Rainwater pumping station and buffer tank;
- External fencing;
- Covered tables;
- Protection spaces;
- Substation;
- Drilled well fencing;
- Water tank with pumping group;
- Ecological container platform;
- Car parking - 87 spaces + 7 spaces in the gas station;
- Covered electric car parking for 6 electric car charging positions with 3 pcs. of charging equipment to which 2 pcs of electric car can be simultaneously connected;
- Bus parking - 6 places;
- Heavy vehicle parking - 33 places;
- Parking for people with disabilities - 6 places;
- Gas station reserved space;
- Space reserved for trade + public food;
- Equipment maintenance cell.

2.1.4.1.9 Hydrotechnical works

In order to ensure an optimum hydraulic flow of water under the bridges, but also to protect the road embankment, when it is in contact with running water or standing water, the construction of hydrotechnical works is required.

The designed hydrotechnical works ensure:

- protecting riverbeds in the area of bridges;
- optimum hydraulic routing and water flowing by the bridges spans;
- protection of the road slope, the areas on which it is subject to the action of water;
- ensuring the stability of the thalweg in the area of water crossings.

The hydrotechnical works were designed to ensure calculation according to the STAS in force.

According to STAS 4273-83 "Classification of importance" - point 2.11 the category of hydrotechnical constructions related to public roads (crossings in the area of water courses) is for the national roads 3. According to point 5.1 of STAS 4273-83, according to the duration of operation - definitive and according to the functional role - main, hydrotechnical construction 3 is appropriate to the importance class III.

In accordance with STAS 4068/2-87 "Annual probabilities of maximum flows and volumes under normal and special operating conditions" - point 2.1 under normal operating conditions at importance class III is appropriate to the annual probability of exceeding 2%.

The hydraulic design of bridges and culverts is done respecting the conditions of free passage in accordance with PD 95-2002, table 6.III. and table 7.I.

For the intersected watercourses (with flows below 1000m^3/s with floats) the minimum height of free passage under bridges is 1.00m.

The main hydrotechnical works are:

- Slope protection
- earth channel recalibration
- Relocation of earth channels
- Construction of concrete channels

2.1.4.1.9.1 Slope protection with a concrete slabs wall

Hydrotechnical Work Type – 1 cast-in-place concrete slab wall: To protect the road embankment at the level with the calculation insurance of 2%, when the road is located in the main river bed, a cast-in-place concrete slab wall reinforced with 15 cm thick Buzău nets was provided. It is supported by a base of concrete beams.

Hydrotechnical work Type - 2- wall made of cast-in-place concrete slabs and gabions: The work is applied to the areas where the alignment approaches the minor river bed. This is a defense solution composed of a gabion wall to protect the bank of the minor river bed and a wall to protect the

motorway embankment, located in the major river bed. The gabion wall has a variable height between 1.5-3.0 m and is placed on a 5.0 m long gabion mattress. The protection of the embankment was planned to be executed with a wall of cast-in-place concrete slabs, supported on a concrete beam. The wall is 15 cm thick and reinforced with a Buzău net.

The recalibration of the bed is necessary in the areas where bank defense works were planned for the river bed as well as in the area of the bridges, where by carrying out the works, the drainage section would be reduced.

Under these conditions, a recalibration of the bed is necessary in these areas, which consists in making the section necessary for the flow of the calculation flow.

Also, in the areas where the water course bed is meandering and have deposits, to increase the area of the drainage section, the bed will be recalibrated on a portion and most often in the area of bridges, where the bed shows deformations of the bottom and especially deposits.

Table no.2-15 Hydrotechnical works to protect the motorway slopes

PROTECTION OF ROAD SLOPE WITH CONCRETE WALL										
No.	Left side			Distance to the nearest protected natural area	Name of protected natural area	Right Side			Distance from the nearest protected natural area	Name of protected natural area
	pK	Pkf	L (m)	km		pK	Pkf	L (m)	km	
1	7+850	7+975	125	2.54	ROSCI0075 Patrauti Forest	7+845	7+975	130	2.42	ROSCI0075 Patrauti Forest
2	8+000	8+150	150	2.44	ROSCI0075 Patrauti Forest	8+000	8+150	150	2.45	ROSCI0075 Patrauti Forest
3	9+225	9+275	50	2.60	ROSCI0075 Patrauti Forest	-	-	-	-	-
4	-	-	-	-	-	9+400	9+500	100	2.10	ROSCI0075 Patrauti Forest
5	9+690	10+350	660	2.50	ROSCI0075 Patrauti Forest	-	-	-	-	-
6	11+400	11+590	190	1.96	ROSCI0075 Patrauti Forest	11+400	11+590	190	1.86	ROSCI0075 Patrauti Forest
7	11+610	11+685	75	2.06	ROSCI0075 Patrauti Forest	11+610	11+685	75	1.98	ROSCI0075 Patrauti Forest
8	11+710	11+900	190	2.11	ROSCI0075 Patrauti Forest	11+710	11+900	190	2.05	ROSCI0075 Patrauti Forest
9	14+380	14+515	135	2.66	ROSCI0075 Patrauti Forest	14+285	14+360	75	2.61	ROSCI0075 Patrauti Forest
10	14+715	14+910	195	3.00	ROSCI0075 Patrauti Forest	14+380	14+525	145	2.84	ROSCI0075 Patrauti Forest
11	15+000	15+200	two hun dred	3.19	ROSCI0075 Patrauti Forest	14+740	14+920	180	3.12	ROSCI0075 Patrauti Forest
12	17+150	17+550	400	3.63	ROSCI0075 Patrauti Forest	17+150	17+550	400	3.54	ROSCI0075 Patrauti Forest
13	17+725	17+875	150	3.19	ROSCI0075 Patrauti Forest	17+725	17+875	150	3.11	ROSCI0075 Patrauti Forest
14	22+090	22+175	85	4.16	ROSCI0075 Patrauti Forest	15+000	15+190	190	4.08	ROSCI0075 Patrauti Forest
15	22+210	22+290	80	4.31	ROSCI0075 Patrauti Forest	22+100	22+175	75	4.24	ROSCI0075 Patrauti Forest
16	25+025	25+200	175	5.50	ROSCI0379 Suceava River	22+215	22+280	65	4.25	ROSCI0075 Patrauti Forest
17	25+250	25+500	250	5.53	ROSCI0379 Suceava River	25+025	25+200	175	5.65	ROSCI0379 Suceava River
18	30+930	30+970	40	4.83	ROSCI0379 Suceava River	25+250	25+500	250	5.39	ROSCI0379 Suceava River

PROTECTION OF ROAD SLOPE WITH CONCRETE WALL										
No.	**Left side**			**Distance to the nearest protected natural area**	**Name of protected natural area**	**Right Side**			**Distance from the nearest protected natural area**	**Name of protected natural area**
	pK	**Pkf**	**L (m)**	**km**		**pK**	**Pkf**	**L (m)**	**km**	
19	30+950	30+970	20	4.84	ROSCI0379 Suceava River	30+930	30+970	40	4.91	ROSCI0379 Suceava River
20	32+545	32+590	45	3.65	ROSCI0379 Suceava River	30+985	31+030	45	4.92	ROSCI0379 Suceava River
21	35+160	35+200	40	3.73	ROSCI0379 Suceava River	55+128	55+283	155	10.67	ROSCI0379 Suceava River
22	36+030	36+050	20	3.85	ROSCI0379 Suceava River	-	-	-	-	
2. 3	36+425	36+560	135	3.84	ROSCI0379 Suceava River	36+425	36+560	135	3.75	ROSCI0075 Patrauti Forest
24	36+590	36+850	260	3.77	ROSCI0075 Patrauti Forest	36+590	36+850	260	3.71	ROSCI0075 Patrauti Forest
25	54+960	55+105	145	0.82	(ROSPA0110) Rogojeşti-Bucecea accumulations	-	-	-	-	
26	55+128	55+283	155	0.80	ROSPA0110) Rogojeşti-Bucecea accumulations	-	-	-	-	

2.1.4.1.9.2 Deviation and bed protection with gabion mattress

The works to deviate the bed of the Horoiţ and Negostina water bodies are designed in the crossing areas with bridges, thus avoiding the creation of abutement in the minor bed.

The protection of the bed with the gabion mattress is applied because it is necessary to stabilize the bank and the talveg, thus ensuring its protection against erosion induced by water bodies.

The gabion mattresses are placed on a geosynthetic material that acts as a filter. The gabions are overlapped, behind which a geotextile filter will be placed.

The advantages of works made of gabions are elasticity, quick execution and the possibility of immediate exploitation.

Table no.2-16 Riverbed deviation in the area of bridges and protection with gabion mattress

No.	Type of work	Interval provided for the completion of the work				Length	Distance to the nearest protected natural area (km)	Name of the protected natural area
		Left		Right				
		starting km	ending km	starting km	ending km	(m)		
1.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Mitocul tributary 4+940	4+850	4+950	4+900	5+000	189.32	3.7 km	ROSCI0075 Pătrăuți Forest
2.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Dragomirna River km 7+990	7+950	8+050	7+950	8+050	235.73	2.39 km	ROSCI0075 Pătrăuți Forest
3.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Raul Patrăuţeanca km 11+605	11+550	11+650	11+550	11+650	206.53	1.98 km	ROSCI0075 Pătrăuți Forest
4.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Hantuta tributary km 14+370	14+350	14+450	14+250	14+400	193.33	2.74 km	ROSCI0075 Pătrăuți Forest
5.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Paraul Danila km 22+995	22+900	23+025	22+950	23+100	260.44	4.65 km	ROSCI0075 Pătrăuți Forest
6.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Danilă River km 23+554	23+450	23+550	23+450	23+550	220.43	4.87 km	ROSCI0075 Pătrăuți Forest
7.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Horait River km 25+212	25+100	25+250	22+150	25+300	323.52	5.8 km	ROSCI0075 Pătrăuți Forest
8.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Sacari river km 27+910	27+850	27+950	27+875	27+925	160.06	6 km	ROSCI0075 Pătrăuți Forest
9.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Rau Vadutul km 30+375	30+375	30+400	30+325	30+375	185.4	5.75 km	ROSCI0075 Pătrăuți Forest
10.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Paraul cel Adanc km 30+975	30+950	31+000	30+950	31+000	134.82	5.48 km	ROSCI0075 Pătrăuți Forest

No.	Type of work	Interval provided for the completion of the work				Length	Distance to the nearest protected natural area (km)	Name of the protected natural area
		Left		Right				
		starting km	ending km	starting km	ending km	(m)		
11.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Paraul Calina km 33+520	33+450	33+600	33+400	33+550	230.62	1.7 km	ROSCI0075 Pătrăuţi Forest
12.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Horait tributary km 35+120	35+100	35+250	33+050	35+150	215.37	4.01 km	ROSCI0075 Pătrăuţi Forest
13.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Rau Horait km 36+575	36+575	36+700	36+500	36+575	240.46	3.72 km	ROSCI0075 Pătrăuţi Forest
14.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Paraul Rudesti (Negostina) km 42+100	41+975	42+150	42+050	42+250	283.5	4.38 km	ROSPA0010 Rogojesti - Bucecea Accumulations
15.	Recalibration of the riverbed in the area of the bridges - the gabion mattress Paraul Siret km 55+115	55+050	55+150	55+050	55+150	368.54	0.56 km	ROSPA0010 Rogojesti - Bucecea Accumulations

2.1.4.1.9.3 Rainwater collection and evacuation works

The water drainage devices provided in the project are divided into two categories:

- works that ensure the flow of meteoric waters to the watercourse:
  - ditches with a walled section at the edge of the embankment;
  - culverts (with the span of 2 m and 5 m);
  - shoulder gutters from precast elements;
  - water discharge boxes from the motorway surface in the case of high embankments, ramps; bridges and passages;
  - walled gutters in the median area of the motorway in the case of arranged curves.
- works for the depollution of water before discharge into the watercourse or on natural valleys:
  - settlement tank/separator chambers for hydrocarbons 282 pcs., these devices are placed before the discharge of ditches to culverts or in natural water courses;
  - settlement tank/separator chambers for hydrocarbons associated with water dispersion tanks in the number of 15 pcs., are provided in the areas where the water collected in the ditches will be discharged on the natural ground, in depressed areas and has the purpose of the laminar drainage of the water to avoid soil erosion;
  - retention basins 1 piece.

In total, 297 pieces of hydrocarbon interceptors are provided and 16 pcs of retention basins.

In order to drain and evacuate the water from the road pavement, it was planned to extend the granular layer to the edge of the platform to allow the water infiltrated into the foundation to be discharged on the slopes or in the drainage devices along the motorway.

At the base of the embankment slopes, concrete trapezoidal ditches will be constructed to collect rainwater from the motorway area, along the entire length of the motorway (left and right).

Water from the motorway platform will be collected through concrete side ditches and discharged on the slope, in ditches, through boxes located according to the hydraulic capacity calculation of the gutter.

Table no.2-17 Hydrocarbon interceptors provided on the main alignment

No.	KM	Position	Description
1	0+849	right	hydrocarbon interceptor
2	0+850	Left	hydrocarbon interceptor
3	1+213	right	hydrocarbon interceptor
4	1+215	Left	hydrocarbon interceptor
5	3+571	right	hydrocarbon interceptor
6	3+574	Left	hydrocarbon interceptor
7	3+606	right	hydrocarbon interceptor
8	3+602	Left	hydrocarbon interceptor
9	3+951	right	hydrocarbon interceptor
10	3+949	Left	hydrocarbon interceptor

No.	KM	Position	Description
11	4+553	right	hydrocarbon interceptor
12	4+554	Left	hydrocarbon interceptor
13	4+802	right	hydrocarbon interceptor
14	4+799	Left	hydrocarbon interceptor
15	5+035	Left	hydrocarbon interceptor
16	5+428	Left	hydrocarbon interceptor
17	5+430	right	hydrocarbon interceptor
18	6+085	right	hydrocarbon interceptor
19	6+088	Left	hydrocarbon interceptor
20	6+105	Left	retention basin + hydrocarbon interceptor
21	6+117	right	hydrocarbon interceptor
22	6+117	Left	hydrocarbon interceptor
2. 3	6+594	Left	hydrocarbon interceptor
24	6+595	right	hydrocarbon interceptor
25	7+044	right	hydrocarbon interceptor
26	7+044	Left	hydrocarbon interceptor
27	7+809	right	hydrocarbon interceptor
28	7+819	Left	hydrocarbon interceptor
29	7+829	right	hydrocarbon interceptor
30	7+960	right	hydrocarbon interceptor
31	7+963	Left	hydrocarbon interceptor
32	8+013	right	hydrocarbon interceptor
33	8+009	Left	hydrocarbon interceptor
34	9+399	Left	hydrocarbon interceptor
35	9+413	Left	hydrocarbon interceptor
36	9+418	right	hydrocarbon interceptor
37	10+069	Left	hydrocarbon interceptor
38	10+081	Left	hydrocarbon interceptor
39	10+182	right	hydrocarbon interceptor
40	10+192	right	hydrocarbon interceptor
41	10+193	Left	hydrocarbon interceptor
42	10+519	Left	hydrocarbon interceptor
43	10+530	Left	hydrocarbon interceptor
44	10+539	right	hydrocarbon interceptor
45	11+576	right	hydrocarbon interceptor
46	11+576	Left	hydrocarbon interceptor
47	11+616	right	hydrocarbon interceptor
48	11+616	Left	hydrocarbon interceptor
49	12+414	right	hydrocarbon interceptor
50	12+415	Left	hydrocarbon interceptor
51	12+453	Left	hydrocarbon interceptor
52	12+486	right	hydrocarbon interceptor
53	12+916	Left	hydrocarbon interceptor
54	12+916	right	hydrocarbon interceptor
55	12+936	right	hydrocarbon interceptor
56	12+937	Left	hydrocarbon interceptor
57	14+024	Left	retention basin + hydrocarbon interceptor
58	14+342	Left	hydrocarbon interceptor
59	14+345	right	hydrocarbon interceptor

No.	KM	Position	Description
60	14+774	Left	retention basin + hydrocarbon interceptor
61	14+989	Left	hydrocarbon interceptor
62	15+231	Left	hydrocarbon interceptor
63	15+240	right	hydrocarbon interceptor
64	15+251	right	hydrocarbon interceptor
65	15+252	Left	hydrocarbon interceptor
66	15+796	Left	hydrocarbon interceptor
67	15+804	right	hydrocarbon interceptor
68	15+815	Left	hydrocarbon interceptor
69	16+024	Left	retention basin + hydrocarbon interceptor
70	16+292	right	hydrocarbon interceptor
71	16+393	right	retention basin + hydrocarbon interceptor
72	16+643	right	retention basin + hydrocarbon interceptor
73	16+917	Left	hydrocarbon interceptor
74	16+917	right	hydrocarbon interceptor
75	16+927	Left	hydrocarbon interceptor
76	16+928	right	hydrocarbon interceptor
77	17+369	right	retention basin + hydrocarbon interceptor
78	17+746	right	retention basin + hydrocarbon interceptor
79	18+194	Left	hydrocarbon interceptor
80	18+195	right	hydrocarbon interceptor
81	18+204	right	hydrocarbon interceptor
82	18+205	Left	hydrocarbon interceptor
83	20+288	Left	hydrocarbon interceptor
84	20+294	right	hydrocarbon interceptor
85	20+967	Left	hydrocarbon interceptor
86	21+119	Left	hydrocarbon interceptor
87	21+441	Left	hydrocarbon interceptor
88	21+441	right	hydrocarbon interceptor
89	21+452	Left	hydrocarbon interceptor
90	21+453	right	hydrocarbon interceptor
91	22+154	Left	hydrocarbon interceptor
92	22+159	right	hydrocarbon interceptor
93	22+211	right	hydrocarbon interceptor
94	22+221	Left	hydrocarbon interceptor
95	22+999	right	hydrocarbon interceptor
96	22+999	Left	hydrocarbon interceptor
97	23+530	right	hydrocarbon interceptor
98	23+530	Left	hydrocarbon interceptor
99	24+053	Left	retention basin + hydrocarbon interceptor
100	25+161	Left	hydrocarbon interceptor
101	25+185	right	hydrocarbon interceptor
102	25+235	Left	hydrocarbon interceptor
103	25+266	right	hydrocarbon interceptor
104	25+664	Left	hydrocarbon interceptor
105	25+664	right	hydrocarbon interceptor
106	27+083	Left	hydrocarbon interceptor
107	27+084	right	hydrocarbon interceptor
108	27+113	right	hydrocarbon interceptor

No.	KM	Position	Description
109	27+115	Left	hydrocarbon interceptor
110	27+483	right	hydrocarbon interceptor
111	27+486	Left	hydrocarbon interceptor
112	27+515	right	hydrocarbon interceptor
113	27+515	Left	hydrocarbon interceptor
114	27+894	right	hydrocarbon interceptor
115	27+895	Left	hydrocarbon interceptor
116	27+946	Left	hydrocarbon interceptor
117	27+948	right	hydrocarbon interceptor
118	28+565	right	hydrocarbon interceptor
119	28+566	Left	hydrocarbon interceptor
120	28+617	right	hydrocarbon interceptor
121	28+617	Left	hydrocarbon interceptor
122	28+945	right	retention basin + hydrocarbon interceptor
123	29+165	Left	hydrocarbon interceptor
124	29+166	right	hydrocarbon interceptor
125	29+192	Left	hydrocarbon interceptor
126	29+193	right	hydrocarbon interceptor
127	29+544	Left	hydrocarbon interceptor
128	29+572	Left	hydrocarbon interceptor
129	29+574	right	hydrocarbon interceptor
130	29+908	right	hydrocarbon interceptor
131	29+909	Left	hydrocarbon interceptor
132	29+939	right	hydrocarbon interceptor
133	29+940	Left	hydrocarbon interceptor
134	30+393	Left	hydrocarbon interceptor
135	30+394	right	hydrocarbon interceptor
136	30+954	Left	hydrocarbon interceptor
137	30+954	right	hydrocarbon interceptor
138	30+993	Left	hydrocarbon interceptor
139	30+994	right	hydrocarbon interceptor
140	31+320	right	hydrocarbon interceptor
141	31+328	Left	hydrocarbon interceptor
142	31+328	right	hydrocarbon interceptor
143	31+642	right	hydrocarbon interceptor
144	31+643	Left	hydrocarbon interceptor
145	31+664	Left	hydrocarbon interceptor
146	31+665	right	hydrocarbon interceptor
147	32+236	Left	hydrocarbon interceptor
148	32+236	right	hydrocarbon interceptor
149	32+245	Left	hydrocarbon interceptor
150	32+245	right	hydrocarbon interceptor
151	32+512	right	hydrocarbon interceptor
152	32+515	Left	hydrocarbon interceptor
153	32+555	Left	hydrocarbon interceptor
154	32+558	right	hydrocarbon interceptor
155	32+948	right	hydrocarbon interceptor
156	32+973	Left	hydrocarbon interceptor
157	32+973	right	hydrocarbon interceptor

No.	KM	Position	Description
158	33+487	right	hydrocarbon interceptor
159	33+489	Left	hydrocarbon interceptor
160	33+551	right	hydrocarbon interceptor
161	33+552	Left	hydrocarbon interceptor
162	35+014	Left	hydrocarbon interceptor
163	35+016	right	hydrocarbon interceptor
164	35+032	right	hydrocarbon interceptor
165	35+093	Left	hydrocarbon interceptor
166	35+143	right	hydrocarbon interceptor
167	35+144	Left	hydrocarbon interceptor
168	35+997	right	hydrocarbon interceptor
169	36+000	Left	hydrocarbon interceptor
170	36+045	Left	hydrocarbon interceptor
171	36+046	right	hydrocarbon interceptor
172	36+522	right	hydrocarbon interceptor
173	36+552	Left	hydrocarbon interceptor
174	36+602	right	hydrocarbon interceptor
175	36+600	Left	hydrocarbon interceptor
176	37+229	Left	hydrocarbon interceptor
177	37+511	Left	hydrocarbon interceptor
178	37+541	Left	hydrocarbon interceptor
179	37+542	right	hydrocarbon interceptor
180	37+751	Left	hydrocarbon interceptor
181	37+753	right	hydrocarbon interceptor
182	38+571	right	hydrocarbon interceptor
183	38+572	Left	hydrocarbon interceptor
184	38+589	right	hydrocarbon interceptor
185	38+589	right	hydrocarbon interceptor
186	38+767	right	hydrocarbon interceptor
187	38+771	Left	hydrocarbon interceptor
188	38+912	right	hydrocarbon interceptor
189	38+912	Left	hydrocarbon interceptor
190	39+618	Left	hydrocarbon interceptor
191	39+613	right	hydrocarbon interceptor
192	39+949	Left	hydrocarbon interceptor
193	39+958	right	hydrocarbon interceptor
194	40+733	Left	hydrocarbon interceptor
195	40+736	right	hydrocarbon interceptor
196	40+761	right	hydrocarbon interceptor
197	40+762	Left	hydrocarbon interceptor
198	41+690	Left	hydrocarbon interceptor
199	41+690	right	hydrocarbon interceptor
two hundred	42+068	right	hydrocarbon interceptor
201	42+070	Left	hydrocarbon interceptor
202	42+111	right	hydrocarbon interceptor
203	42+123	Left	hydrocarbon interceptor
204	42+702	Left	hydrocarbon interceptor
205	42+704	right	hydrocarbon interceptor

No.	KM	Position	Description
206	42+729	Left	hydrocarbon interceptor
207	42+731	right	hydrocarbon interceptor
208	43+040	Left	retention basin + hydrocarbon interceptor
209	43+650	Left	hydrocarbon interceptor
210	43+650	right	hydrocarbon interceptor
211	43+836	Left	hydrocarbon interceptor
212	43+838	right	hydrocarbon interceptor
213	44+133	Left	hydrocarbon interceptor
214	44+133	right	hydrocarbon interceptor
215	44+958	Left	hydrocarbon interceptor
216	44+958	right	hydrocarbon interceptor
217	44+987	Left	hydrocarbon interceptor
218	44+987	right	hydrocarbon interceptor
219	45+801	right	hydrocarbon interceptor
220	45+802	Left	hydrocarbon interceptor
221	47+032	Left	hydrocarbon interceptor
222	47+032	right	hydrocarbon interceptor
223	47+373	right	hydrocarbon interceptor
224	47+373	Left	hydrocarbon interceptor
225	47+401	right	hydrocarbon interceptor
226	47+401	Left	hydrocarbon interceptor
227	47+924	right	hydrocarbon interceptor
228	47+925	Left	hydrocarbon interceptor
229	47+953	right	hydrocarbon interceptor
230	47+953	Left	hydrocarbon interceptor
231	48+819	right	hydrocarbon interceptor
232	48+820	Left	hydrocarbon interceptor
233	49+000	Left	hydrocarbon interceptor
234	49+001	right	hydrocarbon interceptor
235	50+060	Left	hydrocarbon interceptor
236	50+064	right	hydrocarbon interceptor
237	50+093	Left	hydrocarbon interceptor
238	50+093	right	hydrocarbon interceptor
239	50+979	Left	hydrocarbon interceptor
240	50+981	right	hydrocarbon interceptor
241	51+262	right	hydrocarbon interceptor
242	51+264	Left	hydrocarbon interceptor
243	51+292	Left	hydrocarbon interceptor
244	51+293	right	hydrocarbon interceptor
245	51+462	Left	hydrocarbon interceptor
246	51+466	right	hydrocarbon interceptor
247	51+490	Left	hydrocarbon interceptor
248	51+493	right	hydrocarbon interceptor
249	53+528	Left	hydrocarbon interceptor
250	53+542	right	hydrocarbon interceptor
251	54+513	Left	hydrocarbon interceptor
252	54+550	right	hydrocarbon interceptor
253	55+098	Left	hydrocarbon interceptor
254	55+098	right	hydrocarbon interceptor

No.	KM	Position	Description
255	55+132	right	hydrocarbon interceptor
256	55+138	Left	hydrocarbon interceptor

Hydrocarbon interceptors and retention basins provided at road interchanges are presented in the following table.

Table no.2-18 Hydrocarbon interceptors provided at road interchanges

No.	Object	KM	Position	Description
Interchange 1-DN29A				
1	Link road 3	0+243	Left	hydrocarbon interceptor
2		0+243	right	hydrocarbon interceptor
Interchange 2-DN2P				
3	Link road 4	0+216	right	hydrocarbon interceptor
4		0+233	right	hydrocarbon interceptor
5	Link road 11	0+102	right	retention basin
6	Link road 10	13+252	Left	retention basin + hydrocarbon interceptor
7		13+612	right	hydrocarbon interceptor
8		13+612	Left	hydrocarbon interceptor
9		14+030	right	hydrocarbon interceptor
10		14+029	Left	hydrocarbon interceptor
11		14+040	right	hydrocarbon interceptor
12		14+039	Left	hydrocarbon interceptor
13		14+247	Left	hydrocarbon interceptor
14		14+460	Left	hydrocarbon interceptor
15		14+460	right	hydrocarbon interceptor
16		14+470	Left	hydrocarbon interceptor
17		14+472	right	hydrocarbon interceptor
18	Link road 9	0+265	Left	hydrocarbon interceptor
19		0+265	right	hydrocarbon interceptor
20		0+274	Left	hydrocarbon interceptor
21		0+275	right	hydrocarbon interceptor
22	Link road 7	0+220	Left	hydrocarbon interceptor
Interchange 3-DN2-DN2H				
2. 3	Link road 1	0+333	right	hydrocarbon interceptor
24		0+384	right	hydrocarbon interceptor
25	Connection road DN2H-A7	0+154	Left	retention basin + hydrocarbon interceptor
26		0+844	right	retention basin + hydrocarbon interceptor
27		1+470	right	retention basin + hydrocarbon interceptor
28		1+935	Left	hydrocarbon interceptor
29		1+938	right	hydrocarbon interceptor
30		1+977	right	hydrocarbon interceptor
31		1+978	Left	hydrocarbon interceptor
32	Link road 2	2+965	right	hydrocarbon interceptor
33		2+968	Left	hydrocarbon interceptor
34		3+001	Left	hydrocarbon interceptor
35		3+005	right	hydrocarbon interceptor
36		3+439	right	hydrocarbon interceptor
37		3+484	right	hydrocarbon interceptor
Interchange 4 - DN2 (South Siret)				
38	Link road 3	0+497	Left	hydrocarbon interceptor
39	Link road4	0+175	Left	hydrocarbon interceptor
Interchange 5 – DN2 (Siret Nord)				
40	Link road DN2	0+344	right	hydrocarbon interceptor

No.	Object	KM	Position	Description
41		0+545	right	hydrocarbon interceptor
42		0+566	right	hydrocarbon interceptor

2.1.4.1.10 Consolidation works

2.1.4.1.10.1Earthworks supporting works

Taking into account the ground morphology, the earthworks will be carried out on embankment (fillings) with heights of max. 12 m and cut (excavations) with a depth of max. 30 m, measured in the designed axis.

The materials that will be used to make the embankment must comply with the STAS 2914-84 specifications, thus materials that fall into the "very good", "good" and "mediocre" categories can be used.

The embankment fillings that will be executed on land with a slope greater than 10% will be executed in twin steps after removing the topsoil.

The twinning steps will be executed with a width of min. 3 m and height min. 50 cm. The base of each twinning step will be executed with a slope of 2%-4% in the direction of the inclination of the natural terrain.

The slopes of the embankment slopes were adopted 1:2 and banks of 5 m width at intervals of 6 m vertically. The intermediate benches were provided with concrete gutters for collecting and directing rainwater. The slopes of the slopes were established following general stability calculations, considering cohesive material from the filling in the embankment body with the following characteristic values for the physical-mechanical parameters:

- angle of internal friction of the material ϕ= 15°;
- cohesion c=25 Kpa;
- volumetric weight γ= 19 KN/m^3.

The characteristics of the foundation soil were adopted according to the recommendations of the Geotechnical Study for each horizon identified in the geotechnical drilling correlated with the geological load appropriate to the depth at which each horizon is located.

For the embankment areas, provided with slopes of the slopes of 1:2 and intermediate banks of 5 m wide, at intervals of 6 m vertically, where the general stability is not satisfied, the following individual consolidation solutions or combinations between these have been provided solutions;

- reinforcement of the embankment base with reinforcing geogrids and/or unidirectional high-resistance woven geotextiles;
- improvement of the foundation soil with embankment piles made of granular material or wick drains;
- reinforced concrete supporting structures with indirect foundation on large diameter drilled piles.

In accordance with the specifications of AND 515/93, the fillings adjacent to the reinforced concrete bridges, passages and culverts will be made of granular material of type 1a, 1b, 2a (very good) or 2b (good) according to STAS 2914/84. The length of the embankment that will be made of granular material will be min. 30 m for bridges and passages and min. 5 m for reinforced concrete culverts. The transition from granular filling to cohesive material filling will be done with steps of 1 m width and 1 m height.

The slopes of the slopes adjacent to the bridges and passages were established following general stability calculations, considering the non-cohesive filling material in the embankment body with the following characteristic values for the physical-mechanical parameters:

- angle of internal friction of the material ϕ= 33°;
- cohesion c=2 Kpa;
- volumetric weight γ= 19 KN/m^3.

The slopes of the cut slopes were adopted according to the stratification identified by the geotechnical investigations, so as to ensure their local and general stability. The slopes of the cut slopes were adopted as follows:

- slopes of 1:2 – 1:4 and banks of 5 m width at intervals of 6 m vertically;
- Slopes of 1:5 – 1:10 without intermediate benches on the areas where the stratification of the land indicates appropriate material for the execution of embankment fillings and the configuration of the land allows the execution of excavations with reduced slopes.

The characteristics of the stratification were adopted according to the recommendations of the Geotechnical Study for each horizon identified in the geotechnical drilling correlated with the geological load appropriate to the depth at which each horizon is located.

For the cut areas where the reduction of the slopes to ensure the general stability was not allowed, due to the local constraints of the site (inclinations of the natural land in cross section accentuated, limitations of the expropriation corridor, etc.), supporting structures made of columns were provided large diameter holes.

The benches at the level of the crowns of the embankment and embankment support walls were provided with a width of 3 m and concrete gutters for collecting and directing surface water along the supporting structures. The discharge of the gutters will be done through boxes made of precast elements provided at their minimum point from one of the ends of the retaining walls.

2.1.4.1.10.2 Works for embankment and cutting protection

Protection of embankment slopes

The protection of the embankment slopes was adopted depending on the nature of the land out of which the embankment filling was made and the slope of the embankment slopes as follows:

For non-cohesive filling material and slopes falls of 1:1 or 2:3, the protection of the slopes will be carried out with grassy topsoil, spatial geosynthetics to ensure the stability of the topsoil on the slope and biodegradable geonets to maintain humidity after sprinkling the slopes with water in the vegetation development period (approx. 30 – 60 days) after sowing.

For non-cohesive filling material with slope slopes of 1:2 or 1:3, the protection of the slopes will be done with grassy topsoil and biodegradable geonets to maintain humidity after sprinkling the slopes with water during the vegetation development period (approx. 30 – 60 days) after sowing.

For cohesive filling material (clay dust, dusty clay, sandy clay) and slopes of the slopes 1:1 or 2:3, the protection of the slopes will be done with grassy vegetable soil and biodegradable geonets to maintain humidity after sprinkling the slopes with water in the vegetation development period (approx. 30 – 60 days) after sowing.

For cohesive filling material (clay dust, dusty clay, sandy clay) with slopes of 1:2 or 1:3, the protection of the slopes will be done with grassy topsoil.

Protection of the cutting slopes

The protection of the cut slopes was adopted depending on the stratification and fall of the cut slopes as follows:

For non-cohesive stratification and slopes fall of 1:1 or 2:3, the protection of the slopes will be done with a 50 cm thick rough stone drainage mask.

For non-cohesive stratification and slopes of slopes 1:2, 1:3 or 1:4, the protection of the slopes will be done with a 30 cm thick rough stone drainage mask.

For cohesive type stratification (clay dust, dusty clays, sandy clays) and slopes falls of 1:1 or 2:3, the protection of the slopes will be done with grassy topsoil, spatial geosynthetics to ensure the stability of the topsoil on the slope and biodegradable geonets to maintain humidity following the sprinkling of the slopes with water during the vegetation development period (approx. 30 – 60 days) after sowing.

For cohesive stratification (clay dusts, dusty clays, sandy clays) and slopes of the slopes 1:2, 1:3 or 1:4, the protection of the slopes will be done with grassy vegetable soil and biodegradable geocells to maintain humidity after sprinkling the slopes with water during the vegetation development period (approx. 30 – 60 days) after sowing.

For cohesive stratification (clay dusts, dusty clays, sandy clays) or non-cohesive and slopes of slopes smoother than 1:4, the protection of the slopes will be done with grassy topsoil.

2.1.4.1.10.3Drainage works

Drains in the open cut

For the interception, collection and directed evacuation of the underground water, drains are provided in the open excavation to reduce the humidity of the natural land and improve its physical-mechanical characteristics.

The drains in the open excavation are provided in the following situations:

- longitudinally at the base of the cut slopes
- across the road on the surface of the cut slopes
- longitudinally on the upstream side in the case of mixed cross-sections (embankment / filling)
- transverse to the road in its vicinity when the slope of the natural terrain is accentuated and shows exfiltration of water.

The drains in the open excavation have a height between 1.0m ÷ 3.00 m and a width of 0.60m ÷ 1.20 m.

The drainage filling can be made of ballast grade 0÷63 mm or crushed stone grade 0÷71. Regardless of the type of draining material used, it will be protected with non-woven geotextile with an anti-pollution role, and on the upper part, the drain cover is made by the impermeable surface water drainage system (gutter, ditches, side ditch) or clay plug of 30 cm thick.

At the base of the drain for capturing and directing water to the watercourses or collection points, there is a perforated corrugated tube, SN8, with a diameter between 110 mm - 160 mm.

For the inspection and maintenance of the drains in the open excavation, inspection manholes are provided at intervals of approx. 50 m along the entire length of the drain and at the required points (intersections of drains).

Excavations for the execution of drains with a depth greater than 1.50 m will be carried out with supports from vertical wooden boards, horizontal rulers and sprits.

Horizontally drilled drains

Horizontally drilled drains are provided for the deep drainage of the cut slopes. The procedure consists in making horizontal boreholes that have a slope of 5-10% towards the outlet, over a length of 10.00-20.00m by means of special installations. These boreholes are lined with corrugated pipes / perforated plates with a diameter of 90 – 120 mm (no perforations are provided on the lower third of the pipes to ensure the evacuation of the collected water). The tubes are protected with geotextile with the role of a reverse filter on the entire surface of the tube.

Depending on the situation, the outlet end of the drain is arranged with a wall made of concrete and precast side ditch to direct the water to the collecting elements of the surface water at the base of the slope.

2.1.4.1.10.4Surface improvement of the foundation soil

Compaction of the foundation soil with the compactor cylinder

By compaction, we mean filling by mechanical means, resulting in the reduction of the volume of soil voids. In non-cohesive soils, this compaction is achieved by reorienting the particles, process which is produced by overcoming the friction between them and to a lesser extent by local crushing at the contact points.

In cohesive soils, compaction occurs by breaking the bonds between the particles, followed by reorientation as well as bending and distortion of the particles and the bound water layers that surround them.

The void volume is reduced due to the pores not occupied by water. If the soil is saturated and works as a closed system, without the possibility of water removal, compaction is not possible. The state of saturation represents the theoretical limit for the compaction of a soil, regardless of its natural humidity.

Cushion made of cohesive material compacted and stabilized with hydraulic binders

This type of work aims to remove the very compressible layer or difficult soils (sensitive to wetting, with large swellings and contractions, cohesive soils with reduced bearing capacity (Ic<0.5) on a limited thickness of no more than 1-2 m of loose non-cohesive (ID < 0.33) and replacing them with a suitable earth cushion (3a-4b, according to STAS 2914-84) compacted or stabilized with hydraulic binders.

The percentage of hydraulic binder and the type of hydraulic binder is established on the basis of a sample sector depending on the humidity of the foundation soil and the nature of the cohesive material used in the execution of the pillow.

Mattress made of granular material reinforced and protected with geotextile

The mattress made of granular material reinforced with geosynthetics and protected with geotextile (if applicable) has a double role of preventing capillary ascent and ensuring the general stability of the embankment fillings.

The thickness of the mattress is between 50 cm - 1.20 m depending on the characteristics of the ground and the number of embankment elements.

The reinforcement is made with unidirectional geosynthetics having a long-term calculated resistance between 100 KN/m - 400 KN/m.

If below the level of the mattress made of granular material, the ground is very compressible and with increased humidity, before the execution of the reinforced mattress at the base of the excavation, a block of crushed stone is made, sort 90-200 mm, by embedding in the natural ground until reaching the refuse over which it rests in layer of max. 20 cm of ballast that is compacted with the compactor cylinder.

Verification of the improved foundation soil

After the improvement of the surface of the foundation soil, deformability checks are made with the Benkelman lever and load-bearing capacity checks with the Lucas plate and the dynamic plate according to the specifications of AND 530/2012.

2.1.4.1.10.5 Improvement of the foundation soil depth

It is applied in high embankment areas, bridge ramps and passages, areas adjacent to culverts.

The improvement in depth of the weak soils is achieved by the execution of draining piles made of stone or wick drains made of geosynthetic material.

Depth improvement with stone piles

The improvement of the depth of the foundation soil with 8-32 mm sorted stone piles is applied to the connection areas of the embankments with the works of art and has a double role: a role of eliminating excess water pressure from the pores of the compressible layer and speeding up the process of consolidating the foundation soil and the second role of improving the physical and mechanical parameters of the compressible layer through lateral compaction.

The length of the piles varies between 4.00 m - 12.00 m, the distance between the piles is between 1.50 m - 3.00 m, the diameter of the piles is 0.60 m

Piles are driven from the bottom to the top at intervals of 50 cm, the pushing force is min. 150 KN. The check of the pilings is carried out by dynamic penetrations on the piles and through them (if applicable).

The depth improvement solution with stone piles is recommended in areas where the ground is compressible and the general stability of the embankment is not ensured.

Depth improvement with wick drains

The depth improvement of the foundation soil with wick drains (vertical drains made of geosynthetic material) is applied to the connection areas of the embankments with the works of art and has the role of eliminating the excess water pressure from the pores of the compressible layer and speeding up the consolidation process of foundation soil.

The length of the wick drains varies between 4.00 m - 12.00 m, the distance between the drains is between 1.50 m - 3.00 m.

The improvement solution with wick drains is recommended in areas where the foundation ground is compressible and there are no risks of general instability of the embankment filling.

2.1.4.1.10.6Supporting structures

Reinforced concrete supporting structures

Reinforced concrete supporting structures are used to ensure the local stability of embankments or embankment slopes. The height of these structures is between 1.00m - 6.00m.

The constructive system is:

- Reinforced concrete foundation and elevation;
- Drain trough and barbicans for draining water from behind the supporting structure;
- Draining geocomposite drain at the soffit of the supporting work;
- Waterproofing with bitumen emulsion of the concrete that comes into contact with the ground;
- The supporting structure is executed in 4.00 - 20.00 m sections, the joints between the sections being made of bituminous cardboard in a thickness of 5 - 10 mm.

The visible face of the supporting walls will be protected with anti-corrosion protection for concrete.

Reinforced earth supporting structures

Geogrid-reinforced earth supporting structures are provided at embankments to ensure their local stability, the maximum height of the structures is 12 m.

The constructive system is made of successive layers of compacted granular material, reinforced with unidirectional geogrids at a vertical distance of 40 cm - 80 cm.

The visible face of the reinforced earth retaining walls will be made of precast concrete elements of the panel or block type. The reinforcement elements interconnect with the precast elements of the visible face.

Supporting structures with indirect foundation

The supporting structures with indirect foundations on drilled piles of large diameter (600 mm – 1200 m) are provided to ensure the general stability of the embankment fillings, the height of the elevation is between 2 – 8 m. Depending on the height of the supporting walls, the characteristics of the land foundation and the inclination in the cross section of the natural terrain, the supporting

structures with indirect foundations are provided on one row of piles or two rows of piles. The distance, diameter and length of the piles was established following calculations of local and general stability.

The constructive system is:

- Drilled piles, d = 600 – 1200 mm;
- Leveling and elevation of reinforced concrete;
- Drain trough and barbicans for draining water from behind the supporting structure;
- Draining geocomposite drain at the soffit of the supporting work;
- Waterproofing with bitumen emulsion of the concrete that comes into contact with the ground;
- The supporting structure is executed in 4.00 - 20.00 m sections, the joints between the sections being made of bituminous cardboard in a thickness of 5 - 10 mm.

The visible face of the supporting walls will be protected with anti-corrosion protection for concrete.

Supporting structures made of drilled piles (bars)

The supporting structures made of drilled piles of large diameter (600 mm - 1500 mm) or bars are provided in the cut to ensure the general stability of the slopes resulting from the excavations, the height of the elevation is between 2 - 8 m.

The supporting solution made of drilled piles leads to minimum excavation volume and reduced changes in the stress state in the excavated slope.

The piles drilled at the top will be anchored (if applicable) with bar anchors or anchors made of T15.7 strands.

The constructive system is made up of:

- The platform for drilling the piles at the elevation of the crown of the retaining wall;
- Drilled piles (bars);
- The solidarity beam of the piles at their upper part;
- Anchors at the top of the retaining wall (if applicable);
- Excavation in front of the supporting work and execution of intermediate anchorages on the depth of the excavation (if applicable);
- Exposed front execution retaining wall made of lining concrete, shotcrete or precast elements made of reinforced concrete.
- Monitoring the movements by topographic measurements at each stage of the earth excavation in front of the retaining wall.

The visible face of the supporting walls will be protected with anti-corrosion protection for concrete.

For the elimination of infiltration water, if necessary, horizontally drilled drains are provided between the drilled piles.

2.1.4.1.10.7Monitoring the consolidation works

In order to monitor the behavior of the supporting works over time, they will be instrumented with devices that allow the subsequent measurement of deformations and / or efforts in accordance with SR EN 1997-2004 during the execution period as well as in the post-execution period.

2.1.4.1.11 Works for traffic safety

The signaling and marking system was designed both on the motorway and on the lower-category roads that will intersect the motorway, as well as on the road network in the motorway corridor, where the road signs were designed for orientation towards the motorway.

The materialization of the system for organizing and developing traffic through signs and markings aimed to increase the degree of safety and fluency on the entire network of roads that enter the system and to allow all those who drive on these roads to orientate themselves in order to sign up in time for the direction desired, thus eliminating confusion, wrong maneuvers, additional trips and even traffic jams.

In order to direct traffic in each interchange, two complete portals were provided (one on each side of the interchange).

The consoles were designed for pre-signaling the road interchanges and service areas.

Considering the way how traffic is carried out on the motorway (travel speed, traffic intensity), it is necessary that the drivers are provided with a series of information related to road the conditions, events produced on the motorway, warnings, etc.

This will be done through variable messages, transmitted from the motorway coordination center and displayed on variable message boards.

The motorway being made up of two distinct one-way lanes, the installation of kilometer markers on the edge of the carriageway was foreseen.

Reflectors will be mounted on the safety slides of the parapet.

On the motorway alignment, as well as on the roads intended for international traffic, very large signs have been provided, very large format for the interchange link roads, large format for the national roads, current size signs have been provided for the other roads.

On the safety parapets retro-reflective elements will be installed (reflectors, reflective flyers or other reflective elements).

To protect the pedestrian traffic (including personnel for maintenance, in case of road accidents), the pedestrian parapet will be placed on both sides of the works of art, the edge of the sidewalk.

Very large format signs will be provided on the link roads of the road interchanges.

The consoles on the national roads will be protected with galvanized metal parapets. Portals and consoles will have a closed outline and will be protected by galvanizing.

Vertical signaliazation - signs

The vertical road markings on the Suceava-DN2H Motorway and the DN2H - Siret Border Express Road contain the following elements:

- warning signs;
- regulatory signs;
- guidance and information signs;
- prohibition signs;
- additional signs.

Horizontal signlization – markings

Depending on the location where they are placed and the role of the marking in guiding traffic, several types of marking will be provided:

- longitudinal markings;
- markings for delimitation of the carriageway;
- cross markings;
- various markings;
- side markings.

For traffic safety, the project will include safety barriers as well as pedestrian barriers.

The materialization of the system for organizing and conducting traffic through signs and markings aimed to increasing the degree of safety and fluency on the entire network of roads that enter the system and allows all those who drive on these roads to orientate themselves in order to sign up in time for the desired direction , thus eliminating confusion, wrong maneuvers, additional trips and even traffic jams.

The signaling and marking system was designed both on the motorway and on the lower category roads that will intersect the motorway, as well as the road network in the corridor where the road signaling was designed for orientation towards the motorway. This was done in accordance with AND 604-2012- Guide for the planning and design of road signalization and information to ensure its continuity, uniformity and cognizability.

Traffic signs are supported by metal poles, portals or consoles.

2.1.4.1.12 The motorway communication system and the intelligent traffic control system

System for monitoring the traffic, traffic conditions and the condition of the infrastructure.

System description

The system will be a tool for collecting data on the state of road infrastructure and road traffic in order to increase the efficiency of the administration and operation of CNAIR SA, for all the motorway sectors on the Trans-European Road Transport Network.

A separate volume for the ITS System will be presented as a report and drawings.

ITS system

As part of the construction program of new motorways/express roads and the rehabilitation of the existing ones, the National Company of the Road Infrastructure Administration implements Intelligent Transport Systems (ITS) as a major option for increasing efficiency, fluency, safety and for limiting the impact on the environment regarding the road transport process.

The intelligent transport systems are applications of communications and information technology that ensure both monitoring and management of the road network and informing traffic users.

Component subsystems

The monitoring system is composed of the following subsystems:

- Traffic monitoring subsystem - VEH - Vehicle detectors - using video technology;
- The subsystem for monitoring weather conditions - METEO - Weather stations and frost sensors at the level of the running surface;
- Video monitoring subsystem – CCTV - There will be two types of video cameras for monitoring:
  - CCTV PTZ cameras (with movement and zooming system - Pan Tilt and Zoom) - located at the entrances to the motorway segment, in the parking area, in road interchanges and in accident risk areas;

- Fixed CCTV cameras, fixed zoom, usually placed every 2 km. On the motorway sector, fixed CCTV cameras will fulfill the function of AID cameras, except for fixed cameras in parking lots and security cameras.

- Subsystem for automatic recognition of registration numbers and monitoring/criminal penalties - ANPR;
- Automatic number plate recognition subsystem (ANPR - Automatic Number Plate Recognition);
- Concentration points – CONC.

The concentration points are the locations that will host the equipment needed for the different subsystems. Concentration points will be made approximately every 2 km. Supply of the concentration points, for all the ITS equipment, will be done both from the national electricity network and from solar panels. For those locations that will contain ITS equipment, small energy consumers (e.g.: AID, CCTV cameras, etc.) the supply will be made from systems with solar panels and buffer batteries and the backup will be made by connecting them to the national network of electricity.

Monitoring

The traffic monitoring subsystem allows remote data collection, their evaluation and transmission in am unified format to the command center.

The speed, category and number of vehicles is recorded by the tool in real time for each vehicle and by statistical methods. The road usage rate is calculated and displayed based on the measured data. The classification parameters will be able to be modified through the software. The monitoring system will allow static and dynamic weight measurement.

2.1.4.1.13 Motorway and express road lighting system

Lighting is done fundamentally for all the works of art with lengths over 100 m and equipment. According to the design norm NP-062-02 and the applicable standards SR-EN 40-1-1994 and SR-EN 40-2-2006, interchanges, intersections, and structures with a length of more than 100 m, the parking lots of short duration, but also the Maintenance Centers. The lighting fixtures have also been fitted to an appropriate standard.

The Guide regarding lighting conditions on the national roads and motorways from 2012 was followed with the necessary subsequent additions and corroborated with the compliance with the EU Norms regarding lighting.

For the public lighting of intersections and proposed structures, the following were considered:

A. the lighting was made with intelligent systems that lend themselves to telemanagement, energy saving. The supply of the lighting system provided from the national/regional/local electricity grid will be made mandatory with LED technology and the presentation of the energy efficiency calculation regarding energy consumption.

B. the design of carriageway lighting was done in accordance with SR-EN 13201 and CIE 115-2010, special importance being given to the selection of lighting classes to avoid oversizing the

lighting system, reducing electricity consumption and increasing the efficiency of the proposed lighting system ;

C. the criteria and parameters underlying the selection of lighting classes according to SR-EN 13201 are:
   - Criteria - user speed, types of users in the same area and types of excluded users;
   - Parameters - area (geometry), traffic use and external environmental influences;

D. the selection of lighting classes according to CIE 115-2010 is made according to the following parameters: speed, traffic flow, traffic component, separation of directions, intersection density, ambient luminance level and visual guidance;

E. the correct selection of lighting classes is in close correlation with the fulfillment of performance criteria such as: luminance of the road surface and physiological blindness;

F. the solution proposed by the specialized designer must have a maintenance factor as high as possible and with explicit specifications regarding the depreciation of the luminous flux over time;

G. it is mandatory to specify the corrective maintenance operations;

H. the solutions agreed by the beneficiary are with remote management, namely, intelligent and adaptive, respectively with day and night twilight sensors and traffic sensors with the possibility of managing the light intensity by the beneficiary, depending on the traffic or time interval and energy efficiency of the system lighting.

All the interchanges, intersections and structures with a length greater than 100m will be illuminated. It is mandatory to present the brief calculations for the lighting calculation and to determine the distance between the poles with the presentation of the inventory of coordinates (x, y) for each pole. The lighting of buildings (interior and exterior) is done with intelligent systems.

The lighting poles are protected by a parapet, and when they are placed on site, it will be taken into account that they do not block the visibility of road signs;

The electric public street lighting network designed in accordance with the beneficiary's requirements, in accordance with the legislation, with the norms and regulations in force, will be located in the following areas:

The lighting systems will be located in the following areas:

- In the areas of road interchanges provided in the project;
- In CIC areas, service spaces and short-term parking lots;
- In the areas of bridges, viaducts and passages.

2.1.4.1.14 Works for environmental protection

2.1.4.1.14.1Sound-absorbing panels

To reduce the level of noise generated by the construction works and road traffic on the motorway, the project provides for the installation of sound-absorbing panels. These will be provided mainly in

the locality areas, but also in sensitive areas for fauna. The height of the sound-absorbing panels has to be 3 meters. The locations where sound-absorbing panels are proposed as well as their lengths are presented in the following tables. The sound-absorbing panels also have a role in mitigating the risk of collisions for fauna, which is why they are also proposed at greater distances from the Natura 2000 sites. The panels also contribute to the protection of biodiversity outside the Natura 2000 sites, including species that are not of community interest or of species of community interest that are outside the sites boundaries.

Table no.2-19 Locations of the sound-absorbing panels proposed for the protection of biodiversity

No.	starting km	ending km	The side on which it is installed	Length (m)	The distance from the nearest protected natural area
1.	0+975	1+600	Right	629	ROSCI0075 Pătrăuți Forest (4.5 km)
2.	3+475	3+650	Left	175	ROSCI0075 Pătrăuți Forest (3.2 km)
3.	3+475	3+650	Right	170	ROSCI0075 Pătrăuți Forest (3.2 km)
4.	3+850	4+750	Left	896	ROSCI0075 Pătrăuți Forest (3.4 km)
5.	3+850	3+950	Right	101	ROSCI0075 Pătrăuți Forest (3.3 km)
6.	7+325	7+550	Left	231	ROSCI0075 Pătrăuți Forest (2.4 km)
7.	7+050	8+025	Right	957	ROSCI0075 Pătrăuți Forest (2.5 km)
8.	14+075	15+000	Right	912	ROSCI0075 Pătrăuți Forest (2.6 km)
9.	38+625	39+075	Left	434	ROSCI0075 Pătrăuți Forest (3.2 km)
10.	38+625	39+075	Right	445	ROSCI0075 Pătrăuți Forest (3.2 km)
11.	39+575	40+075	Left	503	ROSCI0075 Pătrăuți Forest (4 km)
12.	39+575	40+075	Right	512	ROSCI0075 Pătrăuți Forest (4 km)
13.	43+550	44+075	Left	516	ROSCI0379 Suceava River (4.5 km)
14.	43+550	44+075	Right	521	ROSCI0379 Suceava River (4.5 km)
15.	48+725	49+125	Left	398	ROSCI0379 Suceava River (2.4 km)
16.	48+725	49+125	Right	393	ROSCI0379 Suceava River (2.4 km)
17.	53+100	54+950	Right	1854	ROSPA0110 Accumulations Rogojești – Bucecea (0.8 km)
18.	53+025	54+950	Left	1953	ROSPA0110 Accumulations Rogojești – Bucecea (0.8 km)
19.	54+950	55+475	Left	500	ROSPA0110 Accumulations Rogojești – Bucecea (0.8 km)

Table no.2-20 Locations of sound-absorbing panels proposed for localities

No.	starting km	ending km	The side on which it is installed	Length (m)	The city served	The distance from the nearest protected natural area
1.	0+675	1+400	Left	720	Municipality of Suceava (0.2 km)	ROSCI0075 Pătrăuți Forest (4.5 km)
2.	3+950	4+575	Right	639	Mitocu Dragomirnei (1.5 km)	ROSCI0075 Pătrăuți Forest (3.3 km)
3.	5+450	6+075	Right	639	Mitocu Dragomirnei (0.9 km)	ROSCI0075 Pătrăuți Forest (2.2 km)
4.	5+425	7+325	Left	1875	Municipality of Suceava (intersected)	ROSCI0075 Pătrăuți Forest (2 km)
5.	7+550	8+250	Left	718	Municipality of Suceava (0.1 km)	ROSCI0075 Pătrăuți Forest (2.5 km)

No.	starting km	ending km	The side on which it is installed	Length (m)	The city served	The distance from the nearest protected natural area
6.	9+025	9+825	Left	805	Mun Suceava (0.3 km)	ROSCI0075 Patrăuti Forest (2.3 km)
7.	11+725	12+375	Right	659	Pătrăuți (0.5 km)	ROSCI0075 Pătrăuți Forest (2.1 km)
8.	12+850	13+875	Right	1017	Pătrăuți (0.5 km)	ROSCI0075 Pătrăuți Forest (2.1 km)
9.	15+000	17+175	Right	2163	Darmanesti (0.1 km)	ROSCI0075 Pătrăuți Forest (3.1 km)
10.	17+800	18+700	Right	884	Darmanesti (0.3 km)	ROSCI0075 Pătrăuți Forest (2.6 km)
11.	21+450	23+600	Right	2151	Mărițea Mică Danila (0.3 km)	ROSCI0075 Pătrăuți Forest (3.7 km)
12.	20+850	21+200	Right (SS type S1)	391	Mărițea Mică (0.3 km)	ROSCI0075 Pătrăuți Forest (3.2 km)
13.	24+175	24+975	Right	807	Iacobesti (0.2 km)	ROSCI0075 Pătrăuți Forest (5.4 km)
14.	24+975	26+350	Left	1496	Slobozia Sucevei (crossed)	ROSCI0379 Suceava River (5.1 km)
15.	26+425	27+900	Right	1460	Romanesti (0.3 km)	ROSCI0379 Suceava River (4.4 km)
16.	26+350	27+450	Left	1185	Slobozia Suceva (0.2 km)	ROSCI0379 Suceava River (4.5 km)
17.	30+800	31+350	Left	550	Granicesti (0.3 km)	ROSCI0379 Suceava River (4 km)
18.	40+625	40+975	Left	330	Pits (0.03 km)	ROSPA0110 Rogojești - Bucecea reservoirs (4.2 km)
19.	43+050	43+275	Right	295	Negostina (0.3 km)	ROSPA0110 Rogojești - Bucecea reservoirs (4.8 km)
20.	49+900	50+125	Right	220	Mănăstioara (0.04 km)	ROSPA0110 Rogojești - Bucecea reservoirs (4.4 km)
21.	49+900	50+125	Left	232	Bancesti (0.03 km)	ROSCI0379 Suceava River (3.2 km)
22.	54+975	55+425	Right	471	Siret (intersected)	ROSPA0110 Accumulations Rogojești – Bucecea (0.8 km)
23.	55+450	55+700	Right	264	Siret (intersected)	ROSPA0110 Accumulations Rogojești – Bucecea (1 km)

During the construction stage, mobile panels will be used that will be installed at the level of the work fronts, especially in areas with high sensitivity (natural protected areas, connectivity/permeability areas for fauna protected species, inhabited areas). The sound-absorbing panels will have heights of up to 3 m in all the areas where it is necessary to maintain low values of the equivalent noise level (inhabited areas and sensitive areas for biodiversity).

2.1.4.1.14.2Anti-collision panels

In order to avoid the collision of fauna with the car traffic during the operating period, the project will provide anti-collision panels in sensitive locations from the biodiversity point of view. The

height of the sound absorbing panels has to be 3 m. The main targeted locations are those at the intersection or adjacent to Special Bird Protection Areas or Sites of Community Importance.

The most important features of anti-collision mesh panels that need to be considered for this project are:

- height: 3 m, to ensure the optimum deviation of the flight of animals over the collision risk area;
- anchoring in a solid foundation with the application of a constructive solution to deter theft;
- made of a sufficiently thick net to ensure its visibility for the widest possible spectrum of flying species (mesh < 5 cm).

It is necessary that the proposed panels be made of materials and colors that ensure the highest degree of their landscape integration.

Figure no.2-5Example of anti-collision panels

(warning: the panels in the example are not 3m high)

Their location is shown in the following table.

Table no.2-21The locations of the proposed anti-collision panels

No.	starting km	ending km	The side on which it is installed	Length (m)	The distance from the nearest protected natural area
1.	1+400	1+550	Left	163	ROSCI0075 Pătrăuţi Forest (4.6 km)
2.	6+075	7+050	Right	985	ROSCI0075 Pătrăuţi Forest (2 km)
3.	11+100	11+700	Left	588	ROSCI0075 Pătrăuţi Forest (1.9 km)
4.	14+075	17+550	Left	3493	ROSCI0075 Pătrăuţi Forest (2.6 km)
5.	22+125	23+625	Left	1495	ROSCI0075 Pătrăuţi Forest (4.3 km)
6.	24+075	24+975	Left	909	ROSCI0075 Pătrăuţi Forest (5.5 km)
7.	25+000	25+900	Right	893	ROSCI0379 Suceava River (5.2 km)
8.	28+500	28+700	Left	199	ROSCI0379 Suceava River (4.4 km)
9.	28+500	28+700	Right	204	ROSCI0379 Suceava River (4.4 km)
10.	29+000	29+875	Right	881	ROSCI0379 Suceava River (4.5 km)
11.	29+000	29+875	Left	873	ROSCI0379 Suceava River (4.5 km)
12.	30+900	31+050	Right	152	ROSCI0379 Suceava River (4.6 km)
13.	32+450	32+700	Left	237	ROSCI0379 Suceava River (3.7 km)
14.	32+450	32+700	Right	240	ROSCI0379 Suceava River (3.7 km)
15.	33+425	33+625	Left	207	ROSCI0379 Suceava River (3.7 km)

No.	starting km	ending km	The side on which it is installed	Length (m)	The distance from the nearest protected natural area
16.	33+425	33+625	Right	205	ROSCI0379 Suceava River (3.7 km)
17.	34+950	35+300	Left	349	ROSCI0379 Suceava River (3.8 km)
18.	34+900	35+300	Right	409	ROSCI0379 Suceava River (3.8 km)
19.	35+875	36+175	Left	290	ROSCI0379 Suceava River (3.8 km)
20.	35+875	36+175	Right	297	ROSCI0379 Suceava River (3.8 km)
21.	42+000	42+225	Left	209	ROSPA0110 Rogojeşti - Bucecea accumulations (4.4 km)
22.	42+000	42+225	Right	211	ROSPA0110 Rogojeşti - Bucecea accumulations (4.4 km)

2.1.4.1.14.3Landscaping works

The landscaping project will include the following operations:

- removal and storage of the topsoil layer;
- covering all the unexposed slopes of all the cuts and earthworks with earth and planting grasses and shrubs;
- restoration of the areas affected by the works (service roads, storage and stacking areas, etc.), by covering with earth and planting appropriate grasses and shrubs;
- planting shrubs. The type of shrubs used will be chosen so as to comply with the height of the earthwork of the adjacent road;
- in the upper part of all cuttings, suitable shrubs must be planted to prevent the penetration of snow;
- all the plant species used for landscaping will be characteristic to the area;
- the soil removed will be stored in order to be reused in covering the cuts and earthworks and for the rearrangement of the areas affected by works.

The basic fund of the landscape design is the vegetation and forest protection curtains. Covering the green spaces near the carriageway, the grassy surfaces, in addition to the role of soil stabilizer, also constitute the background on which the shrub vegetation is created.

In order to protect roads against snow, forest protection curtains have proven to be the most effective solution, they act as biological snow guards. The forest species used must meet the following criteria:

- from a stationary point of view - to grow as fast as possible, so that the curtain becomes functional in the shortest period of time;
- to be long-lived and ensure a good natural regeneration;
- not to harbor pests of agricultural crops from the surfaces they protect;
- to offer other adjacent advantages from an economic point of view.

For the same stationary conditions, under equal conditions of growth and development, long-lived species will be preferred, so that the effect of the curtain is ensured for as long as possible.

For lands with chemical soils and other categories, the following will be planted:

- Trees: brumarian oak, sky, silver linden, sedge, jugastre.
- Shrubs: elder, Tatar maple, hawthorn.

For the border rows, we recommend: wax cherry, red buckthorn, cherry, scurvy, lilac, etc.

2.1.4.1.14.4Constructions for water pretreatment

In the case of the project, in order to protect the quality of the soil and water, the following constructions were designed for water treatment, the number of these constructions being determined according to the hydrographic basins of the area.

The project provides for the construction of the following constructions for water pretreatment:

- hydrocarbon settlement tank/separator chambers 256 pcs. - provided on the main alignment of the motorway sector and the express road sector;
- hydrocarbon settlement tank/separator chambers 41 pcs. - provided on the link roads of road interchanges;
- retention basins 16 pcs.

Details regarding the positioning of the structures for water pre-treatment are presented in the section 2.1.4.1.9.3.

2.1.4.1.14.5Animal crossings

In order to ensure permeability for fauna species, the project will include undercrossing structures (undercrossings for fauna) and overcrossings (ecoducts). The structures provided for the motorway/express road are presented in the following table.

Table no.2-22Undercrossings and overcrossings proposed for the motorway/express road

No.	Structure type	starting km	ending km	Width (m)	Height (m)	The distance from the nearest protected natural area
1.	Overpass	3+450	3+550	100	-	3 km - ROSCI0075 Pătrăuți Forest
2.	Underpass	11+14511+150	11+15511+15	2	2	1.7 km - ROSCI0075 Pătrăuți Forest
3.	Underpass	50+930	51+070	17	5	3.8 km - ROSPA0110 Accumulations Rogojesti - Bucecea

2.1.4.1.14.6Fencing

The motorway, respectively the express road, will be fenced off. In the forest areas, the fence height will be H = 2.6m, km 1+215 – km 3+955 area. H = 1.5m fencing is provided on the rest of the alignment. Fencing will play a role in preventing wildlife from entering the carriageway area.

2.1.4.1.15 Works necessary for site organization

Within the project Suceava-DN2H Motorway and DN2H - Siret Border Express Road, four locations were provided for placing the construction sites, one for the motorway sector and three for the express road sector, the total length of the alignment being approximately 56 km.

The locations of the site organizations will comply with all the conditions and restrictions that will be required by the environmental agreement.

For the execution period, the Contractor has the obligation to carry out all the environmental protection measures regarding the polluting or potentially polluting objectives (production bases, material warehouses, site organizations, earth quarries). The Contractor also has the obligation related to the ecological reconstruction of the occupied or affected lands.

Table no.2-15 The locations of the proposed site organizations

No.	Kilometer interval provided for performance of the work	Side	The distance from the nearest protected natural area	The distance from the inner city of the nearest locality	The distance to the nearest water course
1.	9+700-10+250	right	1.9 km – ROSCI0075 Pătrăuți Forest	0.8 km – Municipality of Suceava	1.3 km - Pătrăuțeanca
2.	27+800-28+000	Left	6.1 km – ROSCI0075 Pătrăuți Forest	0.55 km – Slobozia Suceva	0.7 km - Horaiț
3.	43+050-43+300	right	5 km - ROSPA0110 Accumulations Rogojesti - Bucecea	0.4 km – Negostina	0.3 km - Negostina
4.	54+800-55+100	Left	0.8 km - ROSPA0110 Accumulations Rogojesti - Bucecea	0.25 km - Siret	0.4 km - Siret

The location of site organizations in relation to inhabited areas, water bodies and protected natural areas is presented in the following figures.

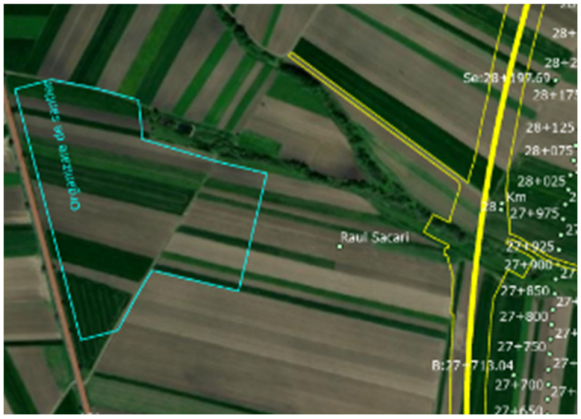


Figure no.2-6Location of site organizations

The main location conditions that must be taken into account when choosing the locations of construction site organizations are:

- Site organizations will not be installed within the boundaries of protected natural areas, with the exclusive exception of office spaces that can be located in the countryside of the localities. The site organizations will be located at distances greater than 500 m from the limits of the protected natural areas;
- Site organizations will not be located near residential areas, with the exclusive exception of office spaces that can be located in the suburbs of localities. In the case of sites where asphalt and/or concrete preparation stations will be installed, the provisions of Order no. 119/2014, with subsequent amendments and additions, will be observed. Also, in the case of these sites, other areas included in the definition of "protected territories" will be considered, according to Order no. 119/2014, with the subsequent amendments and additions, respectively: parks, natural reserves, areas of balneoclimatic interest, rest and recreation, social-cultural, educational and medical institutions;

- The site organizations will not be located in the vicinity of surface water bodies, being necessary to be located at distances greater than 50 m from their banks;
- Site organizations will not be located in the vicinity of water supply sources intended for drinking water (surface or underground) and their protection areas;
- Site organizations will not be located in flood areas, wetlands or swamps, areas at risk of landslides;
- Forest areas will not be deforested for the organization of the construction site;
- Site organizations will not be located in the vicinity of archaeological sites and historical monuments. The minimum distance to these objectives will be established depending on the type of site/monument so that they are not affected by the activities carried out within the site organizations (traffic, vibrations, emissions of atmospheric pollutants);
- Site organizations will not be located in the safety areas of the transport networks and infrastructure, nor in the vicinity of SEVESO industrial objectives.

When choosing locations, the following will also be taken into account:

- access roads to the works site;
- CF ramps and lines;
- electrical network in the vicinity of the location;
- water supply sources;
- access roads to the borrow pits;
- low costs for transporting materials, without requiring long distances;
- maintaining the quality of materials during transport (concrete);
- possibility of placing fixed stations for the preparation of concrete and asphalt mixture;
- rational use of plants and/or installations;
- rational use of water resources;
- provision of hygienic-sanitary facilities for workers.

The conditions for choosing locations for construction site organizations are also valid in case of a possible future stage of decommissioning.

Several specific plants and equipment, necessary for the construction of the structures provided for in the project, will be stored, maintained and used within the site organizations. The main plants present in the site organizations will be: bulldozers, excavators, cranes, drilling rigs, graders and compactor cylinders. Dump trucks, concrete mixers and front loaders will be used for the transport of construction materials in the construction sites.

The facilities related to the construction site organizations consist of:

- Cabin gate;
- Infirmary;

- Laboratory;
- Offices;
- Canteen;
- Covered working platform
- Mechanical workshop;
- Washing ramp;
- Warehouse;
- Concrete station;
- Aggregates for concrete plant;
- Asphalt station;
- Aggregates for asphalt station;
- Hydrocarbon interceptor;
- Water management;
- Fuel station;
- Electricity supply generator;
- Scale;
- Car parking;
- Equipment parking;
- Material warehouses;
- PSI

The main measures provided for reducing the impact related to site organizations during the execution period are:

- site organizations and production bases will be provided with sewerage, treatment and drainage systems for domestic and rainwater. If necessary, a system with drainable basins can be adopted, the connection to the sewage networks in the neighborhood or the installation of pre-treatment/treatment and discharge into the watercourses;
- the plans to prevent and combat accidental pollution developed by each Contractor will include clear provisions regarding the risks, prevention measures and intervention measures related to site organizations in the event of accidental pollution of the soil, underground water and surface water;
- the technological waste water resulting from the processes of preparation of construction materials and the water resulting from the washing of construction means and equipment will be collected and pre-treated in settlement tanks and oil product separators before unloading;

- the material warehouses will be provided with perimeter ditches and jompers to retain the material carried away by precipitation;
- liquid fuel storage tanks will be placed in a protective box, which can support at least 110% of the total volume of the tank with an appropriate guard height. Fill/discharge pipes shall be located to ensure containment of the dischargeed substance in the tank and all the valves shall be lockable. Tanks will be checked and cleaned at regular intervals, including hatches and oil and fuel filters;
- the used oils will be collected in specially built tanks and will later be handed over to specialized units;
- all the mobile generators and other static equipment shall be of the type provided with integrated support or shall be placed in a welded steel tray of adequate volume;
- limitation of atmospheric pollutant emissions at concrete and asphalt preparation plants by equipping them with pollutant and dust retention systems (capture-treatment);
- avoiding the direct placement of construction materials and waste resulting from the works on the ground;
- the temporary on-site storage of waste resulting from the works, as well as household waste, until it is taken over by specialized companies for final disposal or recovery, will be carried out separately, in appropriate containers, in specially designed spaces;
- the storage of dangerous substances and the setting up of asphalt/concrete stations will be done on specially arranged platforms, in order to protect the soil and underground water from accidental leaks and infiltrations;
- site organizations will be properly equipped with specific absorbent materials for each type of material/substance that can cause pollution as a result of improper management;
- the protection and adequate signaling of construction site organizations and the prohibition of access to their premises for unauthorized persons;
- carrying out the restoration works of the surfaces affected by the location of the site organizations after their decommissioning, so that they can structurally and functionally be reintegrated into the previous category of land use. For any restoration and landscaping of the temporarily affected areas, after their decommissioning, only species from the local phytocenotic composition will be used (appropriate to the affected habitats or located near the site organization areas). The use of any foreign (non-native) plant species will be prohibited.

2.1.4.1.16 Decommissioning activities

For performance of the project, demolition works of some existing objectives located on the motorway/express road alignment will be necessary. The locations of these existing objectives were described in section 2.14. The owners of the structures that need to be demolished will be expropriated as a result of an/some expropriation decision(s), respectively Government Decisions.

After demolition of the structures, the resulting waste will be evacuated from the site, and the land will be prepared for the motorway infrastructure works.

The technical methods proposed for carrying out the demolition works are based on the following principles:

- Ensuring a system of managing the materials necessary for the execution of the works under appropriate conditions (the management of construction materials will be done only within the limits of the land owned by the owner, without disturbing the neighbors);
- Compliance with the protection zones of the pipelines and utility networks that cross the site of the work, as well as the conditions imposed by the notices obtained;
- Evacuation from the site of all waste and materials left at the end of the demolition works. The resulting waste will be stored separately, for each type, until they are taken over by authorized operators.
- The demolition works will be carried out mechanized with ordinary machines, usually used in these types of works (excavators, bulldozers, cranes, pickaxes, etc.).

2.1.4.1.17 Borrow pits

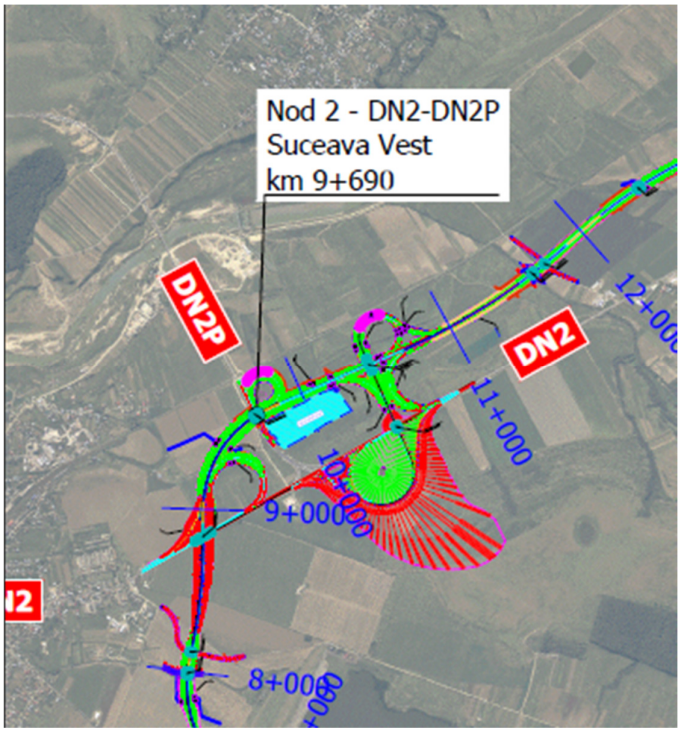
At this stage, the amount of material required for the execution of earthworks in the embankment/filling was identified, the volumes required for the filling works to be taken mainly from the cutting areas within the project where a large amount of material in excess will result (approx. 14 .8 million m^3) or from authorized sources, if applicable.

For the execution of works, division into 3 sections was proposed as follows:

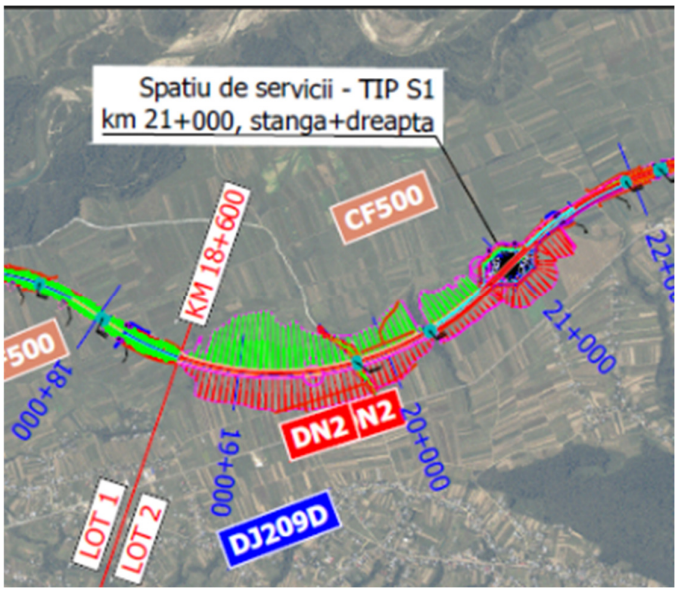
- Lot 1 km 0+000 – km 18+600,
- Lot 2 km 18+600 – km 43+050,
- Lot 3 km 43+050 – km 55+700.

The necessary volumes for fillings will be provided from the cutting areas as follows:

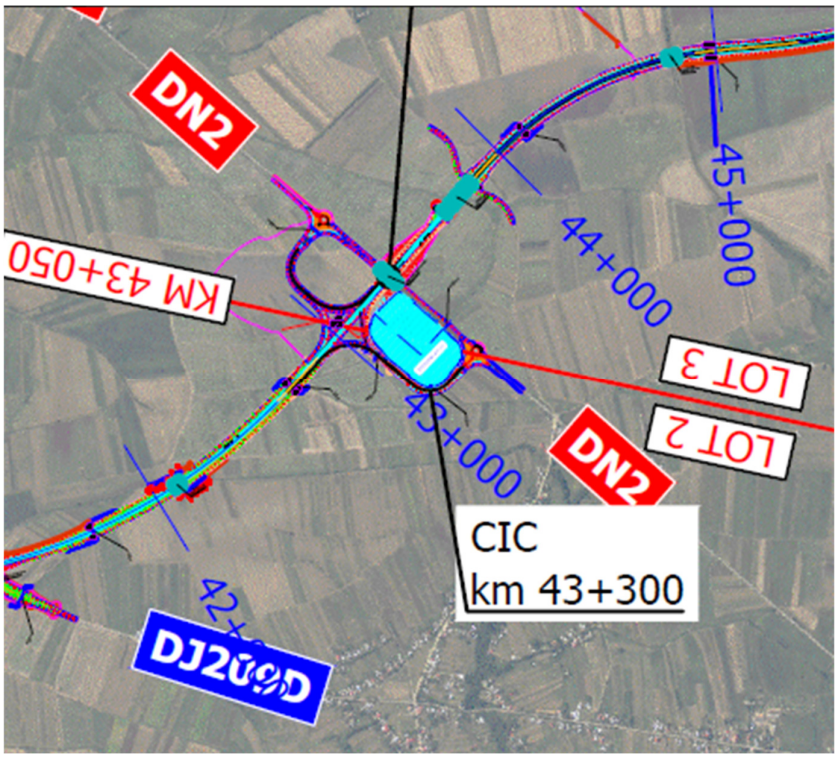
- cutting at nterchange 2P Link road 10 – on the right side, with red



- cutting at km 18+700 – km 21+400 – on the right side, with red



- cutting at interchange Siret Sud Link Road 3-4 – is the outline in magenta where the Km position 43+050 is mentioned



Thus, the project does not provide creation of borrow pits.

Borrow pits are not required, the need for earthworks being offset by the volume of excavations.

2.1.4.1.18 Chemical substances and preparations

The execution of works for the construction of the Suceava - DN2H Motorway and DN2H - Siret Border Express Road will require the use of materials that, by their composition or by their potential effects on the health of employees, fall into the category of dangerous chemical substances and preparations. These substances and materials are represented by:

- Fuels (diesel, gasoline) used for the operation of equipment and means of transport;
- Lubricants (oil, petroleum jelly);
- Paints, adhesives, resins, solvents, etc.;
- Solvents used for diluting paints;
- Additives for asphalt mixtures and bitumen used in asphalting works.

The main substances used, together with the nature of the risk generated by the use of these substances, are presented in the following table.

Table no.2-23 The main dangerous chemical substances and preparations used

No.	Name of the chemical substance/preparation	Classification and labeling of chemical substances or preparations	
		Hazardous/Non-Hazardous Category (P/N)	Degree of danger

No.	Name of the chemical substance/preparation	Classification and labeling of chemical substances or preparations	
		Hazardous/Non-Hazardous Category (P/N)	Degree of danger
1.	diesel fuel	p	High degree of flammability
2.	Lubricants (engine oils)	p	Irritant, hardly flammable
3.	Paints	p	Flammable, irritant
4.	Cleaners	p	Highly flammable
5.	Bitumen	p	Flammable, toxic
6.	Asphalt mixture additives	p	Flammable, toxic
7.	Cement	N	-

The management of these substances will be done in compliance with the legislation in force and the instructions on the packaging of these products, as well as from the safety data sheets that accompany the products.

2.1.4.2 The main characteristics of the operation stage

2.1.4.2.1 Operating time

The execution period of the works is estimated at 30 months. The period of operation is unlimited, provided maintenance and repair work is carried out according to the regulations in force.

The motorway and express road administrator can approve, with the consent of the traffic police, the closure or establishment of traffic restrictions, on specific road sectors and for a limited time, in order to carry out works authorized according to the legal provisions in the motorway area or to protect the roads and traffic users.

Closure of traffic, regardless of duration, or the establishment of traffic restrictions for motorways, is done only by CNAIR and with the consent of the Traffic Police Directorate.

During blizzards, heavy snow or other meteorological phenomena that may cause traffic problems, the following measures will be taken:

- The road administrator will install the appropriate road signaling means to restrict traffic and will inform the traffic users about the measures taken;
- Users will be informed about the possibility of access on the restricted road sector.

2.1.4.2.2 The expected level of traffic

As part of the Feasibility Study development activities for the project Suceava – DN2H Motorway and DN2H – Siret Border Express Road, a Traffic Study was developed. It aimed to estimate the effect of the implementation of new infrastructure (motorways, express roads, national roads, bypasses, bridges, etc.), transport policy measures and any interventions that change the structure and traffic capacity of the road network. The traffic study was carried out at a certain level of detail, to allow the design of the planned intersections, which will ensure connection with the existing road network, and the estimate of the effect on mobility demand and related traffic flows, differentiated

by vehicle types and their combinations, for a period of 30 years from the implementation of the project. The traffic study was used to substantiate the following aspects:

- the preliminary evaluation of the attractiveness of the studied alignment variants, from the point of view of the traffic attracted;
- establishing the cross section of new or existing road sectors, based on the evaluation of traffic demand (design of traffic capacity) - similar to the recommendation of the type of infrastructure;
- establishing the calculation traffic for design of the bearing capacity of the roads; providing input data for the Cost-Benefit Analysis.

The following table shows the estimated traffic attracted by the Suceava - DN2H Motorway and the DN2H - Siret Border express road.

Table no.2-24Estimated traffic attracted by the motorway / expressway for the forecast year 2050 (MZA, vehicles per 24 hours)

Section	Cars	LGV	HGV	BUSES	Total vehicles
Airport – DN29A	9913	1525	2080	416	13882
Node DN29A	6848	1027	1805	299	9979
DN29A – DN/DN2P	8530	1258	2170	370	12328
DN2/DN2P node	11516	1525	2491	480	16012
DN2/DN2P node	11373	1506	2473	475	15827
DN2/DN2P node	11126	1476	2379	463	15444
DN2/DN2P node	9656	1243	1913	396	13208
DN2/DN2P node	8592	1066	1628	349	11635
DN2/DN2P node	12769	1455	1912	499	16635
DN2/DN2P – DN2H	13921	1579	2089	544	18133
Node DN2H	6669	937	1671	355	11832
Node DN2H	3621	259	1023	152	5055
Node DN2H	3794	382	1023	161	5360
DN2H – DN2 Siret S	4155	534	1027	177	5893
Siret S node	718	71	94	27	910
DN2 Siret S – DN2 Siret N	890	93	94	33	1110
DN2 Siret S – DN2 Siret N	890	93	94	33	1110

LGV – Light Goods Vehicles; HGV – Heavy Goods Vehicles

2.1.4.2.3 Maintenance work

The works and services regarding the maintenance of the road infrastructure network consist of all the intervention activities that are carried out throughout the year, determined by wear or degradation under normal operating conditions, which aim to ensure the technical conditions necessary for safe road traffic, in compliance with the rules in force, as well as to maintain a permanent state of cleanliness and appearance.

Maintenance work can be:

- current maintenance works, which are carried out permanently to maintain cleanliness, aesthetics, ensure the drainage of water or to eliminate small-scale damage to the road, works of art, road safety and related buildings;

- periodic maintenance works, which are carried out periodically and planned for the purpose of partial or total compensation of the wear and tear produced on the road structure, works of art, road safety and related buildings.

As a strategy for the execution of maintenance works, they can be:

- curative type strategy - specific works are carried out depending on the degradations that occur;
- preventive type strategy, whose main objectives are the preservation and adaptation of the road system or the element of the work of art (bridge, footbridge, passage, etc.) or road safety for the level of aggression to which it is subjected.

Accidental works due to natural calamities are carried out in the first emergency to restore traffic.

Depending on the technical condition investigated in the field, the type of maintenance and repair work to be adopted is recommended, and the AND Normative 596-2010 includes the performance level for highways and the types of interventions to maintain acceptable indices of technical condition.

Thus, the technical condition class of the road structure on highways is determined according to the load-bearing capacity, the state of degradation, flatness and roughness, and the maintenance works are determined according to the technical condition class. The measurement period of the technical condition evaluation characteristics of the highways is established according to the measurement conditions according to the technical instructions in force.

Defects in the roadway that could cause accidents to road users must be repaired within a maximum of 24 hours or warning signs must be installed immediately after they are detected.

Degradations produced on the surface of the roadway due to frost will be repaired to the required level in a maximum of 1 week.

AND regulation 596-2010 establishes the periodicity of carrying out the main maintenance and current repair works on highways. The periodicity of performing maintenance and current repair work on highways is defined as the time interval at which the respective work is repeated for the same road sector, within the cycle of capital repairs or during a calendar year.

The main elements that determine the periodicity of the works are:

- the size of the traffic intensity and its structure in relation to which the wear or degradation of the works occurs;
- the type of work on which maintenance work or current repairs are carried out;
- the quality of the materials used;
- the effects of winter, the stability of some sectors in the road area, the effects of heavy transport, the optimal periods for the execution of some works;
- the frequency of occurrence of degradation due to traffic and natural factors, etc.

The range of maintenance works depends on the standards related to the treatments or activities to be carried out and the length of time it is desired to maintain the road to the desired standards. These activities are divided into the following categories:

- daily maintenance;
- major maintenance;
- emergencies;
- other maintenance activities regarding project-specific utilities.

Daily maintenance includes short-term activities or periodic activities that are necessary to maintain the road in good conditions and safe in operation. This can involve both current and periodic maintenance activities.

Major maintenance, also known as structural maintenance, refers to road maintenance and rehabilitation of the road structure. It usually involves major rehabilitation of the road equipment after the initial identification of defects during daily inspections and investigations. Following specific surveys and feasibility studies that are usually drawn up, details of the works to be carried out result.

Occasionally, incidents due to road accidents or adverse weather conditions affect road conditions. In the event of a traffic incident requiring emergency action, it is essential to maintain staff to respond as quickly as possible. The aim is to reduce any danger or deformations (distortions) or traffic delays.

Other maintenance activities regarding specific project facilities include daily, periodic maintenance and rehabilitation works that will be carried out in the case of works regarding the environment, maintenance and road facilities.

Location of maintenance spaces and maintenance strategy

The distribution of the maintenance spaces along the highway is done respecting the recommended distance between two maintenance spaces.

This distribution is also made in accordance with the development of the road network in the area and the location of road junctions, as well as with the provisions of AND instructions no. 554-2002 and AND no. 525-2013 regarding maintenance and repair works and winter works, after putting the highway into operation.

The main functions of the maintenance and coordination center will be as follows:

- supervision of the highway, traffic, the evolution of meteorological factors and traffic;
- first aid in case of accident;
- maintenance of the highway on the relevant section, of artworks, parking and service spaces, road markings, lighting, telecommunications and signaling installations;
- repairs and restorations after accidents or natural calamities;
- maintenance, repair of equipment, as well as their parking spaces;
- repair and replacement of accessories following accidents;
- all highway cleaning operations, including periodic cleaning of trenches, drains and building structures, rest and service areas;
- all operations for cleaning and maintenance of markings, safety devices (fences, parapets), lighting system, telecommunications system;

- local repair of damage from clothing, care of plantations;
- winter activity for removing snow and ice, installing, maintaining and storing snow guards.

After the execution of the highway/express road, the Operation and Maintenance Manual of the highway will be developed, which will be based on the following components:

- monitoring and evaluating the operation of the highway, in order to identify the problems that occur or may occur;
- formulating the problems identified through the monitoring and evaluation process;
- the design of the appropriate remedies as well as the possibility of carrying out these remedies;
- implementation of maintenance and improvement works resulting from daily incidents identified through the operating process;
- substantiation of financial needs;
- tracking/ measuring/ evaluating the effectiveness of previously implemented maintenance and improvement works.

The manuals will be constantly updated with legislative changes and advances in maintenance and operation technologies.

2.1.4.2.4 Information about raw materials, natural resources, chemical substances or preparations during the period of operation

During the period of operation, within the CIC, the service areas and the short-term parking lots will need to be supplied with water and electricity. The CIC site will store various materials used in current maintenance work, such as anti-slip materials, paints and thinners.

In the operation stage when repair work will be necessary, the operations and raw materials used will be similar to those in the construction stage, but the extent of the work and the quantities used will be smaller.A series of materials and natural resources will be used both for the maintenance works and for the operation of short-term parking lots, service areas and CIC. The following table shows the estimated quantities of raw materials and natural resources used in this stage.

Table no.2-25The raw materials and construction materials needed in the operation stage

No. crt.	Raw materials	UM	Estimated quantity	Remarks
1.	Wear layer	m3	185916.0	Required once every 5 years, after year 7
2.	Screening binder	tons	413715.2	Required once every 10 years, after year 7
3.	Asphalt mixtures	tons	419158.8	Required once every 15 years, after year 7
4.	Non-slip material	tons / year	3275	-
5.	Paint markings	tons / year	431.7	-
6.	The water	m^3/year	5675	-
7.	Electricity for the highway facilities and for lighting, including the	kWh/year	2631796	-

No. crt.	Raw materials	UM	Estimated quantity	Remarks
	charging stations for electric cars			

2.1.4.2.5 Evacuation of waste water during operation

2.1.4.2.5.1 Water collection from CIC and service areas

Rainwater collected on CIC sites, short-term parking lots and service areas will be pre-purified by means of decanters and hydrocarbon separators. The rainwater collected from the road platform will be directed through the designed collection system into settling basins and hydrocarbon separators before discharging into the outfall. In areas where it is not possible to discharge into natural emissions, retention basins are provided.

The wastewater resulting from the operation stage will be represented by the wastewater resulting from the sanitary groups within the premises of the service spaces and the maintenance and coordination center (CIC). They will be discharged into drainable basins.

2.1.4.2.5.2 Rainwater collection and evacuation works from the highway platform

The ditches and ditches. Prefabricated cement concrete elements will be used for the collection and drainage of rainwater. In situations where rainwater discharges into a natural outlet (watercourse, valley, canal) they will be purified in hydrocarbon separators. In situations where it is not possible to discharge into a natural emissary, rainwater will be discharged into retention basins after a prior purification.

culvertsare provided in situations where rainwater from the platform can be evacuated through such works.

2.1.4.3 Planning / territorial development

The route proposed for the construction of the Autostrada Suceava - DN2H and Expressway DN2H - Frontiera Siret crosses a number of 10 administrative-territorial units Suceava (km 0+000), Mitocul Dragomirnei (km 3+700), Suceava (km 7+200), Pătrăuţi (km 9+230), Dărmăneşti (km 14+520), Grăniceşti (km 23+715), Calafindeşti (km 33+925), Bălcăuţi (km 39+400), Siret (km 46+240), Muşeniţa (km 48+210), Siret (km 49+475), Musenita (km 51+150), Siret (km 53+860).

In order to obtain the building permit for the analyzed objective, the following were issued:

- Urban Planning Certificate No. 192 of 15.12.2022 issued by the Suceava County Council

According to the Urban Planning Certificate, the realization of the project involves the occupation of land with the following types of current use categories: agricultural land, watercourses, forest, roads, railway, archaeological sites, communal household areas (cemetery), built-up areas.

The lands affected by the route of the highway / expressway are located in the extra-urban and intra-urban areas of the localities, part of the public and private domain that will be expropriated as a result of an expropriation decision, respectively Government Decisions.

The project provides for the construction of a high-speed link (motorway and express road) between the municipality of Suceava and DN2H and an express road sector between DN2H and Siret Frontier, this being part of the road project with the generic name "Drumul Siretului", indicative DX5 included in MPGT (Paşcani – Suceava – Siret).

In addition to its national importance, this project will serve in good conditions, the national transit traffic, of goods and people from the territory of Romania and to Ukraine. Depending on the stage of rehabilitation of national roads or under rehabilitation, through them the highway can receive and distribute road traffic through its nodes, it will ensure the necessary traffic capacity and appropriate traffic conditions related to the TEN-T road network with minimal negative effects at the level environment and land use.

2.1.4.4 Proposed ways to connect to the existing infrastructure

2.1.4.4.1 Execution period

The provision of the necessary utilities during the construction period will be carried out as follows:

- Water supply: the necessary technological water and that used for domestic purposes will be provided by connecting to the network in the area, where it exists, or it will be provided by purchase from third parties and will be brought to the site with the help of car tankers. The drinking water needed by the staff will be purchased from the trade;
- Evacuation of waste water: domestic waste water will be directed through the internal sewerage network to the existing networks or into drainable basins, from where it will be taken over and transported to the existing treatment plants in the project area by companies authorized on the basis of the concluded contracts. In the case of work fronts, ecological toilets will be provided in certain areas;
- The electricity supply of all the objectives related to the maintenance center will be made from a transformer station, which will be provided by Electrica SA. The new transformer station will be connected to the supplier's network with a cable protected with copper conductors and XLPE insulation;
- The provision of the thermal agent is necessary exclusively for the site organizations and will be carried out through the thermal power plants.

2.1.4.4.2 Operating period

During the operating period, it will be necessary to ensure the following utilities:

- The water supply will be provided in the CIC and the short-term parking lots by building authorized drilled wells or by connecting to the water supply network in the area (if available);
- Evacuation of waste water: domestic waste water produced in CIC, short-term parking lots and service spaces will be directed through the internal sewerage network to the drainable basins proposed within the objectives. If the local conditions will allow it, the connection to the sewage networks of the neighboring localities will be ensured;

- Rainwater collected on CIC sites and short-term parking lots will be pre-purified by means of decanters and hydrocarbon separators. The rainwater collected from the road platform will be directed through the designed collection system into settling basins and hydrocarbon separators before discharging into the outfall. In areas where it is not possible to discharge into natural emissions, retention basins are provided;
- The electricity supply will be ensured by connection to the existing networks in the area of the locations;
- The thermal agent is needed in the CIC and in the short-term parking lots it will be provided by means of thermal plants and electric radiators.

2.1.4.5 The duration of the construction, operation, decommissioning of the project and the phasing of the project implementation period

The estimated execution period for the project is 30 months. The period of operation is unlimited, provided maintenance and repair work is carried out according to the regulations in force. Decommissioning period, in the situationÞand establishing the need to close the highway and the expressway is estimated at around 30 months.

2.1.5 Natural resources necessary for the implementation of the project (water abstraction, renewable resources, non-renewable resources, others) with the highlighting of those that will be exploited within the protected natural area of community interest

The main natural resources used for the construction of the highway and expressway are water, soil and mineral aggregates (natural stone, ballast, sand). The mineral aggregates will be able to be purchased from the existing quarries/ballasts in the area of the project site.

The transport of aggregates from quarries and/or ballast tanks to the project location area will be carried out with specific vehicles on national and/or local roads, as the case may be. Front-end loaders will also be used for transport within the construction sites/workpoints.

The supply of materials will be carried out gradually, on construction stages, so that they are put into operation and to avoid long-term storage of raw materials.

2.1.6 Information regarding the production that will be carried out and the resources necessary to ensure the production

The proposed project does not involve the realization of production processes, but the creation of a highway and an expressway. During the exploitation period, the project will be intended for road traffic.

2.1.6.1 Information on raw materials and chemical substances or preparations used during construction

The raw materials required for the realization of the project and the estimated quantities required are presented in the following table.

Table no.2-26The raw materials and construction materials necessary for the realization of the project and the estimated quantities

No. crt.	Raw materials and construction materials	UM	Estimated quantity
1.	Asphalt mixtures	tons	409749.7
2.	Natural aggregates stabilized with cement	mc	46316.6
3.	Ballast	mc	74.4878
4.	Asphalt concrete	MP	201189.2
5.	Form layer of stabilized soil	mc	36276.6
6.	Vegetable soil	mc	48045.15
7.	Concrete	mc	35839.25
8.	Cement	tons	20904.7
9.	The water	mc	24491.8
10.	Armature	tons	10054.1
11.	diesel fuel	tons	2764877.85
12.	lubricant	tons	36572.5
13.	Steel parapets	tons	5205.648

The concrete and asphalt mixtures will be prepared in the asphalt and concrete stations located in the construction sites.

The project will require fuel (diesel) for transportation and the operation of the equipment necessary to fulfill the objectives proposed in the execution phase. Fuel supply will be provided from outside the construction site, their transport being carried out with the help of car tanks to the fueling points within the construction site organization.

Electricity will be provided in the site organizations, through connection to the existing network and through generating sets. The provision of electricity in the work fronts will be done by means of generating sets.

During the period of operation, within the CIC, the service areas and the short-term parking lots will need to be supplied with water and electricity. The CIC site will store various materials used in current maintenance work, such as anti-slip materials, paints and thinners.

When repair work is required, the operations and raw materials used will be similar to those in the operation stage, but the extent of the work and the quantities used will be smaller.

2.1.6.2 Information on raw materials and chemical substances or preparations used during the operation period

During the period of operation, within the CIC, the service areas and the short-term parking lots will need to be supplied with water and electricity. The CIC site will store various materials used in current maintenance work, such as anti-slip materials, paints and thinners.

In the operation stage when repair work will be necessary, the operations and raw materials used will be similar to those in the construction stage, but the extent of the work and the quantities used will be smaller.A series of materials and natural resources will be used both for the maintenance works and for the operation of short-term parking lots, service areas and CIC. The following table shows the estimated quantities of raw materials and natural resources used in this stage.

Table no.2-27Raw materials and building materials required in the operation stage

No. crt.	Raw materials	UM	Estimated quantity	Remarks
1.	Wear layer	m3	185916.0	Required once every 5 years, after year 7
2.	Screening binder	tons	413715.2	Required once every 10 years, after year 7
3.	Asphalt mixtures	tons	419158.8	Required once every 15 years, after year 7
4.	Non-slip material	tons / year	3275	-
5.	Paint markings	tons / year	431.7	-
6.	The water	m^3/year	5675	-
7.	Electricity for the highway facilities and for lighting, including the charging stations for electric cars	kWh/year	2631796	-

2.1.7 Emissions of physical, chemical and biological pollutants generated by the project interventions (atmospheric pollutants, noise, artificial lighting, pollutants entering the aquatic environment and other emissions)

2.1.7.1 Emissions in surface water and underground water

2.1.7.1.1 Sources and pollutants generated

During the execution period, the main sources of water pollutants are represented by:

- Soil manipulation works, generating soil particles that can reach surface waters. In the case of large quantities of powders, they can accumulate in watercourses, generating changes in water turbidity and affecting aquatic flora and fauna;
- Site traffic to and from the work fronts or the areas from which construction materials are brought (quarries, ballast);
- Accidental spills of chemicals, fuels and oils from the operation of machinery involved in construction works or due to faulty handling of transport vehicles;
- Improper handling and putting into operation or storage of the materials used in the execution of the works (bitumen, concrete, aggregates, etc.), which can reach the surface waters by entrainment by rainwater;
- Improper extraction of mineral aggregates (sand, ballast, gravel);
- Inadequate storage and management of domestic waste water resulting in the sanitary groups within the construction site organizations, the management being properly ensured by means of authorized operators;

- Washing machines and means of transport at the site organization level.

The waste water generated during the execution stage of the project will be at the level of the site organizations. They will be collected and discharged periodically by emptying, based on contracts concluded with authorized companies, and where possible by discharge into the local sewer networks or discharge into the emissary following appropriate pre-treatment/purification.

During the operating period, the main source of water pollutants is represented by the washing and entrainment by precipitation of solid particles and other soluble compounds deposited on the surface of the road as a result of road traffic, such as heavy metals, hydrocarbons, snow removal substances. Potential sources of pollutants can be represented by:

- Deposition of atmospheric emissions from vehicle thermal engines – heavy metals (Fe, Cr, Zn, Ni, Cd, Cu, Pb), hydrocarbons (PAH, PCB);
- Residues from the wear of vehicle tires and braking elements - suspended particles (PM10, PM2.5);
- Maintenance works - sodium (derived from the substances applied in winter for snow removal); heavy metals and hydrocarbons (from repair works at the level of road surface - asphalting);
- Metallic residues from vehicle corrosion - Fe, Cr, Ni, Cd, Cu and from galvanized parapets - Zn, oils and mineral fats;
- Residues from the wear of the road surface - solid materials.
- The risks of surface water or groundwater contamination are greater in the following situations:
- Direct deposition in surface waters of pollutants generated by vehicles involved in car traffic;
- Improper operation of settling basins and hydrocarbon separators;
- Accidental discharge of liquid or solid pollutants into surface waters (mainly due to massive spills of substances as a result of a traffic accident in the area of a water course).

Domestic wastewater from CIC, SS and PSD can be a source of water pollutants, but these waters will be collected in drainable watertight basins and periodically evacuated by authorized operators.

Rainwater potentially contaminated with hydrocarbons, collected from the road surface and from the CIC premises, service spaces and short-term parking lots will be pre-purified by means of decanters and hydrocarbon separators provided in the project before being discharged into the outfalls.

2.1.7.1.2 Emissions during the operating phase

As stated previously, the main pollutant emissions associated with the operating stage of the expressway are represented by specific pollutants driven by the surface runoff of stormwater that washes all the built (waterproof) elements of the expressway (road platform, service spaces, CIC, service spaces, etc.).

However, the concentrations of pollutants in the volume of meteoric water collected from the expressway depend on the technical condition of the vehicles participating in the traffic, the speed

of travel, the quality of fuels, etc. At the same time, the current qualitative and hydrological conditions (flow, speed) of the emissaries are an important factor in determining the magnitude of the impact due to the evacuation of meteoric waters, they significantly influence the natural self-purification capacity of the rivers (diffusion and dilution processes).

The methodology developed by SETRA was used to estimate pollutant emissions in surface waters[1](Department of Road and Highway Technical Studies - French Ministry of Transport). This methodology presents a simple method for calculating the loads of meteoric water collected from the road structure that takes into account the average annual load, the impermeable surfaces from which the rainwater is collected and the rain flows. The methodology establishes loading factors for the indicators: suspended matter (MS), chemical oxygen consumption (CCO), zinc, copper, cadmium, total hydrocarbons and polycyclic aromatic hydrocarbons (PAH). Annual loads (kg/year or g/year) are presented in the methodology according to:

- traffic volume:
  - ≤ 10,000 vehicles/day;
  - > 10,000 vehicles/day.
- road type:
  - open roads - which do not present obstacles for dispersion (eg: plain areas, areas with little vegetation, backfill areas);
  - closed roads – roads that have elements that can affect the dispersion phenomenon (eg: areas with very large debris, tunnels, large vegetation adjacent to the road, etc.).

The SETRA methodology establishes a formula for calculating pollutant emissions in rainwater that takes into account: average annual pollutant loads deposited on the road structure (kg/year), impervious surfaces (ha), average annual precipitation (m) and reduction factors (corresponding to the solutions provided for the pre-treatment of rainwater).

The following table presents the results of the calculations of the average annual pollutant loads, divided by the sections considered in the Traffic Study.

Table no.2-28Average annual concentrations of pollutants on the expressway and on the highway calculated according to the traffic volume

Section	Total veh/day (2050)	Area (ha)	Ca - Annual loads (kg/year)						
			THX	COD	Zn	With	CD	Total hydrocarbons	PAH
Airport - DN29A	13882	3.30	2109.38	2032.47	6.76	0.80	0.037	34.85	0.0056
Node DN29A	9979	1.50	900.89	900.89	3.00	0.30	0.015	13.51	0.0023
DN29A - DN2/DN2P	12328	16.89	10530.19	10294.20	34.28	3.81	0.181	167.79	0.0273

1SETRA (2007) Guide Technique. Pollution d'origine routiere. Concept des ouvrages de treatment des eaux. Service d'Ètudes Techniques des Routes et Autoroutes (SETRA)

Section	Total veh/day (2050)	Area (ha)	Ca - Annual loads (kg/year)						
			THX	COD	Zn	With	CD	Total hydrocarbons	PAH
DN2/DN2P node	16012	0.19	123.38	116.63	0.39	0.05	0.002	2.13	0.0003
DN2/DN2P node	15827	0.59	387.06	366.51	1.22	0.16	0.007	6.66	0.0011
DN2/DN2P node	15444	0.47	310.60	295.09	0.98	0.12	0.006	5.30	0.0008
DN2/DN2P node	13208	0.27	170.57	165.37	0.55	0.06	0.003	2.77	0.0004
DN2/DN2P node	11635	0.17	107.43	105.72	0.35	0.04	0.002	1.68	0.0003
DN2/DN2P node	16635	0.28	184.71	173.68	0.58	0.08	0.003	3.23	0.0005
DN2/DN2P - DN2H	18133	38.86	26477.98	24581.59	81.68	11.25	0.483	476.19	0.0741
Node DN2H	11832	0.28	171.40	168.35	0.56	0.06	0.003	2.70	0.0004
Node DN2H	5055	0.11	31.85	31.85	0.11	0.01	0.001	0.48	0.0001
Node DN2H	5360	0.35	112.79	112.79	0.38	0.04	0.002	1.69	0.0003
DN2H - DN2 Siret S	5893	42.36	14976.45	14976.45	49.92	4.99	0.250	224.65	0.0374
Siret S node	910	0.37	20.41	20.41	0.07	0.01	0.0003	0.31	0.0001
DN2 Seret S - DN2 Seret N	1110	29.85	1987.70	1987.70	6.63	0.66	0.033	29.82	0.0050
DN2 Seret S - DN2 Seret N	1110	2.04	135.58	135.58	0.45	0.05	0.002	2.03	0.0003

The determination of pollutant concentrations in rainwater was made by applying the formula:

$$Cm = \frac{C_a \, x \, (1-\tau)}{9 \text{ x } S \text{ x } H}$$, where

Cm = average annual concentration (mg/l);

Ca = annual load (kg) – calculated in the table above

τ = reduction rate (depends on the rainwater pretreatment solution);

S = impervious surface (ha);

H = water height for peak rainfall (m).

The average concentrations of pollutants in rainwater were calculated considering a reduction rate (τ) corresponding to the designed pretreatment solutions, respectively retention basins (with reduction efficiency of 85% for MS, 75% for CCO, 80% for Cu, Cd , Zn and 65% for total hydrocarbons and PAHs - according to table no. 10 of the SETRA Methodology).

The results of the calculations are presented for each section in the table below.

Table no.2-29Average annual pollutant concentrations in rainwater collected from the highway and expressway

Section	Cm - Rainwater concentrations (mg/l)

	THX	COD	Zn	With	CD	Total hydrocarbons	PAH
Airport - DN29A	21.29	34.20	0.091	0.011	0.00050	0.821	0.00013
Node DN29A	19.96	33.26	0.089	0.009	0.00044	0.699	0.00012
DN29A - DN2/DN2P	20.78	33.85	0.090	0.010	0.00048	0.772	0.00013
DN2/DN2P node	22.00	34.67	0.092	0.012	0.00052	0.887	0.00014
DN2/DN2P node	21.94	34.63	0.092	0.012	0.00052	0.881	0.00014
DN2/DN2P node	21.81	34.54	0.092	0.012	0.00052	0.869	0.00014
DN2/DN2P node	21.07	34.05	0.091	0.010	0.00049	0.800	0.00013
DN2/DN2P node	20.55	33.70	0.090	0.010	0.00047	0.751	0.00012
DN2/DN2P node	22,21	34.81	0.093	0.012	0.00053	0.906	0.00014
DN2/DN2P - DN2H	22.71	35.14	0.093	0.013	0.00055	0.953	0.00015
Node DN2H	20.61	33.74	0.090	0.010	0.00047	0.757	0.00012
Node DN2H	10,11	16.85	0.045	0.004	0.00022	0.354	0.00006
Node DN2H	10.72	17.87	0.048	0.005	0.00024	0.375	0.00006
DN2H - DN2 Siret S	11.79	19.64	0.052	0.005	0.00026	0.413	0.00007
Siret S node	1.82	3.03	0.008	0.001	0.00004	0.064	0.00001
DN2 Seret S - DN2 Seret N	2.22	3.70	0.010	0.001	0.00005	0.078	0.00001
DN2 Seret S - DN2 Seret N	2.22	3.70	0.010	0.001	0.00005	0.078	0.00001
Limits NTPA001-2005 (mg/l)	**35**	**70**	**0.5**	**0.1**	**0.2**	**5**	**-**

From the analysis of the results, it is found that the efficiency of the rainwater pre-treatment facilities provided in the project before their discharge into the outfalls is appropriate, the estimates indicating concentrations below the maximum admissible limits according to the Normative NTPA001-2005 regarding the establishment of pollutant loading limits of industrial and urban wastewater upon discharge into natural receptors.

2.1.7.2 Atmospheric emissions

2.1.7.2.1 Sources and pollutants generated

During the execution period of the works necessary for the realization of the project, the main sources of atmospheric emissions will be represented by:

- The activities of handling the masses of earth (excavation of fertile soil, excavations, fillings, leveling, loading, unloading, transport), of some construction materials (sand, gravel, ballast) and of waste – undirected stationary sources. Pollutants: suspended dust and sedimentable dust;
- Temporary storage of powdery materials (sand, earth) that can be carried away by the wind. Pollutants: suspended dust and sedimentable dust;
- Wind erosion on disturbed or unvegetated land surfaces – undirected stationary sources. Pollutants: suspended dust and sedimentable dust;
- Generator sets to ensure energy supply in site organizations and work fronts - directed stationary source. Pollutants: NO2, SO2, CO, dust;
- Diesel storage. Pollutants: volatile organic compounds;

- The operation of asphalt and concrete stations - stationary point sources, located at the site organizations level;
- Welding/cutting activities of metal elements – non-directed stationary sources. Pollutants: metal particles, combustion gases corresponding to the use of welding / cutting devices;
- Mobile emission sources (vehicles and machines that participate in land preparation and the transport of materials and equipment, as well as in the supply of substances and materials during the execution of construction works. Pollutants: NOx, SOx, CO, suspended dust, particles with metals heavy.

Atmospheric pollutant emissions will be generated by works necessary to carry out the entire construction process, starting with digging and excavations and continuing with the filling works, the realization of the embankment of the highway and the expressway and the creation of works of art. The area of the work fronts will constitute the most important source of emissions as it accumulates the activity of several polluting factors.

The construction works also include numerous mobile sources represented by the machines necessary for the development of the land and the construction of the objectives, by the vehicles that will ensure the supply of construction materials, but also by the vehicles necessary to evacuate the waste from the site. Their operation will be intermittent, depending on the work schedule and the work schedule.

The works related to the project will be carried out with modern equipment (excavator, bulldozer, loader, mobile crane, pile drilling installations, etc.).

For the most part, the emission sources of atmospheric pollutants are ground sources (except for works of art located at high heights from the ground level), free, open and mobile or stationary diffuse/directed.

During the operation period of the objective, the sources of atmospheric pollutants will be mobile, represented mainly by the vehicles that will transit the highway and expressway. According to the EMEP/EEA air pollutant emission inventory guidebook 2019, the main pollutants emitted by road traffic are:

- ozone precursors (CO, NOx, NMVOC);
- greenhouse gases (CO2, CH4, N2O);
- acidifying substances (NH3, SO2);
- particulate matter (PM);
- carcinogenic substances (PAHs and POPs);
- toxic substances (dioxins and furans);
- heavy metals.

2.1.7.2.2 Emissions during the execution period

2.1.7.2.2.1 Emissions from directed stationary sources

In the execution stage, the directed stationary sources are represented by generator sets to ensure the energy supply.

2.1.7.2.2.2 Emissions from undirected stationary sources

Undirected stationary sources of atmospheric pollution will appear during the execution period of the works proposed to achieve the objective and will be represented by the activities of handling the earth masses (excavation work, uncovering the soil, loading - unloading, transport), of some materials construction, as well as the processing activities of metal elements (cutting and welding). The dust generated by material handling and wind erosion is mainly of natural origin (soil particles, mineral dust).

The operations of cutting and welding metal elements can lead to emissions of metal particles. These operations will generate emissions of: fine particles containing, mainly, metal oxides (iron oxide, manganese oxide, nickel oxide, etc.), carbon monoxide resulting from the decomposition of carbon dioxide from the atmosphere in the area of the electric arc, dioxide of nitrogen resulting from the oxidation of atmospheric nitrogen due to the high temperature in the area of the electric arc, ozone.

The estimation of pollutant emissions generated as a result of construction activities was carried out according to the EMEP/EEA 2019 – 2.A.5.b Construction and demolition methodology, using the following equation:

$$EM_{PM10} = EF_{PM10}\ x\ A_{affected}\ x\ d\ x\ (1 - CE) x\ \left(\frac{24}{PE}\right)\ x\ \left(\frac{S}{9\%}\right)$$, where:

EF - the emission factor corresponding to the types of constructions carried out within the site, respectively road construction → according to 2.A.5.b Construction and demolition table 3.4;

Aaffected – the total surface arranged in the project → 6045320. m2;

d - duration of execution works → 2.5 years;

CE - efficiency of emission control measures → 0.5 according to 2.A.5.b Construction and demolition, page 9;

PE – evaporation index → 41.5 (calculated according to the formula from 2.A.5.b Construction and demolition, page 9);

s – soil sediment content → 35% (determined according to the type of soil in the site area).

The results of emission calculations for the PTS, PM10 and PM2.5 indicators are presented in the following table.

Table no.2-30Undirected emissions associated with highway and expressway construction operations

Road sign	emissions (t/ execution period)
TSP	130,819
PM10	39,075
PM2.5	3,907

The emissions estimated in the table above reflect all the activities of handling the earth masses (excavation, compaction) and pouring concrete over the entire surface of the project.

Also, in the execution stage, other important undirected stationary sources will be represented by the asphalt and concrete stations. According to EMEP/EEA 2019 - 2.D.3.b Road paving with asphalt, emissions from asphalt and concrete plants are suspended particles, volatile organic compounds, liquid aerosols and organic vapors. The main sources of emissions from an asphalt station are the dryer, areas with high temperatures, storage areas, but also the loading and unloading of the material and the associated vehicle traffic.

The estimation of total emissions from asphalting activities (from production to asphalting itself) was carried out based on the emission factors provided for in the EMEP/EEA 2019 methodology - 2.D.3.b Road paving with asphalt (Table 3.1 Tier1 emission factors for source category 2.D.3.b Road paving with asphalt) and the total amount of asphalt mixtures necessary for the realization of the project (presented in Section 2.3.4.1).

Table no.2-31Air pollutant emissions generated in asphalt stations

Road sign	Emission factor*	Amount of asphalt required for the entire project	emissions
	(g/t)	(t)	(t/ per, of execution)
VOC	16	2,211,042	35.4
MTS	14,000		30954.6
PM10	3,000		6633.1
PM2.5	400		884.4

It is specified that the total emissions estimated in the table above will occur only in a certain stage of the project, corresponding to the road superstructure construction operations (especially the asphalting operations), estimated to be carried out in approx. 22 months.

Of the total emissions, a part will be generated directed within the asphalt stations and a part will be generated undirected on the road surface, at the time of asphalting works. The emissions generated within the asphalt stations are limited by means of the filtration systems provided in the stations, which have the role of filtering both the burnt gases resulting from the drying process of the aggregates in the dryer drum and the dust resulting from the sifting - dosing and weighing of the aggregates. The retained dust is transported for storage in a dust silo and can be reintroduced into the technological flow, depending on the recipe used. Venturi emission reduction installations were taken into account in the emission estimation. The calculations were based on their minimum filtering capacity of 97%, according to the EMEP methodology.

2.1.7.2.2.3 Emissions from mobile sources

The estimation of pollutant emissions generated by non-road mobile sources (equipment) was made using the EMEP/EEA calculation methodology - 1.A.4. Non-road mobile machinery 2019, Tier 1, which takes into account the type of fuel, the fuel consumption used and the emission factors corresponding to the characteristic pollutants. The results are presented in the table below and represent the total emissions from all the machines that will be involved in the execution works, divided by each type of machine.

Table no.2-32Mobile sources during the execution period

Name of the source	Pollutants and mass flows									
	NO2*		CO2		Co.		SO2		PM10	
	g/h	g/s	g/h	g/s	g/h	g/s	g/h	g/s	g/h	g/s
Dump	251.4	0.070	84,131.8	23,370	286.8	0.080	26.6	0.007	56.0	0.016
Bulldozer	353.6	0.098	118,310.4	32,864	403.4	0.112	37.4	0.010	78.8	0.022
Self grader	125.7	0.035	42,065.9	11,685	143.4	0.040	13.3	0.004	28.0	0.008
Compactor	330.0	0.092	110,423.0	30,673	376.5	0.105	34.9	0.010	73.5	0.020
Excavator	157.1	0.044	52,582.4	14,606	179.3	0.050	16.6	0.005	35.0	0.010
Excavators with long arm (20 m)	149.3	0.041	49,953.3	13,876	170.3	0.047	15.8	0.004	33.3	0.009
backhoe	117.9	0.033	39,436.8	10,955	134.5	0.037	12.5	0.003	26.3	0.007
Front loader	94.3	0.026	31,549.4	8,764	107.6	0.030	10.0	0.003	21.0	0.006
Water tank	117.9	0.033	39,436.8	10,955	134.5	0.037	12.5	0.003	26.3	0.007
Generator 330 kW	502.9	0.140	168,263.7	46,740	573.7	0.159	53.2	0.015	112.0	0.031
20T truck crane	62.9	0.017	21,033.0	5,842	71.7	0.020	6,7	0.002	14.0	0.004

**NO2 calculated as a percentage of 29% of NOX*

Order 462/1993 does not provide for limits for mobile sources. The order indicates that the polluting emissions of road vehicles are limited as a preventive measure by the technical conditions stipulated in the technical inspections carried out periodically throughout the use of road vehicles registered in the country.

2.1.7.2.3 Emissions during operation

Emissions during the operating period are mainly represented by mobile sources related to car traffic on the highway and the expressway. A detailed analysis of emissions from mobile sources is not necessary considering the absence of limit values in the legislation for these types of sources. The modeling of emissions from mobile sources, as well as the analysis of their impact on air quality, is presented in detail in section 7.3.2.

Secondary, at the level of service spaces and CIC, directed fixed sources (such as thermal power plants or generating sets) may appear, as well as non-directed surface sources (fueling at fuel stations). Occasionally, maintenance operations may take place on the highway and the expressway, which may include asphalting activities or other interventions at the road infrastructure level. These operations are generators of atmospheric pollutant emissions, but their contribution is insignificant.

2.1.7.2.4 Greenhouse gas emissions

Greenhouse gas (GHG) emissions associated with the project are represented by CH4 and N2O (expressed as CO2 eq) resulting from road traffic. According to the data available on the website of the European Environment Agency (2020), road transport is the main contributor to greenhouse gas emissions, covering approx. 21% of their total (CO2 equivalent) at European level. To estimate the GHG emissions resulting from road traffic, the equivalent CO2 emissions were calculated using the methodology of the European Investment Bank – EIB Project Carbon Footprint Methodologies, 2023.

GHG emissions were estimated for the entire project of the Suceava - DN2H highway and the DN2H - Siret expressway, both for the "without project" scenario (reference emissions) and for the "with project" scenario (absolute emissions). The relative emissions were calculated by the difference between the absolute emissions and the reference emissions.

Table no.2-33Estimation of GHG emissions

Forecast year	Reference emissions	Absolute emissions	Relative emissions	
	(tCO2e/year)	(tCO2e/year)	(tCO2e/year)	(% CO2)
2025	43,629	56,581	12,952	+30
2030	49,103	62,759	13,656	+28
2035	51,417	66,302	14,885	+29
2040	53,260	70,491	17,231	+32
2045	55,181	73,935	18,754	+34
2050	56,522	77,632	21,110	+37

Through the implementation of the project, an increase in relative GHG emissions of 28% to 37% is estimated in the period 2025-2050,representing the difference between the emissions generated by road traffic with the presence of the project (absolute emissions) and those generated only with the existing infrastructure (reference emissions).

2.1.7.3 Potential sources of soil and subsoil contamination

In the construction stage, the potential sources of contamination/degradation for soil, subsoil and groundwater will be represented by:

- Improper storage of machinery and construction materials;
- Improper management and storage of the waste resulting from the works, as well as household waste resulting from the personnel involved in the execution of the works;
- The traffic of vehicles and machines involved in achieving the objective. Along with the impurity of the air, there is the possibility that a certain amount of atmospheric pollutants (SO2, NOx, heavy metals) reach the soil, which can lead to the modification of its characteristics;
- Accidental leaks of fuels, lubricants and other chemical substances from the vehicles and machinery involved in the construction works or from their improper storage;
- Degradation of soil quality through improper handling/storage of uncovered/excavated material, implicitly the occurrence of erosion and/or spreading phenomena;
- Contamination of the soil with germinal material belonging to ruderal and/or non-native invasive and potentially invasive species, as a result of soil manipulation activities, as well as the traffic of machinery and work personnel;
- Deposition of the dust resulting from excavation, loading, transport and unloading of construction materials;

- Inadequate management of domestic and technological waste water resulting from the site of the construction site organizations and in the work fronts.

In the operating stage, the potential sources of pollution will consist of the following:

- Road traffic, which represents a continuous source of pollutants from the exhaust gases resulting from the burning of fuels. This represents a continuous source of pollution through which elements such as NOX, SO2, PM10 and heavy metals generated by exhaust gases, road wear, tire wear, etc. they can deposit and accumulate on the soil level, affecting both its quality and the abiotic and biotic elements that depend on it;
- Accidental leaks of fuels, lubricants from waste transport vehicles and personnel involved in maintenance activities;
- Accidental leaks of toxic substances or hydrocarbons as a result of road accidents in which vehicles transporting dangerous substances are involved;
- Substances used in the cold season for snow removal (basic solutions of calcium/sodium chloride) as a result of road maintenance activities, which causes an input of chlorides in the soil and surface waters by entrainment of particles by rainwater, as well as affecting the vegetation on the side of the road.
- The project may generate a potential impact on the geology during the construction period, as a result of the construction of piles and bridges. In the case of the other elements of the project, the works will be carried out with the superficial damage to the soil layers so that they will not have an impact on the geological environment.

2.1.7.4 Noise and vibrations

2.1.7.4.1 Current background noise level

In the study area there is a dense network of roads that represent an important source of noise pollution for the receivers in the area, especially in the localities intersected by national and county roads, as follows:

- DJ178A – Costâna, Mihoveni, Scheia, Parhăuţi;
- DJ178B – Grănicesti;
- DJ208D – Mitocaşi, Mitocu Dragomirnei, Suceava;
- DJ208T – Suceava;
- DJ208U – Mitocu Dragomirnei;
- DJ208V – Squares;
- DJ209D – Calafindeşti, Costâna, Darmăneşti, Botoşaniţa Mare;
- DJ291A – Băncesti, Mănăstioara, Musenita, Siret;
- DN17A – Balcauti;
- DN2H – Railway Station, Milişauţi, Slobozia Sucevei;
- DN29A – Suceava;
- DN29C – Lace.

Among these roads, strategic noise maps were made in 2017 only for DN2, available on the CNAIR website. In order to establish the current background noise level, the strategic noise map was analyzed on the DN2 road section of interest for the study area, between km 441+500 – km 457+100. The relevant localities for the project, analyzed on this section of DN2, are: Balcăuţi, Dănila, Dărmăneşti, Grăniceşti, Iacobesti, Mărţeia Mică, Siret, Slobozia Sucevei, Pătrăuţi, Românești and Suceava.

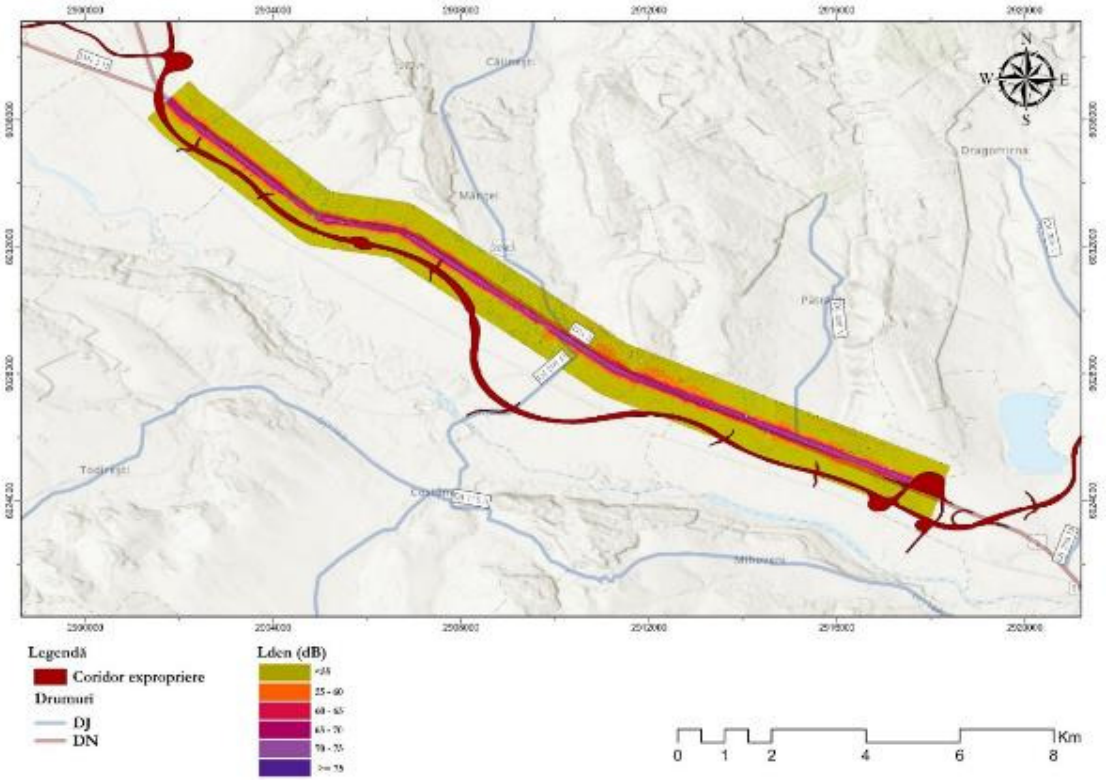


Figure no.2-7Strategic noise map of the DN2 national road, section 441+500 457+100 in relation to the project location

Using the strategic noise map associated with the studied section of the DN2 national road, the localities with data on noise pollution were identified, as follows:

Table no.2-34Localities affected by noise pollution caused by the DN2 national road, according to the CNAIR strategic noise map

CITY	Lzsn(dB)	Total exposed area [km²]	Estimated number of people exposed	Estimated number of exposed dwellings	Estimate number		
					Schools/kindergartens exposed	Exposed hospitals	Exposed administrative buildings
You're screwing up	> 55	1.86	442	190	0	0	5
	> 65	0.66	86	37	0	0	0
	> 75	0.10	0	0	0	0	0
Granicesti	> 55	0.53	14	5	0	0	0
	> 65	0.18	11	3	0	0	0
	> 75	0.04	0	0	0	0	0
The	> 55	0.39	12	5	0	0	0

municipality of Suceava	> 65	0.14	3	1	0	0	0
	> 75	0.02	0	0	0	0	0
Squares	> 55	1.16	65	18	0	0	0
	> 65	0.39	0	0	0	0	0
	> 75	0.07	0	0	0	0	0

Exceedings of the Lzsn threshold value of 55 dB were identified in all the studied localities. The axis of the DN2 national road passes through the center of Grăniceşti and Dărmăneşti localities and thus affects a high percentage of the inhabitants through noise pollution. Most of the houses in the town of Grănicesti are located in the alignment of the DN2 road, being thus subject to a very high noise level, which exceeds values of 65 dB during the day.

The values of Lzsn > 65 dB and Ln > 50 dB are typical for almost all roads with a traffic of more than 3 million vehicles per year.

Also, the project intersects railway tracks 500, 513 and 518. CF500, which connects the cities of Liteni, Suceava and Cernăuţi, crosses the localities of Dărmăneşti, Gara, Musenita, Slobozia Sucevei, Vişcani and the city of Suceava and is located in the vicinity of the town of Milişauţi. CF513, which connects the towns of Dărmăneşti and Cacica, is located in the vicinity of the towns of Costâna, Dărmăneşti and Sârghiesti and crosses the town of Părhăui. CF518, which connects the cities of Suceava and Siret, is located in the vicinity of the town of Mănăstioara. The National Railway Company has created a series of strategic noise maps for the major network nodes in the country, but the municipality of Suceava or any of the railway segments of interest are not found in these maps.

Due to the dense transport networks in the study area, all localities of interest for the project are considered in the evaluation as having a low sensitivity in terms of current background noise (with noise values higher than the limit values).

2.1.7.4.2 Project execution stage

During the construction stage, the noise sources will have a temporary character and duration, they will manifest themselves locally and intermittently. The main sources of noise will be represented by:

- traffic in the areaorganizations ofconstruction site, work front,from access roads,traffic to and from areas where construction materials are obtained (quarries, ballast yards, storage areas, etc.);
- the activities of excavation, handling of ballast materials, respectively their loading and unloading;
- operation of asphalt and concrete stations, asphalt/concrete pouring;
- operation of machines (transporters, heavy-duty trucks, concrete mixers, excavators, cranes, bulldozers, compressors) - operation of engines, handling and transport of loads.

2.1.7.4.3 The operation stage of the project

During the operation stage, the sources of noise and vibrations will be generated by the movement of vehicles at the level of the highway / expressway (traffic and maintenance activity), which will be permanent, carried out during the entire operation period.

2.1.7.4.4 Vibration level

During the operation of the highway, vibrations of different intensities will be generated depending on the volume of traffic, the average driving speed, the type of vehicles that transit a certain sector, the structure of the basement. Also, the effect of these vibrations is based on the type of materials from which the buildings are constructed, the footprint of these buildings, their height and age. Based on these factors, at certain values of the vibration intensity, they can have a direct negative effect both on people and on the constructions in the vicinity of the highway.

Ground vibration (GBV) is the oscillatory motion of the ground around an equilibrium position that can be described in terms of displacement, velocity or acceleration. Vibrational displacement represents the distance a body moves away from its static position. Velocity is the instantaneous movement of this body in a certain period of time, and acceleration is the rate of change of speed.

The frequency range of greatest concern for GBV is approximately 1 Hz to 100 Hz. Typical vibrations from transport activities usually fall within the range of 10 – 30 Hz and with a median around 15 Hz.

Peak Particle Velocity (PPV – mm/s) is generally accepted as the most suitable indicator for assessing the building damage potential. It represents the highest value recorded at the level of the three mutually perpendicular displacement directions of the vibratory movement.

At the European level, there are the following standards that establish limits for vibrations in the context of affecting buildings: the Dutch standard SBR-A (2017), the German standard DIN 4150-3 (2016), the British standard BS 7385-2 (1993) and the Swiss SN 640 312: (1989). These are shown in the following table.

Table no.2-35 Vibration limit values for constructions

The type of building	SBR-A limits depending on the type of vibration manifestation (mm/s2)			DIN 4140-3 limits depending on the type of vibration manifestation (mm/s2)		BS 7385-2 limits depending on the type of vibration manifestation (mm/s2)		Limits SN 640 312: 1989 depending on the type of vibration manifestation (mm/s2)
	Short term	Repetitive – short duration	continuously	Repetitive – short duration	continuously	Repetitive – short duration	continuously	Generally valid
Fragile buildings - monuments	2.9	3.0	2.5	8	2.5	-	-	3
Residential buildings - masonry	5.0	5.0	5.0	15	5.0	15	7.5	5
Concrete buildings	20	20	10	40	10	50	25	12

In the operating stage, the vibrations associated with road traffic will manifest continuously and repetitively, for an indefinite period of time and at different intensities depending on several parameters and situations.

According to a study carried out in Canada (Osama Hunaidi - Traffic vibrations in buildings), car traffic can generate vibrations between 5 and 25 Hz (oscillations per minute). The amplitude of the vibrations at the level of the driving zone of the highway varies between 0.005 and 2 m/s2 (0.0005 and 0.2 g) measured as acceleration or 0.05 and 25 mm/s measured as speed. Predominantly, the frequencies and amplitude of the vibration depend on many factors, including the condition of the road; vehicle weight, speed and systemsuspension; soil type and stratification; the season of the year distance from the road and the type of building. The amplitude and frequency of the vibrations are influenced by the type and stratification of the soil. In the project area, the predominant soil class is that of mollisols (50%), followed by clay loams (22%) and undeveloped truncated or uncovered soils (22%). Considering the given conditions, the vibration values in the operating stage are estimated to register a maximum of 2 m/s2 at the level of the road embankment, this value being located below the most unfavorable limit value presented in the previous table, respectively 2.5 m/s2 for fragile buildings (Standard SBR-A).

2.1.7.5 Light pollution

The Suceava – Siret highway and expressway will contribute to increasing the level of light pollution in the area where it will be built. The project proposes the lighting of several areas of the highway and expressway, including road junctions and other structures.

For the analysis of the current level of light pollution in the project area, publicly available resources were used. Light pollution map[2]was an important resource. This shows the level of artificial brightness of the sky, according to the methodology proposed by Falchi et al. in 2016[3]and is based on the quantification of the light pollution level of the sky based on satellite images and brightness measurements (Falchi et al., 2016).

According to this map, the most light-polluted area in the area of the expressway is located in the municipality of Suceava, approximately 0.3 km from its axis. Among the UATs crossed by it, most localities are characterized by a moderate level of light pollution. Only the localities of Bălcăuți and Calafindești predominantly present a low level of light pollution, oriented on the right side of the expressway axis. The following map shows the highway/express road Suceava – Siret and the level of light pollution in the territorial administrative units intersected by it (based on the data set associated with the work of Falchi et al. from 2016).

[2]The map is available at the following addresshttps://www.lightpollutionmap.info/#zoom=8.67&lat=46.4735&lon=25.6189&layers=B0FFFFFFFTFFFFFFFF

[3]Falchi, F., Cinzano, P., Duriscoe, D., Kyba, CCM, Elvidge, CD, Baugh, K., Portnov, BA, Rybnikova, NA, & Furgoni, R. (2016). The new world atlas of artificial night sky brightness. *Science Advances*, *2*(6), e1600377.

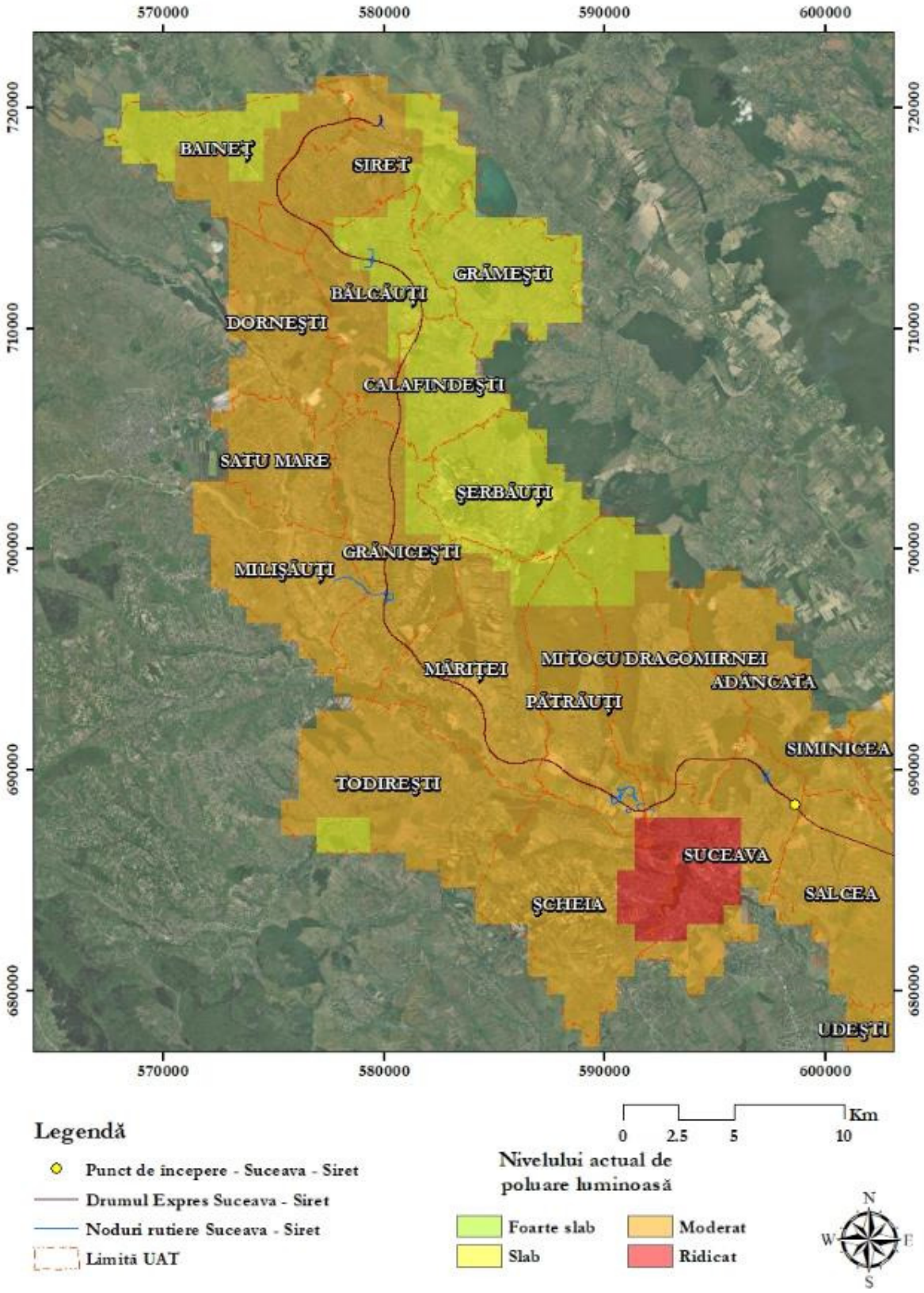


Figure no.2-8The existing level of light pollution in the Suceava – Siret highway / expressway area

The project proposes lighting in several areas: in the areas of passages / bridges / viaducts larger than 100 m, in the area of road junctions, short-term parking lots and in CIC and service spaces. These illuminated sectors are also located inside sensitive areas from the point of view of biodiversity, in areas where the current level of lighting is low.

Based on the available data and information regarding the proposed artificial lighting on the highway / expressway, the areas where there is a high risk of disturbing the activity of wildlife species are the following:

- In the town of Suceava, where the highway/express road provides for a viaduct (km 4+255) near some forest areas;
- In the town of Calafindești, where the highway/express road provides two short-term parking lots near an area with a low level of light pollution;
- In the town of Bălcăuți, where the highway/express road provides a CIC space near an area with a low level of light pollution.

2.1.8 Waste generated by the project and how to manage it

The waste estimated to be generated both in the execution stage and in the operation stage, as well as the manner of their management, are presented in the following table.

Table no.2-36The waste estimated to be generated in the execution stage and in the operation stage

Waste name	Estimated amount to be generated	Place of generation	Unit	Physical condition*	Waste Code**	Management mode
Execution stage						
Mixed municipal waste	36	The social activity of construction personnel	y/y	S	20 03 01	Specially arranged spaces will be created, equipped with bin-type containers. Periodically they will be picked up by authorized operators and transported to the waste depots or to the transfer stations of the localities.
Paper and cardboard	3			S	20 01 01	They will be collected separately in specially arranged temporary storage areas within the site organizations and in the work fronts. Periodically they will be picked up by authorized operators and transported for recovery.
Plastic	2			S	20 01 39	
Metals	1			S	20 01 40	
Metallic mixtures	22	Remains of fittings or other metal elements used in construction	t/ execution period	S	17 04 07	
Plastic waste	9	Material scraps used in construction (PVC pipes, profiles, etc.)		S	17 02 03	
Paper and cardboard packaging	4	Building materials supplied		S	15 01 01	
Packaging of plastic materials	7			S	15 01 02	
Wooden packaging	9			S	15 01 03	
Packaging containing dangerous substances	4			S	15 02 10*	They will be collected and stored selectively, in order to be transported to disposal facilities by authorized operators. The exception is the packaging that is returned to the manufacturer (eg: IBCs).
Absorbents, filter materials (including oil filters not otherwise specified), polishing materials, protective clothing contaminated with hazardous substances	1	Equipment maintenance		S	15 02 02*	They will be collected in sealed bags and stored in specially arranged spaces and will be handed over to authorized operators for disposal.
Other engine, transmission and lubricating oils	34			S	13 02 08*	They will be collected in closed, labeled containers, stored in a closed enclosure equipped with a concrete platform. They will be handed over to authorized units for collection and recovery.
Used tires	10			S	16 01 03	They will be collected on concrete platforms from the site organizations and handed over to

Waste name	Estimated amount to be generated	Place of generation	Unit	Physical condition*	Waste Code**	Management mode
						authorized units for collection and recovery.
Welding waste	0.9	From welding works		S	12 01 13	They will be collected in covered bins located in specially designed spaces and will be handed over to authorized operators for disposal.
Earth and stones other than those specified in 17 05 03*	9	Excavations, excavations		S	17 05 04	Stored in the area of the work fronts and later reused as a filling material.
Sludge from drainable basins	9	From the drainable watertight basins in the construction sites		SS	20 03 04	The sludge collected in the drainable basins that serve the sanitary groups will be mandatorily emptied and transported by authorized operators to nearby treatment plants.
Operation stage						
Mixed municipal waste	225	Social activity of CIC employees and traffic participants (in short-term parking lots)	y/y	S	20 03 01	Within the CIC and in the short-term parking lots, there will be specially arranged spaces equipped with bin-type containers. Periodically they will be picked up by authorized operators and transported to the waste depots or to the transfer stations of the localities.
Paper and cardboard	44			S	20 01 01	They will be collected selectively in the bins provided in the CIC and short-term parking lots. Periodically they will be picked up by authorized operators and transported for recovery.
Metallic mixtures	56			S	17 04 07	
Plastic materials	9			S	17 02 03	
Paper and cardboard packaging	2	Materials supplied in CIC and used for highway / expressway maintenance		S	15 01 01	They will be selectively collected in temporary storage spaces specially arranged within the CIC. Periodically they will be picked up by authorized operators and transported for recovery.
Packaging of plastic materials	3			S	15 01 02	
Wooden packaging	4			S	15 01 03	
Packaging containing dangerous substances	2			S	15 02 10*	They will be collected and stored selectively, in order to be transported to the recovery facilities by authorized operators. The exception is the packaging that is returned to the manufacturer (eg: IBCs).
Used tires	4	Derived from the machinery used for highway / expressway maintenance		S	16 01 03	They will be collected on concrete platforms within the CIC and handed over to authorized units for collection and recovery.
Absorbents, filter materials (including oil filters not otherwise specified), polishing materials, protective clothing contaminated with hazardous substances	0.9			S	15 02 02*	They will be collected in sealed bags and stored in specially arranged spaces and will be handed over to authorized operators for disposal.
Other engine, transmission and lubricating oils	4			S	13 02 08*	They will be collected in closed, labeled containers, stored in a closed enclosure equipped with a

Waste name	Estimated amount to be generated	Place of generation	Unit	Physical condition*	Waste Code**	Management mode
						concrete platform. They will be handed over to authorized units for collection and recovery.
Mixtures of fats and oils from the separation of water/oil mixtures from sectors other than those specified in 19 08 09	180	Hydrocarbon separators	m3/year	SS	19 08 10*	They will be collected from the settling chambers of the hydrocarbon separators and transported by authorized operators for disposal.
Sludge from drainable basins	45	From the drainable cisterns in the CIC, service spaces and short-term parking lots	m3/year	SS	20 03 04	The sludge collected in the drainable basins that serve the sanitary groups will be mandatorily emptied and transported by authorized operators to nearby treatment plants.

** Physical state: Solid-S, Liquid-L, Semisolid-SS.*

*** In accordance with the List containing the waste, provided in the Decision of the European Commission 2014/955/EU and in Annex no. 2 of HG no. 856/2002 regarding the record of waste management and for the approval of the list including waste, including hazardous waste, with subsequent amendments and additions.*

In all stages of the project, contracts will be concluded with authorized companies that will ensure the elimination/utilization of all types of generated waste. All waste generated as a result of the project, in all its stages, will be temporarily stored only on surfaces specially arranged for this purpose.

In all stages of the project, records of waste management will be maintained according to GEO no. 92/2021 regarding the waste regime, with subsequent amendments and additions, GD no. 856/2002 and respectively Law no. 249/2015 regarding the way of managing packaging and packaging waste, with subsequent amendments and additions. All the employees on the construction site will be trained on the handling of waste as well as how to sort it by category, in the containers specially provided for each category of waste.

In the case of hazardous waste, special measures will be taken to manage it (by separate storage only on impermeable surfaces), so as not to contaminate the rest of the waste or the soil. Within the premises of the construction site, the contractor will set up platforms specially designed for the collection and management of all types of waste that will result from the execution of the works, provided with bins, containers and containers specially designed for the temporary storage of waste. The platforms will be set up in such a way as to allow the handling of waste by the contracted authorized companies, in safe conditions. The temporary storage of waste will be done separately, for each type of waste, each container or container intended for storage being labeled with the corresponding waste code, according to HG 856/2002 with subsequent amendments and additions.

2.1.9 Requirements related to the use of land necessary for the execution of the project

During the execution of the works, physical changes to the land may occur due to different categories of works, namely:

- earthworks that lead to soil degradation and induce structural changes in the soil profile;
- removing the topsoil layer and building an artificial profile through the earthworks performed;
- loss of the natural characteristics of the fertile soil layer through inadequate storage of waste or various substances, materials;
- temporary occupation of land for the location of construction site organizations;
- possible modification of soil quality through accidental spills of substances/compounds directly on the soil. This type of impact can occur in case of accidental spills of oil or diesel in the area of work fronts, during the operation of machines in the work fronts or the running of site vehicles;
- qualitative changes of the soil under the influence of pollutants present in the air (qualitative and quantitative changes of the local geochemical circuits);
- changing the function of lands from lands occupied with agricultural crops, pastures to lands covered with road infrastructure constructions.

According to the Urban Planning Certificate issued for the project, from a legal point of view the lands on which the proposed project is executed are made up of properties belonging to the public domain of national interest, the public domain of territorial administrative units, as well as private properties of natural and legal persons.

From an economic point of view, the main current uses of the land on which the highway project is proposed are: agricultural land, watercourses, forest, roads, railway, archaeological sites, communal household areas (cemetery) and built-up areas.

The table below shows the legal regime, as well as the current and planned uses of the land according to the Town Planning Certificate issued by the competent authority.

Table no.2-37The legal regime, the current economic regime and the proposed economic regime for the land in the highway area according to the town planning certificate

County	Legal regime	Current economic regime (current use)	Proposed economic regime (proposed use)
Suceava	The building belongs to the public domain of national interest (national road DN29A, DN2, railway, water, forest), the public domain of Suceava County (DJ 208D), the public domain of the cities of Siret and Milşauţi, the public domain of the communes: Mitocu Dragomirnei, Pătrăuţi, Darmăneşti, Grăniceşti,	Agricultural lands, watercourses, forests, railways, archaeological sites, cemeteries, built-up areas.	Construction land (highwayUm).

County	Legal regime	Current economic regime (current use)	Proposed economic regime (proposed use)
	Calafindeşti, Bălcăuţi, Muşesnita and private properties of natural and legal persons.		

In order to carry out the proposed project, it is necessary to occupy some areas of land, conventionally divided into two categories:

- definitively occupied lands - those land surfaces that will be occupied by the highway embankment, its safety zone, restoration of road connections, relocation of utility networks and highway equipment;
- temporarily occupied lands – land surfaces that will be occupied for construction site organizations and production bases.

2.1.9.1 The temporarily occupied land area

All lands that will be temporarily occupied will be returned to their original use category and conditionUmafterUm Qcompletion of construction works.

For the execution period, it is estimated that a temporarily occupied area of about 36 ha will be needed, for the site organizations (4 site organizations are proposed: S1 = approx. 9 ha, S2 = approx. 9 ha, S3 = approx. 8, 7ha, S4 = approx. 9.2ha).

For the temporary occupation of the landit is not necessary to remove any land surface from the forest fund. The land use category that will be temporarily occupied by the site organizations is arable land.

2.1.9.2 The land area permanently occupied

The land area definitively occupied by the highway was estimated at 822.84 ha, based on the construction limit of the highway (expropriation limit). The definitively occupied lands are those areas of land that will be occupied by the highway, its safety zone and for the restoration of road connections, the highway equipment and the relocation of utilities.

For the realization of the project, it is planned to remove a land area of 37.57 ha from the forest fund.

The estimation of the land areas permanently occupied by the project according to the type of land use are presented in the following table.

Table no.2-38The areas estimated to be permanently occupied by the highway/express road, depending on the different uses of the land

Types of land use	Suceava-Siret highway and expressway [ha]
Localities – Discontinuous built spaces	0.20
Non-irrigated arable areas	738.65
orchards	21.93

Types of land use	Suceava-Siret highway and expressway [ha]
pasture	8.14
Complex cultivation patterns	2.08
Areas mostly occupied by agriculture with significant areas of natural vegetation	8.21
Deciduous forests	36.70
Coniferous forests	0.86
Transition areas between forests and shrubs	5.55

2.1.10Additional services required by project implementation

2.1.10.1 Deforestation and cutting of vegetation

A category of preparatory works for achieving the investment objective that can lead to a potential significant impact on the environment is the cutting of vegetation (trees, shrubs, grasses).

According to preliminary calculations, the areas estimated to be deforested total 37.57 ha. The following table shows the areas proposed to be deforested.

Table no.2-39The areas proposed to be removed from the forest fund and deforested for the realization of the Suceava highway project - DN2H and Expressway DN2H - Siret border

No. No.	countyÞ	failed	The forestry department, the forestry bypass	Development unit (UA)	The surfacethe estimated deforestation (Ha)
1	SUCEAVA	MITOCU DRAGOMIRNA	Forestry Directorate Suceava, OS Adâncata, Deep VI	5A	0.1329
2	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	5A	3.8251
3	SUCEAVA	MITOCU DRAGOMIRNA	Forestry Directorate Suceava, OS Adâncata, Deep VI	5C	0.0321
4	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	5C	0.1189
5	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adancata, VI Adancata	8B	0.2133
6	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	11	0.1300
7	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adancata, VI Adancata	11B	5.0304
8	SUCEAVA	SUCEAVA	Suceava forestry department Deep VI	11C	0.3375
9	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	12	7.1826
10	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adancata, VI Adancata	12D	0.0010
11	SUCEAVA	SUCEAVA	Forestry Directorate	12F	0.0017

No. No.	countyÞ	failed	The forestry department, the forestry bypass	Development unit (UA)	The surfacethe estimated deforestation (Ha)
			Suceava, OS Adâncata, Deep VI		
12	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	13C	2.1579
13	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adancata, VI Adancata	13E	0.6256
14	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adancata, VI Adancata	25	0.0559
15	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	25B	6.0480
16	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adancata, VI Adancata	25C	0.2836
17	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	26	0.0082
18	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	26J	0.4079
19	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	81B	0.0002
20	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	81E	0.2071
21	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	12B	4.7489
22	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	26 L	0.1379
2. 3	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adancata, VI Adancata	8A	2.8221
24	SUCEAVA	SUCEAVA	Forestry Directorate Suceava, OS Adâncata, Deep VI	81AA	0.0767
25	SUCEAVA	MITOCU DRAGOMIRNA	Suceava forestry department Pătrăuți forestry detour, V Dragomirna	31	2.9339
26	SUCEAVA	SUCEAVA	Suceava forestry department Pătrăuți forestry detour, V Dragomirna	31	0.0603
TOTAL					**37.5797**

2.1.10.2 Relocation of utility networks

In order to carry out the project, it is also necessary to relocate some utility networks (water supply and sewerage, transport or gas supply, telephone installations and electrical networks). The

disposition (kilometer positions) of the utilities relocations that will be carried out on the highway route are presented in the following tables.

Table no.2-40Relocation/protection works of water and sewage networks intersected by the project

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area	Other information
1.	Public water supply - sewerage service - Com. Squares	11+700, 11+800	ROSCI0075 Pătrăuți Forest (2 km)	-
2.	Notice City Hall Com. You're screwing up	16+650, 17+800, 19+980	ROSCI0075 Pătrăuți Forest (10.2 km)	-
3.	This Suceava	54+300-55+600, 5+900-5+800	ROSPA0110 Accumulations Rogojești – Bucecea (1.2 km)	-

Table no.2-41Relocation/diversion/protection works of gas/oil transport networks

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area	Other information
1.	Gas transport network	11+800 – 11+900	ROSCI0075 Pătrăuți Forest (7.8 km)	-
2.	Gas transport network	15+600 – 15+700	ROSCI0075 Pătrăuți Forest (10.4 km)	-
3.	Gas transport network	16+450 – 16+550	ROSCI0075 Pătrăuți Forest (11.2 km)	-
4.	Development of an intelligent natural gas distribution network in the commune of Dărmanesti	16+650 – 17+800	ROSCI0075 Pătrăuți Forest (10.2 km)	-
5.	Gas transport network	16+900 – 17+000	ROSCI0075 Pătrăuți Forest (11.4 km)	-
6.	Gas transport network	17+375 – 17+475	ROSCI0075 Pătrăuți Forest (11.5 km)	-
7.	Low pressure natural gas distribution pipeline PEHD Dn 63 mm in execution	49+900 – 50+000	ROSCI0379 Suceava River (2.1 km)	-
8.	Medium pressure natural gas distribution pipe PEHD Dn 110mm	55+500 – 55+600	ROSPA0110 Accumulations Rogojești – Bucecea (0.7 km)	-

The following table shows the telephone networks that will be relocated or protected and the related kilometer positions.

Table no.2-42Relocation works of telephone networks

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area	Other information
1.	RCS-RDS network	1+150, 29+400, 40+600, 42+400, 50+000, 51+100, 52+050	ROSPA0110 Accumulations Rogojești – Bucecea (5 km)	-
2.	Aerial and underground network	1+800 – 2+100	ROSCI0075 Pătrăuți Forest (4 km)	-
3.	Air network	5+600 – 5+700	ROSCI0075 Patrăuti Forest (2.3 km)	-
4.	Underground network	8+800	ROSCI0075 Pătrăuți Forest (2.4 km)	-
5.	Underground network	9+000 – 9+100	ROSCI0075 Pătrăuți Forest (2.4 km)	-

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area	Other information
6.	Underground network	9+800	ROSCI0075 Patrăuti Forest (2.3 km)	-
7.	Underground network	10+400 – 11+400	ROSCI0075 Pătrăuți Forest (1.9 km)	-
8.	Aerial and underground network	25+500 – 25+700	ROSCI0075 Patrăuți Forest (5.9 km)	-
9.	Aerial and underground network	26+400 (strap)	ROSCI0379 Suceava River (5.1 km)	-
10.	Underground network	39+300 – 40+000	ROSCI0075 Pătrăuți Forest (3.3 km)	-
11.	Aerial and underground network	40+300 – 40+700	ROSCI0075 Pătrăuți Forest (4.1 km)	-
12.	Underground network	41+100	ROSPA0110 Accumulations Rogojesti – Bucecea (4.2 km)	-
13.	Underground network	43+300	ROSCI0379 Suceava River (5.2 km)	-
14.	Air network	49+800	ROSCI0379 Suceava River (3.2 km)	-
15.	Aerial and underground network	55+200 (strap), 55+700	ROSPA0110 Accumulations Rogojești – Bucecea (0.4 km)	-
16.	DC FIBER HOME SRL			

The following table shows the relocation or protection works of the electrical networks and their related kilometer positions.

Table no.2-43Electrical network relocation/diversion works

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area	Other information
1.	LEA 110 KV DOROHOI CONNECTIONS	0+500 approx	ROSCI0380 Suceava Liteni River (4.4 km)	-
2.	LES 20KV, LES 0.4, LEA 0.4 KV	1+900 – 2+200	ROSCI0075 Pătrăuți Forest (4.1 km)	-
3.	LEA 20KV DERIVATION PT 2	7+000 – 7+900	ROSCI0075 Pătrăuți Forest (2.4 km)	-
4.	LEA 20 KV LEA 20 KV AVICOLA LEA 20 KV ITCANI – DEEP DERIVE PTZ1	8+100 – 9+300	ROSCI0075 Pătrăuți Forest (2.1 km)	-
5.	LEA 20 KV ITCANI	PARALLELISM – 9+800 – 11+300	ROSCI0075 Pătrăuți Forest (1.9 km)	-
6.	LEA 20 ITCANI – DARMANESTI	11+600 – 11+700	ROSCI0075 Pătrăuți Forest (1.9 km)	Patrăuţeanca River
7.	LEA 20 KV ITCANI – DARMANESTI, LEA 20 KV	16+400 – 17+600	ROSCI0075 Pătrăuți Forest (3.7 km)	-
8.	LEA 20 KV	26+200, 28+400,	ROSCI0075 Pătrăuți Forest (5.5 km)	-
9.	LEA 20 KV	28+500 – 28+60029+400 – 29+80030+900 – 31+500	ROSCI0075 Patrăuti Forest (5.6 km)	-
10.	LEA 20 KV	39+200 – 39+300	ROSCI0075 Pătrăuți Forest (3.3 km)	-
11.	LEA 20 KV DERIV PT A1 RUDESTI LEA 20 KV SIRET – BALCAUTI	40+000 – 40+10039+500 – 40+600	ROSCI0075 Pătrăuți Forest (3.9 km)	-
12.	LEA 110 KV RADUTI - SIRET	43+300 – 43+400	ROSCI0379 Suceava River (5.2 km)	-

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area	Other information
13.	LEA JT	50+300	ROSCI0379 Suceava River (3.6 km)	-
14.	LEA JT	51+900	ROSPA0110 Accumulations Rogojesti – Bucecea (3.2 km)	-
15.	LEA 20KV – SIRET – TATARCINA	51+700 – 52+100	ROSPA0110 Accumulations Rogojesti – Bucecea (3.2 km)	-
16.	LEA 20 KV	53+600 – 53+700	ROSPA0110 Accumulations Rogojesti – Bucecea (1.9 km)	-
17.	LEA 20 KV SIRET – MIHAILENI	55+100 – 55+200	ROSPA0110 Accumulations Rogojesti – Bucecea (0.8 km)	-
18.	LEA 0.4 KV	55+100 – 55+200	ROSPA0110 Accumulations Rogojeşti – Bucecea (0.4 km)	-

The following table shows the sewer relocation works and their related kilometer positions.

Table no.2-44Relocation of sewage networks

No. No.	Name	The distance from the nearest protected natural area		Other information
		[km]	name	
1.	Node Km 0+000 Bretea 1 Km 0+375	1.8	ROSCI0075 Pătrăuţi Forest	-
2.	Node Km 0+000 Belt 1 Km 1+050	2.1	ROSCI0075 Pătrăuţi Forest	-
3.	Express Road Km 1+650	4.5	ROSCI0075 Pătrăuţi Forest	-
4.	Express Road Km 3+200	3	ROSCI0075 Pătrăuţi Forest	-
5.	Express Road Km 4+000	3.2	ROSCI0075 Pătrăuţi Forest	-
6.	Express Road Km 4+331.82	3.3	ROSCI0075 Pătrăuţi Forest	-
7.	Express Road Km 4+972	3.2	ROSCI0075 Pătrăuţi Forest	-
8.	Express Road Km 5+214	3	ROSCI0075 Pătrăuţi Forest	-
9.	Express Road Km 5+700	2.5	ROSCI0075 Pătrăuţi Forest	-
10.	Express Road Km 5+900	2,3	ROSCI0075 Pătrăuţi Forest	-
11.	Express Road Km 6+020	2.2	ROSCI0075 Pătrăuţi Forest	-
12.	Express Road Km 6+080	2	ROSCI0075 Pătrăuţi Forest	-
13.	Express Road Km 7+183	2,3	ROSCI0075 Pătrăuţi Forest	-
14.	Express Road Km 8+150	2	ROSCI0075 Pătrăuţi Forest	-
15.	Express Road Km 8+950	2.4	ROSCI0075 Pătrăuţi Forest	-
16.	Express Road Km 9+014	2.4	ROSCI0075 Pătrăuţi Forest	-
17.	Express Road Km 9+750	2.4	ROSCI0075 Pătrăuţi Forest	-
18.	Express Road Km 9+980	2.2	ROSCI0075 Pătrăuţi Forest	-

The following table shows the relocation works of the ANIF canals, proposed in the areas with bridges.

Table no.2-45Relocations of ANIF channels, proposed in areas with bridges

No. crt.	Kilometer position of ANIF canal intersection	Type of work	Interval provided for the completion of the work		Length (m)	The distance to the nearest protected area	
			km start	km end		[km]	name
1	10+190	recalibration, unclogging channel 100m downstream and 100m upstream	10+185	10+195	125	2	ROSCI0075 Pătrăuţi Forest
2	27+475	recalibration, unclogging channel 100m downstream and 100m	27+495	27+505	160	5.8	ROSCI0075 Pătrăuţi Forest

No. crt.	Kilometer position of ANIF canal intersection	Type of work	Interval provided for the completion of the work		Length (m)	The distance to the nearest protected area	
			km start	km end		[km]	name
		upstream					
3	29+180	recalibration, unclogging channel 100m downstream and 100m upstream	29+175	29+185	100	5,6	ROSCI0075 Pătrăuţi Forest
4	29+502	recalibration, unclogging channel 100m downstream and 100m upstream	29+555	29+565	185	5.5	ROSCI0075 Pătrăuţi Forest
5	31+325	recalibration, unclogging channel 100m downstream and 100m upstream	31+320	31+330	155	6.4	ROSCI0075 Pătrăuţi Forest
6	32+240	recalibration, unclogging channel 100m downstream and 100m upstream	32+235	32+245	140	5	ROSCI0075 Pătrăuţi Forest
7	37+737	recalibration, unclogging channel 100m downstream and 100m upstream	37+732	37+742	430	2.9	ROSCI0075 Pătrăuţi Forest

2.1.10.3 Relocating and restoring road connections

The route of the Suceava-DN2H highway and the DN2H expressway – Frontiera Siret intersects a series of exploitation roads, interrupting their continuity.

Depending on their importance, uneven intersections without access to the highway (of the type of passage over/under the highway) or their deviation along the highway and their grouping in order to create a common passage over the highway were foreseen. In the case of roads of communal or county importance, passages were provided in the intersection area. These are shown in the following table.

Table no.2-46County roads that require relocation

No. No.	Name	Position km	The distance from the nearest protected natural area		Other information
			[km]	name	
1.	DJ208D	5+790 – 5+830	1 km	ROSCI0075 Pătrăuţi Forest	-
2.	DJ209D	16+475-16+515	1 km	ROSCI0075 Pătrăuţi Forest	-
3.	DJ178B	31+500-31+540	1 km	ROSCI0075 Pătrăuţi Forest	-
4.	DJ209D (relocation at km 39+650) through an opening of the viaduct	39+630-39+670	1 km	ROSCI0075 Pătrăuţi Forest	-
5.	DJ209D	41+230-41+270	2 km	ROSCI0075 Pătrăuţi Forest	-
6.	DJ291A	49+793-49+833	961 m	ROSPA0110 Accumulations Rogojesti – Bucecea	-

Table no.2-47Communal and local exploitation roads that require relocation

No. No.	Name	Position km	The distance from the nearest protected natural area		Other information
			[km]	name	
1	Local road (Fetesti-Suceava) over the highway	0+240 – 0+260	4.5	ROSCI0380 Suceava River – Liţeni	-
2	DE local underpass	8+110-8+130	1.8	ROSCI0075 Pătrăuţi Forest	-
3	DE local (relocation at km 11+750) underpass	11+540 – 11+560	1.9	ROSCI0075 Pătrăuţi Forest	-
4	Local road (Patrauti-Mihoveni) passage over the highway	11+690 – 11+710	2	ROSCI0075 Pătrăuţi Forest	-
5	DE local (relocation at km 12+450) underpass	12+190 – 12+210	1.9	ROSCI0075 Pătrăuţi Forest	-
6	Local road (Patrauti-Mihoveni) passage over the highway	13+367 – 13+387	2.1	ROSCI0075 Pătrăuţi Forest	-
7	OF relocation parallel to the highway and crossing through the passage on the highway at km 15+080	14+807 – 14+827	3.3	ROSCI0075 Pătrăuţi Forest	-
8	DL relocation parallel to the highway and crossing through the passage on the highway at km 15+080	15+390 – 15+410	3.4	ROSCI0075 Pătrăuţi Forest	-
9	OF relocation parallel to the highway and crossing through the passage on the highway at km 17+295	17+490 – 17+510	3.4	ROSCI0075 Pătrăuţi Forest	-
10	OF relocation parallel to the highway and crossing through the passage on the highway at km 18+170	17+685 – 17+705	3.2	ROSCI0075 Pătrăuţi Forest	-
11	Local road over the highway	19+967 – 19+987	2.5	ROSCI0075 Pătrăuţi Forest	-
12	Local relocation road parallel to the highway and crossing through the passage on the highway at km 22+335	21+847 – 21+867	3.9	ROSCI0075 Pătrăuţi Forest	-
13	Local road (Danila-Halta Danila) – passage on the highway	22+923 – 22+943	4.5	ROSCI0075 Pătrăuţi Forest	-
14	OF relocation parallel to the highway and crossing through the passage on the highway at km 23+700	23+365 – 23+385	4.7	ROSCI0075 Pătrăuţi Forest	-
15	Local road - passage on the highway	24+435 – 24+455	5.5	ROSCI0075 Pătrăuţi Forest	-
16	OF relocation parallel to the highway and crossing through the overpass at km 29+804	28+740 – 28+760	4.6	ROSCI0379 Suceava River	-
17	DC40C (Granicesti-Dumbrava) passage over the expressway	29+794 – 29+814	4.8	ROSCI0379 Suceava River	-

No. No.	Name	Position km	The distance from the nearest protected natural area		Other information
			[km]	name	
18	OF relocation parallel to the express road and crossing through the passage on the express road at km 30+508	30+257 – 30+277	4.8	ROSCI0379 Suceava River	-
19	OF relocation parallel to the express road and crossing through the passage on the express road at km 32+700	33+085 – 33+105	3.8	ROSCI0379 Suceava River	-
20	OF relocation parallel to the express road and crossing through the passage on the express road at km 33+675	33+455 – 33+475	3.9	ROSCI0379 Suceava River	-
21	OF relocation parallel to the express road and crossing through the passage on the express road at km 33+675	33+905 – 33+925	3.9	ROSCI0379 Suceava River	-
22	DC35 (DN2-Calafindeşti) expressway passage	35+203 – 35+223	3.9	ROSCI0379 Suceava River	-
2. 3	OF relocation parallel to the express road and crossing through the passage on the express road at km 35+213	35+685 – 35+705	3.8	ROSCI0075 Pătrăuţi Forest	-
24	DC35 (BalăuÞi-Gropeni) expressway passage	40+614 – 40+634	4.1	ROSPA0110 Accumulations Rogojesti – Bucecea	-
25	OF relocation parallel to the express road and crossing through the passage on the express road at km 42+230	42+380 – 42+400	4.6	ROSPA0110 Accumulations Rogojesti – Bucecea	-
26	OF relocation parallel to the express road and crossing through the passage on the express road at km 43+880	44+010 – 44+030	4.5	ROSCI0379 Suceava River	-
27	OF relocation parallel to the expressway and crossing through the viaduct opening at km 48+940	48+045 – 48+065	2.5	ROSCI0379 Suceava River	-
28	OF relocation parallel to the express road and crossing through the passage over the express road at km 49+945	49+465 – 49+485	2.9	ROSCI0379 Suceava River	-
29	Strada Dragos Voda (locality Bancesti) passage over the expressway	50+443 – 50+463	3.8	ROSCI0379 Suceava River	-
30	DC52 (Siret-VăşcăuÞi) passage over express road	51+996 – 52+016	3.2	ROSPA0110 Accumulations Rogojesti – Bucecea	-
31	OF relocation parallel to the express road and crossing through the passage over the express road at km 53+340	53+330 – 53+350	2	ROSPA0110 Accumulations Rogojesti – Bucecea	-

No. No.	Name	Position km	The distance from the nearest protected natural area		Other information
			[km]	name	
32	DC52 (Siret-Vășcăuți) crossing through the opening of the bridge over Siret	53+665 – 53+685	1.2	ROSPA0110 Accumulations Rogojesti – Bucecea	-

2.1.10.4 Maintenance roads

The maintenance roads will be located on the entire highway/expressway inside the permanent safety fence. In the following figure, the characteristics of the maintenance roads are represented, namely the width is 3.5 m with road structure made of ballast.

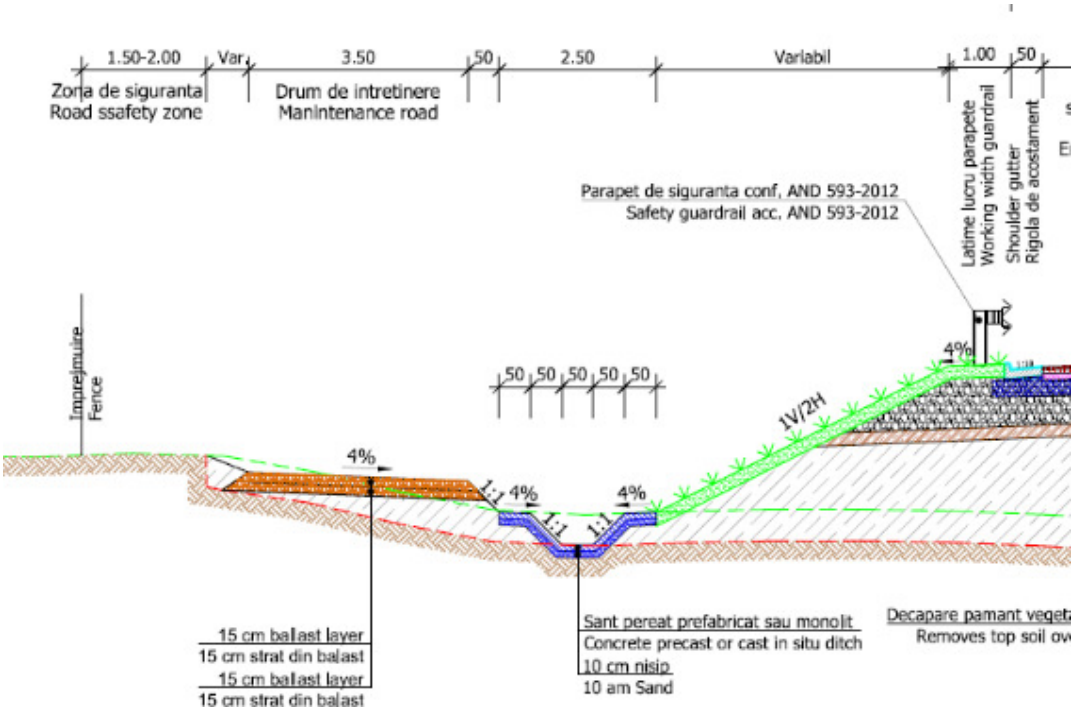


Figure no.2-9Location of maintenance roads

2.1.10.5 Decommissioning and demolition works

No demolition works are necessary for the realization of the project.

2.1.11Activities generated as a result of project implementation

The construction of the Suceava DN2H highway and the Siret DN2H border expressway leads to the realization of an optimized road infrastructure, which will have a major role in regional development and in close connection with the achievement of MPGT objectives but also with other European strategies, such as:

- improving the mobility of the population and the traffic related to the transport of goods within the basic TEN-T network and the extended network;
- ensuring a safe and operational road transport network, which will contribute to reducing the number of road accidents, as well as reducing travel times;
- ensuring territorial and social cohesion;
- smart, sustainable and inclusive economic growth.

The highway will serve the following:

- Streamlining the traffic on DN2 by reducing transit times and supporting a sustainable development of the transport infrastructure;
- Increasing the degree of safety and reducing human losses caused by accidents;
- Responds to freight transport and logistics needs between the North-East region (Moldova);
- The development of tourism through much greater accessibility to the big cities;
- As a result of the completion of the project, new jobs can be created both during the construction period and later during the operation period of the highway.

After the implementation of the project, the main activities that can be generated by it are associated with the service sector. The areas of short-term parking and service spaces will facilitate commercial activities, and the connection of the highway with different localities can also facilitate the development of the tourism sector in the area.

2.1.12 Description of the technological processes of the project

For the implementation of the project, a series of construction works will be necessary, which will include:

- Location of site organizations;
- Landscaping
- Realization of earthworks;
- Realization of the relocation or protection works of intersected utilities;
- Realization of works of art (bridges, walkways, passages);
- Realization of hydrotechnical works;
- Construction of the rainwater drainage system;
- Realization of consolidation works;
- Carrying out the necessary works for traffic protection;
- Realization of works for environmental protection;
- Landscaping works.

For the realization of the project, demolition works of some existing objectives located on the highway route will not be necessary.

Earthworks

For the actual execution of the highway, earthworks are initially required. The embankments support the carriageway and ensure its connection to the natural terrain. Through the road structure, they take over the efforts arising from the demands of the vehicles.

The following categories of works are distinguished during the execution of earthworks:

- Preparatory work;
- Basic works;
- Finishing work.

Preparatory work

These works are carried out before the basic works and aim to bring the natural terrain (on the width of the highway and expressway area) to the state where it can be excavated or receive the earth filling.

The preparatory works are the following:

- Obtaining land;
- Drawing the work platform;
- Removal and storage of the vegetation layer;
- Landscaping;
- Protection and relocation of utilities;
- Arrangements for environmental protection and restoration;
- Ammunition clearance (demining of the project implementation area) - carried out along the entire route of the highway, more specifically on its edge.

Basic works

After the preparatory works are finished, the basic works are carried out, i.e. the actual earthworks, which consist of:

- loading, transporting and leveling the earth in the backfill;
- soil compaction.

Fillings that are usually compacted will be made with the following types of equipment:

- compactor cylinders;
- tankers for the transport of water needed to correct the humidity of embankments put into operation;
- bulldozers, graders.

Finishing works

The group of finishing works includes the operations necessary to bring the platform, slopes and surface water drainage devices to a good working condition and a suitable aesthetic presentation.

Foundations and road dressings

The foundation is the part between the highway bedandexpressway and pavement and has the role of receiving, distributing and transmitting to the embankments or the natural terrain the loads of vehicles acting on the road pavement.

The road surface represents the part of the highway placed above the foundation and which supports the traffic and can be made up of one or more layers. The set of layers of the covering and the foundation is called a road system.

From a constructive point of view, the road structure of the highway is made up of:

- form layer;
- foundation layer;
- base layer;
- connecting layer;
- wear layer.

The execution technology of the road system requires the use of numerous materials and raw materials for the technological processes of manufacturing concrete, asphalt mixtures, etc.

Regarding the road structure, the road system adopted for the road will be a semi-rigid road system.

Works on the highway / expressway superstructure

Laying the ballast layer in the foundation involves unloading it from dump trucks, mechanized leveling and compaction with the vibratory cylinder. The layer of natural aggregates stabilized with cement involves preparing the mixture in the concrete plant, bringing it to the site and then using the above technology.

The priming of the surfaces with cationic emulsion with quick breaking is done with a special tanker truck. The base layer is made of asphalt mixture with hot bitumen and crushed aggregates. The mixture will be brought to the construction site with dump trucks equipped with tarpaulins, unloaded into distributors and then compacted with specific cylinders for asphalt. The hot run screening binder bond layer will follow the above technology. The wear layer of the stabilized asphalt mixture will be executed using the same technology.

The transport of the mixture is done with isothermal dump trucks to maintain the temperature until it is put into operation. The laying of the coating is done with the spreader-finisher, a complex machine consisting of: leveling plate, thickness adjustment device, vibrating beam, spreading auger, hopper, conveyor belt.

Works of art

The works of art fall into the following categories: bridges, passages, viaducts, boxed structures and decks.

1. Bridges

The superstructure of the bridges on the highway and expressway consists of two decks (one for each direction of traffic), made of prefabricated pre-compressed concrete beams for spans up to 40.00 m, metal beams for spans between 50.00 - 90 .00 m and monolithic beams with variable height pre-compressed concrete, cast in cantilever, for openings between 90.00 – 150.00 mm.

The adoption of the continuity system at the level of the over-concreting plate at the decks of the highway structures will lead to the realization of a reduced number of watertight devices to cover the expansion joints, and therefore to lower post-execution maintenance costs.

The main advantages of this solution are:

- A reduced number of beams in the cross section;
- The use of prefabricated elements allows a higher construction speed;
- Greater control over element performance.

For an efficient response of the superstructure to seismic actions, monolithic reinforced concrete mezzanines are provided at both ends of the deck, and anti-seismic devices are installed on the infrastructure benches.

The abutments of highway/expressway bridges are massive reinforced concrete abutments, with turned walls and retaining wall. They are founded indirectly, by means of drilled piles of large diameter. The drilled piles are made of monolithic reinforced concrete, with a different length depending on the loads from the superstructure and the lithological structure of the soil in which they are made.

In the horizontal plane, the connection of the structure with the highway embankment is done with the help of connection plates, to avoid different settlements between the road system on the road and the road system on the superstructure of the works of art. The connections in the vertical plane with the embankment of the highway/express road of the works of art are made, depending on the existing situation in the field of each structure with quarter cones, retaining walls made of gabions, etc.

The piles of the structures have lamellar elevations, provided at the top with a reinforced concrete ruler. They are indirectly founded by means of drilled piles of large diameter, monolithically made of reinforced concrete. The drilled piles are solidarized at the top with monolithic reinforced concrete screeds.

At each end of the structures, water drains and access stairs will be constructed.

2. passages

The passages have the width of the carriageway of about 7.80 m with sidewalks of about 2.35 m on each side of the superstructure. The minimum opening of passages crossing the highway/express road is 28.00 m.

The deck of the passageways is composed, in cross-section, of prefabricated beams, solidarized between them with monolithic reinforced concrete mezzanines and in their upper part by means of a monolithic cast reinforced concrete surfacing plate. The static scheme of the structure is of the "continuous beam" type.

The abutments of the passages over the highway/express road are of the drowned type, with two pillars, made of monolithic reinforced concrete, with turned walls. The piles will be founded indirectly by means of drilled piles of large diameter.

In the horizontal plane, the connection of the structure with the highway embankment will be done with the help of connection plates, to avoid different settlements between the soil filling behind the piles and the highway embankment.

3. Boxed structures and decks

These structures are intended for the crossing of both watercourses and various other communication routes (national road, county roads, communal roads). They are located both on the highway route and on other adjacent routes (road junctions). The location possibilities, along with the obliquity imposed by the situation on the ground and the gauge values that must be ensured, lead to a significant variety of lengths of these types of structures.

In cross-section, the structures are of the frame type, monolithic, made of reinforced concrete minimum class C30/37. It is based on a layer of concrete with the role of protection against the action of the freeze-thaw phenomenon. All concrete areas in contact with the ground will be protected by applying appropriate insulating solutions. Behind the walls, the draining filling, covered in geotextile, will be executed. The evacuation of infiltrated water will be done longitudinally of the structure (respectively transverse to the highway), through PVC barbicans. The exterior of the slab will be protected with a waterproofing membrane, adequately protected with a special mortar. The connections with the embankments will be made through C30/37 reinforced concrete wings (founded similar to the frame structure) and reinforced concrete connection plates.

Water collection and evacuation works

The drainage of rainwater was achieved by designing trenches, ditches that are discharged into the outfalls, after appropriate pre-treatment. The collected rainwater, before being discharged into the outfalls, passes through decanters and hydrocarbon separators in order not to negatively influence the quality of the existing waters in the outfall.

The separators will be mounted on a layer of compacted aggregates. Another layer of sand will be placed over this layer.

The compaction of the fillings around the hydrocarbon separators will be done with light machinery. The fill will be bedded and compacted at the same level around the separators.

The installation of the hydrocarbon separators and the execution of the settling basins presupposes the setting up of the work platform and the actual layout of the works.

Consolidation works

Several types of consolidation works were planned for the realization of the project. Details regarding these works are presented in the section2.1.4.1.10

Hydrotechnical works

The highway project crosses a series of watercourses, located in the Siret hydrographic space. Their list is presented in the section2.1.4.1.9

Enclosures

The installation of the parapets provided for in the project will be done as follows:

- The pillars supporting the parapets in the field (foundations) will be fixed according to the technical sheet resulting from the shock test;
- The overlap of the metal parapet slats will be done respecting the principle of the direction of attack of the traffic;
- On bridges with devices to cover the expansion joints, the safety parapet and the pedestrian parapet will be provided with elements to compensate for the length in the area of the joints and end elements;
- Red and white or yellow (approved) reflective devices and signaling elements at the end of the parapet will be mounted on the parapet.

Signs and markings

The execution technology for horizontal signaling works – longitudinal, transverse and various road markings consists of:

- cleaning surfaces;
- pre-marking;
- the execution of longitudinal and transversal markings, through arrows and various inscriptions, executed with piles for directing traffic;
- surface cleaning;
- pre-marking;
- execution of markings.

The surface of the road surface, where the marking material is to be placed, will be clean and dry.

Pre-marking is performed before the actual marking operation. Pre-marking is performed with surveying devices for all markings. The pre-marking is done by drawing landmarks on the road surface.

- During the execution of the works, the following aspects will be taken into account:
- ensuring free spaces on the highway/road, to ensure the working speed of the marking machine, according to its parameters;
- execution of marking and installation of protective cones;
- protecting the applied marking, with a cone recovery vehicle;
- the method of covering the paint layer with microbes is constantly monitored. If an uneven spreading of them is noticed, the works are stopped immediately and the appropriate measures are taken.

The side markings delimiting the traffic lanes from the emergency lane, as well as the one in the median zone, will be of the resonator type.

On the deceleration lanes of the road junctions, to warn about the reduction of speed, transverse resonator markings will be used in sequences of 6 lanes, located at a distance of 1 m from each other.

On the braces of the junctions, the lateral delimitation marking of the carriageway will be executed profiled to ensure the resonator effect.

The technology of making the asphalt mixture

- Asphalt mixtures are prepared in installations equipped with devices for predosing, drying, springing and gravimetric dosing of natural aggregates, gravimetric or volumetric dosing of bitumen and filler, as well as a device for forced mixing of aggregates with the bituminous binder. The verification of the functioning of the asphalt mixture production installations is done periodically by specialized personnel according to a maintenance program specified by the equipment manufacturer and the metrological verification program of the measuring and control devices.
- The stages of making the asphalt mixture are as follows:
- Picking up the aggregates from the warehouse with the help of self-loaders, loading them into the compartments of the predosing bunker of the station, from where, by means of the conveyors, they are directed into the drum for drying and heating;
- Introducing the hot aggregates into the mixer for preparing the mixture;
- Pneumatic transport of the filler from the warehouse to the working silo of the installation, then to the filler dispenser with the help of an elevator. From the dispenser, the filler is fed into the mixture mixer by means of a conveyor;
- The fluidized bitumen is transported by pumping from car tankers to the stock tanks, and from here by pumping to the day storage;
- The fluidization of the bitumen is carried out with the help of the boiler that uses hot oil as a heating agent;
- Mixing the hot aggregates with filler and bitumen in the station's mixer, thus resulting in the actual asphalt mixture. From the mixer the mixture is sent to the storage hopper for dispatch to the work points. To maintain the constant temperature of the asphalt mixture, until its delivery, the storage bunker is equipped with a heating installation, which uses hot oil as a heating agent;
- The transport of the mixture to the work points is done with a dump truck (covered with a tarpaulin) that goes under the storage hopper and takes the mixture by gravity.

Concrete production technology

The raw materials and materials used for the preparation of concrete are: sorted river aggregates, cement and water.

- The technological flow of concrete preparation is as follows:
- Bringing the sorted aggregates from the ballast with the help of vehicles, unloading and storing them on the sorters;

- Bringing cement in specialized wagons, unloading it in silos;
- Taking the aggregates from the warehouse with the help of self-loaders, loading them into the compartments of the station's dosing hopper, from where, by means of conveyors, they are directed to the loading ship of the concrete station's mixer;
- The cement from the stock warehouse is loaded by gravity into an impeller, from where it is sent to the service silos with the help of compressed air. From the silos, with the help of conveyors, the dosing scale is fed. After dosing, the cement is discharged by gravity into the mixer of the concrete station;
- Mixing aggregates with cement and water in the station's mixer. After mixing, the concrete is unloaded by gravity into concrete trucks and taken to the work sites.

Transport activities

For the realization of the project, a large and different volume of materials, semi-finished and prefabricated, is used so that it is necessary to use a diverse range of means of transport:

- dump trucks of various capacities (generally over 16 tons), dumpers, tankers, autoisotherms;
- concrete mixers and concrete pumps;
- trailers.

2.1.13 The existing PP characteristics, proposed or approved, which may generate a cumulative impact with the project which is in the evaluation procedure and which may affect the natural areas protected by community interest;

In order to evaluate the impact on the species and habitats of the Natura 2000 sites considered in the evaluation, the cumulative impact of the project on them was analyzed. In this sense, the presence of other projects to be carried out or currently in the execution process and which have the potential to affect habitats and species of community interest was analyzed.

The following projects generate cumulative effects on the analyzed Natura 2000 sites:

- DX5B Suceava – Botoşani, located at a distance of:
  - 900 m from the site ROSCI0076 Dealul Mare – Hârlău;
  - 900 m from the site ROSPA0116 Dorohoi – Şaua Bucecei;
  - 2200 m from the site ROSCI0380 Suceava River - Liteni;
  - 4700 m from the site ROSAC0391 Siretul Mijlociu – Bucecea;
- Extension of sewerage networks in the city of Siret - Vama Siret, Suceava county;
  - Intersects ROSPA0110 Accumulations Rogojeşti – Bucecea;
  - 8600 m from the site ROSCI0075 Păduera Patrăuţi;
- Pašcani – Suceava highway, located at a distance of:
  - 1000 m from the site ROSCI0380 Suceava Liteni River;

- 1400 m from the site ROSCI0076 Dealul Mare – Hârlău;
- 1400 m from the site ROSPA0116 Dorohoi – Bucecei Saddle;

⚙ CF modernization: Ilva Mica – Suceava located at a distance of:

- 2000 m from the site ROSCI0380 Suceava Liteni River;
- 4900 m from the site ROSCI0075 Pătrăuti Forest;

⚙ CF modernization: Pascani – Darmanesti, located at a distance of:

- 15 m from the site ROSCI0380 Suceava Liteni River;
- 40 m from the site ROSCI0379 Suceava River;
- 2100 m from the site ROSCI0075 Patrăuti Forest;
- 3200 m from the site ROSCI0076 Dealul Mare – Hârlău;

⚙ CF electrification: Darmanesti – Vicsani, located at a distance of:

- 2900 m from the site ROSCI0075 Pădurea Patrăuți;
- 7900 m from the site ROSPA0110 Accumulations Rogojești – Bucecea.

The collection of information regarding the plans and projects proposed in the area was also achieved through consultation with local stakeholders, especially the UAT Town Halls in the highway area.

The construction of the Suceava DN2H highway and the Siret border DN2H expressway may amplify existing pressures or anticipated threats, and has the potential to generate a significant cumulative impact, especially in the case of habitats and species in an unfavorable-inadequate or unfavorable-bad conservation status .

2.1.14 Summary of the project's interventions inside or in the area of Natura 2000 sites

The scope of the project does not cross Natura 2000 sites. It is adjacent to 5 Natura 2000 sites, the closest being ROSPA0110 Rogojești Reservoirs – Bucecea, located at a distance of about 0.4 km from the project, followed by ROSCI0075 Pădurea Pătrăuți, located at a distance of 0, 7 km, ROSCI0380 Suceava Liteni River located at a distance of 4.1 km and ROSCI0391 Siretul Mijlociu – Bucecea located at a distance of 8 km.

The interventions proposed by the project in the vicinity of the Natura 2000 sites are mainly related to the embankment of the highway. No interventions are proposed inside the Natura 2000 sites.

The following tables summarize the interventions that generate impact on the species in the analyzed Natura 2000 sites.

Table no.2-48Analysis of project interventions in relation to the ROSCI0075 Pădurea Pătrăuţi site

Intervention code	Intervention	Effects	Direct impacts	Indirect impacts	Secondary impacts	Cumulative impacts	Long and short term impacts	species	Parameter / target affected	Impact quantification	Quantification mode
IE1.	Realization of site organizations	Collision of some individuals with construction site traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Short	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-	Short	*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IE2	Relocation of utility networks	Collision of some individuals with construction site traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Short	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-	Short	*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IE3	Relocating roads	Collision of some individuals with construction site traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Short	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-		*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IE4.	Earthworks	Interruption of connectivity of habitats	Fragmentation of habitats	-	-	-	Short	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-		*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IE5	Artwork (above ground)	Collision of some individuals with construction site traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Short	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-		*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IE6	Consolidation works	Collision of some individuals with construction site traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Short	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-		*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IE7	Hydrotechnical	Collision of some	Reduction of	-	-	-	Short	*Carabus*	Population	1 individual	Species mortality

Intervention code	Intervention	Effects	Direct impacts	Indirect impacts	Secondary impacts	Cumulative impacts	Long and short term impacts	species	Parameter / target affected	Impact quantification	Quantification mode
	works	individuals with construction site traffic - Direct mortality of some individuals	the population					*variolosus*	size	(accidental)	risk analysis
				-	-	-		*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IE8	Highway works	Collision of some individuals with construction site traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Short	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-		*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IE9	Rehabilitation works of the lands temporarily affected by the works	Collision of some individuals with construction site traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Short	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-		*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IO1.	The development of car traffic	Collision of some individuals with car traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Long	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-	Long	*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-	Long	*Myotis myotis*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-	Long	*Myotis dasycnema*	Population size	2 individual (accidental)	Species mortality risk analysis
				-	-	-	Long	*Barbastella barbastellus*	Population size	3 individual (accidental)	Species mortality risk analysis
IO2.	Precipitation management	-	-	-	-	-	Long				
IO3.	Maintenance and upkeep works	Collision of some individuals with construction site traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Long	*Carabus variolosus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-	Long	*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
IO4.	The activity of	Collision of some	Reduction of	-	-	-	Long	*Carabus*	Population	1 individual	Species mortality

Intervention code	Intervention	Effects	Direct impacts	Indirect impacts	Secondary impacts	Cumulative impacts	Long and short term impacts	species	Parameter / target affected	Impact quantification	Quantification mode
	short-term parking lots and CIC	individuals with car traffic - Direct mortality of some individuals	the population					*variolosus*	size	(accidental)	risk analysis
				-	-	-	Long	*Lucanus cervus*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-	Long	*Myotis myotis*	Population size	1 individual (accidental)	Species mortality risk analysis
				-	-	-	Long	*Myotis dasycnema*	Population size	2 individual (accidental)	Species mortality risk analysis
				-	-	-	Long	*Barbastella barbastellus*	Population size	3 individual (accidental)	Species mortality risk analysis

Table no.2-49Analysis of project interventions in relation to the site ROSCI0380 Suceava Liteni River

Intervention code	Intervention	Effects	Direct impacts	Indirect impacts	Secondary impacts	Cumulative impacts	Long and short term impacts	species	Parameter / target affected	Impact quantification	Quantification mode
IE1.	Realization of site organizations	The collision of some individuals with construction site traffic	Reduction of the population	-	-	-	Short	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IE2	Relocation of utility networks	The collision of some individuals with construction site traffic	Reduction of the population	-	-	-	Short	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IE3	Relocating roads	The collision of some individuals with construction site traffic	Reduction of the population	-	-	-	Short	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IE4.	Earthworks	Interruption of connectivity of habitats	Fragmentation of habitats	-	-	-	Short	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IE5.	Artwork (above ground)	The collision of some individuals with construction site traffic	Reduction of the population	-	-	-	Short	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IE7.	Hydrotechnical works	The collision of some individuals with construction site traffic	Reduction of the population	-	-	-	Short	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IE8	Highway works	The collision of some individuals with construction site traffic	Reduction of the population	-	-	-	Short	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IE9	Rehabilitation works of the lands temporarily affected by the works	The collision of some individuals with construction site traffic	Reduction of the population	-	-	-	Short	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IO1.	The development of car traffic	Collision of some individuals with car traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Long	*Myotis myotis*	Population size	1 individual (accidental)	Species mortality risk analysis
					-	-	Long	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis

Intervention code	Intervention	Effects	Direct impacts	Indirect impacts	Secondary impacts	Cumulative impacts	Long and short term impacts	species	Parameter / target affected	Impact quantification	Quantification mode
IO2.	Precipitation management	-	-	-	-	-	Long	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
IO3.	Maintenance and upkeep works	Collision of some individuals with car traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Long	*Myotis myotis*	Population size	1 individual (accidental)	Species mortality risk analysis
IO4.	The activity of short-term parking lots and CIC	Collision of some individuals with car traffic - Direct mortality of some individuals	Reduction of the population	-	-	-	Long	*Otter otter*	Population size	1 individual (accidental)	Species mortality risk analysis
					-	-	Long	*Myotis myotis*	Population size	1 individual (accidental)	Species mortality risk analysis

Table no.2-50Analysis of project interventions in relation to the site ROSPA0110 Accumulations Rogojeşti - Bucecea

Intervention code	Intervention	Effects	Direct impacts	Indirect impacts	Secondary impacts	Cumulative impacts	Long and short term impacts	species	Parameter / target affected	Impact quantification	Quantification mode
IE1.	Realization of site organizations	The collision of some individuals of the species with construction site traffic	Reduction of the population	-	-	-	Short	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IE2	Relocation of utility networks	The collision of some individuals of the species with construction site traffic	Reduction of the population	-	-	-	Short	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IE3	Relocating roads	The collision of some individuals of the species with construction site traffic	Reduction of the population	-	-	-	Short	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IE4.	Earthworks	The collision of some individuals of the species	Reduction of the population	-	-	-	Short	All bird species in the site	Population size, Population	It could not be quantified	-

Intervention code	Intervention	Effects	Direct impacts	Indirect impacts	Secondary impacts	Cumulative impacts	Long and short term impacts	species	Parameter / target affected	Impact quantification	Quantification mode
		with construction site traffic							size trend		
IE5.	Artwork (above ground)	The collision of some individuals of the species with construction site traffic	Reduction of the population	-	-	-	Short	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IE6	Consolidation works	The collision of some individuals of the species with construction site traffic	Reduction of the population	-	-	-	Short	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IE7.	Hydrotechnical works	The collision of some individuals of the species with construction site traffic	Reduction of the population	-	-	-	Short	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IO1.	The development of car traffic	The collision of individuals of the species with car traffic	Reduction of the population	-	-	-	Long	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IO2.	Precipitation management	-	Reduction of the population	-	-	-	Long	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IO3.	Maintenance and upkeep works	The collision of individuals of the species with car traffic	Reduction of the population	-	-	-	Long	All bird species in the site	Population size, Population size trend	It could not be quantified	-
IO4.	The activity of short-term parking lots and CIC	The collision of individuals of the species with car traffic	Reduction of the population	-	-	-	Long	All bird species in the site	Population size, Population size trend	It could not be quantified	-

2.1.15 Synthesis maps of all interventions that have the potential to affect Natura 2000 sites

The following figures illustrate the interventions of the project near the Natura 2000 sites.

Figure no.2-10Proposed interventions in the vicinity of the ROSCI0075 Pădurea Pătrăuți site

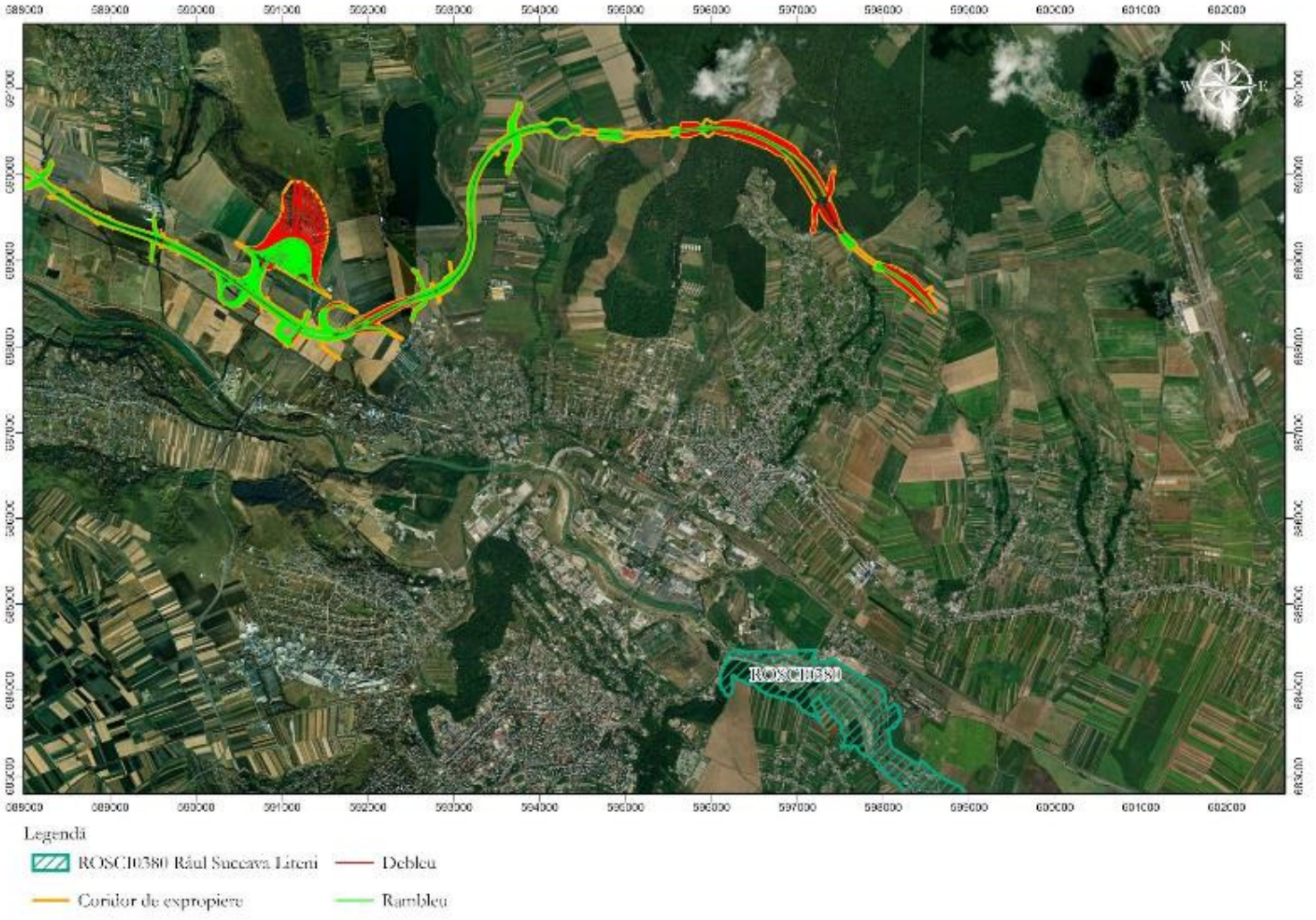


Figure no.2-11Proposed interventions in the vicinity of the site ROSCI0380 Suceava Liteni River

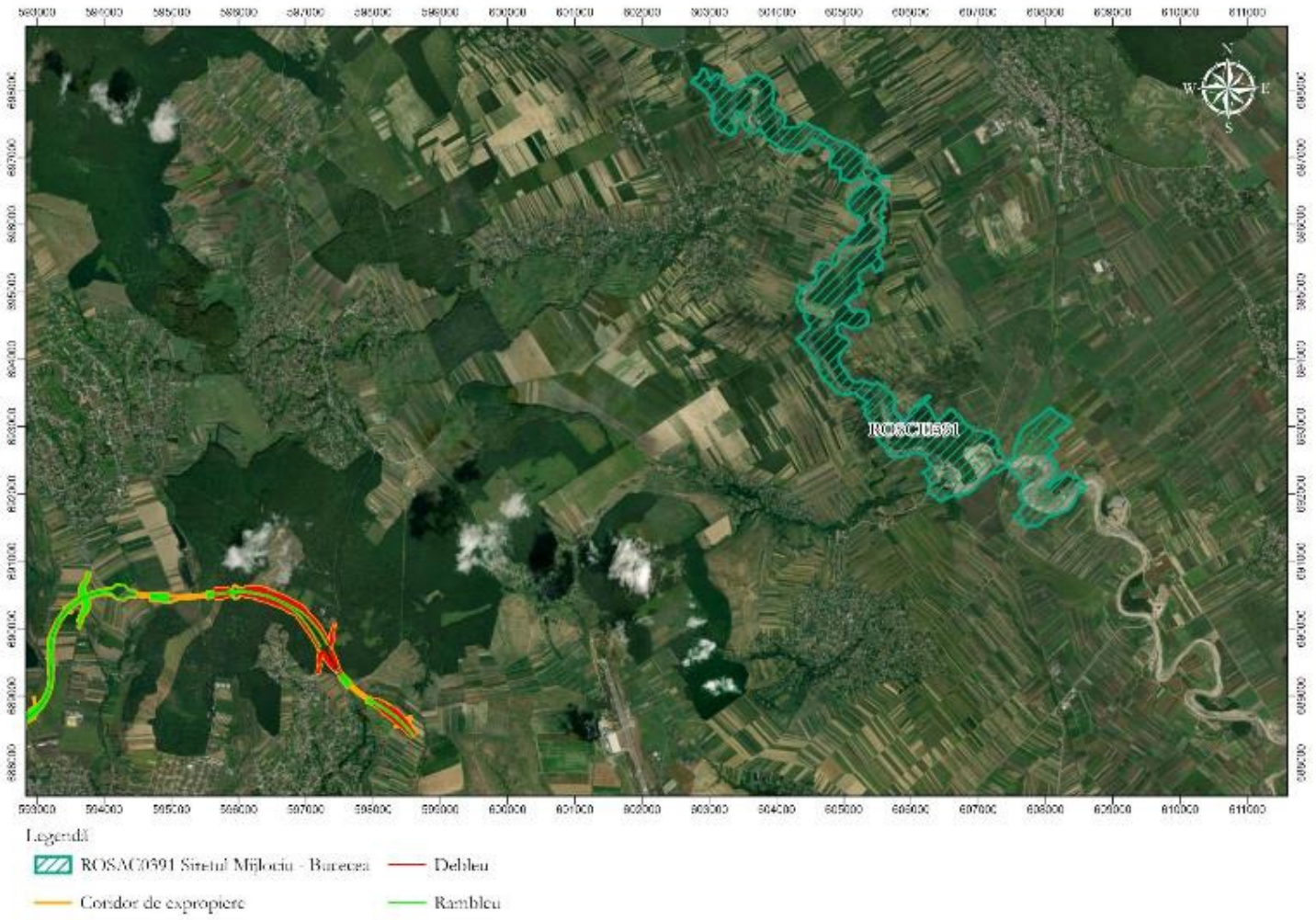


Figure no.2-12Proposed interventions in the vicinity of the site ROSCI0391 Siretul Mijlociu - Bucecea

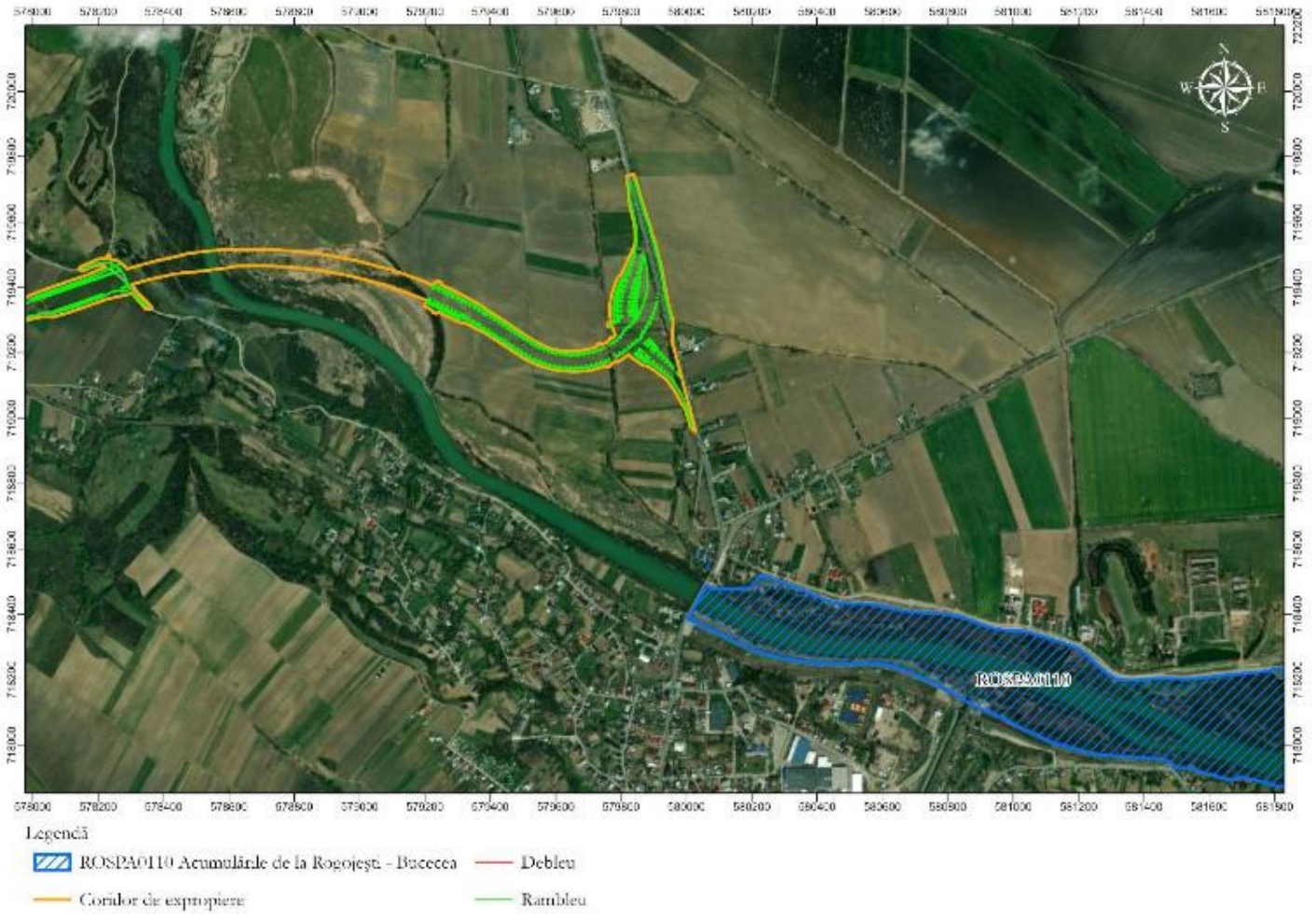


Figure no.2-13Proposed interventions in the vicinity of the site ROSCI0110 Accumulations from Rogojeşti - Bucecea

2.2 EFFECTS GENERATED BY THE PROJECT'S INTERVENTIONS

The following table presents a synthesis of the effects generated by the highway and expressway project.

Table no.2-51Summary of the effects generated by the implementation of the project

Stage	Effects	Type / types of intervention that generate the effect	The method of quantification	Quantification of effects	The distance up to which the effects are felt	ANPIC potentially affected
Construction	Structural changes in the soil and vegetation as a result of the permanent occupation of the land	IE1, IE3, IE4, IE5, IE6, IE7, IE8, IE9	GIS analysis	0 ha in Natura 2000 sites	Within the construction limit	-
	Structural changes in the soil and vegetation as a result of the temporary occupation of the land	IE2, IE4			In the loan pits	-
	Definitive and temporary changes to water bodies (construction of bridges, constructions on banks, etc.);	IE5, IE7	GIS analysis	0 ha in Natura 2000 sites	0.28 km	-
	Emissions of atmospheric pollutants	All IE	Dispersion modeling. GIS analysis	The higher values are for PM10. The main areas with higher values are those around construction site organizations, where increases in concentrations of over 40 ug/m3 are expected). Areas at risk of increasing pollutant concentrations are located outside Natura 2000 sites.	About 500 - 600 m.	-
	Spills of pollutants on the ground	All IE	GIS analysis	0 ha in Natura 2000 sites	Max.. 20 m around the road.	-
	Leaks of pollutants in the aquatic environment	All IE	GIS analysis	Strictly accidental in the area of working fronts in riverbeds. In case of accidental pollution, it is expected that the effect will manifest itself	10 - 500 meters (strictly accidental)	-

Stage	Effects	Type / types of intervention that generate the effect	The method of quantification	Quantification of effects	The distance up to which the effects are felt	ANPIC potentially affected
				locally, at distances of tens to hundreds of meters.		
	Noise and vibrations generated by construction site activities	All IE	Noise level modeling. GIS analysis	100 m buffer around work fronts and site organizations. The entire area is outside the Natura 2000 sites.	Noise values above the maximum admissible limits can extend up to a distance of about 60 m from the work fronts and site organizations.	-
	Artificial lighting and human presence	All IE	GIS analysis	0 ha in Natura 2000 sites	Approx. 100 m around the building boundary	-
	Waste generation (mainly construction waste and household waste);	All IE	Mathematical calculation	0 ha in Natura 2000 sites	Within the construction limit	-
	Introducing and/or favoring the spread of invasive/potentially invasive species	IE8, IE9	GIS analysis	0 ha in Natura 2000 sites	Maximum 500 m	-
	The creation of physical and behavioral barriers	IE4, IE6, IE7	GIS analysis	0 ha in Natura 2000 sites	Local level (5-10 km around the construction boundary)	-
	Mortality generated by the execution of works	IE1, IE4, IE5, IE6, IE7, IE8	GIS AnalysisMathematical calculation	Variable depending on the species. Under 100 individuals / year	Up to 5 km	ROSCI0075ROSCI0380ROSPA0110
operating	Contamination of the soil as a result of the deposition of atmospheric pollutants or	IO1, IO2	GIS analysis	0 ha in Natura 2000 sites	Max.. 20 m around the road.	-

Stage	Effects	Type / types of intervention that generate the effect	The method of quantification	Quantification of effects	The distance up to which the effects are felt	ANPIC potentially affected
	accidental pollution					
	Contamination of the aquatic environment as a result of accidental pollution or improper maintenance of rainwater pre-treatment equipment	IO2., IO4	GIS analysis	Strictly accidental in the event of improper maintenance or failure of rainwater pre-purification systems. In case of accidental pollution, it is expected that the effect will manifest itself locally, at distances of tens to hundreds of meters.	10 - 500 meters (strictly accidental)	-
	Change in air quality as a result of the increase in air pollutant emissions generated by car traffic	IO1	Dispersion modeling. GIS analysis	Pollutant emission will be mainly limited to the area immediately adjacent to the roadway, without presenting a large extension around it. Exceedings of the maximum allowed concentrations strictly in the area of the highway / expressway are expected. The expansion of pollutant emissions will not intersect Natura 2000 sites.	Maximum 200 m left - right of the road.	-
	Noise generated by car traffic	IO1	Noise level modeling. GIS analysis	Approx. 23000 ha are affected by increases in the noise level (>45 dB). The entire area is outside the Natura 2000	The noise can extend up to a distance of about 1.3 km.	-

Stage	Effects	Type / types of intervention that generate the effect	The method of quantification	Quantification of effects	The distance up to which the effects are felt	ANPIC potentially affected
				sites.		
	Attracting or repellent factors that can influence the behavior of animals, such as: artificial lighting, temporary waste storage, etc.	IO4	GIS analysis	0 ha in Natura 2000 sites	Approx. 100 m around the building boundary	-
	Collision of animals with car traffic	IO1	GIS AnalysisMathematical calculation	Variable depending on the species. Under 100 individuals / year	Up to 5 km	ROSCI0075ROSCI0380ROSPA0110
	Introducing and/or favoring the spread of non-native/invasive species	IO1	GIS analysis	0 ha in Natura 2000 sites	Maximum 500 m	-
	The creation of physical and behavioral barriers	IO1, IO4	GIS analysis	0 ha in Natura 2000 sites	Local level (5-10 km around the construction boundary)	-

2.3 OTHER PLANS OR PROJECTS WITH WHICH THE ANALYZED PROJECT CAN GENERATE CUMULATIVE IMPACT

In order to evaluate the impact on the species and habitats of the Natura 2000 sites considered in the evaluation, the cumulative impact of the project on them was analyzed. In this sense, the presence of pressures and threats was analyzed in the Management Plans and Standard Forms of the sites, as well as other projects to be carried out or currently in the execution process and which have the potential to affect the habitats and species of interest community.

The management plans of potentially affected Natura 2000 sites indicate several pressures and threats that may affect habitats and species of community interest. Road or highway construction or car traffic are also mentioned as pressures/threats for some of the sites included in the assessment.

The collection of information regarding the plans and projects proposed in the area was also achieved through consultation with local stakeholders, especially the UAT Town Halls in the highway area. A list of the pressures considered in the impact analysis is presented in the annex of this Study.

The construction of the Suceava DN2H highway and the Siret DN2H border expressway may amplify existing pressures or anticipated threats, and has the potential to generate a significant cumulative impact, especially in the case of habitats and species in an unfavorable-inadequate or unfavorable-bad conservation status .

Table no.2-52Other plans or projects

Natura 2000 site	Subcomponent	Location in relation to the Natura 2000 site	The source of the information	Effects generated											Form of impact				
				Land occupation	Changes in vegetation	The spread of invasive species	Fauna mortality	Generation of barriers	Emissions to water	Air emissions	Soil contamination	Light pollution	Noise	Waste generation	pH	AH	FH	STEP	REP
ROSAC0391 Siretul Mijlociu - Bucecea	DX5B Suceava - Botosani	about 4700 m	GTMP	-	-	-	X (Accidental lutra lutra, off site)	-	is downstream	X	-	-	-	-	–	–	–	–	X
ROSPA0110 Accumulations Rogojesti - Bucecea	Extension of sewerage networks in the city of Siret - Vama Siret, Suceava county	intersects	Recorder.ro	-	-	X	-	-	X	-	-	-	-	-	-	X	-	X	X
ROSCI0380 Suceava Liteni River	Pašcani - Suceava highway	approx. 1 km	MGPT	-	-	X	X	X		X	X	X	X	X	–	X	–	X	X
	CF modernization: Ilva Mica - Suceava	about 2 km	MGPT	-	-	X	X	-	X	X	-	-	-	-	–	X	–	X	X
	CF modernization: Pascani - Darmanesti	15 m	MGPT			X	X	X	X	X	X	X	X	X	–	X	–	X	X
	DX5B Suceava - Botosani	about 2 km	MGPT	-	-	-	-	-	-	X	-	-	-	-	–	-	–	-	X
ROSCI0075 Pătrăuți Forest	FC Pašcani-Darmănești	2200 m	GTMP	-	-	X	X	X	-	X	-	-	-	-	-	-	-	X	X
	CF electrification: Darmanesti - Vicsani	2900 m	MGPT	-	-	X	X	X	-	X	-	-	-	-	–	–	–	–	X

3 INFORMATION ON PROTECTED NATURAL AREAS OF COMMUNITY INTEREST AFFECTED BY THE IMPLEMENTATION OF THE PROPOSED PROJECT

3.1 NATURA 2000 SITES INCLUDED IN THE ANALYSIS

In order to identify the protected natural areas of community interest potentially affected by the Suceava - DN2H highway project and the DN2H - Siret border expressway, a GIS spatial analysis was carried out that took into account all the elements of the project (including elements located at a distance). The selection of Natura 2000 sites potentially affected by the project involved following several steps:

1. Identification of all Natura 2000 sites crossed by the project;
2. Identification of Sites of Community Importance (SCI) located at a short distance (generally less than 1 km) from the project;
3. Identification of Special Bird Protection Sites (SPA) located at a short distance (generally less than 6 km) from the project;
4. Identification of Sites of Community Importance (SCI) in which species of large mammals are the subject of conservation, and which are connected to the route area throught ecological corridors;
5. Identification of Natura 2000 sites that have a hydrological connection (through a river) with the project area.

Based on the results of the analysis of the sites potentially affected in accordance with the stages mentioned above, a final list of the sites to be included in the impact analysis of the Suceava -DN2H highway and DN 2H - Siret border expressway was established. It is important to mention that none of the analyzed sites is crossed by the route of the expressway.

The full list of Natura 2000 sites included in the analysis is presented in the following table.

Table no.3-1Complete list of Natura 2000 sites included in the highway/expressway impact assessment and the reason for inclusion in the analysis

No. crt.	Natura 2000 site	Intersection	Adjacent SCI/SAC	Neighboring SPA	Ecological corridor	Hydrological link
1.	ROSCI0075 Pădurea Pătrăuți		X		X	X
2.	ROSAC0391 Siretul Mijlociu - Bucecea		X			
3.	ROSPA0110 Acumularile Rogojesti - Bucecea			X		
4.	ROSCI0380 Râul Suceava Liteni		X		X	X

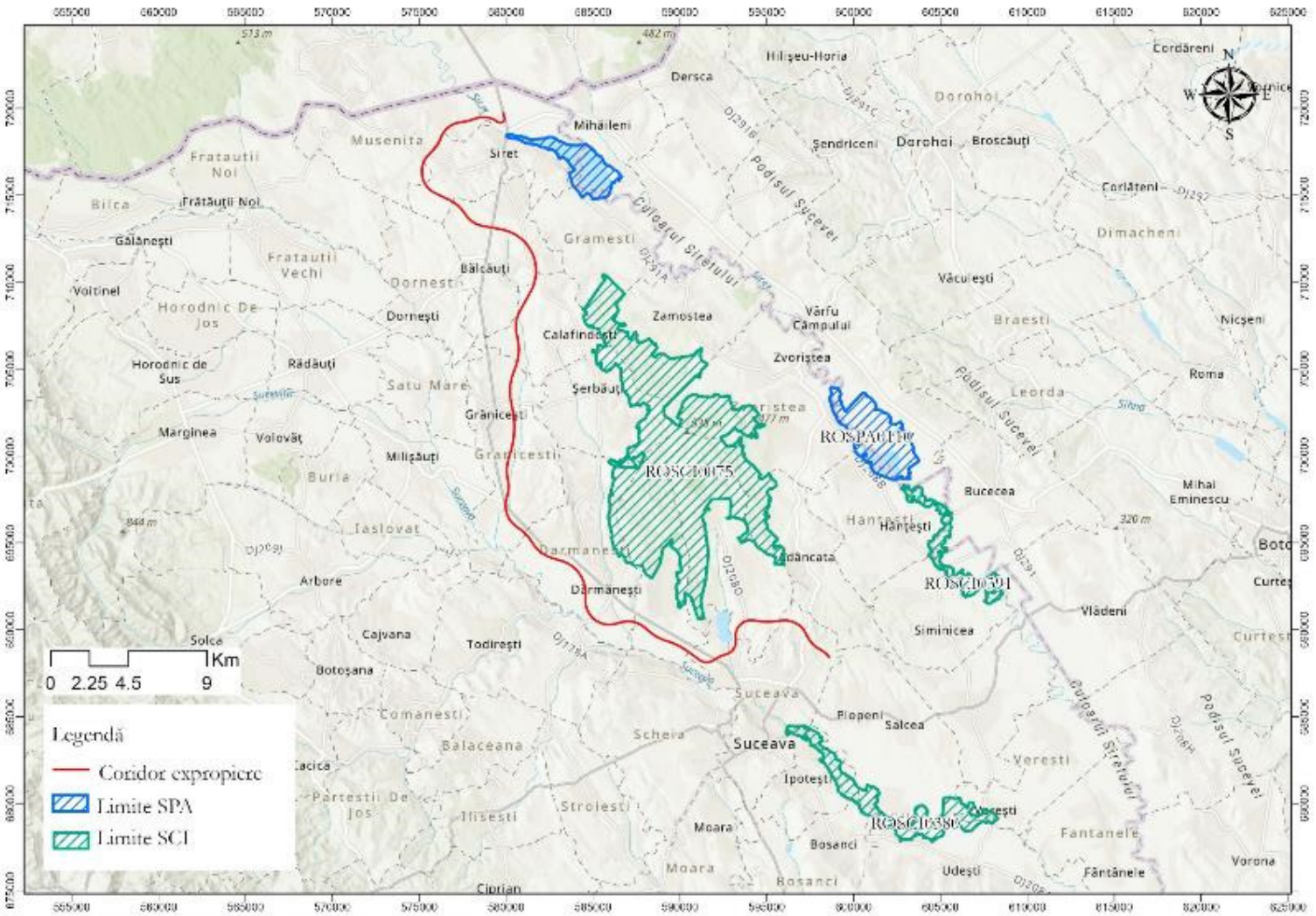


Figure no.3-1 Natura 2000 sites potentially affected by the highway and expressway

3.2 DATA ON PROTECTED NATURAL AREAS OF COMMUNITY INTEREST

The following table summarizes information about the protected natural areas of community interest, such as the surface of the sites, their importance, the existence of Management Plans and the Decisions or Notes approving the conservation objectives specific to the sites.

As part of the Presentation Memorandum, and subsequently in this Study, 4 Natura 2000 sites were analyzed that may have the potential to be affected by the Suceava - DN2H highway and the DN 2H - Siret border expressway project.

The following table shows the list of Natura 2000 sites potentially affected by the highway and expressway.

Table no.3-2Data on the Natura 2000 sites affected by the implementation of the project

No.	Natura 2000 site name and code	Site area (ha)	Importance / Role	Management plan and no. OM by which it was approved	Decision / Note of approval of the conservation objectives of the site
1.	ROSCI0075 Pădurea Pătrăuți	8772.3	The Pădurea Pătrăuți site includes one of the largest and most compact Forest bodies in the Moldavian Plateau. The site is of particular importance for habitats 9130, 91Y0 and 91E0* contributing to their better coverage with sites. Also, the site is of particular importance for some fauna species of community interest.	-	4484/04.08.2022
2.	ROSAC0391 Siretul Mijlociu - Bucecea	586.7	For the presence of *Unio crassus* and *Rhodeus sericeus amarus* species.	1205	415/03.08.2022
3.	ROSPA0110 Acumulările Rogojesti - Bucecea	2106.5	Important stopover for migratory birds with large agglomerations of waterfowl during migration. Lakes are important nesting sites for many species of waterfowl because swamp vegetation is abundant along the shores and forms reed islands. Near the lakes, especially near the Bucecea reservoir, we find swamps, pastures, and extensive agricultural crops that provide food for several species such as *Ciconia ciconia* and Western marsh harrier *Circus aeroginosus*.	1098	130/28.03.2022
4.	ROSCI0380 Râul Suceava Liteni	1253.9	It is among the few designated sites for *Lutra lutra, Spermophillus citellus, Emys orbicularis*. Of high importance for the species of *Bombina, Triturus cristatus* and *Myotis*.	-	73254/23.11.2021

Table no.3-3 The types of ecosystems existing in each of the analyzed Natura 2000 sites

No.	Natura 2000 site name and code	Ecosystem types (%)																					
		Marine areas	Estuaries and lagoons	Salt marshes	Sandy beaches	Rivers and lakes	Rocks and areas with poor vegetation	Other artificial fields	Other arable land	Deciduous forests	Swamps and swamps	Conifer forest	Bushes and thickets	Natural meadows	Mixed forest	Forest habitats (transition forests)	Vineyards and orchards	Crops (arable land)	Gorges	Forests and natural vegetation	Aquatic areas	Agricultural areas	Artificial surfaces	Wet areas
1.	ROSCI0075 Pădurea Pătrăuți	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	91.20	0.00	3.52	0.00	0.00	1.48	2.78	0.00	0.29	0.27	0.00	0.00	0.00	0.00	0.00
2.	ROSAC0391 Siretul Mijlociu - Bucecea	0.00	0.00	0.00	0.00	37.06	0.00	0.00	0.00	25.67	5.47	0.00	0.00	0.00	0.00	0.00	0.00	18.16	13.64	0.00	0.00	0.00	0.00	0.00
3.	ROSPA0110 Acumularile Rogojesti - Bucecea	0.00	0.00	0.00	0.00	48.88	0.00	0.28	10.66	0.00	7.40	0.00	0.00	0.00	0.00	0.00	0.00	24.51	8.27	0.00	0.00	0.00	0.00	0.00
4.	ROSCI0380 Râul Suceava Liteni	0.00	0.00	0.00	0.00	26.71	0.00	8.51	1.68	4.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.27	44.85	0.00	0.00	0.00	0.00	0.00

Table no.3-4Overlaps with other natural protected areas and the relationship of the site with other protected areas

No.	Natura 2000 site name and code	Overlap with other protected natural areas	The relations of the site with other natural protected areas
1.	ROSCI0075 Pădurea Pătrăuţi	-	Ecological otter corridor with ROSCI0184, Hydrological connection through the Baranca river with ROSCI0184, Hydrological connection through the Hânțesti river (Valea Mare) with ROSCI0391
2.	ROSAC0391 Siretul Mijlociu - Bucecea	-	Hydrological connection through the Gârla Siretului river and the Siret river (baraj Bucecea - cf Moldova) with ROSPA0110, Hydrological connection through the Hânțesti river (Valea Mare) with ROSCI0075
3.	ROSPA0110 Acumularile Rogojesti - Bucecea	-	Hydrological connection through the Siret river (ac Rogojești - ac Bucecea) with ROSCI0184, Hydrological connection through the Valea Poienilor river (Valea Harigii) with ROSPA0116, Hydrological connection through the Gârla Siretului river and the Siret river (baraj Bucecea - cf Moldova) with ROSCI0391
4.	ROSCI0380 Râul Suceava Liteni	-	-

Table no.3-5 The biogeographical regions in which the analyzed Natura 2000 sites are included

No. crt.	Natura 2000 site name and code	Biogeographic region/regions where the site is located (% coverage)					
		ALP	cone	STE	PAN	BIS	MBL
1.	ROSCI0075 Pădurea Pătrăuți	0	100	0	0	0	0
2.	ROSAC0391 Siretul Mijlociu - Bucecea	0	100	0	0	0	0
3.	ROSPA0110 Acumularile Rogojesti - Bucecea	0	100	0	0	0	0
4.	ROSCI0380 Râul Suceava Liteni	0	100	0	0	0	0

The information presented below for the Natura 2000 sites analyzed in this appropriate assessment study corresponds to the current situation approved by ANANP through the Site-Specific Conservation Objectives. These are based on the information of the Standard Forms of the Natura 2000 sites and those of their Management Plans. The following figure shows the location of the highway/expressway in relation to all the Natura 2000 sites presented in the previous table.

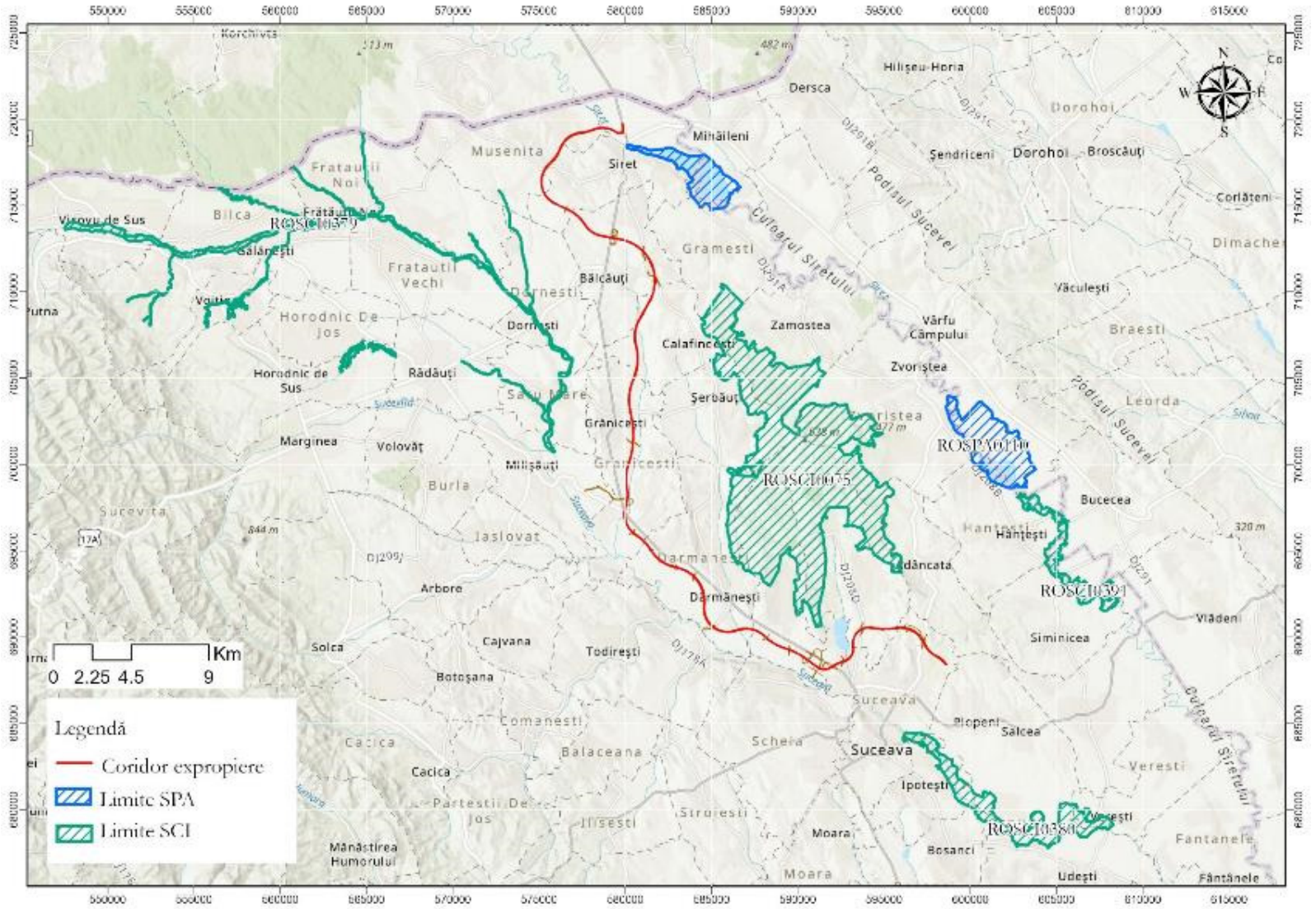


Figure no.3-2Natura 2000 sites potentially affected by the highway and expressway

3.2.1 ROSCI0075 Pădurea Pătrăuţi

Regarding the Natura 2000 site ROSCI0075 Pădurea Pătrăuţi, the information used was taken from the site's Standard Form.

From a geographical point of view, the Natura 2000 site ROSCI0075 Pădurea Pătrăuţi falls within the Moldavian Plateau. It has a typical relief of hills and platform plateaus, structurally erosive, with a monoclinal or weakly folded horizontal structure.

From a geological point of view, the lithological substratum is made up of an alternation of clays, marls, sands and sandstones. The accumulative relief is characteristic of the more important valleys of the site, areas where Quaternary deposits of gravel, sand and fine alluvium appear.

The soils mainly belong to the class luvisols (preluvosol, luvosol) and cambisols (eutricambosol).

Regarding the hydrographic system, the site presents a series of streams that flow into the Suceava River or directly into the Siret River, and among the most important streams are: Hatnuta, Patraceanca, Dragomirna, Mitoc, Podul Vătafului.

The Pădurea Pătrăuţi site is of particular importance for the habitats 9130 Beech forests of the *Asperulo – Fagetum* type, 91Y0 – Dacian oak and hornbeam forests and 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*, but also for some fauna species of community interest.

Among the general characteristics of the site are several classes of habitats, such as crops (0.29%), pastures (0.27%), other arable land (0.38%), deciduous forests (91.20%), coniferous forests (3.52%), mixed forests (1.48%), forest habitats (2.78%). The habitat classes have a total coverage of 99.92%.

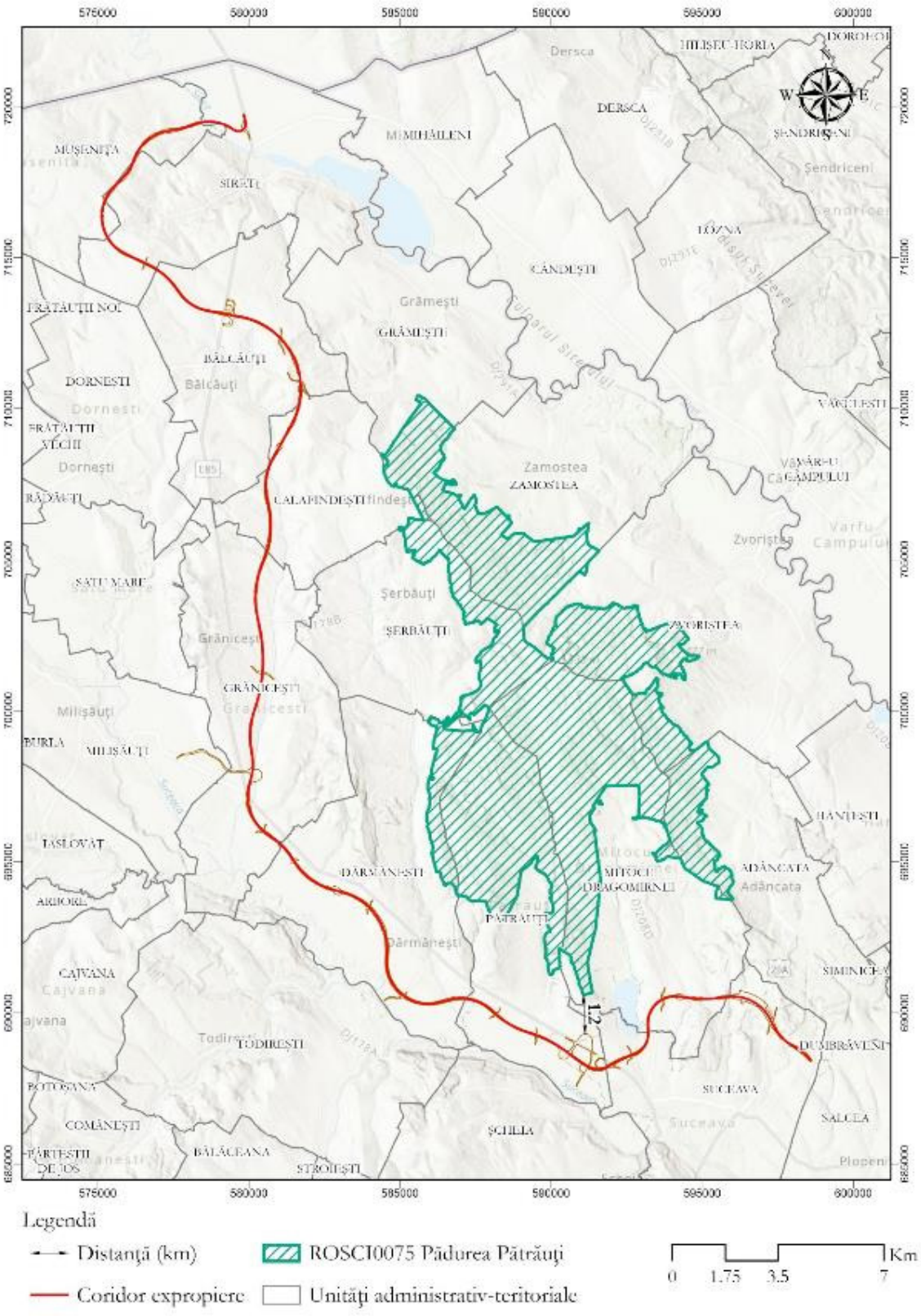


Figure no.3-3 Location of the project in relation to the ROSCI0075 Pădurea Pătrăuți site

3.2.2 ROSAC0391 Siretul Mijlociu - Bucecea

Regarding the Natura 2000 site ROSAC0391 Siretul Mijlociu – Bucecea, the information used was taken from the site's Standard Forms.

The location of the site is in the southeastern area of the Suceva Plateau, in the Bucecea-Vorona saddle sector, with altitudes between 250 - 150 m. The characteristic relief is that of low hills, wide plains with plateau-like interfluves and low relief energy, on average 30-40 years.

The climate is temperate - continental, strongly influenced by the air masses from the east of the continent, and the proximity to the great Euro-Asian plain strongly influences the air and precipitation regime. Winters are poor in snow, summers are devoid of moisture, prevailing winds are north-west and south-west.

This site is of importance and quality for the presence of *Unio crassus* and *Rhodeus sericeus amarus* species.

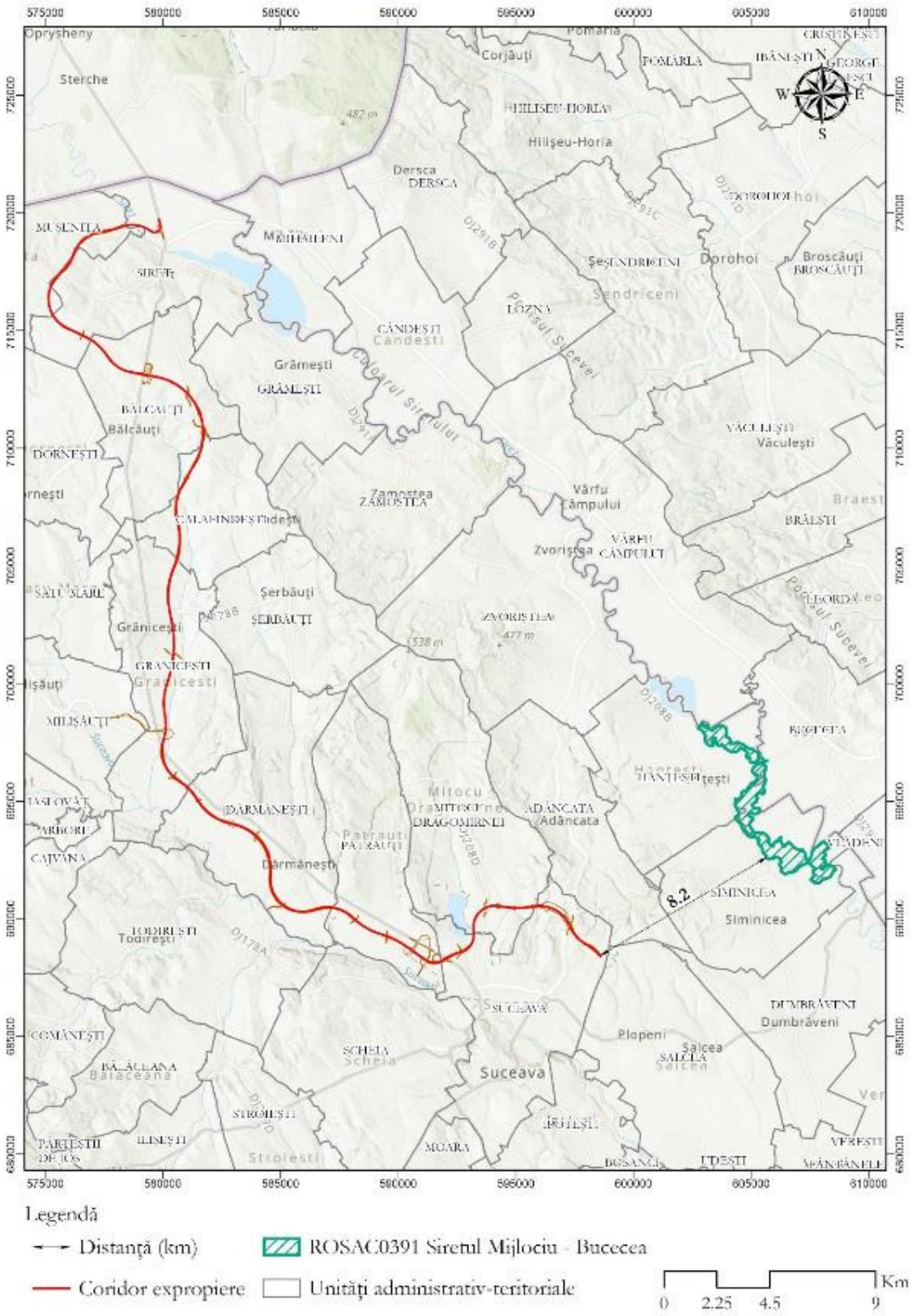


Figure no.3-4 Location of the project in relation to the site ROSAC0391 Siretul Mijlociu - Bucecea

3.2.3 ROSPA0110 Acumulările Rogojesti - Bucecea

Regarding the Natura 2000 site ROSPA0110 Acumulările Rogojeşti - Bucecea, the information used was taken from the site's Standard Forms.

The site is located in the western part of Botoşani county, at the contact of the Moldavian Plain with the high plateau of Suceava, included from the point of view of geographical region in the sub-unit of the Suceava Plateau: Culmea Bour-Dealul Mare.

It is of particular importance for migratory birds, highlighting the large agglomerations of waterfowl during migration. It presents an abundant swamp vegetation near the banks, important nesting places for many species of waterfowl. Near the lakes there are marshes, pastures and agricultural crops that provide food for several species such as the white stork (*Ciconia ciconia*), but also the Western marsh harrier (*Circus aeroginosus*).

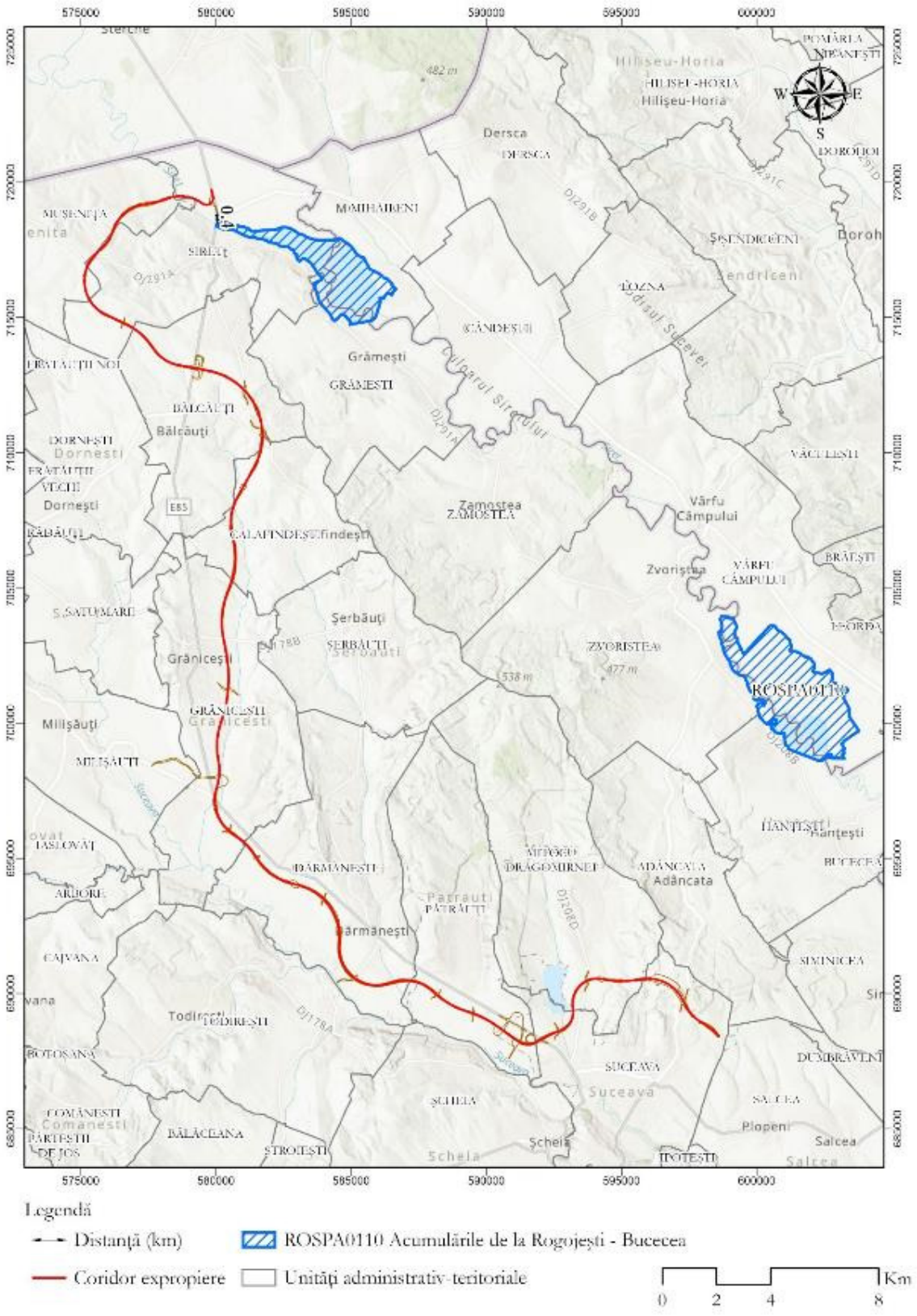


Figure no.3-5 Location of the project in relation to the site ROSPA0110 Acumulările Rogojeşti - Bucecea

3.2.4 ROSCI0380 Râul Suceava Liteni

Regarding the Natura 2000 site ROSCI0380 Râul Suceava Liteni, the information was taken from the Standard Form version 2021.

It represents a specific habitat for four species of mammals of conservation interest, along with four species of reptiles and amphibians, and two species of fish of conservation interest.

It is of high importance for the species of *Bombina, Triturus cristatus* and *Myotis*. Moreover, it is among the few sites designated for *Lutra lutra, Spermophillus citellus* and *Emys orbicularis*.

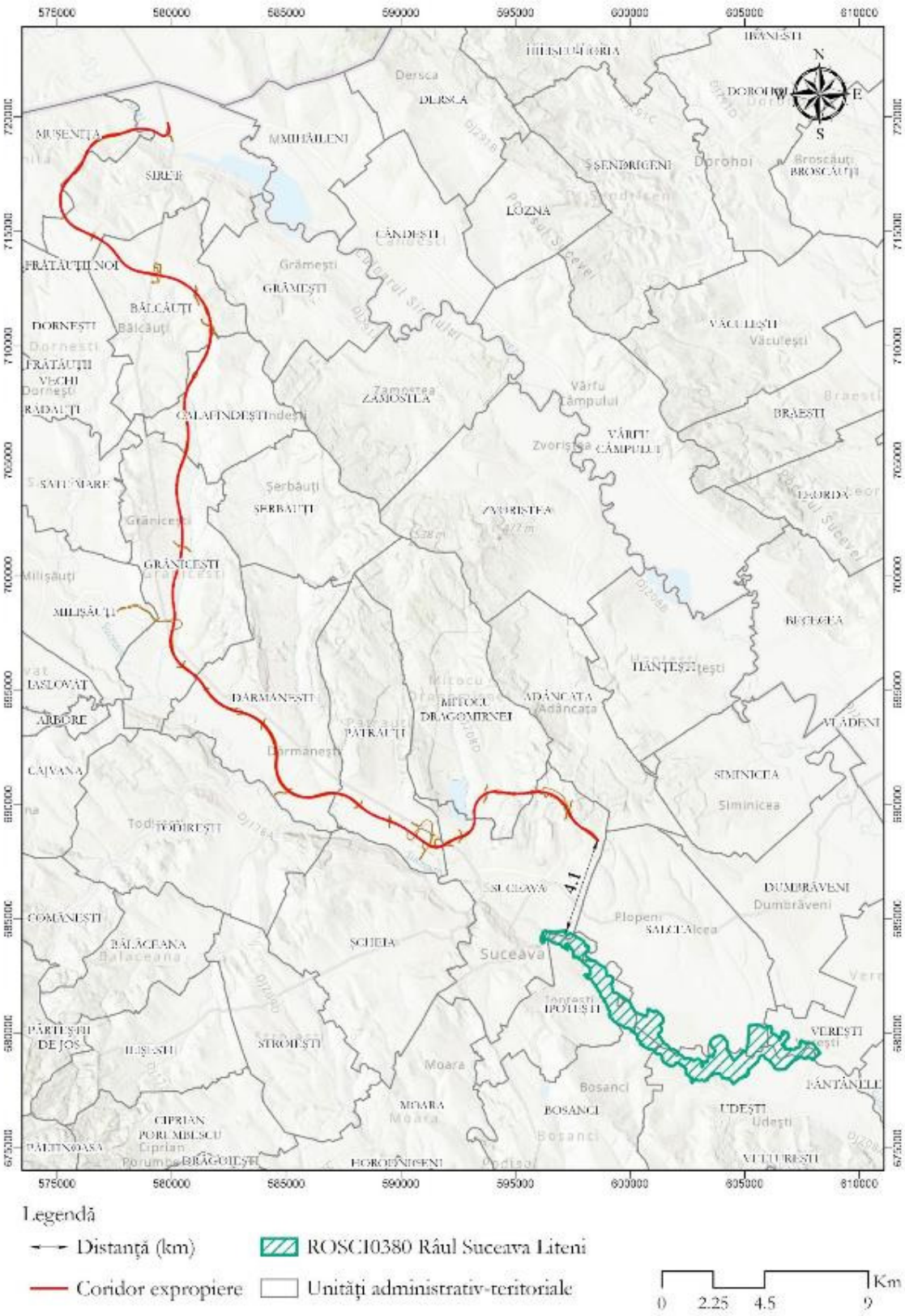


Figure no.3-6 Location of the project in relation to the site ROSCI0380 Râul Suceava Liteni

3.3 DATA ON HABITATS / SPECIES IN NATURA 2000 SITES POSSIBLY AFFECTED BY THE PROJECT

3.3.1 ROSCI0075 Pădurea Pătrăuţi

The following table shows the location of the habitats and species of community interest from the site ROSCIOO75 Pădurea Pătrăuţi in relation to the highway/express road. The project does not intersect the site or the habitats located on the site. The minimum distance at which the project is located from the site is about 1.3 km.

Table no.3-6The location of the highway/express road in relation to the habitats and species that are the object of conservation on the site

Code Natura 2000	Habitats/Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	The surface of habitat (ha)	State of conservation in the site
9130	*Asperulo-Fagetum* type beech forests	The Suceava-Siret express road does not intersect the habitat and the site. The project is located at a distance of approximately 1850 m from the habitat.	-	Density -	DIRECTIVE habitat trends Assessment of the state of conservation in the PM Population trend	-	6056.5	Favorable
91E0*	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salcion albae)*	The Suceava-Siret express road does not intersect the habitat and the site. The project is located at a distance of approximately 4550 m from the habitat.		-	-	-	64.03	Favorable
91Y0	Dacian forests of oak and hornbeam	The Suceava-Siret express road does not intersect the habitat and the site. The project is located at a distance of approximately 3000 m from the habitat.	-	-	-	-	500.5	Favorable
4014	*Carabus variolosus*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is at a distance of approximately 1700 m from the favorable habitat of the species. This species is associated with the habitat of community interest 91E0*, but it is not intersected by the project either, but is at a distance of about 4550 m from the project.	1000-5000	-	-	-		Favorable
1087*	*Rosalia alpina*	According to the management plan, the presence of the species in the site is uncertain, but the potential habitat for the species is approximately 2700 m from the project. Also, the species is associated with habitats of community interest 9130, 9110, 91Y0, 91M0, but only 9130 is present in the analyzed site, but it is not intersected by the project either, but is at a distance of about 1850 m.	-	-	-	1443 ha		Not rated

Code Natura 2000	Habitats/Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	The surface of habitat (ha)	State of conservation in the site
1083	*Lucanus cervus*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is at a distance of approximately 1300 m from the favorable habitat of the species. This species is associated with habitats of community interest 9130, 91Y0, 91M0, 9110, 9170, of which habitats 9130 and 91Y0 are present on the site, but they are not intersected by the project either, but are at a distance of about 1850 m , respectively 3000 m of the project.	1000-5000	-	-	The entire surface of the site according to PM		Favorable
1166	*Triturus cristatus*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is located at a distance of approximately 1300 m from the habitat of the species.	500-1000	-	-	-		Favorable
1188	*Bombina bombina*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is located at a distance of approximately 7500 km from the habitat of the species.	500-1000	-	-	-		Favorable
1188	*Bombina variegata*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is located at a distance of approximately 1300 m from the habitat of the species.	500-1000	-	-	-		Favorable
1324	*Myotis myotis*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is located at a distance of approximately 1300 m from the habitat of the species. The species is associated with the following habitats of community interest: 9110, 9130, 8310. Of these, only 9130 is present in the analyzed site, but it is also not intersected by the project, but is at	100-500	-	-	The entire surface of the site according to PM		Favorable

Code Natura 2000	Habitats/Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	The surface of habitat (ha)	State of conservation in the site
		a distance of approximately 1850 m.						
1318	*Myotis dasycneme*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is located at a distance of approximately 1300 m from the habitat of the species.	10-50	-	-	-		Favorable
1308	*Barbastella barbastellus*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is located at a distance of approximately 1300 m from the habitat of the species. The species is associated with the following habitats of community interest: 9110, 8310, but these habitats of community interest are not present in the analyzed site.	100-500	-	-	-		Favorable

Table no.3-7 Conservation status and trends of habitats and species from the ROSCI0075 site at bioregion level

Habitat / species code	Species name / habitat	Conservation status at bioregion level						trend					
		ALP	cone	STE	PAN	BIS	MBL	ALP	cone	STE	PAN	BIS	MBL
9130	*Asperulo-Fagetum type forests*	FV	FV					Stable	Stable				
91E0	*Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion nicanae, Salicion albae)*	U1	U1					Stable	Stable				
91Y0	*Dacian forests of oak and hornbeam*		U1	U1					Stable	Stable			
1188	*Bombina bombina*		FV	FV	FV	FV			Stable	Stable	Stable	Stable	
1193	*Bombina variegata*	U1	U1		U1			Stable	Stable		Stable		
1166	*Triturus cristatus*	20th	20th		20th			Stable	Stable		Stable		

4014	*Carabus variolosus*	FV	FV					Stable	Stable				
1087	*Rosalia alpina*	FV	FV					Stable	Uncertain				
1324	*Myotis myotis*	FV	FV					Stable	Stable				
1083	*Lucanus cervus*	FV	FV	FV	FV	FV		Stable	Stable	Stable	Stable	Uncertain	
1218	*Myotis dasycnema*	U1	U1		U1			Stable	Stable		Stable		
1308	*Barbastella barbastellus*	U1	U1					Stable	Stable				

Table no.3-8Information on the ecology of the species and the sensitivity of the habitats in the Natura 2000 site ROSCI0075 Pădurea Pătrăuţi

Habitat / species code	Species name / habitat	Ecology of the species				Sensitivity to the effects generated by PP			Perspectives - climate change
		Favorable habitat	Trophic resource	Sensitive period	Migration / displacement requirements	Dependence on underground water	Dependence on surface water	Resistance to invasive species	
9130	*Asperulo-Fagetum type forests*	-	-	-	-			Big	Average
91E0	*Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion nicanae, Salicion albae)*	-	-	-	-	X	X	small	high
91Y0	*Dacian forests of oak and hornbeam*	-	-	-	-	-	-	Big	-
1188	*Bombina bombina*	Aquatic	insectivorous	April May	-	-	-	-	-
1193	*Bombina variegata*	Aquatic	insectivorous	April May	-	-	-	-	-
1166	*Triturus cristatus*	Aquatic lentic, terrestrial	Predator	March, June	Small distances (150 m).	-	-	-	-
4014	*Carabus variolosus*	Riparian and marshy areas, aquatic vegetation	Predator	April, May, June, July, August, September, October	-	-	-	-	-
1087	*Rosalia alpina*	Beech forests	Necrophagous	June, July, August, September		-	-	-	-
1324	*Myotis myotis*	Church towers, spacious bridges or caves	insectivorous	May, June, July (birth) November, December, January, February, March (hibernation)	-	-	-	-	-
1083	*Lucanus cervus*	forest	Polyphagous	May, June, July, August, September	-	-	-		-
1218	*Myotis dasycneme*	Buildings, bridges, wall cracks, church towers, manholes	insectivorous	May, June, July (birth) November, December, January, February, March (hibernation)	-	-	X		-

1308	*Barbastella barbastellus*	forest	insectivorous	May, June (birth) November, December, January, February, March (hibernation)	-				-

3.3.2 ROSAC0391 Siretul Mijlociu - Bucecea

The following table shows the location of habitats and species of community interest from the site ROSAC0391 Siretul Mijlociu – Bucecea in relation to the highway/expressway route. The minimum distance at which the project is located from the site is about 8 km.

Table no.3-9 The location of the highway/express road in relation to the habitats and species that are the object of conservation on the site

Code Natura 2000	Habitats/Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	The surface of habitat (ha)	State of conservation in the site
6430	Edge communities with hygrophilous tall grasses from lowland and montane to alpine	The Suceava-Siret express road does not intersect the habitat and the site. The project is located at a distance of approximately 8000 m from the habitat.	-	-	stable	-	5.36	Unfavorable-inadequate
1032	*Unio crassus*	According to the Management Plan, the population of Unio crassus within the Natura 2000 site ROSCI0391 Siretul Mijlociu - Bucecea was not represented by any individual (the species was not encountered in the site). Also, according to Romania's Reports based on Article 17 of the Habitats Directive (DH), the species is not present in the site.	-	-	-	-	-	Not rated
1130	*Aspius aspius*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is at a distance of approximately 9000 m from the habitat of the species.	100-500	0.74 individuals/100 m^2	increasing	35 ha	-	Unfavorable-inadequate
5266	*Barbus petenyi*	According to the Management Plan, the species was not identified during the study period at the level of the Natura 2000 site ROSCI0391 Siretul Mijlociu - Bucecea, so its presence in the site is uncertain. Also, according to Romania's Reports based on Article 17 of the Habitats Directive (DH), the species is not present on the site.	-	-	-	-	-	Not rated
6963	*Cobitis taenia*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is at a distance of approximately 8200 m from the habitat of the species.	1000-5000	-	increasing	35 ha	-	Unfavorable-inadequate
6143	*Romanogobio kesslerii*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is at a distance of approximately 8200 m from the habitat of the species.	5000-10000	-	stable	30 ha	-	favorable
1146	*Sabanejewia aurata*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is at a distance of approximately 9800 m from the habitat of the species.	1000-5000	-	increasing	35 ha	-	Unfavorable-inadequate
1355	*Lutra lutra*	The express road Suceava-Siret does not cross the habitat of the species nor the site. The project is approximately 8000 m from the species' habitat. The species is associated with the following habitats of community interest: 1130, 1150*, 1160, 2190, 3240, 6430, 91F0, 9180*, 3150, 3270, 92A0, 91E0* . Of these, only the 6430 dwelling is present in the site, but it is not intersected by the	-	-	-	-	-	good

Code Natura 2000	Habitats/Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	The surface of habitat (ha)	State of conservation in the site
		project, but is located about 8000 m in front of the project.						

Table no.3-10 Conservation status and trends of habitats and species from the ROSAC0391 site at bioregion level

Habitat / species code	Species name / habitat	Conservation status at bioregion level						trend					
		ALP	cone	STE	PAN	BIS	MBL	ALP	cone	STE	PAN	BIS	MBL
6430	*Border associations with tall hydrophilic grasses from plains to mountain and alpine levels*	FV	FV	FV	FV	FV		Stable	Stable	Stable	Stable	Stable	
1130	*Aspius aspius*		FV	FV	FV	FV			Increasing	Increasing	Increasing	Stable	
5266	*Barbus petenyi*	FV	FV					Stable	Stable				
6963	*Cobitis taenia Complex*		U1	U1	U1	U1			Stable	Stable	Stable	Stable	
6143	*Romanogobio kesslerii*		U1	U1	U1				Stable	Stable	Stable		
5329	*Romanogobio vladykovi*		U1	U1	U1	U1			Stable	Stable	Stable	Stable	
5197	*Sabanejewia balcanica*	U1	U1	U1	U1	U1		Stable	Increasing	In decline	In decline	In decline	
1032	*Unio crassus*		FV	U1	FV				Stable	Decreasing	Stable		
1355	*Lutra lutra*	FV	FV	FV	FV	FV		Stable	Stable	Stable	Stable	Stable	

Table no.3-11 Information on the ecology of the species and the sensitivity of the habitats in the Natura 2000 site ROSAC0391 Siretul Mijlociu - Bucecea

Habitat / species code	Species name / habitat	Ecology of the species				Sensitivity to the effects generated by PP			Perspectives - climate change
		Favorable habitat	Trophic resource	Sensitive period	Migration / displacement requirements	Dependence on underground water	Dependence on surface water	Resistance to invasive species	
6430	*Border associations with tall hydrophilic grasses from plains to mountain and alpine levels*	-	-	-	-	X	X	small	Low
1130	*Aspius aspius*	-	-	-	-	-	-	-	-
5266	*Barbus petenyi*	Aquatic lotic	Insectivorous, rarely phytophagous or detritivorous	May June	-	-	-	-	-
6963	*Cobitis taenia Complex*	Aquatic lotic, lentic	Bentophagus	May, June, July	-	-	-	-	-
6143	*Romanogobio kesslerii*	Rheophilic aquatic	insectivorous	May, June, July, August, September	-	-	-	-	-
5329	*Romanogobio vladykovi*	Rheophilic aquatic	insectivorous	May June	-	-	-	-	-
5197	*Sabanejewia balcanica*	Rheophilic aquatic	insectivorous	Reproduction takes place in May, June, July, August	-	-	-	-	-
1032	*Unio crassus*	Aquatic	Detritivore	April May	-	-	-	-	-
1355	*Lutra lutra*	Riparian areas	Aquatic predator	March, April (play)	-	-	-	-	-

3.3.3 ROSCI0380 Râul Suceava Liteni

The following table shows the location of species of community interest from the site ROSCI0380 Râul Suceava Liteni in relation to the route of the highway/express road. The project does not intersect the site. The minimum distance at which the project is located from the site is about 4350 m.

Table no.3-12The location of the highway/express road in relation to the species that are the object of conservation in the site

Code Natura 2000	Habitats / Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	The surface of habitat (ha)	State of conservation in the site
6964	*Barbus meridionalis*	The project does not intersect the site nor the habitat of the species within the site. According to Romania's Reports based on Article 17 of the Habitats Directive (DH), the species is not present in the area of the site, but according to the map in the Site Guide for monitoring community fish species in Romania, it is located at approximately 6880 m.	-	-	-	-	-	Good
5339	*Rhodeus amarus*	The project does not intersect the site nor the habitat of the species within the site. It is located approximately 4350 m from the project, according to Romania's Reports based on article 17 DH.	-	-	-	-	-	Good
1166	*Triturus cristatus*	The project does not intersect the site nor the habitat of the species within the site. It is located approximately 4350 m from the project, according to Romania's Reports based on article 17 DH.	-	-	-	-	-	Good
1188	*Bombina bombina*	The project does not intersect the site nor the habitat of the species within the site. It is located approximately 4350 m from the project, according to Romania's Reports based on article 17 DH.	-	-	-	-	-	Good
1193	*Bombina variegata*	The project does not intersect the site nor the habitat of the species within the site. It is located approximately 4350 m from the project, according to Romania's Reports based on article 17 DH.	-	-	-	-	-	Medium or low
1220	*Emys orbicularis*	The project does not intersect the site nor the habitat of the species within the site. It is located approximately 4350 m from the project, according to Romania's Reports based on article 17 DH.	-	-	-	-	-	Good
1355	*Lutra lutra*	The project does not intersect the site nor the habitat of the species within the site. It is located approximately 4350 m from the project, according to Romania's Reports based on article 17 DH.	-	-	-	-	-	Good
1324	*Myotis myotis*	The project does not cross the site nor the potential habitat of this species within the analyzed site. The potential habitat of the species is located approximately 5150 m from the project. The species is associated with the following habitats of community interest: 9110, 9130, 8310. These habitats are not present in the analyzed site.	-	-	-	-	-	Unfavorable
1323	*Myotis bechsteinii*	The project does not cross the site nor the potential habitat of this species within the analyzed site. The potential habitat of the species is located approximately 5150 m from the project. The species is associated with habitats of community interest, respectively 9110 and 9130. These habitats are not present in the analyzed site.	-	-	-	-	-	Unfavorable

Code Natura 2000	Habitats / Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	The surface of habitat (ha)	State of conservation in the site
1355	*Spermophilus citellus*	The project does not intersect the site nor the habitat of the species within the site. It is located approximately 4350 m from the project, according to Romania's Reports based on article 17 DH. The species is associated with habitats of community interest 6240*, 6250*, 62C0*, but they are not located in the analyzed site.	-	-	-	-	-	Unfavorable

Table no.3-13 Conservation status and trends of habitats and species from the ROSCI0380 site at bioregion level

Habitat / species code	Species name / habitat	Conservation status at bioregion level						trend					
		ALP	cone	STE	PAN	BIS	MBL	ALP	cone	STE	PAN	BIS	MBL
1188	*Bombina bombina*		FV	FV	FV	FV			Stable	Stable	Stable	Stable	
1193	*Bombina variegata*	U1	U1		U1			Stable	Stable		Stable		
1166	*Triturus cristatus*	20th	20th		20th			Stable	Stable		Stable		
5266	*Barbus petenyi*	FV	FV					Stable	Stable				
5339	*Rhodeus amarus*		FV	FV	FV	FV			Increasing	Increasing	Stable	Stable	
1355	*Lutra lutra*	FV	FV	FV	FV	FV		Stable	Stable	Stable	Stable	Stable	
1323	*Myotis bechsteinii*	U1	U1	U1				Stable	Increasing	Stable			
1324	*Myotis myotis*	FV	FV					Stable	Stable				
1335	*Spermophilus citellus*		U1	U1	U1				Decreasing	Decreasing	Decreasing		
1220	*Emys orbicularis*		FV	FV	FV	FV			Stable	Stable	Stable	Stable	

Table no.3-14Information on the ecology of the species and the sensitivity of the habitats from the Natura 2000 site ROSCI0380 Râul Suceava - Liteni

Habitat / species code	Species name / habitat	Ecology of the species				Sensitivity to the effects generated by PP			Perspectives - climate change
		Favorable habitat	Trophic resource	Sensitive period	Migration / displacement requirements	Dependence on underground water	Dependence on surface water	Resistance to invasive species	
1188	*Bombina bombina*	Aquatic	insectivorous	April May	-	-	-	-	-
1193	*Bombina variegata*	Aquatic	insectivorous	April May	-	-	-	-	-
1166	*Triturus cristatus*	Aquatic lentic, terrestrial	Predator	March, June	Small distances (150 m).	-	-	-	-
5266	*Barbus petenyi*	Aquatic lotic	Insectivorous, rarely phytophagous or detritivorous	May June	-	-	-	-	-
5339	*Rhodeus amarus*	Aquatic lotic, lentic	Vegetable detritivore	April May June	-	-	-	-	-
1355	*Lutra lutra*	Riparian areas	Aquatic predator	March, April (play)	-	-	-	-	-
1323	*Myotis bechsteinii*	forest	insectivorous	May - June (birth) November, December, January, February, March (hibernation)	-	-	-	-	-
1324	*Myotis myotis*	Church towers, spacious bridges or caves	insectivorous	May, June, July (birth) November, December, January, February, March (hibernation)	-	-	-	-	-
1335	*Spermophilus citellus*	Grassy vegetation	Omnivorous	March, April, May, June (breeding) September, October, November, December, January, February, March (hibernation)	-	-	-	-	high
1220	*Emys orbicularis*	Rivers/Lakes/Wetland	Carnivorous	May June	-	-	-	-	-

3.3.4 ROSPA0110 Acumulările Rogojesti - Bucecea

The following table shows the location of the avifauna species of community interest from the ROSPA0110 Acumulările Rogojeşti - Bucecea site in relation to the highway/express road route. The project does not intersect the site or the habitats located on the site. The minimum distance at which the project is located from the site is about 427 m.

Table no.3-15The location of the highway/express road in relation to the habitats and species of avifauna that are the object of conservation on the site

Code Natura 2000	Habitats / Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	Conservation status in the site
A229	*Alcedo athis*	The species was identified in the north-west of Rogojeşti lake, thus confirming its presence in the entire perimeter of the lake. The habitat of the species being represented by the Rogojeşti lake is at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	7-8 pairs	-	-	1029.66	Favorable
A029	*Ardea purpurea*	The species was identified in the reed areas of the two lakes, thus confirming its presence in the entire perimeter of the lake. The habitat of the species is at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	1-2 pairs	-	-	1185.54	Unfavorable
A060	*Aythya nyroca*	The species was identified on Lake Bucecea, thus confirming its presence in the entire perimeter of the lake. The habitat of the species is located at a distance of 9642 m from the nearest works of the project, namely the related highway section km 2+875. According to Romania's reports based on art. 12, the species is at a distance of at least 35100 m from the project.	5-45 individuals	-	-	1185.54	Unfavorable
A021	*Botaurus stellaris*	The species was identified in the reed areas of the two lakes, the closest point of presence being at a distance of 2435 m from the nearest works of the project, and its habitat being at a distance of 427 m from the same works, namely road junction with DN02.	6-9 pairs	-	-	1185.54	Favorable
A196	*Chlidonias hydribus*	The species was identified in the reed areas of the two lakes, the closest point of presence being at a distance of 3663 m from the nearest works of the project, and its habitat being at a distance of 427 m from the same works, namely road junction with DN02.	15-20 pairs	-	-	1185.54	Favorable
A197	*Chlidonias niger*	The species was identified in the reed areas of the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	30-45 pairs	-	-	1185.54	Favorable
A031	*Ciconia ciconia*	The species was not identified in the site, its favorable habitat being at a distance of 1659 m from the closest works of the project, namely the road junction with DN02.	1000-2000 individuals	-	-	2100.60	Favorable
A081	*Circus aeruginosus*	The species was identified in the reed areas of the two lakes, the closest point of presence being at a distance of 1652 m from the nearest works of the project, and its habitat being at a distance of 427 m from the same works, namely road junction with DN02.	3-5 pairs 10-25 individuals	-	-	1070.94	Favorable
A082	*Circus cyaneus*	The species was identified in agricultural crops in the vicinity of the two lakes, this potential feeding habitat being intersected by the project, namely through the road junction with DN02.	4-15 individuals	-	-	1070.94	Unfavorable
A038	*Cygnus cygnus*	The species was identified on the water surface of the two lakes and on the agricultural crops in the vicinity of the two lakes, this potential feeding habitat being intersected by the project, namely through the road junction with DN02.	3-15 individuals	-	-	1944,72	Favorable
A027	*Egretta alba*	The species was identified in the reed areas on the north-eastern shore and west of the Rogojeşti lake, this habitat being at a distance of 427 m from the closest works of the	100-150 individuals	-	-	1185.54	Favorable

Code Natura 2000	Habitats / Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	Conservation status in the site
		project, namely the road junction with DN02.					
A026	*Egretta garzetta*	The species was identified in the reed areas of the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	30-40 individuals	-	-	1185.54	Favorable
A002	*Gavia arctica*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	6-15 individuals	-	-	1029.66	Favorable
A001	*Gavia stellata*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	2-7 individuals	-	-	1029.66	Favorable
A075	*Haliaeetus albicilla*	The species was identified in feeding behavior on the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	2-8 individuals	-	-	1185.54	Favorable
A131	*Hymantopus hymantopus*	The species was identified in feeding behavior on the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	20-60 individuals	-	-	1185.54	Favorable
A022	*Ixobrychus minutus*	The species was identified in the reed areas of the two lakes, the closest point of presence being at a distance of 587 m from the nearest works of the project, and its habitat being at a distance of 427 m from the same works, namely road junction with DN02.	30-60 pairs	-	-	1185.54	Favorable
A338	*Lanius collurio*	The species was identified in bushes and shrubs areas from the eastern side of Lake Bucecea and in the west and the northeast of Rogojeşti lake , its habitat being at a distance of 427 m from the same works, namely the road junction with DN02	5-7 pairs	-	-	920.96	Favorable
A339	*Lanius minor*	The species was identified in bushes and shrubs areasAfrom the eastern side of Lake Bucecea and in the west and the northeast of Rogojeşti lake, its habitat being at a distance of 427 from the nearst works of the project, namely the road junction with DN02	15-20 individuals	-	-	920.96	Favorable
A117	*Larus minutus*	The species was identified on the water surface of Lake Bucecea, its habitat being at a distance of at least 9,680 m from the nearest works of the project, namely the related highway section km 2+875.	5 individuals	-	-	1185.54	Unfavorable
A068	*Mergus albellus*	The species was identified in feeding behavior on the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	50-120 individuals	-	-	1185.54	Favorable
A393	*Phalacrocorax pygmeus*	The species was identified in feeding behavior on the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with	20-80 individuals	-	-	1185.54	Unfavorable

Code Natura 2000	Habitats / Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	Conservation status in the site
		DN02.					
A151	*Philomachus pugnax*	The species was identified in feeding behavior on the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	1500-2000 individuals	-	-	2100.60	Favorable
A140	*Pluvialis apricaria*	The species was identified in the areas around the Rogoje lakesANDITANDi Bucecea, this habitat aflâgoing to a distanceyourof 427 myourof the closest thingsUmri of the project, namely the road junction with DN02.	150-400 individuals	-	-	915.06	Favorable
A195	*Sterna albifrons*	The species was identified on the water surface of Lake Bucecea, its habitat being at a distance of at least 9,680 m from the nearest works of the project, namely the related highway section km 2+875.	1 individual	-	-	1185.54	Unfavorable
A193	*Sterna hirundo*	The species was identified in the reed areas of the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	20-30 individuals	-	-	1185.54	Favorable
A166	*Tringa glareola*	The species was identified in the areas around the Rogojești and Bucecea lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	20-200 individuals	-	-	1185.54	Favorable
A054	*Anas acuta*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	40-150 individuals	-	-	1029.66	Favorable
A052	*Anas crecca*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	1300-1600 individuals	-	-	1029.66	Favorable
A050	*Anas penelope*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	70-160 individuals	-	-	1029.66	Unknown
A053	*Anas platyrhynchos*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	300-600 individuals in winter; 20-30 nesting pairs; 8000-10000 individuals in the passage	-	-	1029.66	Favorable
A055	*Anas querquerdula*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	300-400 individuals	-	-	1029.66	Favorable

Code Natura 2000	Habitats / Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	Conservation status in the site
A051	*Anas strepera*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	20-30 individuals	-	-	1029.66	Favorable
A059	*Aythya ferina*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	1500-2000 individuals	-	-	1029.66	Favorable
A061	*Aythya fuligula*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	300-650 individuals	-	-	1029.66	Favorable
A062	*Aythya marila*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	2-30 individuals	-	-	1029.66	Unfavorable
A036	*Cygnus olor*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	250-350 individuals	-	-	1029.66	Favorable
A125	*Fulica atra*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	250-350 individuals	-	-	1029.66	Favorable
A459	*Larus cachinnans*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	250-350 individuals	-	-	1029.66	Favorable
A179	*Larus ridibundus*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	2000 individuals	-	-	1029.66	Favorable
A017	*Phalacrocorax carbo*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	300-500 individuals	-	-	1029.66	Favorable
A028	*Ardea cinerea*	The species was identified in the reed areas of the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	100-150 individuals	-	-	155.88	Favorable
A136	*Charadrius dubius*	The species was identified at the edge of the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	10-15 individuals	-	-	155.88	Favorable
A156	*Limosa limosa*	The species was identified at the edge of the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	300-400 individuals	-	-	155.88	Unfavorable
A161	*Tringa erythrhopus*	The species was identified at the edge of the two lakes, this habitat being at a distance of	300-500	-	-	155.88	Favorable

Code Natura 2000	Habitats / Species according to Standard Form	Location to the project	Population size	Quantified information regarding the presence of individuals	Population dynamics	The surface of the habitat of the species	Conservation status in the site
		427 m from the closest works of the project, namely the road junction with DN02.	individuals				
A165	*Tringa ochropus*	The species was identified at the edge of the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	150-200 individuals	-	-	155.88	Favorable
A162	*Tringa totanus*	The species was identified at the edge of the two lakes, this habitat being at a distance of 427 m from the closest works of the project, namely the road junction with DN02.	150-200 individuals	-	-	155.88	Favorable
A142	*Vanellus vanellus*	The species has been identified in agricultural areas and with meadow from the edge of the lakes., this habitat being at distance of 427 m from the closest works of the project, namely the road junction with DN02.	800-1500 individuals	-	-	It must be defined within 2 years	Favorable
A041	*Anser albifons*	The species was identified on the water gloss of the two lakes, this habitat being at a distance of 427 m from the nearest works of the project, namely the road junction with DN02.	200-500 individuals	-	-	It must be defined within 2 years	Favorable

Table no.3-16Population trends of bird species from the ROSPA0110 site at national level

Habitat / species code	Species name / habitat	Type of population (only for SPA)	National trend	Ecology of the species			
				Favorable habitat	Trophic resource	Sensitive period	Migration / displacement requirements
A229	*Alcedo atthis*	Nesting	Unknown	Aquatic areas	Polyphagous	March April	-
A054	*Anas acuta*	Passage	Unknown	Meadow areas with water	Omnivorous	April May June	-
A052	*Anas crecca*	Passage	Unknown	Aquatic areas	Granivore	April	-
A050	*Anas Penelope*	Passage	Unknown	Aquatic, marshy and tundra areas	Omnivorous	April May	-
A053	*Anas platyrhynchos*	Wintering	Stable	Aquatic areas	Omnivorous	February March	-
A053	*Anas platyrhynchos*	Nesting	Increasing	Aquatic areas	Omnivorous	February March	-
A053	*Anas platyrhynchos*	Passage	Unknown	Aquatic areas	Omnivorous	February March	-

Habitat / species code	Species name / habitat	Type of population (only for SPA)	National trend	Ecology of the species			
				Favorable habitat	Trophic resource	Sensitive period	Migration / displacement requirements
A055	*Anas querquedula*	Passage	Unknown	Aquatic areas	Herbivore	April, May, June, July, August	-
A051	*Anas strepera*	Passage	Unknown	Aquatic areas	Phytophage, granivore	April, May, June, July	-
A041	*Anser albifrons*	Passage	Unknown	Marshy areas	Herbivore	May June	-
A028	*Ardea cinerea*	Passage	Unknown	Aquatic areas	Carnivorous	January, February, March, April, May, June	-
A029	*Ardea purpurea*	Nesting	Unknown	Aquatic areas	Carnivorous	April May	-
A059	*Aythya ferina*	Passage	Unknown	Wet areas	Omnivorous	April May	-
A061	*Aythya fuligula*	Passage	Unknown	Aquatic and plain areas	Omnivorous	May	-
A062	*Aythya marila*	Wintering	Decreasing	Wet areas	Omnivorous	April May	-
A060	*Aythya nyroca*	Passage	Unknown	Aquatic areas	Omnivorous	April May	-
A021	*Botaurus stellaris*	Nesting	Unknown	Aquatic areas	Carnivorous	April	-
A136	*Charadrius dubius*	Passage	Unknown	Aquatic and marshy areas	insectivorous	April May June	-
A196	*Chlidonias hybridus*	Nesting	Unknown	Aquatic and marshy areas	Insectivore, carnivore	May June	-
A197	*Chlidonias niger*	Wintering	Unknown	Wet areas	Polyphagous	April	-
A031	*Ciconia ciconia*	Passage	Unknown	Anthropophilic areas and areas of hay and meadows	Carnivorous	March	-
A081	*Circus aeruginosus*	Nesting	Uncertain	Wet areas	Carnivorous	April May	-
A081	*Circus aeruginosus*	Passage	Unknown	Wet areas	Carnivorous	April May	-
A082	*Circus cyaneus*	Passage	Unknown	Areas of meadows, pastures, swamps, forest, peatlands	Carnivorous	April May June	-
A038	*Cygnus cygnus*	Passage	Unknown	Wetland, plain and agricultural	fitofagus	April May	-

Habitat / species code	Species name / habitat	Type of population (only for SPA)	National trend	Ecology of the species			
				Favorable habitat	Trophic resource	Sensitive period	Migration / displacement requirements
				areas			
A036	*Cygnus olor*	Passage	Unknown	Aquatic areas	Herbivore	March April	-
A027	*Egretta alba*	Wintering	Unknown	-	-	-	-
A026	*Egretta garzetta*	Wintering	Unknown	Wet areas	Carnivorous	April	-
A125	*Fulica atra*	Wintering	Stable	Aquatic areas	Omnivorous	February, March, April, May, June, July, August, September (March, April, May, June, July)	-
A002	*Gavia arctica*	Wintering	Uncertain	Aquatic areas	Polyphagous	April May June	-
A001	*Gavia stellata*	Wintering	Uncertain	Wetlands and peatlands	Polyphagous	May June	-
A075	*Haliaeetus albicilla*	Wintering	Uncertain	Wet areas	Carnivorous	March	-
A131	*Hymantopus hymantopus*	Passage	Unknown	Wet areas	Carnivorous	June	-
A022	*Ixobrychus minutus*	Nesting	Unknown	Aquatic areas	Insectivore, Ichthyophage, Carnivore	May June	-
A338	*Lanius collurio*	Nesting	Increasing	Areas of meadows, pastures, agricultural lands	Insectivorous, carnivorous, frugivorous	May June	-
A339	*Lanius minor*	Nesting	Uncertain	Grassland areas	Carnivorous	May June	-
A459	*Larus cachinnans*	Wintering	Uncertain	Marine areas	Carnivorous	April May	-
A177	*Larus minutus*	Wintering	Unknown	Wet and marshy areas	insectivorous	April May June	-
A179	*Larus ridibundus*	Wintering	Unknown	Aquatic areas	Insectivore, Ichthyophage and Detritivore	March, April, May, June	-
A156	*Limosa limosa*	Passage	Unknown	Aquatic areas	Polyphagous	March April May	-
A068	*Mergus albellus*	Wintering	Unknown	Aquatic areas	Polyphagous	The spawning period begins in the	-

Habitat / species code	Species name / habitat	Type of population (only for SPA)	National trend	Ecology of the species			
				Favorable habitat	Trophic resource	Sensitive period	Migration / displacement requirements
						months of April - May in the southern part and in May - June in the northern part.	
A017	*Phalacrocorax carbo*	Wintering	Unknown	Wet areas	Omnivorous	April May June	-
A393	*Phalacrocorax pygmeus*	Wintering	Unknown	-	-	-	-
A151	*Philomachus pugnax*	Wintering	Unknown	Marsh areas, ponds, water areas	Insectivore, ichthyophage, carnivore	March, April, May, June	-
A140	*Pluvialis apricaria*	Wintering	Unknown	Coastal area	Insectivore, granivore, vegetarian	April May June	-
A195	*Sterna albifrons*	Wintering	Unknown	Wet areas	Insectivore, ichthyophage	May, June, July	-
A193	*Sterna hirundo*	Wintering	Unknown	Aquatic areas	Ichthyophage	April May June	-
A161	*Tringa erythropus*	Passage	Unknown	Wet areas	Carnivorous	May, June, July	-
A166	*Tringa glareola*	Wintering	Unknown	Wet areas	Carnivorous	May, June, July	-
A165	*Tringa ochropus*	Wintering	Unknown	Wet areas	Carnivorous	April May	-
A162	*Tringa totanus*	Passage	Unknown	Wet areas	Carnivorous	April May June	-
A142	*Vanellus vanellus*	Passage	Unknown	Wet areas, meadows and hayfields	insectivorous	March, April, May, June	-

3.4 STRUCTURAL AND FUNCTIONAL RELATIONSHIPS THAT CREATE AND MAINTAIN THE INTEGRITY OF PROTECTED AREAS

3.4.1 Green infrastructure

The highway route intersects areas that form the green infrastructure, composed of all the natural and semi-natural or anthropogenic ecosystems/habitats and "blue" (a component of the green infrastructure), made up of natural and artificial water bodies. The essential components of the green infrastructure are represented by the Natura 2000 sites, they fulfill the role of ensuring the natural processes that maintain life and are mainly responsible for the production of ecosystem goods and services on which the maintenance of biodiversity depends, but also the maintenance/development of the socio-economic infrastructure.

Natural areas abound in elements of biodiversity, being vital by constituting the genetic and population reservoir, especially for degraded ecosystems. They are managed on a large spatio-temporal scale, while humanized areas (gardens, agricultural lands, parks, etc.) are managed on a small spatio-temporal scale. The anthropized green spaces are equally important, they represent dispersion environments for flora and fauna species.

Semi-natural habitats appear as a result of traditional agricultural activities and present a great diversity of species on their surface (Craioveanu and Rakosy, 2011). According to the thematic publication of the National Rural Development Network no. 42, year II, Agro-pastoral landscape and biodiversity[4], at the European level three types of agricultural land with high natural value were identified, respectively land characterized by large stretches of semi-natural vegetation (reduced intervention of the human population), land characterized by mosaic type landscapes (hedges, rows of trees etc.) or lands with low natural value, but which represent important ecological color for the maintenance of habitats and rare species, important areas for the nesting of certain rare bird species or for migratory birds (cereal crops).

In Romania[5], lands with high natural value can be classified taking into account the criteria proposed by the European Forum for Nature Conservation and Pastoralism[6]) in natural and semi-natural meadows in the mountain area; extensive traditional orchards (the bottom of the old hayfields is preserved almost entirely); mosaic landscapes (meadows, trees, shrubs and agricultural plots with abundant biodiversity); meadows in the vicinity of forests characterized by a great diversity of fauna (birds, invertebrates, mammals, etc.).

A large part of the previously mentioned valuable lands can also be found in the area of the construction project of the Suceava -DN2H highway and the DN2H - Siret border expressway, these being represented in terms of geographical distribution in the figure below.

4National Rural Development Program for the period 2014 – 2020, Ministry of Agriculture and Rural Development (MADR) - General Directorate of Rural Development (AM PNDR)
5 https://www.rndr.ro/comunicare/publicatii/publicatii-tematice.html
6 http://www.efncp.org/what-we-do/high-nature-value-farming/indicators-high-nature-value-farming/

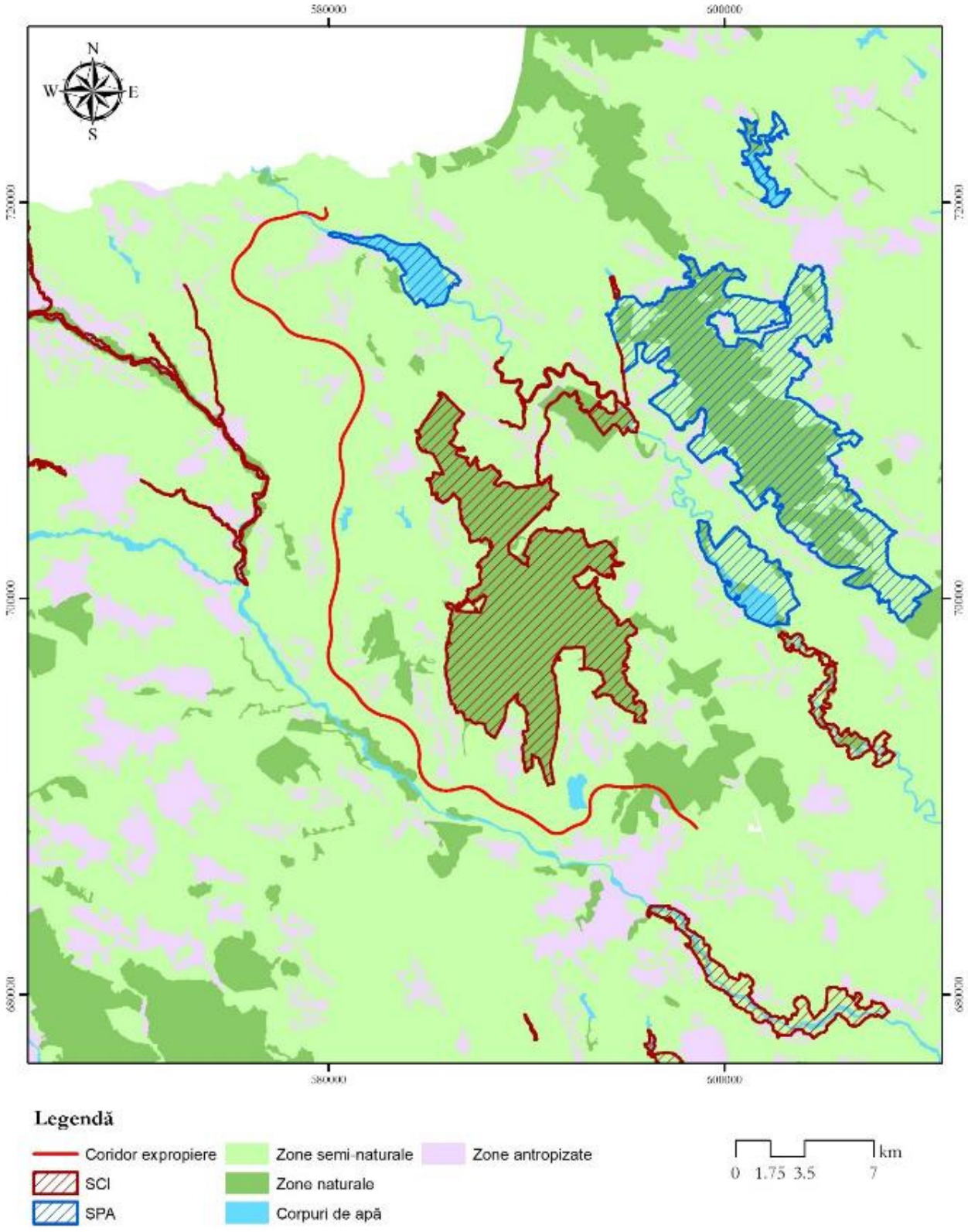


Figure no.3-7Green infrastructure in the project area

In the area of the Suceava - DN2H highway and the DN2H - Siret border expressway there are several key areas for biodiversity. Near the project, the main Key Biodiversity Zone is the Rogojeşti - Bucecea Reservoirs. Key Biodiversity Areas are established based on IUCN criteria. It is considered that they have a significant contribution to the global conservation of biodiversity (Key Biodiversity Areas KBA -www.keybiodiversityareas.com). The following figure shows the KBAs in the area of the Suceava - DN2H highway and the DN2H - Siret border expressway and represents an extract from the general map of the international KBAs[7]significant, including global KBAs, regional KBAs and those whose global/regional status is not yet determined.

[7] http://www.keybiodiversityareas.org/site/mapsearch

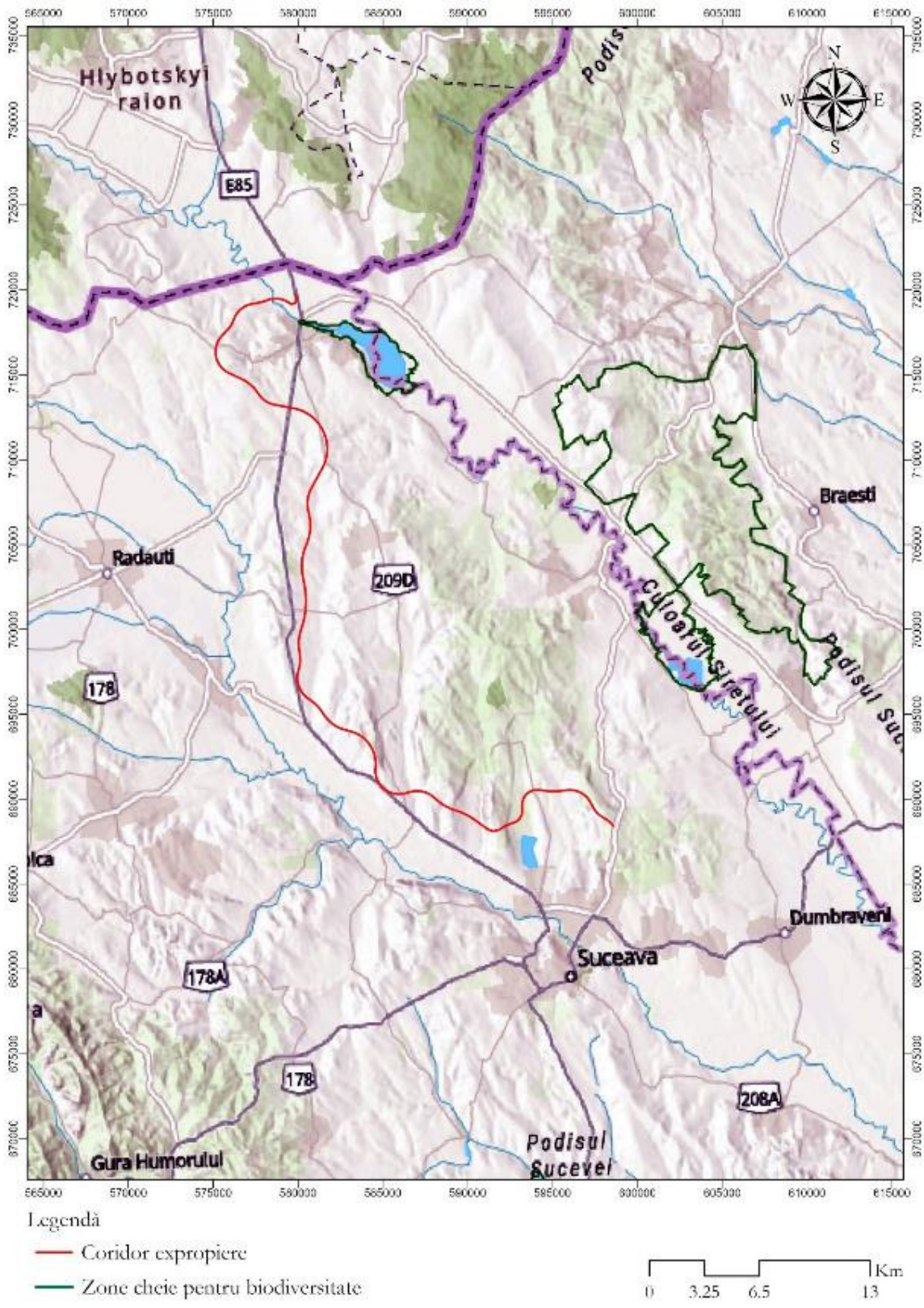


Figure no.3-8 Key Biodiversity Areas, represented next to project boundaries and Natura 2000 sites - data sourcehttp://www.keybiodiversityareas.org/kba-data

3.4.2 Ecological corridors

For the highway and the expressway, an analysis was made of the existence of ecological corridor areas and of the known information regarding the movement of large carnivore species (especially bears) in the area proposed for the project. Data and information from the project were used"CoreHABS - Ecological corridors for habitats and species in Romania"[8]and information from other sources. A modeling of potential wildlife crossing areas was also carried out as part of this project. This modeling was based on the Circuitscape methodology and used the Gnarly Tools toolbox for ArcGIS

The results of the modeling of the connectivity areas by means of the Circuitscape methodology, as well as the information regarding the movement areas of large mammals, such as *Cervus elaphus* and *Canis lupus*, indicate an important passage area between the localities of Iacobeşti - Slobozia, Dărmăneşti - Costina, Adâncata - Scheia (county Suceava).The following figure shows the important areas for connectivity, as they were identified based on modeling and existing data and information in the specialized literature.

[8]The large mammal report resulting from this project is available athttp://corehabs.ro/images/rapoarte/1.%20METODOLOGIE%20CARNIVORE.pdf

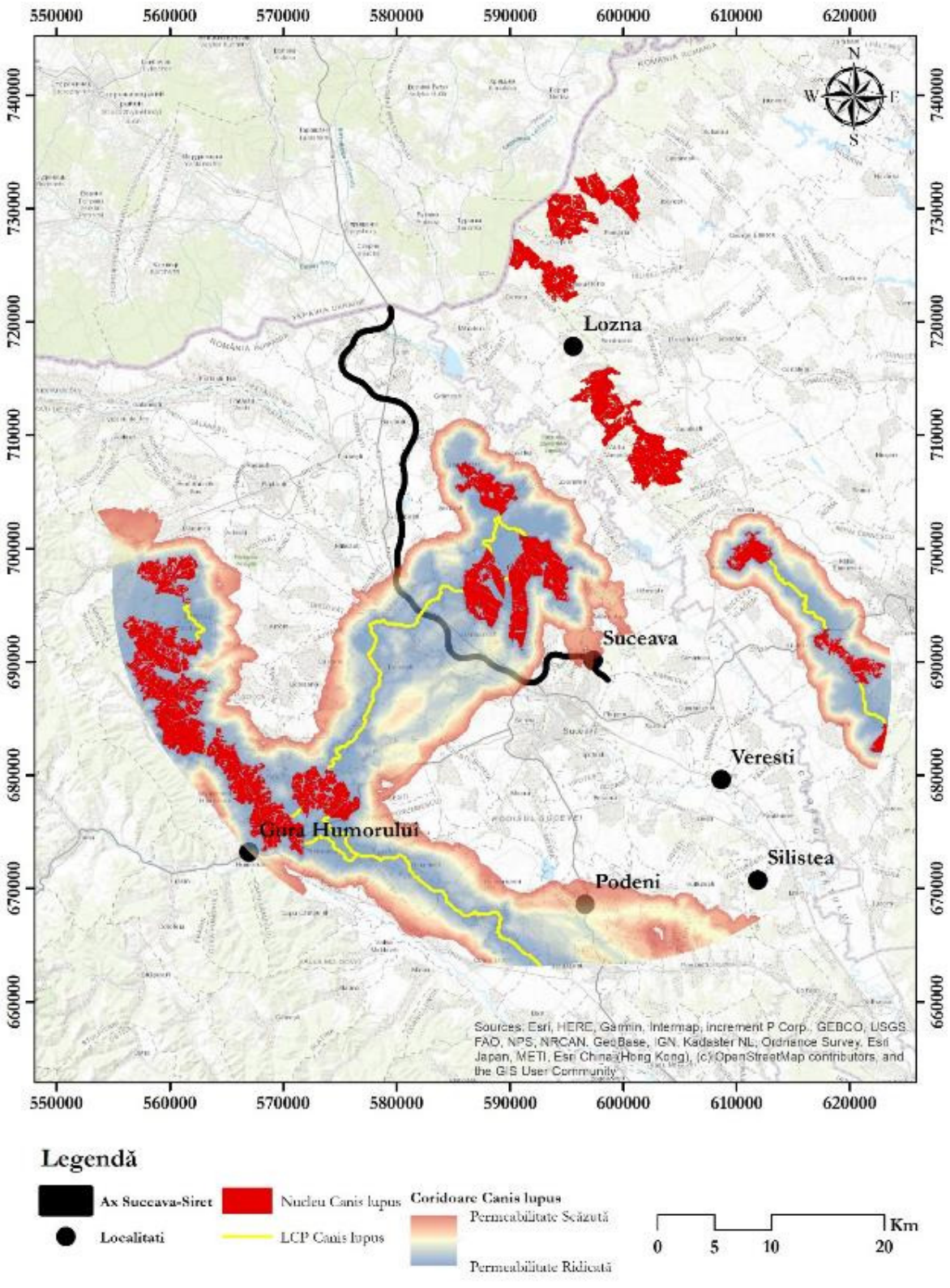


Figure no.3-9The main area considered important for the movement of the *Canis lupus* species (marked in yellow). The areas were determined based on ecological connectivity modeling and observations from the specialized literature

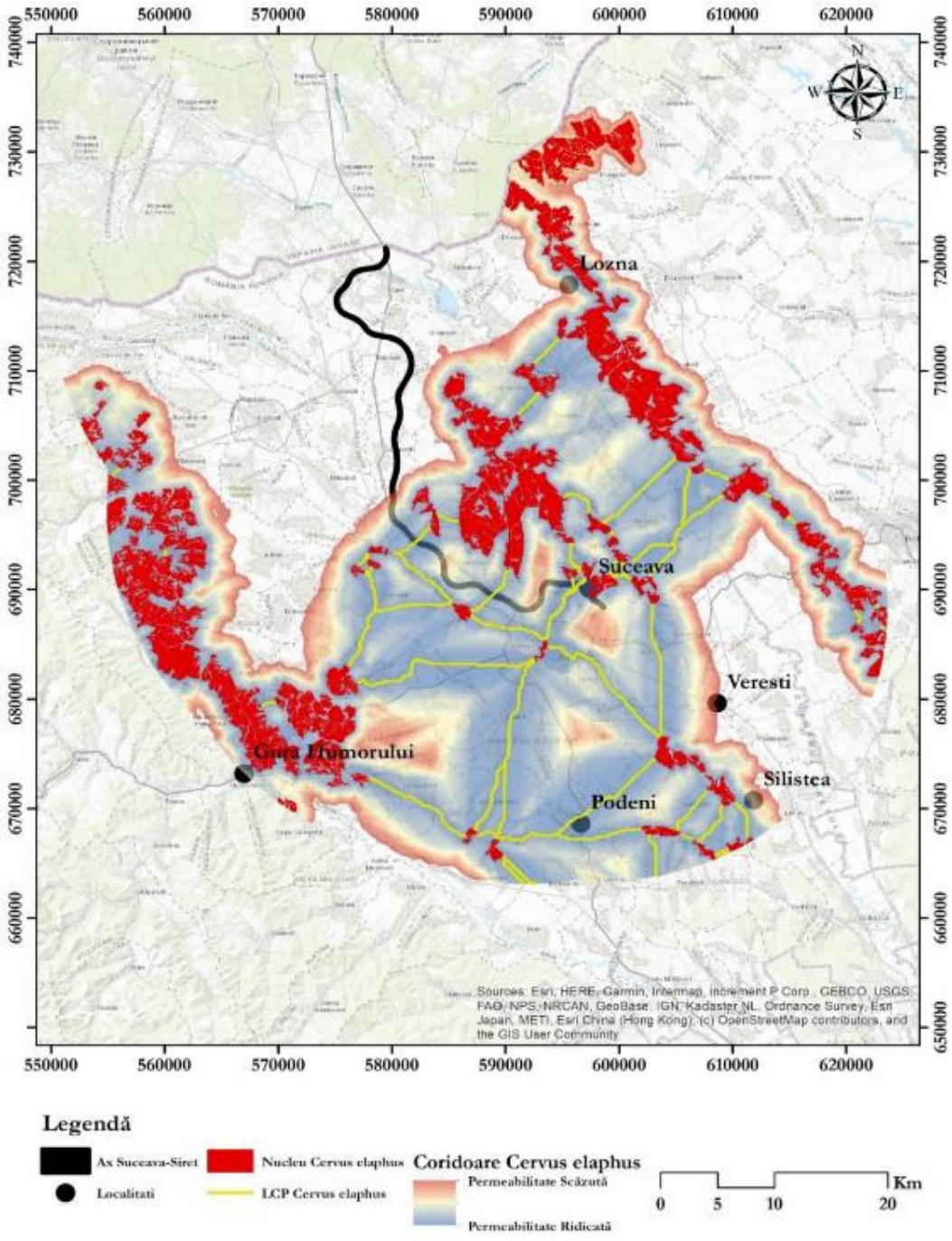


Figure no.3-10The main area considered important for the movement of the *Cervus elaphus* species (marked in yellow). The areas were determined based on ecological connectivity modeling and observations from the specialized literature

3.4.3 The particularities of the sites potentially affected by the project

The particularities of the Natura 2000 sites from the point of view of the structural and functional relationships existing in each site are presented in detail below.

3.4.3.1 ROSCI0074 Pădurea Pătrăuţi

Table no.3-17The main relations from the Natura 2000 site ROSCI0074 Pădurea Pătrăuţi

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
91E0*	Dependent on surface water but also groundwater (moderate sensitivity to quantitative changes and low-moderate to qualitative changes)	-	-	Primary producer Support for birds that prefer forest habitats for nesting	It can provide connectivity along rivers.
91Y0	-	-	Precipitation = 500-800 mm	Primary producer Support for xylophagous invertebrates (*Lucanus cervus*) and for birds that prefer forest habitats for nesting	
9130	-	-	Rainfall water	Primary producer It represents support for xylophagous invertebrates (*Lucanus cervus*) and birds that prefer forest habitats for nesting.	
Carabus variolosus	Surface waters - rivers	91E0*	The species avoids acidic soils, so the number of conifers in the habitat must be small (conifer needles lead to soil acidification).	Hygrophilous predator It feeds on insect larvae or small crustaceans (isopods, amphipods) or aquatic annelids Bird Resource	Travel up to 3 km along the riparian zone
Rosalia alpina		9130		Saproxil	Travel in flight. It can move up to 1.6

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
				Especially beech (*Fagus* sp.). The larva can also develop in other species such as: willow (*Salix* sp.), hornbeam (*Carpinus* sp.), oak (*Quercus* sp.), oak (*Quercus robur*), alder (*Alnus* sp) and apple (*Malus* sp). Other host species can also be: *Tilia spp, Acer pseudoplatanus, A. canpestre, A. platanoides, Fraxinus sp., Ulmus sp.* Birds	km
Lucanus cervus		9130, 91Y0,		Xylofag, saproxil Species from the genus Quercus sp., *Fagus sylvatica* or *Acer pseudoplatanus* Food resource for bird species	
Triturus cristatus	Surface - large puddles	-		insectivorous Arthropods, including aquatic invertebrates Food resource for *Lutra lutra*, birds	Small distances (150 m).
Bombina bombina	Surface - lakes, non-permanent, temporary puddles	-		insectivorous arthropods Food resource for Lutra lutra birds	93 - 251.35 m - depending on the amount of precipitation
Bombina variegata		-	Occupies any body of water, mainly temporary puddles, being able to reproduce even in uneven ground that contains less than 1 l of water (it can also survive in highly polluted ecosystems)	insectivorous arthropods Food resource for birds	

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
Myotis myotis	-	9130		insectivorous invertebrates Nocturnal birds of prey	It can travel significant distances (between 10-25 km) from shelters to feeding habitats.
Myotis dasycnema	Surface waters	Buildings, bridges, wall cracks, church towers, manholes		insectivorous invertebrates Nocturnal birds of prey	They can fly between 15-25 km from the roost.
Barbastella barbastellus	-	-		insectivorous invertebrates Nocturnal birds of prey Dependent on *Fagus* spp.	

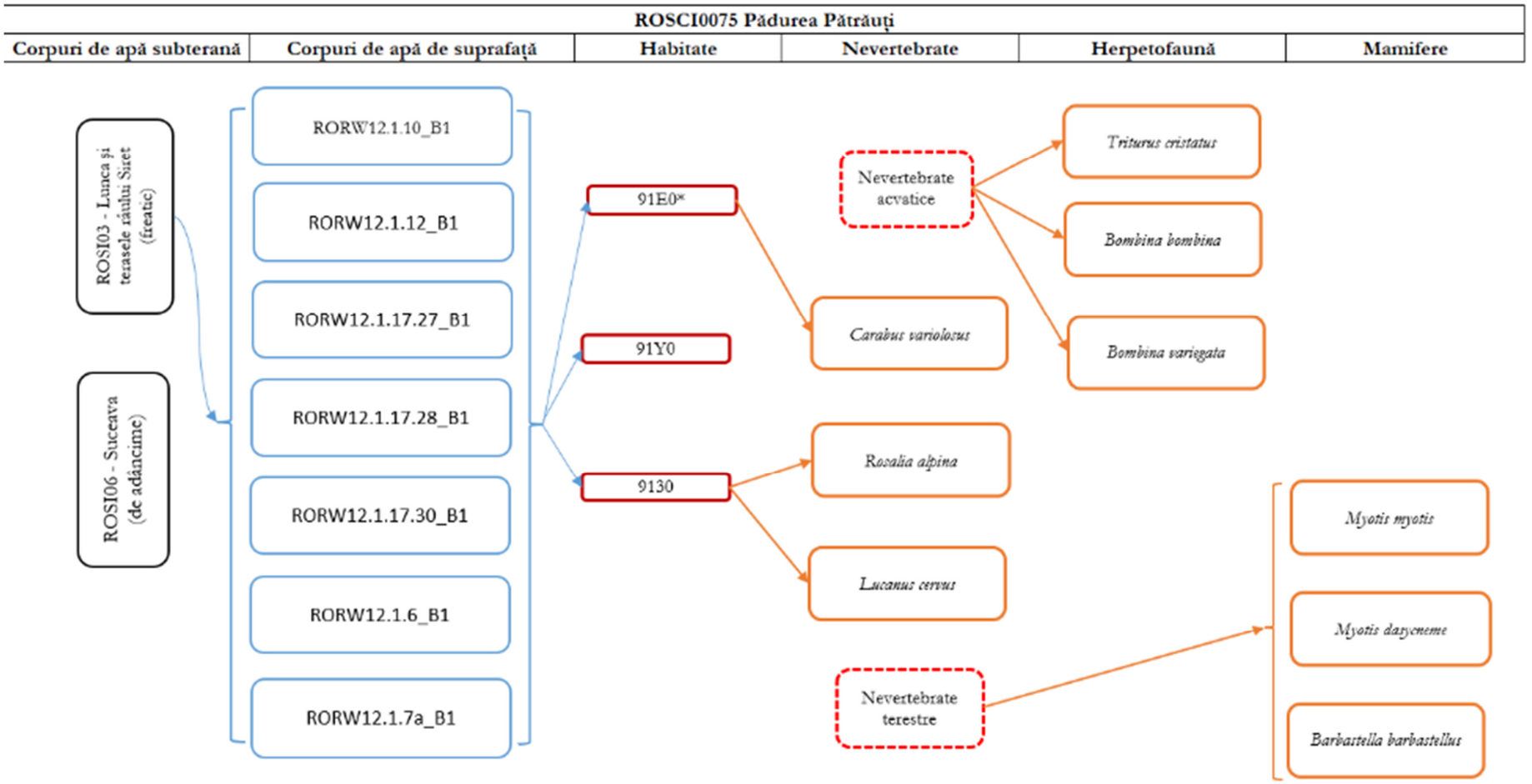


Figure no.3-11The structural and functional relationships in the Natura 2000 site ROSCI0075 Pădurea Pătrăuţi

3.4.3.1 ROSAC0391 Siretul Mijlociu – Bucecea

Table no.3-18The main relations from the Natura 2000 site ROSAC0391 Siretul Mijlociu - Bucecea

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	Relationship between species and ecological corridors
91Y0	-	-	Precipitation = 500-800 mm	Primary producer Support for xylophagous invertebrates *(Lucanus cervus*) and for birds that prefer forest habitats for nesting	-
Unio crassus	From surface waters (it populates streams and rivers, rarely rivers, in ponds that have a permanent connection with rivers or streams and rarely in lakes.	-		filter- Phytoplankton, dissolved organic matter, algae smaller than 20-30 µm, detritus, algae and bacteria Fish, mammals	-
Aspius aspius	Surface waters (rivers, seas)	-	A good part of the specimens from the Danube enter the ponds for reproduction and retreat when the waters recede; others remain in the Danube, and others are sedentary in ponds.	rape Diurnal species that feeds on small fish (small fish, especially bream), insect larvae, small molluscs, crustaceans and worms. Food source for birds.	-
Barbus petenyi	Surface water (rivers)	-	It reproduces in fast and cold stony rivers (exclusively in the mountain area and the upper part of the hilly region)	Benthic aquatic invertebrates (ephemeroptera, trichoptera, gammarids, oligochaetes, tenidipedes) less often with plants or detritus	-

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	Relationship between species and ecological corridors
				Food resource for Lutra Lutra	
Cobitis taenia	Surface water (rivers)		Sludge deposited on gravel substrate and submerged vegetation. It does not undertake long migrations. Benthic species, requires the maintenance of riverbeds without obstacles.	insectivorous Rotifera Food source for *Lutra lutra*	-
Romanogobio kesslerii	Surface water (rivers)	-	Sludge deposited in shallow water, over gravel, sand or submerged vegetation.	insectivorous Benthic invertebrates Food source for *Lutra lutra* and bird species	-
Sabanejewia aurata	Surface water (rivers)	-	Tip deposited on sandy substrate or on gravel.	insectivorous Benthic invertebrates Food source for *Lutra lutra* and bird species	-
Lutra lutra	Surface - rivers, lakes	-	Requires watercourses for movement, preferably without barriers.	Aquatic predator Fish, aquatic invertebrates (juveniles)	-

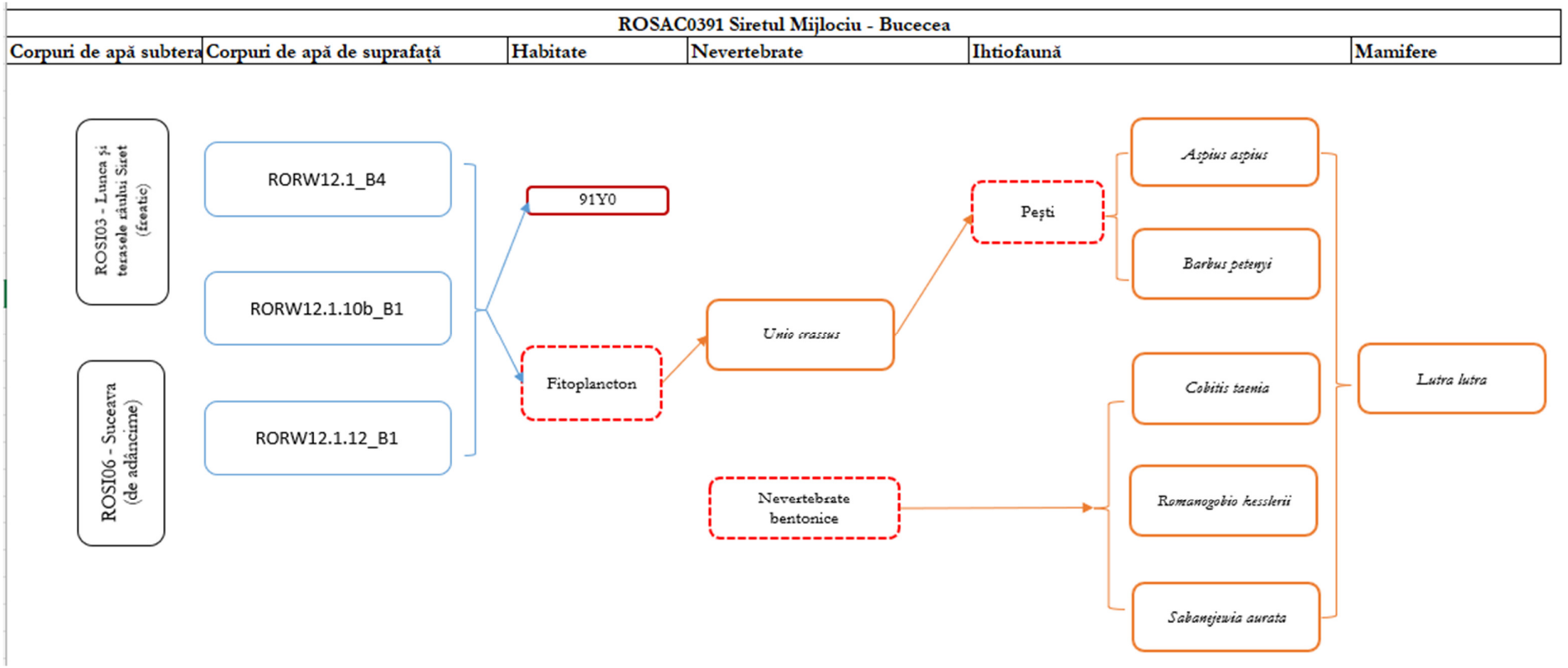


Figure no.3-12 Structural and functional relationships in the Natura 2000 site ROSAC0391 Siretul Mijlociu - Bucecea

3.4.3.1 ROSPA0110 Acumulările Rogojesti – Bucecea

Table no.3-19The main relations from the Natura 2000 site ROSPA0110 Acumulările Rogojeşti - Bucecea

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
Alcedo atthis	Surface - rivers, lakes	-	Nesting in lakes, marshes, floodplains, dirt banks.	Aquatic predator (amphibious fish)	-
Anas acuta	Surface - rivers, lakes	-	Nesting in lakes, marshes, floodplains.	Aquatic herbivore (plant matter) Food resource for birds of prey	-
Anas crecca	Surface - rivers, lakes	-	Nesting in lakes, swamps, floodplains, coastal areas.	Aquatic herbivore (plant matter) Food resource for birds of prey	-
Anas penelope	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains, coastal areas.	Omnivore (invertebrates, plant matter) Food resource for birds of prey	-
Anas platyrhynchos	Surface - rivers, lakes	-	Nesting in lakes, rivers, swamps, floodplains, anthropogenic water systems, thickets.	Aquatic herbivore (plant matter) Food resource for birds of prey	-
Anas querquerdula	Surface - rivers, lakes	-	Nesting in lakes, swamps, floodplains, coastal areas, thickets.	Aquatic herbivore (plant matter) Food resource for birds of prey	-
Anas strepera	Surface - rivers, lakes	-	Nesting in lakes, rivers, swamps, floodplains, anthropogenic water systems, meadows, pastures, thickets.	Aquatic herbivore (plant matter) Food resource for birds of prey	-
Anser albiforns	Surface - rivers, lakes	-	Nesting in swamps, floodplains, meadows, pastures.	Aquatic herbivore (plant matter)	-

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
Ardea cinerea	Surface - rivers, lakes	-	Nesting in lakes, swamps, floodplains, anthropogenic aquatic systems.	Aquatic predator (fish, amphibians)	-
Ardea purpurea	Surface - lakes	-	The large natural aquatic habitats, with large areas of reeds, in which they place their colonies (in secluded, isolated areas)	Aquatic predator (fish, amphibians) Food resource for birds of prey	-
Aythya ferina	Surface - rivers, lakes	-	Nesting in lakes, coastal area.	Aquatic herbivore (plant matter) Food resource for birds of prey	-
Aythya fuligula	Surface - rivers, lakes	-	Nesting in lakes, marshes, floodplains.	Aquatic herbivore (plant matter) Food resource for birds of prey	-
Aythya marila	Surface - rivers, lakes	-	Nesting in lakes, marshes, floodplains.	Aquatic predator (Plant Matter) Food resource for birds of prey	-
Aythya nyroca	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains.	Aquatic herbivore (plant matter) Food resource for birds of prey	-
Botaurus stellaris	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains.	Aquatic predator (fish, amphibians) Food resource for birds of prey	-
Charadrius dubius	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains.	Aquatic predator (fish, amphibians) Food resource for birds of prey	-
Chlidonias hybridus	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains.	Aquatic predator (terrestrial or aquatic insects, crustaceans,	-

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
				amphibians and small fish)	
Chlidonias niger	Surface - rivers, lakes	-	Nesting in lakes, marshes, floodplains.	Aquatic predator (fish, amphibians) Food resource for birds of prey	-
Ciconia ciconia	Surface - rivers, lakes	-	Nesting in cliffs, orchards, parks, coniferous forests, deciduous forests, poles, buildings.	Omnivorous Micromammals (mice, shrews), lizards, snakes, amphibians, small birds (especially chickens, sometimes eggs), large insects. In aquatic areas, the food is diversified and includes fish and aquatic invertebrates (molluscs, crustaceans). It also consumes vegetable matter.	-
Circus aeruginosus	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains.	Terrestrial predator (Amphibians, reptiles, mammals, fish, small-medium sized birds, chicks and their eggs, invertebrates)	-
Circus cyaneus	-	-		Terrestrial predator (amphibians, reptiles, mammals)	-
Cygnus cygnus	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains, coastal areas.	Aquatic herbivore (plant matter)	-
Cygnus olor	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains, coastal areas.	Aquatic herbivore (plant matter)	-
Egretta alba/ Ardea alba	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains, coastal areas.	Aquatic and terrestrial predators In aquatic habitats it feeds on fish, frogs, snakes, crustaceans, aquatic	-

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
				insects. It often feeds in the fields, with reptiles, amphibians, birds and small mammals. Food source for birds (predators), other birds (such as corvids) or mammals that consume the eggs.	
Egretta garzetta	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains, coastal areas.	Aquatic predator (fish, amphibians) Food source for birds of prey.	-
Fulica atra	Surface - rivers, lakes	-	Nesting in lakes, swamps, floodplains, anthropogenic aquatic systems, coastal areas.	Aquatic herbivore (plant matter) Food source for birds of prey.	-
Gavia arctica	Surface - rivers, lakes	-		Aquatic predator (fish, amphibians) Food source for birds of prey.	-
Gavia stellata	Surface - rivers, lakes	-		Aquatic predator (fish, amphibians) Food source for birds of prey.	-
Haliaeetus albicilla	Surface waters - rivers, lakes	-	It prefers large wetlands, including river meadows, extensive marshes, lakes and coastal areas. For nesting, it prefers forest habitats with tall trees in the vicinity of wetlands (forests, meadows, etc.),	Aquatic predator (mixed-diet carnivore, including fish species waterfowl species mammals of various sizes: rodents, rabbits, deer, sheep and goats	-

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
			but also rocky outcrops (it very rarely nests directly on the ground).		
Himantopus himantopus	-	-	Nesting in lakes, swamps, floodplains, coastal areas.	Aquatic predator (Insects, molluscs, crustaceans, spiders, small fish and seeds)	-
Ixobrychus minutus	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains.	Aquatic predator (amphibians, fish) Food source for birds of prey.	-
Lanius collurio	-	-	Nesting in agricultural land, meadows, pastures, thickets, orchards, parks.	Insectivore (invertebrates)	-
Lanius minor	-		Nesting in agricultural land, meadows, pastures, thickets, orchards, parks.	Insectivore (invertebrates)	-
Larus cachinnans	Surface - rivers, lakes	-	Nesting in lakes, rivers, anthropogenic aquatic systems, coastal zone.	Omnivore (invertebrates, plant matter)	-
Larus miutus					-
Larus ridibundus					-
Limosa limosa	Surface - rivers, lakes	-	Nesting in lakes, swamps, floodplains, meadows, pastures.	Aquatic predator (fish, amphibians)	-

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
Mergus albellus	Surface - rivers, lakes	-		Aquatic predator (fish, amphibians)	-
Phalacrocorax carbo sinensis	Surface - rivers, lakes	-	Nesting in lakes, rivers, marshes, floodplains, coastal areas.	Aquatic predator (fish, amphibians) Food source for birds of prey.	-
Phalacrocorax pygmeus					-
Philomachus pugnax Mycrocarbo pygmaeus	Surface - rivers, lakes	-	Nests in floodplains along the Danube with dense stands, shrubs or thick reeds.	Omnivore (Fish and occasionally small mammals, crustaceans, leeches, large insects)	-
Pluvialis apricaria	Surface - rivers, lakes	-		Omnivore (Earthworms, insects, millipedes, snails, seeds, fruits, plant debris)	-
Sterna hirundo	Surface - rivers, lakes	-	Nesting in lakes, swamps, floodplains, coastal areas.	Aquatic predator (fish, amphibians)	-
Sternula albifrons	Surface (lakes, rivers)	-	It nests alone or in small colonies, in bare places or covered by very little vegetation, located on the banks of the waters, on islands, in salt marshes, marshes, bays, or on the muddy terraces at the edge of the waters.	Aquatic predator (fish, small crustaceans, annelids, molluscs and invertebrates)	-
Tringa	Surface - rivers, lakes	-		Aquatic predator (fish,	-

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	The relationship between species and ecological corridors
erythropus				amphibians) Food source for birds of prey.	
Tringa glareola	Surface - rivers, lakes	-		Aquatic predator (fish, amphibians) Food source for birds of prey.	-
Tringa ochropus	Surface - rivers, lakes	-		Aquatic predator (fish, amphibians) Food source for birds of prey.	-
Tringa totanus	Surface - rivers, lakes	-	Nesting in swamps, floodplains, anthropogenic water systems, meadows, pastures.	Aquatic predator (fish, amphibians) Food source for birds of prey.	-
Vanellus vanellus	-	-	It nests in a wide variety of open habitats, such as arable land, pastures, hayfields, natural meadows or wetlands.	Omnivore (invertebrates, plant matter) Food source for birds of prey.	-

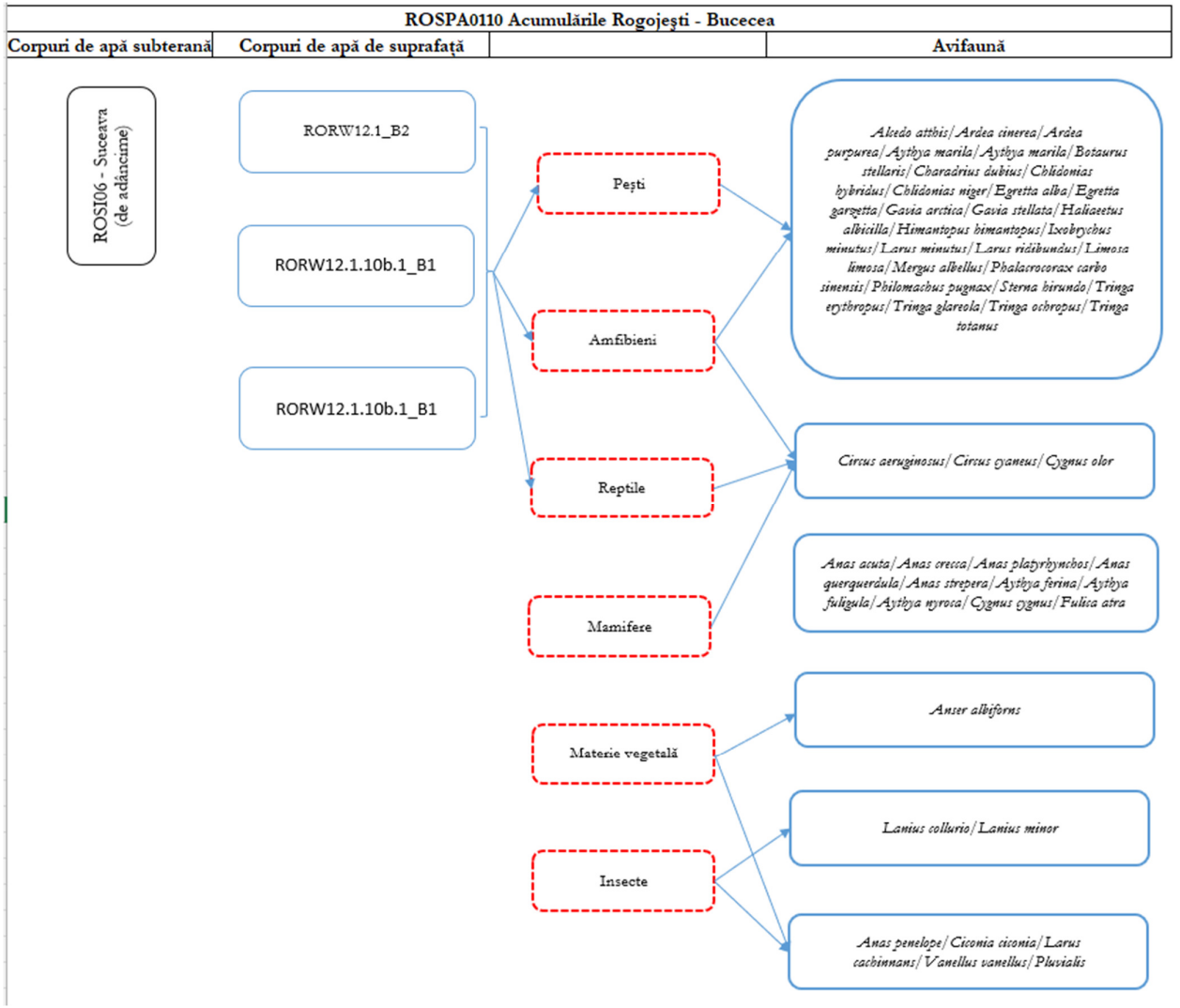


Figure no.3-13Structural and functional relationships from the site ROSPA0110 Accumulations Rogojeşti - Bucecea

3.4.3.1 ROSCI0380 Suceava Liteni River

Table no.3-20 The main relations from the Natura 2000 site ROSCI0380 Râul Suceava - Liteni

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	Relationship between species and ecological corridors
Barbus meridionalis	Surface water (rivers)	-	Breeds in fast and cold stony rivers (exclusively in the mountain area and the upper part of the hilly region)	Benthic aquatic invertebrates (ephemeroptera, trichoptera, gammarids, oligochaetes, tenidipedes) less often with plants or detritus Food resource for *Lutra lutra*	-
Rhodeus amarus	Surface water (rivers)	-		Detritivore (Plant matter - phytoplankton, aquatic plant debris, occasional invertebrate plant detritus) Food source for *Lutra lutra*, birds	-
Triturus cristatus	Surface - large puddles	-	Reproduction in shallow ponds, with submerged vegetation.	Insectivore (arthropods, including aquatic invertebrates) Food source for *Lutra lutra*, birds	-
Bombina bombina	Surface - lakes, non-permanent, temporary puddles	-		insectivorous arthropods Food resource for *Lutra lutra* birds	93 - 251.35 m - depending on the amount of precipitation
Bombina variegata		-	Occupies any body of water, mainly temporary puddles, being able to reproduce even in uneven ground that contains less than 1 l of water (it can also survive in highly polluted ecosystems)	insectivorous arthropods Food resource for birds	-

Species name / habitat	Dependency relationships between the site and the underground and surface water bodies	Dependency relationships between species and habitats of community interest	Dependency relationships between species / habitats and other characteristics (relief, geological, altitudinal, others)	Relationships between species of community interest based on trophic relationships or other interspecific relationships	Relationship between species and ecological corridors
Emys orbicularis	Surface - large ponds, lakes, rivers	-	Breeding in areas near lakes, up to a distance of about 200 m. Breeding areas are near the shore and near the roots of plants.	Omnivore (invertebrates, fish, amphibians, plant matter)	-
Spermophilus citellus	-	-	Steppe with low and very low grass vegetation (pastures and areas with well-drained soil) where it makes its galleries. Reported also in lands cultivated with perennial plants.	It consumes plant species (seeds, leaves) from grassland habitats. In addition to plants, they also consume large terrestrial arthropods	-
Myotis myotis	-	9130		Insectivore (invertebrates) Nocturnal birds of prey	It can travel significant distances (between 10-25 km) from shelters to feeding habitats.
Myotis bechsteinii	-	9130		Insectivore (invertebrates) Nocturnal birds of prey	-
Lutra lutra	Surface - rivers, lakes	-	Requires watercourses for movement, preferably without barriers.	Aquatic predator Fish, aquatic invertebrates (juveniles)	-

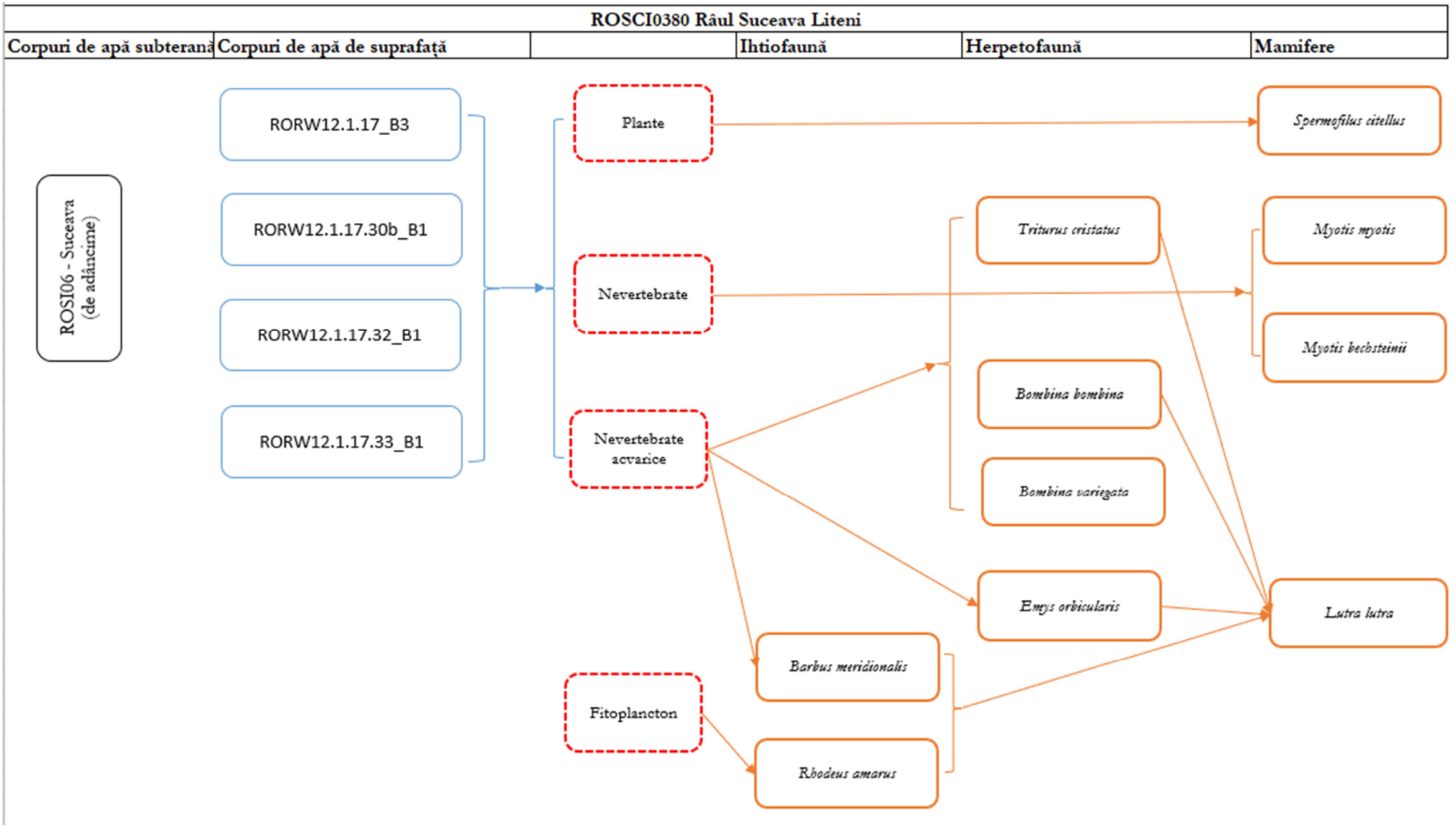


Figure no.3-14Structural and functional relationships from the site ROSCI0380 Râul Suceava - Liteni

3.5 THE CONSERVATION OBJECTIVES OF THE PROTECTED NATURAL AREA OF COMMUNITY INTEREST, WHERE THEY HAVE BEEN ESTABLISHED BY MANAGEMENT PLANS

The conservation objectives of the habitats and species in the potentially affected Natura 2000 sites are presented in the following tables. The objectives were established by the National Agency for Protected Natural Areas through Decisions and Notes.

Table no.3-21The conservation objectives established for the habitats and species in the Natura 2000 site ROSCI0075 Pădurea Pătrăuți, according to the objectives established by ANANP

Habitat / species code	Species name / habitat	Conservation objective at the site level
9130	*Asperulo-Fagetum* type forests	Maintaining the conservation status
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion nicanae, Salicion albae)*	Maintaining the conservation status
91Y0	Dacian forests of oak and hornbeam	Maintaining the conservation status
1188	*Bombina bombina*	Maintaining the conservation status
1193	*Bombina variegata*	Maintaining the conservation status
4014	*Carabus variolosus*	Maintaining the conservation status
1087	*Rosalia alpina*	No specific conservation objectives have been formulated for this species
1324	*Myotis myotis*	Maintaining the conservation status
1166	*Triturus cristatus*	Maintaining the conservation status
1083	*Lucanus cervus*	Maintaining the conservation status
1318	*Myotis dasycnema*	Maintaining the conservation status
1308	*Barbastella barbastellus*	Maintaining the conservation status

Table no.3-22The conservation objectives established for the habitats and species in the Natura 2000 site ROSAC0391 Siretul Mijlociu - Bucecea, according to the objectives established by ANANP

Habitat / species code	Species name / habitat	Conservation objective at the site level
6430	Border associations with tall hydrophilic grasses from plains to mountain and alpine levels	Improving the conservation status
1130	*Aspius aspius*	Improving the conservation status
5266	*Barbus petenyi*	No specific conservation objectives have been formulated for this species
6963	*Cobitis taenia*	Improving the conservation status
6143	*Romanogobio kesslerii*	Maintaining the conservation status
5197	*Sabanejewia balcanica*	Improving the conservation status
1032	*Unio crassus*	No specific conservation objectives have been formulated for this species
1355	*Lutra lutra*	Maintaining the conservation status

Table no.3-23The conservation objectives established for the habitats and species in the Natura 2000 site ROSPA0110 Acumulările Rogojeşti - Bucecea, according to the objectives established by ANANP

Habitat / species code	Species name / habitat	Conservation objective at the site level
A229	*Alcedo atthis*	Maintaining the conservation status
A054	*Anas acuta*	Maintaining the conservation status
A052	*Anas crecca*	Maintaining the conservation status
A050	*Anas penelope*	Improving the conservation status
A053	*Anas platyrhynchos*	Maintaining the conservation status
A053	*Anas platyrhynchos*	Maintaining the conservation status
A053	*Anas platyrhynchos*	Maintaining the conservation status
A055	*Anas querquedula*	Maintaining the conservation status
A051	*Anas strepera*	Maintaining the conservation status
A041	*Anser albifrons*	Maintaining the conservation status
A028	*Ardea cinerea*	Maintaining the conservation status
A029	*Ardea purpurea*	Improving the conservation status
A059	*Aythya ferina*	Maintaining the conservation status
A061	*Aythya fuligula*	Maintaining the conservation status
A062	*Aythya marila*	Improving the conservation status
A060	*Aythya nyroca*	Improving the conservation status
A021	*Botaurus stellaris*	Maintaining the conservation status
A136	*Charadrius dubius*	Maintaining the conservation status
A196	*Chlidonias hybridus*	Maintaining the conservation status
A197	*Chlidonias niger*	Maintaining the conservation status
A031	*Ciconia ciconia*	Maintaining the conservation status
A081	*Circus aeruginosus*	Maintaining the conservation status
A081	*Circus aeruginosus*	Maintaining the conservation status
A082	*Circus cyaneus*	Improving the conservation status
A038	*Cygnus cygnus*	Maintaining the conservation status
A036	*Cygnus olor*	Maintaining the conservation status
A027	*Egretta alba*	Maintaining the conservation status
A026	*Egretta garzetta*	Maintaining the conservation status
A125	*Fulica atra*	Maintaining the conservation status
A002	*Gavia arctica*	Maintaining the conservation status
A001	*Gavia stellata*	Maintaining the conservation status
A075	*Haliaeetus albicilla*	Maintaining the conservation status
A131	*Himantopus himantopus*	Maintaining the conservation status
A022	*Ixobrychus minutus*	Maintaining the conservation status
A338	*Lanius collurio*	Maintaining the conservation status
A339	*Lanius minor*	Maintaining the conservation status
A459	*Larus cachinnans*	Maintaining the conservation status
A177	*Larus minutus*	Improving the conservation status
A179	*Larus ridibundus*	Maintaining the conservation status
A156	*Limosa limosa*	Improving the conservation status

Habitat / species code	Species name / habitat	Conservation objective at the site level
A068	*Mergus albellus*	Maintaining the conservation status
A017	*Phalacrocorax carbo*	Maintaining the conservation status
A393	*Phalacrocorax pygmeus*	Improving the conservation status
A151	*Philomachus pugnax*	Maintaining the conservation status
A140	*Pluvialis apricaria*	Maintaining the conservation status
A195	*Sterna albifrons*	Improving the conservation status
A193	*Sterna hirundo*	Maintaining the conservation status
A161	*Tringa erythropus*	Maintaining the conservation status
A166	*Tringa glareola*	Maintaining the conservation status
A165	*Tringa ochropus*	Maintaining the conservation status
A162	*Tringa totanus*	Maintaining the conservation status
A142	*Vanellus vanellus*	Maintaining the conservation status

Table no.3-24The conservation objectives established for the habitats and species in the Natura 2000 site ROSCI0380 Suceava River - Liteni, according to the objectives established by ANANP

Habitat / species code	Species name / habitat	Conservation objective at the site level
1188	*Bombina bombina*	Maintaining the conservation status
1193	*Bombina variegata*	Improving the conservation status
1166	*Triturus cristatus*	Maintaining the conservation status
5266	*Barbus petenyi*	Maintaining the conservation status
5339	*Rhodeus amarus*	Maintaining the conservation status
1355	*Lutra lutra*	Maintaining the conservation status
1323	*Myotis bechsteinii*	Improving the conservation status
1324	*Myotis myotis*	Improving the conservation status
1335	*Spermophilus citellus*	Improving the conservation status
1220	*Emys orbicularis*	Improving the conservation status

Table no.3-25The conservation objectives established for the habitats and species in the Natura 2000 site ROSCI0391 Suceava River - Liteni, according to the objectives established by ANANP

Habitat / species code	Species name / habitat	Conservation objective at the site level
3230	Mountain rivers and their woody vegetation with *Myricaria germanica*	Improving the conservation status
6430	Border associations with tall hydrophilic grasses from plains to mountain and alpine levels	Maintaining the conservation status
9130	*Asperulo-Fagetum* type forests	Maintaining the conservation status
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion nicanae, Salicion albae)*	Maintaining the conservation status
91Y0	Dacian forests of oak and hornbeam	Improving the conservation status
1193	*Bombina variegata*	Maintaining the conservation status
2001	*Triturus montandoni*	Maintaining the conservation status

Habitat / species code	Species name / habitat	Conservation objective at the site level
5266	*Barbus petenyi*	Maintaining the conservation status
6963	*Cobitis taenia Complex*	Maintaining the conservation status
2484	*Eudontomyzon mariae*	Improving the conservation status
5339	*Rhodeus amarus*	Maintaining the conservation status
6143	*Romanogobio kesslerii*	Maintaining the conservation status
6145	*Romanogobio uranoscopus*	Improving the conservation status
5197	*Sabanejewia balcanica*	Maintaining the conservation status
6199	*Euplagia quadripunctaria*	Maintaining the conservation status
1060	*Lycaena dispar*	Maintaining the conservation status
1061	*Maculinea nausithous*	Maintaining the conservation status
1059	*Maculinea teleius*	Maintaining the conservation status
1355	*Lutra lutra*	Maintaining the conservation status

3.6 Conservation measures from the Management Plans / regulations of Natura 2000 sites

According to the management plan of the site ROSCI0391, the development of infrastructure, other than that of visiting, and of land improvements, other than those already existing, as well as the change of the land use category that may affect the surfaces and functions of the habitats of species of conservation interest, are prohibited.

According to the management plan of the ROSCI0075 site, the custodian of the Natura 2000 Pădurea Pătrăuți site will grant approvals for various projects/plans that will be carried out on the territory of the protected area only after consulting the forest fund managers on the territory of this site and after obtaining their point of view. At the same time, in Art 22 it is mentioned that the regime of constructions is established by the general town planning plans of the localities that have areas from the site included in their administrative territories. On the territory of the site, the realization of permanent or temporary constructions is done in compliance with the environmental legislation in force and with the approval of the custodian. Any plan or project that is not directly related to or not necessary for the management of the site, but which could significantly affect the site, alone or in combination with other plans or projects, is subject to an appropriate assessment of the potential effects on the site, having - considering its conservation objectives, according to the provisions of art. 28 of the Government Emergency Ordinance no. 57/2007, approved with amendments and additions by Law no. 49/2011, with subsequent amendments and additions.

4 PRESENTATION OF THE RESULTS OF THE FIELD ACTIVITIES

Table no.4-1 The results of field activities

Uncertainty identified	Proposed approach	Aspects analyzed	Clarification of uncertainties	The uncertainty has been clarified (Yes / No / Partially)
The location of the *Rosalia alpina* species in the ROSCI0075 site and its relationship with the project is not known.	Investigations in the field in the area of the expressway route and in the areas of favorable habitat of the species near it. Investigations in the field in the transit areas between the limits of the sites and the feeding habitats of the species in the area of the route.	The presence and distribution of habitats and species within the limits of the project and in the area of its direct influence	Spatial analysis Field investigations	The species was not identified in the field, but no sites favorable for the species were identified in the project area.
For ROSAC0391, the presence of the *Lutra lutra* species is not known and the potential to reach the project area is not known.	Investigations in the field in the area of the expressway route and in the areas of favorable habitat of the species near it. Investigations in the field in the transit areas between the limits of the sites and the feeding habitats of the species in the area of the route.		Field investigations + spatial analysis.	The species was not identified in the field. Having a high mobility, it is considered that the species has a potential presence in the project area as well, as it intersects areas of favorable habitat for it.
For ROSCI0380, the exact location of herpetofauna and mammal species and the risk of them reaching the highway area are not known.	Investigations in the field in the area of the expressway route and in the areas of favorable habitat of the species near it. Investigations in the field in the transit areas between the limits of the sites and the feeding habitats of the species in the area of the route.		Field investigations + spatial analysis.	Appropriate movement mechanisms were identified between the site and the project area only for the otter and the chiropteran species. Their presence in the project area cannot be excluded.
The current distribution of invasive plant species in the project area is not known.	Field investigations to identify and map areas with a high abundance of invasive plant species. Spatial analysis to highlight the risk of the spread of these species.	Alteration of habitat	Field investigations + spatial analysis.	Potentially invasive species such as *Prunus cerasifera* and *Gleditsia triacanthos* and invasive alien species such as *Amaranthus retroflexus, Ambrosia artemisiifolia, Amorpha fruticosa,*

Uncertainty identified	Proposed approach	Aspects analyzed	Clarification of uncertainties	The uncertainty has been clarified (Yes / No / Partially)
				Erigeron annuus subsp. annuus, Erigeron canadensis, Robinia pseudoacacia, Xanthium orientale subsp. italicum. The detailed description of invasive species can be found in Chap. 5.3.5.1 Vegetation
Not all project works have been finalized. Hydrotechnical works and consolidation works have the potential to fragment favorable habitats of fauna species.	Analysis of proposals for hydrotechnical works and consolidation works from the project.	Fragmentation of habitats	Project analysis, spatial analysis.	The project interventions were finalized and included in the impact analysis.
The degree of disruption of the species' activity cannot be quantified.	Analysis of the results of the modeling related to the noise level and the spatial distribution of the noise in the context of the realization of the project, in relation to the favorable habitats and the distribution of species inside the Natura 2000 sites.	Disturbance of species activity	Spatial analysis, mathematical modeling.	Modeling was carried out regarding the noise level and the spatial distribution of the noise in the context of the realization of the project, in relation to the favorable habitats and the distribution of species within the Natura 2000 sites.
The reduction of population numbers cannot be quantified.	Identification and analysis of structural and functional relationships at the level of each Natura 2000 site. Analysis of the results regarding the mortality risk of individuals of different fauna species, related to the estimated population size for each species.	Reduction of the population	Spatial analysis, literature analysis, mathematical modeling	Risk zones were taken into account (eg: it passes through favorable habitats of the species represented by meadows, forests, etc., is in the vicinity of the site, etc.) depending on which the potential risk of collision was quantified.

5 ANALYSIS OF PRESSURES AND THREATS

The following table presents the main pressures and threats identified in the Management Plans and Standard Forms of the Natura 2000 sites potentially affected by the Suceava – DN2H highway project and DN2H – Frontieră Siret expressway project.

Table no.5-1Analysis of pressures and threats

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
ROSAC0391 Siretul Mijlociu - Bucecea	6430	Habitat area, Abundance of edifying/characteristic species, Numbers of edifying/characteristic species, Vegetation height interval	A03.02 Non-intensive mowing	P.M	Low	-	
	6430, *Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata, Unio crassus*	Habitat area, Abundance of building/characteristic species, Numbers of building/characteristic species Range of vegetation height	A04 Grazing	P.M	Low	-	
	6430, *Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata, Unio crassus*	Species distribution Integrity of riparian vegetation Natural hydromorphology Ecological state of water bodies based on chemical and physico-chemical elements Water turbidity Length of sectors negatively affected by anthropogenic interventions	C01.01 Extraction of sand and gravel	P.M	Medium	-	
	6430	Habitat surface	E03.03 Storage of inert - non-reactive materials	P.M	Low	-	
	6430, *Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata, Unio*	Habitat surface	E03.04 Other types of storage	P.M	Low	-	

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
	crassus						
	6430	Habitat surface	H05.01 Garbage and solid waste	P.M	Low	-	It is unlikely that the DX5B Suceava - Botoşani project will contribute to this pressure. The project is located outside the site, at a relatively long distance.
	6430	Species distribution Integrity of riparian vegetation Natural hydromorphology Ecological state of water bodies based on chemical and physico-chemical elements Water turbidity	K01.01 Erosion	P.M	Low	-	
	6430	Species distribution Integrity of riparian vegetation Natural hydromorphology Ecological state of water bodies based on chemical and physico-chemical elements Water turbidity	K01.02 Clogging	P.M	Low	-	
	6430, All species of community interest	All parameters	K02 Biocenotic evolution, succession	P.M	Low	-	
	6430, *Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata*	All parameters	L08 Floods - natural processes	P.M	Low	-	
	Aspius aspius, Gobio kessleri, Cobitis	Population size.	F02.03.02 Angling	P.M	Medium	-	

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
	taenia, Sabanejewia aurata	Distribution of the species					
	Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata, Unio crassus	Population size Population density Species distribution Ecological status of water bodies based on chemical and physico-chemical elements Ecological status of water bodies based on ecological indicators Water turbidity	H01.09 Diffuse pollution of surface waters	P.M	Low	-	The DX5B Suceava - Botoşani project crosses the Siret river downstream of the site location (at a distance of about 5 km).
	Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata, Unio crassus	The integrity of riparian vegetation. Water turbidity	J02.04 Flood changes	P.M	Low	-	
	Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata, Unio crassus	Population size Population density Species distribution Ecological status of water bodies based on chemical and physico-chemical elements Ecological status of water bodies based on ecological indicators Riparian vegetation integrity	M01.02 Droughts and low rainfall	P.M	Low	-	
	6430	Habitat surface Abundance of edifying/characteristic species Numbers of edifying/characteristic	E01 Urbanized areas, human habitation (human dwellings)	FS	high	-	

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
		species Abundance of disturbance indicator species (nitrophilic, ruderal species) Abundance of disturbance indicator species (nitrophilic, ruderal species) Vegetation height interval					
	Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata, Unio crassus	Ecological state of water bodies based on chemical and physico-chemical elements Ecological state of water bodies based on ecological indicators	J02.05 Modification of hydrographic functions, generalities	FS	high	-	
	Aspius aspius, Gobio kessleri, Cobitis taenia, Sabanejewia aurata, Unio crassus	Integrity of riparian vegetation Degree of longitudinal fragmentation Degree of lateral fragmentation Natural hydromorphology Length of sectors negatively affected by anthropogenic interventions	J02.12 Dams, dykes, artificial beaches, general	FS	high	-	
	6430	Abundance of non-native species (invasive and potentially invasive) Abundance of disturbance indicator species (nitrophilous, ruderal species)	Paths	P.M	Medium	DX5B Suceava - Botosani	The project will not be carried out inside the site, but the appearance of some effects due to it cannot be excluded.
ROSPA0110	*Ixobrychus minutus, Botaurus stellaris,*	Population size	F02 Fishing and	P.M	Low	-	

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
Acumulările Rogojesti - Bucecea	*Chlidonias hybridus, Chlidonias niger, Egretta garzetta, Sterna hirundo, Gavia arctica, Gavia stellata, Cygnus cygnus, Mergellus albellus, Phalacrocorax pygmeus, Aythya nyroca, Circus aeruginosus, Circus cyaneus, Egretta alba, Himantopus himantopus, Tringa glareola. Haliaeetus albicilla, Pluvialis apricaria, Philomachus pugnax, Aythya marila, Anas platyrhynchos, Anas querquedula, Larus ridibundus, Phalacrocorax carbo, Tringa ochropus, Tringa totanus, Charadrius dubius, Anser albifrons, Anas penelope, Anas acuta, Anas strepera, Ardea cinerea, Tringa erythropus, Anas crecca, Aythya fuligula, Cygnus olor, Larus cachinnans, Limosa limosa, Fulica atra, Aythya ferina*	Population size trend Pattern of distribution Pattern of distribution	harvesting of aquatic resources				
	Ixobrychus minutus, Botaurus stellaris, Chlidonias hybridus, Chlidonias niger, Circus aeruginosus, Egretta alba	Population size Habitat area Population size trend Distribution pattern	J01.01 Fires	P.M	Low	-	
	Ixobrychus minutus, Botaurus stellaris, Chlidonias hybridus, Chlidonias niger, Sterna hirundo, Circus aeruginosus, Egretta alba	The surface of the habitat	K01.04 Flooding	P.M	Medium	-	
	Chlidonias hybridus, Chlidonias niger, Sterna hirundo, Gavia arctica, Gavia stellata, Cygnus cygnus, Mergellus albellus, Phalacrocorax pygmeus, Aythya nyroca, Himantopus himantopus, Tringa glareola, Pluvialis apricaria, Philomachus pugnax, Aythya marila, Anas platyrhynchos, Anas querquedula, Vanellus vanellus , Larus	Water quality based on physico-chemical indicators (oxygen regime, nutrients, salinity, metals, organic and inorganic micro-pollutants)	H01 Diffuse surface water pollution	P.M	Low	Extension of sewerage networks in the city of Siret - Vama Siret, Suceava county	The canal water project proposes the undercrossing of the Siret River. The occurrence of surface water pollution cannot be excluded. However, the identified pressure

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
	ridibundus, Phalacrocorax carbo, Tringa ochropus, Tringa totanus, Charadrius dubius, Anser albifrons, Anas penelope, Anas acuta, Anas strepera, Ardea cinerea, Tringa erythropus, Anas crecca, Aythya fuligula, Cygnus olor, Larus cachinnans, Limosa limosa, Fulica atra, Aythya ferina						refers to diffuse pollution, an aspect to which the Siret canal water project can contribute.
	Chlidonias hybridus	Population size Habitat area Trend of population size Distribution pattern Water quality based on physico-chemical indicators (oxygen regime, nutrients, salinity, metals, organic and inorganic micro-pollutants) Water quality based on ecological indicators (macroinvertebrates, phytobenthos, phytoplankton)	K01.03 Rye	P.M	Low	-	
	Lanius minor, Circus aeruginosus, Circus cyaneus, Ciconia ciconia, Haliaeetus albicilla, Anser albifrons	Water quality based on physico-chemical indicators (oxygen regime, nutrients, salinity, metals, organic and inorganic micro-pollutants)	A07 Use of biocidal products, hormones and chemical substances	P.M	Low	-	
	Lanius minor	The surface of the habitat	A10.01 Removal of hedges and bushes	P.M	Low	-	
	Lanius minor	The surface of the habitat	B02.04 Removal of dry or drying trees	P.M	Low	-	
	Lanius minor	The surface of the habitat	G05.06 Tree clearing,	P.M	Low	-	

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
			public safety pruning, roadside tree removal				
	Chlidonias niger, Sterna hirundo, Gavia arctica, Gavia stellata, Cygnus cygnus, Mergellus albellus, Phalacrocorax pygmeus, Aythya nyroca, Circus cyaneus, Himantopus himantopus, Tringa glareola, Haliaeetus albicilla, Pluvialis apricaria, Philomachus pugnax, Aythya marila, Anas platyrhynchos, Anas querquedula. Vanellus vanellus, Larus ridibundus, Phalacrocorax carbo, Tringa ochropus,Tringa totanus, Charadrius dubius, Anser albifrons, Anas penelope, Anas acuta, Anas strepera, Ardea cinerea, Tringa erythropus, Anas crecca, Aythya fuligula, Cygnus olor, Larus cachinnans, Limosa limosa, Fulica atra, Aythya ferina	Population size The trend in population size	F03.01 Hunting	P.M	Low	-	
	Chlidonias niger, Sterna hirundo, Gavia arctica, Mergellus albellus, Phalacrocorax pygmeus, Aythya nyroca, Circus cyaneus, Himantopus himantopus, Tringa glareola, Ciconia ciconia, Pluvialis apricaria, Philomachus pugnax, Aythya marila, Anas querquedula, Vanellus vanellus, Larus ridibundus, Phalacrocorax carbo, Tringa ochropus, Tringa totanus, Charadrius dubius, Anas penelope, Anas acuta, Anas strepera, Ardea cinerea, Tringa erythropus, Anas crecca, Aythya fuligula, Cygnus olor, Larus cachinnans, Limosa limosa, Fulica atra	Distribution pattern	G01 Outdoor sports and leisure activities	P.M	Low	-	

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
	Chlidonias niger, Egretta alba		J02.01 Filling water basins with earth, damming and sanitation: generalyties	P.M	Medium	-	
	Gavia arctica, Gavia stellata, Cygnus cygnus, Mergellus albellus, Phalacrocorax pygmeus, Aythya nyroca, Aythya marila, Anas platyrhynchos, Anas querquedula, Phalacrocorax carbo, Tringa ochropus, Tringa totanus, Charadrius dubius, Anser albifrons, Anas penelope, Anas acuta, Anas strepera, Tringa erythropus, Anas crecca, Aythya fuligula, Cygnus olor, Limosa limosa, Fulica atra, Aythya ferina	The surface of the habitat	J02.04 Flood changes	P.M	Low	-	
	Circus cyaneus, Ciconia ciconia,	The surface of the habitat	A04.01 Intensive grazing	P.M	Low	-	
	Ciconia ciconia	The surface of the habitat	A02.01 Intensive agriculture	P.M	Low	-	
	Ciconia ciconia	Water quality based on physico-chemical indicators (oxygen regime, nutrients, salinity, metals, organic and inorganic micro-pollutants) Habitat surface	E03.01 Storage of household waste/waste from leisure facilities	P.M	Low	Extension of sewerage networks in the city of Siret - Vama Siret, Suceava county	The project may contribute to the storage of waste in the site area, especially during the construction period.
	Ciconia ciconia	The surface of the habitat	J02.04.02 Lack of floods	P.M	Low	-	
ROSCI0380 Suceava Liteni River	*Barbus meridionalis, Rhodeus amarus, Triturus cristatus, Emys orbicularis*	Population size Population density Composition by age classes of the population	C01.01 Extraction of sand and gravel	FS	Medium	-	
	Barbus meridionalis, Rhodeus amarus, Triturus cristatus, Emys orbicularis	The ecological state of water bodies based on chemical	E03.01 Storage of household waste /	FS	Medium	Highway Pascani – Suceava	The occurrence of potential accidental

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
		and physico-chemical elements	waste from leisure facilities			CF modernization: Ilva Mica – Suceava CF modernization: Pascani – Darmanesti DX5B Suceava - Botoşani	pollution as a result of the implementation of the projects cannot be excluded.
	Spermophilus citellus	The area of the species' habitat (pastures)	E04.01 Agricultural infrastructures, constructions in the landscape	FS	Medium	-	
ROSCI0075 Pădurea Pătrăuți	*Carabus variolosus,* 9130, 91Y0	Habitat area The area of the species' habitat	E03.01 Storage of household waste / waste from leisure facilities	P.M	Medium	CF Paşcani-Dărmăneşti CF electrification: Darmanesti - Vicsani	Projects can contribute to increasing the level of household waste storage. Considering that it does not intersect the site, it is unlikely that it will be affected.
	Carabus variolosus, Lucanus cervus	Population size	F03.02.01 Collecting animals (insects, reptiles, amphibians)	P.M	Low	-	
	Carabus variolosus, Lucanus cervus	Population size	F03.02.05 Accidental capture	P.M	Low	-	
	Rosalia alpina, Myotis myotis, Myotis dasycneme, Barbastella barbastellus, 9130, 91Y0	Volume of dead wood Volume of dead wood on the ground or on the foot	B02.04 Removal of dry trees or in the process of drying	PM+FS	Low	-	
	Triturus cristatus, Bombina variegata	Population size	G01.03.02 Off-road driving of motorized	P.M	Low	-	

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
			vehicles				
	Cypripedium calceolus	Population size	F04.02.02 Manual collection	P.M	Low	-	
	Carabus variolosus, 9130	Population size, Habitat area of the species, Tree riparian vegetation of at least 5 m wide on both banks of watercourses Habitat area	M01.02 Droughts and low precipitation	P.M	Low	-	
	Triturus cristatus, Bombina bombina, Bombina variegata, Rana dalmatina	Population size, Habitat area, Species distribution, Breeding habitat density	K01.03 Rye	P.M	Low	-	
	9130, 91Y0	Habitat area Composition of the grassy layer (characteristic species)	B06 Grazing in forest/wooded area	P.M	Medium	-	
	9130	Habitat area, Volume of dead wood on the ground or standing Biodiversity trees, age class over 80 years	G05.04 Vandalism	P.M	Medium	-	
	9130, 91Y0	Biodiversity trees, age class over 80 years	K01.01 Erosion	P.M	High	-	
	9130	Biodiversity trees, age class over 80 years	K04.03 Introduction of diseases (microbial pathogens)	P.M	High	-	
	91E0*	Volume of dead wood on the ground or on the leg	B02.02 CureÞarea pUmDuri	P.M	High	-	
	9130, 91Y0	Characteristic tree species, Grass layer composition (characteristic species) Abundance of non-native	K02.01 Change in species composition (succession)	P.M	Medium	-	
			A10 Restructuring of	FS	High	-	

Natura 2000 site	Species/habitat	Parameter/target affected	Pressure / threat according to PM / FS of the Natura 2000 site	The source of the information	Pressure/threat level according to PM FS of the Natura 2000 site	Projects contributing to pressure / threat	Remarks
		species (invasive and potentially invasive)	agricultural land ownership				
	9130, 91Y0, 91E0*	Habitat surface	B03 Logging without replanting or in the process of drying	FS	High	-	

6 IMPACT ASSESSMENT

6.1 IDENTIFICATION AND QUANTIFICATION OF THE IMPACT

6.1.1 The methodology for evaluating the potential impact

6.1.1.1 The conceptual framework

The evaluation methodology was chosen taking into account mainly the parameters present in the specific conservation objectives for each type of habitat and species of community interest. The changes proposed by the project that are likely to generate significant/insignificant impacts were also taken into account.

The evaluation is carried out for each habitat and species of community interest, at the level of conservation objectives, as defined by ANANP. Conservation objectives include parameters and targets. The impact assessment will be carried out for each of the parameters established by ANANP, by reference to the set target value. The evaluation results will be presented in a summary table (see the model in Table no.6-1)

Also, the evaluation will be done taking into account the need to maintain the integrity of the Natura 2000 sites that are intersected by the project or are in its vicinity.

Table no.6-1The structure of the columns for the summary table regarding the evaluation of the impact on each parameter established for the conservation objectives of habitats and species

1	2	3	4	5	6	7	8	9	10	11	12
N2k sites	N2k component	N2k code	Habitats/Species according to the Standard Form	Type of presence (for birds only)	Location relative to the project (in meters)	Appendix I (for birds only)	Spatial data source	Source of informati on	Conservation status	Conservation objectives	Parameter

13	14	15	16	17	18	19	20	21	22	23
Parameter unit of measure	Current (Minimum)	Current (Maximum)	Target value	Possible to be affected by the project?	Explanation regarding the possibility of impairment	Quantification of impacts (um)	The potential impact (fUmRUmmUmsmile)	Justification of the estimated impact	Measures adopted to ensure insignificant residual impacts	Residual impact

In the following figure (Figure no.6-1) is presented, schematically, the conceptual framework used, which includes the methodological steps followed. In the following sections, the main methodological elements taken into account during the impact assessment process on Natura 2000 sites are presented.

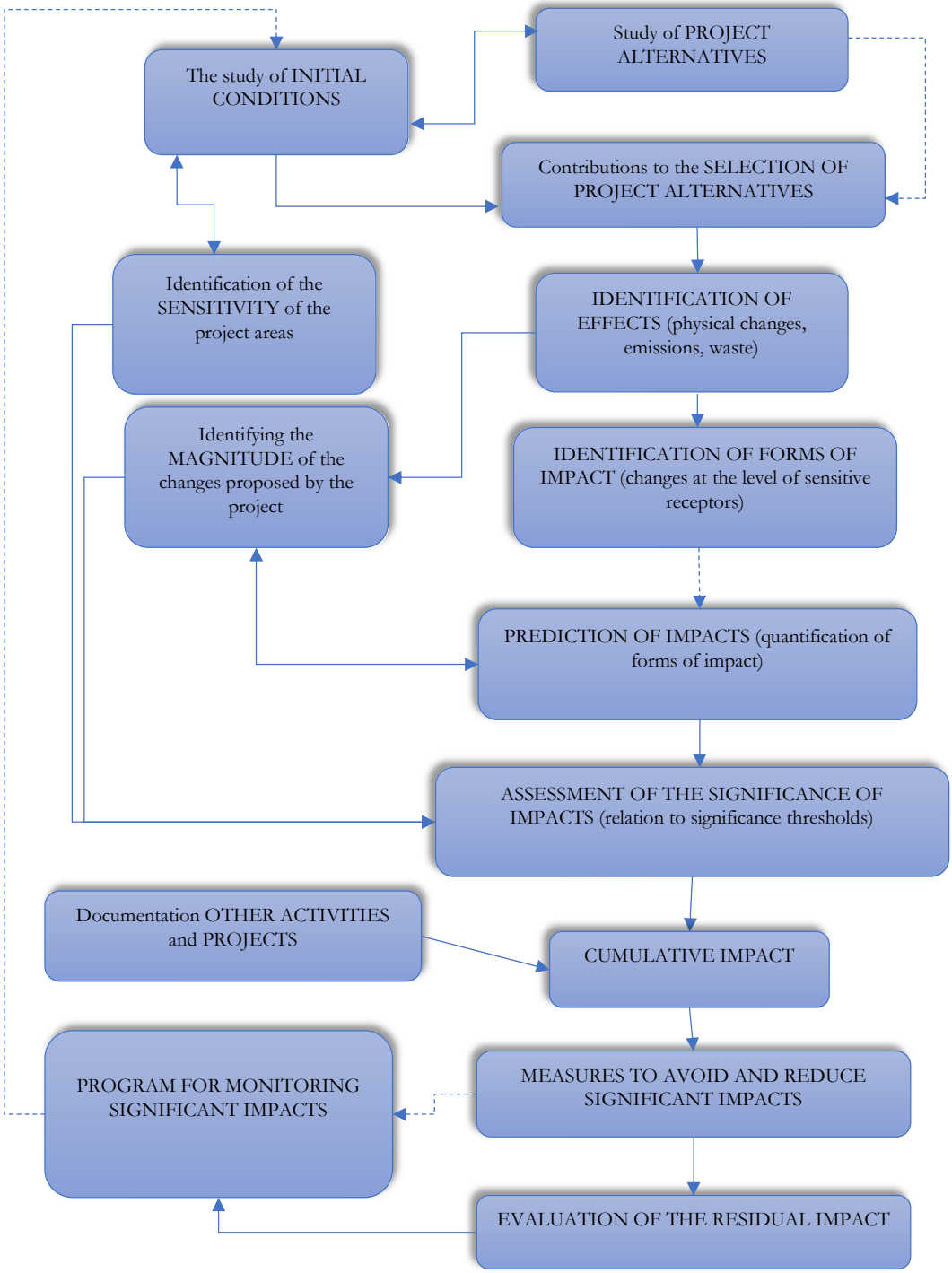


Figure no.6-1The conceptual framework for assessing the impact on Natura 2000 sites

6.1.1.2 Identification of effects and forms of potential impact

The methodology of this study proposes a differentiation between the concept of "effect" and that of "impact" for the evaluation of the elements of community interest targeted by this project. In the sense used by the present study, the effects refer to the changes caused to the physical environment as a direct consequence of the causes (interventions) generated by the project (both in the construction and operation stages). The effects mainly include: modification of topography, modification of edaphic conditions, modification of hydrological flows, emissions of pollutants, waste, etc.. Mainly, the impacts include, either at the structural level or at the functional level, changes at the level of sensitive receptors, respectively of the Natura 2000 components (Natura 2000 habitats, population numbers, habitats of Natura 2000 species).

The transfer of negative elements, between cause and effect, is carried out through a vector. The impact can also be expressed directly, if the cause-effect relationship is well known and traceable, such as habitat loss if the project modifies the natural surface.

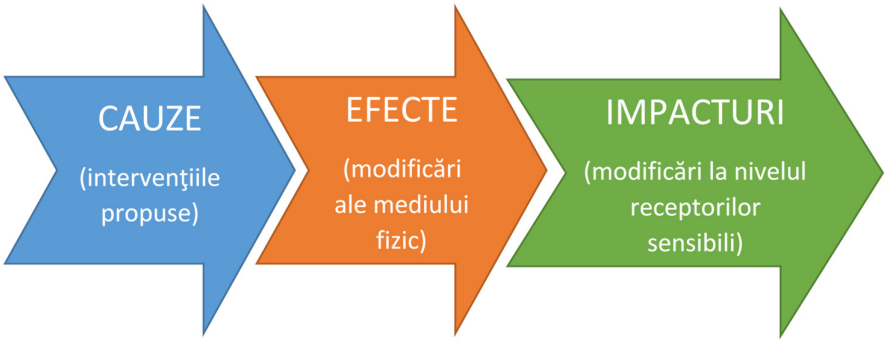


Figure no.6-2Conceptual model applied for the identification of effects and forms of impact

It can be said that the impact is indirect, when the process from cause to effect manifests itself through several components, which are linked to each other through different relationships, such as the case of the alteration of habitats by favouring the dispersal of some non-native invasive species, which use the wheels of cars as dispersion vectors. The degree of difficulty and uncertainty in establishing the exact impact generated is given by the complexity of the relationships through which a cause ends up generating an effect.

All the activities proposed by the project were grouped within a set of interventions, in order to ensure a unitary nature of the evaluation, depending on similarity, spatial location or simultaneous progress in the same time interval. The following table presents the set of interventions used in the evaluation.

Table no.6-2The proposed interventions analyzed in the evaluation

Code	Type of intervention	Activities included
IE1.	Realization of site organizations	Offices, manufacturing/storage platforms, asphalt and concrete stations.

Code	Type of intervention	Activities included
IE3.	Relocation of utility networks	Changes to underground and above-ground utility networks
IE4.	Relocating roads	Changes to existing roads
IE5.	Earthworks	Excavations in profile, excavations in borrow pits, fillings, including in the area of road junctions, service spaces, short-term parking lots and CIC
IE6.	Structures (above ground)	Construction of viaducts, bridges and passages
IE7.	Consolidation works	Construction of defense walls and retaining walls
IE8.	Hydrotechnical works	All works related to water
IE9.	Works on the highway and expressway	The superstructure (form layer, foundation, asphalt mixtures, wear layer), traffic safety works, environmental protection works, signs and markings
IE10.	Rehabilitation works of the lands temporarily affected by the works	Restoration and redevelopment of green areas (including short-term parking lots and CIC).
IO1.	Car traffic	Car traffic on the highway and side roads, including the fencing of the carriageway area and risks related to car traffic.
IO2.	Precipitation management	Drainage of rainwater, snow removal, frost prevention
IO3.	Maintenance and upkeep works	Including repairs, asphalting, etc.
IO4.	The activity of short-term parking lots and CIC	Operation of short-term parking lots and CIC

Caption: IE. – Interventions during the execution period; IO – Interventions during the operating period;

The execution period is estimated at 30 months, and the operation period is unlimited in time, provided that the state of the road infrastructure is maintained in operational conditions, according to technical safety standards.

The impact, therefore, can be classified according to the project implementation period as:

1. The impact generated during the execution period;
2. The impact generated during the operating period;
3. Impact generated during the decommissioning period.

The problem in estimating the impact on natural systems, at the level of the individual (individuals) or supra-individual (populations, habitats, ecosystems), lies in estimating the magnitude of the manifested impact and the importance of the affected biodiversity element. The magnitude of the impact is a function of the severity and reversibility of the effect (of its temporal character) caused by the activity that generates the impact.

The main effects, which could affect the structure and functions of the protected natural areas identified for the proposed project, are the following:

- In the construction phase:
  - Structural changes to the soil and vegetation as a result of the permanent and temporary occupation of the land;
  - Definitive and temporary changes to water bodies (construction of bridges, constructions on banks, etc.);
  - Air pollutant emissions and pollutant spills on the ground and in the aquatic environment;

- Noise and vibrations generated by construction site activities;
- Artificial lighting and human presence;
- Generation of waste (mainly construction waste and household waste);
- Introducing and/or favoring the spread of invasive/potentially invasive species;
- The creation of physical and behavioral barriers;
- Mortality generated by the execution of works.

➢ In the operating stage:

- Contamination of the soil as a result of the deposition of atmospheric pollutants or accidental pollution;
- Contamination of the aquatic environment as a result of accidental pollution or improper maintenance of rainwater pre-purification equipment;
- Change in air quality as a result of the increase in air pollutant emissions generated by car traffic;
- Noise generated by car traffic;
- Attracting or repellent factors that can influence the behavior of animals, such as: artificial lighting, temporary storage of waste, etc.;
- Collision of animals with car traffic;
- Introducing and/or favoring the spread of non-native/invasive species;
- The creation of physical and behavioral barriers.

➢ In the decommissioning stage:

- Soil/basement structural changes;
- Affecting some nests/shelters from existing constructions/elements;
- Emissions of atmospheric pollutants;
- Accidental spills of dangerous products;
- Hydromorphological alterations of water bodies;
- Vegetation removal;
- Noise and vibrations;
- Lighting;
- Waste generation (including land storage);
- Introduction of invasive/potentially invasive species;
- The creation of physical and behavioral barriers;
- Mortality generated by the execution of construction works.

The main types of impact were grouped according to the affected component, the nature and reversibility of the impact in:

- PH – loss of habitats;
- AH – alteration of habitat conditions;
- FH – fragmentation of habitats;
- PAS – disturbance of species activity;
- REP – population reduction.

The interpretation of these forms of impact is as follows:

A. **Loss of habitats**: this form of impact affects all components of biodiversity, manifesting itself mainly during the execution stage and maintaining itself throughout the operation period. The generated impact is long-term, most likely irreversible.
   Habitat loss occurs mainly at the level of terrestrial ecosystems, but it can also occur in the aquatic environment, being expressed by any terrestrial or aquatic surface on which the original habitats can no longer be resettled and can no longer be used by fauna or flora species characteristics in order to ensure the conditions of existence, reproduction, feeding and shelter. Loss of habitat can also occur in the case of species, not only in Natura 2000 habitats, through the loss of resting, breeding, feeding or transit areas.
B. **Alteration (degradation) of habitats**: this form of impact occurs as a result of physical, chemical and biological changes produced in terrestrial and aquatic habitats, and includes those structural and functional changes that lead to a decrease in their supporting capacity (for example, populations of flora species of community interest undergoes changes as a result of the decrease in trophic support or the increase in competition with non-native/invasive species). Over time, altered habitats can lead to habitat loss for species of community interest.
   Alteration of habitats represents a process of temporary or long-term loss of the initial, characteristic qualities of the affected areas, expressed through those transformations that diminish both their structure and composition, as well as the favorability for fauna species. Alteration of habitats refers to both Natura 2000 habitat types and species habitats (environments defined by abiotic and biotic factors, in which species live at any stage of the biological cycle).
   During the execution stage, the alteration of habitats can occur both on the surfaces on which work is carried out and in the areas adjacent to them, manifesting also as an indirect impact caused by noise or light pollution. During the operation stage, the alteration of habitats can occur mainly on the surfaces affected by the presence of pollutants,but it can also be produced by the spread of invasive/potentially invasive species.
C. **Fragmentation of habitats**: form of impact that affects both the habitats, through the effective reduction of the occupied surfaces and the appearance of a structural discontinuity (isolated fragments of the habitats), as well as the species that use the respective habitat for shelter or trophic support.
   It can appear in the execution stage, but it can manifest itself throughout the operation stage. In the case of wild fauna, the two components that generate habitat fragmentation were taken into account:

- **Physical barriers** – mainly built elements that prevent the free movement of individuals;
- **„Behavioural" barrier**– the density of traffic and of secondary developments created near the highway which causes avoidance behavior to occur. The behavioral barrier can also be felt by some of the flying species (invertebrates, birds, bats).

By building and operating a road infrastructure project, habitat permeability (landscape feature that indicates the degree to which wildlife can move freely in the territory) will be partially reduced, as an indirect effect of the behavioral barrier induced by road traffic. The reduction in permeability will most likely affect the mammal species in the area.

D. Disturbance of fauna activity: it appears both in the construction and operation stages, but also in the decommissioning stage. It is a form of impact associated with human presence and activity. The main causes that lead to the disturbance of the activity of fauna species, in the case of the construciton of a road infrastructure project, are represented by noise and vibrations, artificial lighting or speeding of vehicles (visual disturbance). In this report, conventionally, air pollutant emissions or pollutant emissions into water bodies were considered within the framework of "habitat alteration".

This form of impact can extend to considerable distances from the highway corridor. The most important causes of this form of impact are:

a. **Increasing noise level** – noise disturbance not only affects nesting, but also inter- and intraspecific communications, reproduction or feeding of wild animals;

b. **Artificial lighting** - it affects the growth of plants, the nesting and feeding activities of certain bird species, or it can induce behavioral changes in the activity of some nocturnal species, such as invertebrates, amphibians, birds or bats. Due to the collision of individuals with car traffic, artificial lighting is also a cause of increased mortality as a result of the attractiveness of lighting sources for prey (invertebrates) and predators (bats, birds).

E. Reduction of population numbers of fauna species, as a result of the increase in their mortality: this form of impact can manifest both directly, due to the collision with car traffic or due to some structures that can be traps for some fauna species, as well as indirectly, caused by the modification of the habitat conditions (eg hydromorphological alterations that lead to the modification of the oxygen regime in the water and, thus, to the mortality of certain aquatic species). This form of impact can occur in all stages of the project: construction, operation and decommissioning.

F. Mortality appears first of all during the operation period, directly, but also during the construction stage, when it can occur accidentally (following the action of technological equipment, means of transport or excavation and handling of earth masses or following accidental trapping in various structures which can be traps for some species of fauna). The species most sensitive to the barrier effect and mortality caused by traffic specific to a road infrastructure project are (Iuell et al., 2003):

a. Rare species with small local populations and extensive individual territories;

b. Species with daily or seasonal migratory movements between local habitats (e.g. amphibian species);

c. The species that carry out seasonal migratory movements over long distances between the winter and summer quarters (especially birds);

d. The species that use the surface of the roads and the adjacent areas in search of food, as well as the necrophagous species, attracted to the road by the victims of collisions.

Mainly, the species affected by direct mortality are invertebrates, amphibians, reptiles, birds and mammals.

The spatial localization of the forms of impact was made based on the information available from field observations, based on the analysis of satellite images as well as the spatial modeling of effects such as noise.

Table no.6-3Effects and forms of potential impact associated with the proposed interventions in the construction stage

Types of interventions		Soil/subsoil structural changes	Affecting some nests/shelters from existing constructions	Emissions of atmospheric pollutants	Accidental releases of dangerous products	Hydro-morphological alterations of water bodies	Vegetation removal	Noise and vibrations	Lighting	Waste generation	Introduction of invasive species	The creation of physical and behavioral barriers	Mortality generated by the execution of works
IE1.	Realization of site organizations	AH	AH, REP	AH	AH, REP	-	AH	STEP	STEP	AH, STEP, REP	AH	-	REP
IE2.	Relocation of utility networks	AH	-	AH	AH	-	AH	STEP	STEP	AH	AH	-	REP
IE3.	Restoration of road links	AH	AH, REP	AH	AH, REP	-	AH	STEP	-	-	AH	STEP, REP	REP
IE4.	Earthworks	AH	REP	AH	AH, REP	-	AH	STEP	-	AH	AH	-	REP
IE5.	Structures (above and below ground)	PH, AH	PH, AH, REP	AH	AH, REP	AH, REP	PH, AH, REP	STEP	-	AH	AH	STEP, REP	REP
IE6.	Consolidation works	AH	AH	AH	AH, REP	AH, REP	AH, REP	STEP	-	-	AH	-	REP
IE7.	Hydrotechnical works	PH, AH	PH, AH, REP	AH	AH, REP	AH, REP	PH, AH, REP	STEP	-	-	AH	STEP, REP	REP
IE8.	Highway works	AH	-	AH	AH, REP	-	AH	STEP	-	-	AH	-	REP
IE9.	Land rehabilitation works upon completion of construction	-	STEP	-	-	-	-	STEP	-	-	AH	-	- REP
IE10.	Rehabilitation works of the lands temporarily affected by the works	-	-	AH	-	-	-	STEP	-	-	AH	-	-

Legend: PH – habitat loss; AH – habitat alteration; PAS – disruption of species activity; REP – population reduction; "-" - absence of a cause-effect relationship for the occurrence of an impact.

Table no.6-4Effects and forms of potential impact associated with the interventions/activities in the operation stage

Types of interventions		Soil contamination	Contamination of the aquatic environment	Emissions of atmospheric pollutants	Noise and vibrations	Lighting	Waste generation	Wildlife collision	Other risk situations	Introduction of invasive species	The creation of physical and behavioral barriers
IO1.	Car traffic	AH	AH, REP	AH	STEP	STEP	AH, STEP	REP	AH, STEP, REP	AH	STEP
IO2.	Precipitation management	-	AH, REP	-	-	-	-	-	-	-	-
IO3.	Maintenance and upkeep works	AH	AH	AH	STEP	-	-	REP	AH	AH	-
IO4.	The activities carried out in the short-term parking lots and in the CIC	AH	AH	-	-	STEP	AH	-	AH	-	-

Legend: PH – Habitat loss; AH – Alteration of habitats; PAS – Disturbance of species activity; REP – Reduction of the population; "-" - absence of a cause-effect relationship for the appearance of an impact.

Table no.6-5Effects and forms of impact associated with interventions/activities in the decommissioning stage

Types of interventions		Soil contamination	Contamination of the aquatic environment	Emissions of atmospheric	Noise and vibrations	Lighting	Waste generation	Wildlife collision	Other risk situations	Introduction of invasive species	The creation of physical and behavioral barriers
ID1.	Realization of site organizations	AH	AH, REP	AH	STEP	STEP	AH, STEP, REP	REP	AH, STEP, REP	AH	-
ID2.	Demolition work	AH	AH, REP	AH	STEP	-	AH, STEP, REP	REP	AH, STEP, REP	AH	-
ID3.	Restoration work	-	AH	-	STEP	-	-	REP	STEP	AH	-

Caption: PH– Habitat loss; AH – Alteration of habitats; PAS – Disturbance of species activity; REP – Reduction of the population; "-" - absence of a cause-effect relationship for the appearance of an impact.

6.1.1.3 Analysis of the possibility of cumulative impacts at the level of potentially affected Natura 2000 sites

The analysis of the possibility of cumulative impacts at the level of potentially affected sites was carried out by following the following steps:

1. Identification of current forms of impact based on:
    a. The current pressures on the Natura 2000 components according to the information available in the Site Specific Conservation Objectives, the N2k Standard Forms and the Management Plan;
    b. Identification of other activities with potential impact existing in the implementation area of the Motorway Suceava - DN2H and Expressway DN2H - Siret border;
2. Identification of major projects proposed to be implemented in the area of Natura 2000 sites potentially affected by the project;
3. Consulting the interested factors in the area, regarding the information held by them in reference to the projects proposed to be carried out in the area, the current level of fauna mortality on the existing roads, etc. The Town Halls of the communes in the area of the highway/express road, various local experts, representatives of the authorities were consulted;
4. Identification of the effects that can lead to forms of cumulative impact on the Natura 2000 components of the N2k sites potentially affected by the project (current pressures + other proposed projects + Motorway Suceava - DN2H and Express Road DN2H - Siret border).

6.1.1.4 Quantification and evaluation of the significance of the impact

The evaluation of the impact on the Site Specific Conservation Objectives (SSCO) was carried out by going through the following steps:

1. Analysis of the objectives, parameters and targets established for each of the habitats or species of community interest included in the SSCO;
2. Case-by-case analysis (for each site) of the parameters, for each habitat/species that could be affected by the proposed project. This was achieved by:
    a. Identification of the possibility of affecting the component (habitat/species): Is the habitat/species habitat intersected? Is it located downstream in the area of manifestation of an effect generated by the construction of the highway and the expressway? Can individuals of the species reach the project area? Can invasive/potentially invasive plant species reach the habitat of community interest/species habitat because of the project? Can the project affect one of the ecological functions of the habitat/species?;
    b. Identification of the possibility of affecting the parameter: is there a cause-effect relationship between the project activities and the analyzed parameter (eg: physical or chemical interactions)?
3. Justification of how each SSCO-related parameter could be affected;

4. Estimation / quantification (where possible) of the degree of parameter impact;
5. Appreciation of the significance of the impact. Two classes were used: significant/non-significant. The significance was assessed based on the following parameters:
   a) Quantitative – the percentage of impact from the target value. As an indicative percentage, it was considered that habitat losses must be <1% (the analysis is done case by case, taking into account the criteria below), and in the case of priority habitats, it is considered that any habitat loss is a significant impact;
   b) Qualitative:
      i. If the central or marginal area of the habitat is affected;
      ii. Conservation status at the level of the site and at the level of the biogeographical region;
      iii. Presence in other N2k sites;
      iv. Species at the limit of their distribution area.
   c) Ecological functions:
      i. Maintaining/restoring ecological connectivity;
      ii. Maintenance of critical physico-chemical parameters, such as water level.
   d) Impact form parameters (see impact forms prediction below).

In assessing the significance of the impact, a cautious approach was used (impacts were considered significant when there is not enough data and information to assess the impact, and the conservation status is unfavorable, the population numbers are reduced or there is a cumulative impact due to the contribution of several pressures/ threats). Also, the appreciation of the significance required the use of "expert opinion".

6. Formulation of measures to avoid/reduce impacts that can ensure a non-significant level of residual impact.

6.1.2 Prediction of impact forms

The prediction of the forms of impact represents a qualitative and quantitative evaluation of the forms of impact. The parameters considered for the assessment of the impacts are:

- Project stage (construction, operation, decommissioning);
- Type of impact (positive, negative);
- The nature of the impact (direct, secondary, indirect);
- Spatial extension (local, zonal, county, regional, national, cross-border);
- Duration (short, medium, long term);
- Frequency (accidental, intermittent, periodic, permanent, single intervention/temporary);
- Probability (uncertain, improbable, likely, very likely);

- Reversibility (reversible, irreversible).

Table no.6-6The parameters taken into account for the evaluation of the impacts

Evaluation parameter	The variables of the evaluation parameters	Description of the characteristics of the evaluation parameters variables
Impact type	Positive	The changes contribute to improving the state/achieving the objectives of the analyzed component.
	Negative	The changes contribute to the deterioration of the condition/ failure to achieve the objectives of the analyzed component.
Impact nature	Direct	Main impact form produced by the occurrence of an effect.
	Secondary	Impact form generated by a direct impact.
	Indirect	The form of impact that appears not due to an effect generated by the project, but to some activities that are encouraged to occur as a consequence of the project.
Spatial extension	Local	It equates to a reduced number of habitat locations in the site.
	AREA	It is equivalent to the entire area of the habitat on the site.
	County	It is equivalent to the area of several sites.
	Regional	Equivalent to biogeographical region level.
	National	The impact produces changes felt throughout the country.
	border	The impact is manifested on the territory of some neighboring countries.
term	Short term	The impact manifests itself for a maximum of 1 year.
	Medium term	The impact is manifested during construction and for a short period post-construction.
	Long term	The impact manifests itself over several years.
Frequency	Accidentally	The impact manifests itself only as a result of an accident (accidental pollution).
	Intermittent	The impact occurs repeatedly/discontinuously, with an unknown frequency.
	Periodic	The impact manifests itself repeatedly, with a known frequency.
	Permanent	The impact manifests continuously after the moment of appearance.
	One time/temporary	The impact is manifested only once in one of the stages of the project. Most often associated with a short duration.
Probability	Uncertain	The probability of the impact is unknown, most likely it will not occur.
	Unlikely	The probability of the impact occurring is low – it may occur.
	Probable	The probability of the impact occurring is high – it is very likely to occur.
	Very likely	Impact production is certain.
Reversibility	Reversible	After the impact disappears, the affected component can return to its initial conditions.
	Irreversible	The impact does not allow the return to the initial conditions of the affected environmental component.

Where possible, the prediction of impacts is carried out quantitatively and can be expressed in surface units (hectares) or time (number of years), as well as regarding the changes occurring at the level of the studied component/sensitive receptor. Quantitative assessments are mainly based on numerical modeling of the behavior of pollutants or processes and the use of spatial analysis (GIS). In situations where a precise quantification is not possible (information is missing, there is no quantification method, the degree of uncertainty is high, etc.) the qualitative assessment classes of each parameter are used (see the information specified in the brackets of the previous enumeration) .

In the evaluation process, to the extent possible, redundancies were eliminated. More precisely, when two effects lead to the same form of impact on the same surface and in the same time interval, the effect was maintained which may also include the other redundant effects (e.g. removal of

vegetation, soil compaction and soil structural changes that lead to the alteration of habitats on the same surface).

The forms of impact presented in the table below are associated with the types of interventions involved in the implementation of the project and are applicable to all locations where these types of interventions are proposed (including within Natura 2000 sites). The assessment of the level and significance of the forms of impact for Natura 2000 sites is carried out in detail in chapter 4.

Table no.6-7The interventions proposed by the project and their potential effects and impacts on different biological groups

Code	Type of intervention	Form of impact	Stage	Positive / Negative	Impact nature	Cumulative potential	Extension	Duration	Frequency	Likelyhood	Reversibility	Potentially affected groups					
												Habitats and plants	Invertebrates	Fish	Herpetology	Birds	Mammals
IE1.	Realization of site organizations	AH	E	Negative	Direct	Not	Local	Shorten	Accidentally	Very likely	Reversible	X	X	-	X	X	X
		STEP	E	Negative	Direct	Not	Local	Shorten	Intermittent	Probable	Reversible	-	-	-	X	X	X
		REP	E	Negative	Direct	Not	Local	Shorten	Intermittent	Probable	Reversible	-	-	-	X	X	X
IE2.	Relocation of utility networks	AH	E	Negative	Direct	Not	Local	Shorten	Once	Very likely	Reversible	X	X	-	X	X	X
		STEP	E	Negative	Direct	Not	Local	Shorten	Once	Probable	Reversible	-	-	-	X	X	X
		REP	E	Negative	Direct	Not	Local	Shorten	Accidentally	Uncertain	Reversible	-	X	-	X	X	X
IE3.	Road restoration	AH	E	Negative	Direct	Not	Local	Long	Permanent	Very likely	Reversible	X	X	-	X	X	X
		STEP	E	Negative	Direct	Not	Local	Long	Intermittent	Probable	Reversible	-	X	-	X	X	X
		REP	E	Negative	Direct	Not	Local	Long	Accidentally	Probable	Reversible	-	X	-	X	X	X
IE4.	Earthworks	AH	E	Negative	Direct	Not	Local	Average	Permanent	Very likely	Reversible	X	X	-	X	X	X
		STEP	E	Negative	Direct	Not	Local	Shorten	Permanent	Very likely	Reversible	-	X	-	X	X	X
		REP	E	Negative	Direct	Not	Local	long	Accidentally	Very likely	Reversible	-	X	-	X	X	X
IE5.	Artwork (above ground)	pH	E	Negative	Direct	Not	Local	long	Permanent	Very likely	Reversible	X	X	X	X	X	X
		AH	E	Negative	Direct	Yes	Local	Long	Permanent	Very likely	Irreversible	X	X	X	X	X	X
		STEP	E	Negative	Direct	Yes	Local	environment	Intermittent	Probable	Reversible	-	X	X	X	X	X
		REP	E	Negative	Direct	Yes	Local	environment	Accidentally	Probable	Reversible	-	X	X	X	X	X
IE6.	Consolidation works	AH	E	Negative	Direct	Not	Local	Long	Accidentally	Very likely	Irreversible	X	X	X	X	X	X
		STEP	E	Negative	Direct	Not	Local	environment	Intermittent	Probable	Reversible	-	X	X	X	X	X
		REP	E	Negative	Direct	Not	Local	Short	Accidentally	Probable	Reversible	-	X	X	X	X	X
IE7.	Hydrotechnical works	pH	E	Negative	Direct	Not	Local	long	Permanent	Very likely	Reversible	X	X	X	X	X	X
		AH	E	Negative	Direct	Yes	Local	Long	Permanent	Probable	Reversible	X	X	X	X	-	X
		STEP	E	Negative	Direct	Yes	Local	environment	Intermittent	Probable	Reversible	-	-	X	X	-	X
		REP	E	Negative	Direct	Yes	Local	Short	Accidentally	Probable	Reversible	-	-	X	X	-	X
IE8.	Highway works	AH	E	Negative	Direct	Not	Local	Long	Permanent	Very likely	Irreversible	X	X	-	X	X	X
		REP	E	Negative	Direct	Not	Local	environment	Accidentally	Probable	Reversible	-	X	-	X	X	X
		STEP	E	Negative	Direct	Not	Local	environment	Intermittent	Probable	Reversible	-	X	-	X	X	X
IE9.	Rehabilitation works of the lands temporarily affected by the works	AH	E	Negative	Direct	Not	Regional	Long	Permanent	Very likely	Reversible	X	X	-	X	X	X
		STEP	E	Negative	Direct	Not	Local	Short	Intermittent	Probable	Reversible	-	-	-	X	X	X
		REP	E	Negative	Direct	Not	Local	Short	Accidentally	Probable	Reversible	-	X	-	X	-	X
IO1.	The development of car traffic	AH	A	Negative	Direct	Not	Regional	Long	Permanent	Very likely	Irreversible	-	X	-	X	X	X
		STEP	A	Negative	Direct	Not	Regional	Long	Permanent	Very likely	Irreversible	-	X	-	X	X	X
		REP	A	Negative	Direct	Not	Regional	Long	Permanent	Very likely	Irreversible	-	X	-	X	X	X
IO2.	Precipitation management	AH	A	Negative	Direct	Not	Regional	Long	Periodic	Probable	Reversible	-	-	X	X	-	X
IO3.	Maintenance and upkeep works	AH	A	Negative	Direct	Not	Regional	Long	Intermittent	Probable	Reversible	X	-	-	-	-	-
		STEP	A	Negative	Direct	Not	Regional	Long	Intermittent	Probable	Reversible	-	X	-	X	X	X
		REP	A	Negative	Direct	Not	Regional	Long	Intermittent	Probable	Reversible	-	X	-	X	X	X
		Maintenance of natural surfaces	A	Positive	Direct	Not	Local	long	Permanent	Probable	Reversible	X	-	-	-	-	-

Code	Type of intervention	Form of impact	Stage	Positive / Negative	Impact nature	Cumulative potential	Extension	Duration	Frequency	Likelyhood	Reversibility	Potentially affected groups					
												Habitats and plants	Invertebrates	Fish	Herpetology	Birds	Mammals
IO4.	The activity of short-term parking lots and CIC	AH	A	Negative	Direct	Not	Regional	Long	Intermittent	Probable	Reversible	X	-	-	-	-	-
		STEP	A	Negative	Direct	Not	Regional	Long	Intermittent	Probable	Reversible	-	X	X	X	X	X
ID1.	Realization of site organizations	AH	d	Negative	Direct	Not	Local	Shorten	Accidentally	Very likely	Reversible	X	X	-	X	X	X
		STEP	d	Negative	Direct	Not	Local	Shorten	Intermittent	Probable	Reversible	-	-	-	X	X	X
		REP	d	Negative	Direct	Not	Local	Shorten	Intermittent	Probable	Reversible	-	-	-	X	X	X
ID2.	Demolition work	AH	d	Negative	Direct	Yes	Local	Shorten	Once	Very likely	Reversible	X	X	X	X	X	X
		STEP	d	Negative	Direct	Yes	Local	Shorten	Once	Very likely	Reversible	-	-	X	X	X	X
		REP	d	Negative	Direct	Yes	Local	Shorten	Accidentally	Very likely	Reversible	-	X	X	X	X	X
ID3.	Restoration work	AH	d	Negative	Direct	Not	Regional	Long	Permanent	Very likely	Reversible	X	X	-	X	X	X
		STEP	d	Negative	Direct	Not	Local	Short	Intermittent	Probable	Reversible	-	-	-	X	X	X
		REP	d	Negative	Direct	Not	Local	Short	Accidentally	Probable	Reversible	-	X	-	X	-	X
		Expansion of natural surfaces	d	Positive	Direct	Not	Local	Average	Permanent	Probable	Reversible	X	X	-	X	X	X
		Defragmentation of habitats	d	Positive	Direct	Not	Local	Average	Permanent	Very likely	Reversible	-	-	-	X	-	X

Legend: E - Execution, O - operation, D - decommissioning, "X" - group potentially affected, "-" Group cannot be affected.

6.1.3 Analysis of forms of cumulative impact

Loss of habitat can occur by replacing some habitats or favorable species habitats with built structures. Considering the fact that the project does not intersect Natura 2000 sites and the project does not involve works in Natura 2000 sites, it was considered that no cumulative impact of habitat loss is generated with other projects.

Alteration of habitats may appear as a result of changes in the structure and specific composition of habitats or favorable habitats of species of community interest. In the case of transport infrastructure, habitat alteration can occur mainly as a result of the spread of invasive plant species during the construction and operation of the projects. In the case of the project, potential habitat alterations may occur in the case of Natura 2000 sites ROSCI0380 and ROSCI0075, due to the spread of invasive plant species.

In the case of this project, it is improbable to affect the majority of Natura 2000 sites by altering the aquatic habitats. The highway and the expressway are not in a position to affect the water quality in the sites ROSCI0380, ROSCI0075 and ROSAC0391. A potential cumulative alteration of the aquatic habitats may occur in the case of the ROSPA0110 Rogojeşti - Bucecea Accumulations site, as a result of the cumulation with the project of Extension of sewerage networks in the city of Siret - Vama Siret, Suceava county. The project proposes the expansion of the sewer system in the city of Siret and its connection to the existing network. Although the water and wastewater management project does not propose the construction of a new treatment plant, but the use of the existing one, the risk of potential damage to the habitats of bird species remains relevant, for example in the case of potential accidental pollution.

Fragmentation of habitats (and ecological corridors) represents one of the most important forms of cumulative impact that can occur as a result of the construction of the highway. In addition to the actual fragmentation generated by the highway, there is the risk of additional fragmentation of the ecological corridors as a result of the change in the level of car traffic on the roads adjacent to the highway. The increase in traffic on these roads, in response to the effect of attracting the population to the new highway, can turn some adjacent roads into impermeable barriers for the movement of fauna and into traps for individuals, who can become accidental victims of collisions with car traffic. This remote effect is documented in a 2021 paper from Poland, which concluded that the level of mortality for *Meles meles* increased on roads adjacent to a new highway after the highway was put into operation, compared to the pre-existing situation (Nowakowski et al., 2021).

The analysis of the changes in the traffic level was carried out taking into account the existing traffic data in the Traffic Study done for the project, corresponding to the current situation and the situation in 2050 in the scenario without the project and with the project. In the traffic study, the following methodology was used for the construction of the traffic level forecast model:

- Identification of relevant socio-economic parameters for the generation of trips, specifically for internal-external movements, but also for passenger-goods movements;
- Forecast of socio-economic parameters, using the most relevant data sources available;
- Testing the multiple linear regression model, which generates the synthetic demand for the base year 2017;

- Selection of the multiple linear regression model suitable for the purpose and its running for each forecast year;
- Application of growth factors to the level of transport demand calibrated to the level of the base year 2017.

The forecast scenario was determined in the hypothesis of average (realistic or moderate) growth. Following modeling, values of the average number of vehicles/day were obtained for the adjacent roads.

Based on the traffic data, the permeability level of the adjacent roads was established (permeable roads / impermeable roads). According to the Road Infrastructure Best Practice Guidelines (Nistorescu et al., 2016), it was considered that a value of 10,000 vehicles/day makes a road impermeable. Values between 10,000 vehicles/day and 1,000 vehicles/day were considered as barriers. Roads with traffic values lower than 1,000 vehicles/day were considered permeable.

The analysis mainly involved establishing the permeability of different sectors on National Road 2 and the Suceava Bypass, these roads being the ones mainly analyzed in the Traffic Study developed for the project.

The main results of the analysis carried out on the roads adjacent to the freeway indicate that in general the traffic level will decrease in the scenario with the project compared to the scenario without the project. However, it is important to note that DN2 will remain a barrier for the movement of fauna and, in the context of the project, on the entire sector between Suceava and Siret. The higher intensity of traffic in the context of the realization of the project occurs in areas close to urban settlements (Suceava and Siret).

The following table presents the situation of car traffic on the adjacent roads, at the level of 2050, in the scenarios without project and with project.

Figure no.6-3The estimated level of car traffic on the roads adjacent to the Suceava DN2H highway and the Siret border DN2H expressway in the year 2050, in the scenario with the project and in the scenario without the project

Road	Section	Estimated traffic level 2050 without project (no. vehicles / day)	Estimated traffic level 2050 with project (no. vehicles / day)	Changing the permeability of the road sector
Suceava belt	DN2 - DJ209C	10207	5072	Waterproof->Barrier
Suceava belt	DJ209C - DN17	11252	7144	Waterproof->Barrier
Suceava belt	DN17 - DN2	10291	11767	Waterproof->Waterproof
DN2	VO Suceava S - VO Suceava V	25124	16282	Waterproof->Waterproof
DN2	Bosnians - VO Suceava S	26614	21275	Waterproof->Waterproof
DN2	VO Suceava V - Patrauti	18686	4360	Waterproof->Barrier
DN2	Darmanesti - DJ178B	5075	1003	Barrier->Barrier
DN2	DJ178B - DN17A	5075	1003	Barrier->Barrier
DN2	Siret S knot - DJ291A (Siret)	14668	13180	Waterproof->Waterproof
DN2	DJ291A (Screw) - DN29C (Screw)	6766	4576	Barrier->Barrier
DN2	Siret S node	14668	10632	Waterproof->Waterproof
DN2#Dc11	DN15C - DN2E	28153	20151	Waterproof->Waterproof
DN2	DN15B - Foresters	9579	5027	Barrier->Barrier

Road	Section	Estimated traffic level 2050 without project (no. vehicles / day)	Estimated traffic level 2050 with project (no. vehicles / day)	Changing the permeability of the road sector
DN2	DN28A - DN15B	10709	6358	Waterproof->Barrier
DN2	Foresters - DN15C	9949	5330	Barrier->Barrier
DN2	DN2E - Falticeni	23122	17360	Waterproof->Waterproof
DN2	Falticeni - Radaseni	23694	18230	Waterproof->Waterproof
DN2	Radaseni - Moara	20578	15136	Waterproof->Waterproof
DN2	Moara - Bosnians	21728	16343	Waterproof->Waterproof
DN2	Squares - DJ209D	17921	3430	Waterproof->Barrier
DN2	VO Suceava V - DJ209D	18686	3431	Waterproof->Barrier
DN2	DJ209D - DN2H	17921	3430	Waterproof->Barrier
DN2	DN2H - Darmanesti	8836	4555	Barrier->Barrier
DN2	DN17A - Siret S knot	14668	8397	Waterproof->Barrier
DN2E	DN 2 - Cornu Luncii	10151	8122	Waterproof->Barrier
DN2E	Cornu Luncii - Braiesti	10241	6880	Waterproof->Barrier
DN2E	Braiesti - Capu Codrului	9306	6630	Barrier->Barrier
DN2E	Codrulu's head	9306	6630	Barrier->Barrier
DN2E	Capu Codrului - DN 17	9306	6630	Barrier->Barrier
DN17	Suceava Ring Road, DN 2P - Stroiesti	12276	13227	Waterproof->Waterproof
DN17	Stroiesti - Ilisesti	12276	13227	Waterproof->Waterproof
DN17	Ilisesti -Paltinoasa	11058	11211	Waterproof->Waterproof
DN17	Paltinoasa - Gura Humorului	17126	17047	Waterproof->Waterproof
DN17	Mouth of Humor	12296	12213	Waterproof->Waterproof
DN17	DN 2 - You want	9873	8054	Barrier->Barrier
DN17	You want	9873	8054	Barrier->Barrier
DN17	Dornesti - Radauti	9873	8054	Barrier->Barrier
DN2H	DN 2 - Millisauti (DX)	12118	2972	Waterproof->Barrier
DN2H	DN 2 - Millisauti	12118	15584	Waterproof->Waterproof
DN2H	Milliseconds	12118	15584	Waterproof->Waterproof
The Bucovina Way	Milisauti - Radauti belt	10219	11734	Waterproof->Waterproof
DN29	Suceava - Plopeni	8147	2660	Barrier->Barrier
DN29	Plopeni	8147	2660	Barrier->Barrier
DN29	Willow	9229	2507	Barrier->Barrier
DN29	Salcea - Dumbraveni	4962	1584	Barrier->Barrier
DN29	Dumbraveni	4962	1584	Barrier->Barrier
DN29	Dumbraveni	7001	3238	Barrier->Barrier
DN29	Dumbraveni - Hutani	7001	3238	Barrier->Barrier
DN29	Hutans	4751	495	Barrier->Permeable
DN29	Hutani - Vladeni	4751	495	Barrier->Permeable
DN29	Vladeni	4751	495	Barrier->Permeable
DN29	Brehuiesti	1086	1152	Barrier->Barrier
DN29	Brehuiesti - Baisa	1086	1152	Barrier->Barrier
DN29	Bais	2358	2290	Barrier->Barrier
DN29	Baisa - Botosani	2358	2290	Barrier->Barrier
DN29	Botosani	13237	18075	Waterproof->Waterproof
DN29	Botosani	13237	18075	Waterproof->Waterproof
DN29	Botosani	13237	18075	Waterproof->Waterproof
dN29	Suceava - Deep	6563	7440	Barrier->Barrier
dN29	Deep	4043	4757	Barrier->Barrier
dN29	Monks	4043	4757	Barrier->Barrier
dN29	Calugareni - Serbanesti	4043	4757	Barrier->Barrier
dN29	Serbans	4043	4757	Barrier->Barrier

Road	Section	Estimated traffic level 2050 without project (no. vehicles / day)	Estimated traffic level 2050 with project (no. vehicles / day)	Changing the permeability of the road sector
dN29	He was gossiping	4591	4738	Barrier->Barrier
dN29	Zvoristea - Varfu Campului	4591	4738	Barrier->Barrier
DN29C	Verfu Campului	3724	2336	Barrier->Barrier
DN29C	Varfu Campului - Lunca	3724	2336	Barrier->Barrier
DN29C	Meadow	3724	2336	Barrier->Barrier
DN29C	Sole	3724	2336	Barrier->Barrier
DN29C	Sole - Candesti	3724	2336	Barrier->Barrier
DN29C	When you are	5392	4069	Barrier->Barrier
DN29C	Candesti - Mihaileni	5392	4069	Barrier->Barrier
DN29C	Mihaileni	5392	4069	Barrier->Barrier
DN29C	Mihaileni - DN 2	5392	4069	Barrier->Barrier

The following figure shows the spatial representation of how it is estimated that the permeability of the adjacent roads will vary as a result of the construction of the highway and the expressway.

The project is not located in an area with ecological corridors, which have the potential to be affected by these changes in traffic on the adjacent roads. The landscape in the project area is mainly dominated by areas with agricultural land, unlikely to represent optimal habitats for species of flora and fauna of community interest.

Considering these aspects, any potential fragmentation has a local character, which can be manifested strictly in the area around the roads adjacent to the project. It is also important to mention that the project will contribute to reducing the level of traffic on the adjacent roads, compared to the current situation, thus reducing the risk of accidental victims as a result of collisions with car traffic.

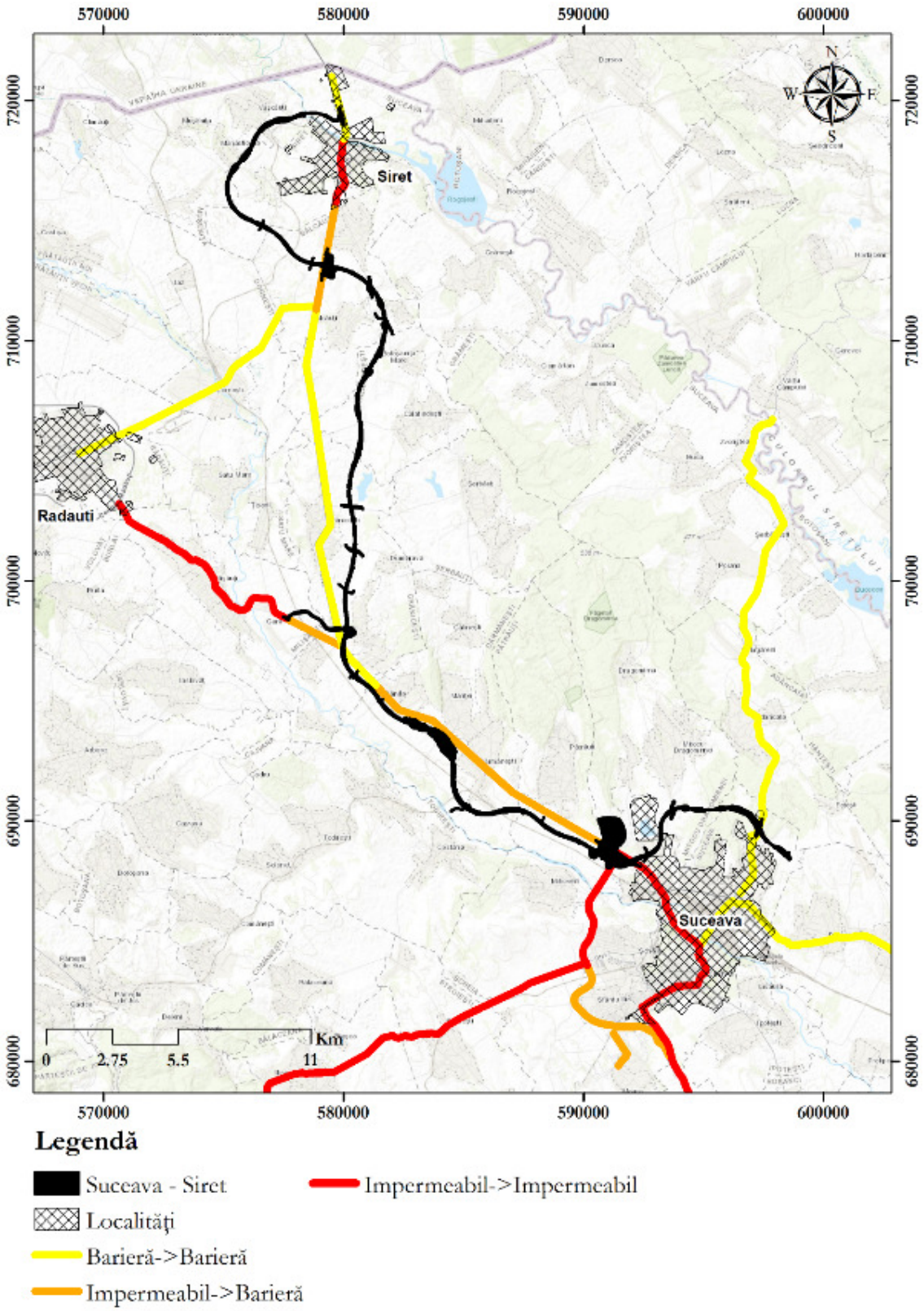


Figure no.6-4Changing the permeability of the roads adjacent to the highway in 2050, as a result of the construction of the Suceava – DN2H highway and the Siret border DN2H expressway

6.1.4 Highway/expressway permeability analysis

The fragmentation of natural habitats for wild fauna and flora species is one of the main causes for the loss of biological diversity at the global level. This effect generates barrier-type pressures, but also disturbances, alterations or losses of natural habitats. The strongest negative effect caused by habitat fragmentation is the loss of genetic diversity, which ensures the integrity of populations both locally and regionally (Bennett, 2003). The dispersals or migrations of some animals, either over long distances to identify new territories, or seasonal over short distances for food, are the main behaviors that must be preserved in terms of maintaining the permeability of an infrastructure project.

Avoiding areas with the role of ecological corridor and, if this is not possible, the creation of crossing structures are critical elements for maintaining the connectivity between the habitats of fauna species, an essential element for ensuring a good state of conservation of their populations.

Ecological corridors are an important and usually the most vulnerable component of an ecological network, ensuring the connectivity of populations of animal and plant species between favorable habitats, whether they are found in wilderness areas, natural protected areas, or modified anthropic areas.

Ensuring the permeability of the highway/expressway is necessary along its entire length, but it is crucial in the area of the ecological corridors.

The functionality of crossing structures for fauna species depends on their width and length (corresponding to the width of the road crossed), and in the case of undercrossings, also depending on their height.

For the optimal dimensioning of a functional underpass for fauna, an index of relative openness was established, calculated according to the formula IO = [(width x height)/length]. According to Hlavac et al., 2019, the IO should have values greater than 1.5 for small mammals, greater than 4 for medium-sized mammals, and greater than 10 for large mammals, to meet the functional requirements.

The density of the locations of the passage structures for fauna species represents an extremely important decision-making element in achieving an optimal degree of permeability. Determining the number and type of structures depends on the target species and the importance of the intersected area both locally and regionally.

The conditions regarding the type and density of crossing structures considered in the evaluation, depending on the importance for the fauna species of the areas crossed by the highway, are those presented in Nistorescu et al, 2016, adapted from Anděl P., Hlaváč V. 2002 and Moţ, R ., 2013.

In order to evaluate the functionality from the point of view of the permeability of the highway and the expressway, a calculation of the IO index and the functionality of the structures was made, according to the above methodology. The permeability calculation presented in the following table was the basis of the proposed measures provided in the project to ensure permeability and to reduce the impact on fauna elements (underpasses and overpasses for fauna).

The sensitivity of the area was established according to the particularities of the area from the point of view of ensuring connectivity. The following were taken into account: the ecological corridors designated for the area[9], the results of the detailed connectivity modeling for large mammal species carried out for the elaboration of this study, the boundaries of Natura 2000 sites, the way of land use or the presence of urbanized areas.

The results of the analysis indicate critical areas regarding the level of permeability, respectively high sensitivity in the following kilometer intervals:

- 3+900 - 3+605;
- 3+950 - 4+550;
- 11+700 - 11+712.

[9]According to the results of the CoreHABS project, available athttp://corehabs.ro/ro/rapoarte-produse

Table no.6-8Permeability analysis for the Suceava DN2H highway and the Siret border DN2H expressway

Sensitivity	Intersected or adjacent protected area	Kilometer position		Structure type	Length (m)	Obstacles that limit movement	Number of openings (bridges and viaducts)	Other travel limitations (m)	Total movement restrictions in the area of structures (m)	Average height (m)	Width (m)	IO	Functionality			Fulfilling the conditionsÞDISCLOSURES					
		km start	end km										Large mammals	Medium mammals	Small mammals	Distance to a functional structure (km)	Large mammals	Distance to a functional structure (km)	Medium mammals	Distance to a functional structure (km)	Small mammals
Moderate		+850	1+210	viaduct	360	Deep Valley - Suceava; DJ208T	9	10	22	9.6	23.5					2.74	Yes	2.74	Yes	2.39	Not
Big	ROSCI0075	3+600	3+605	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	0.345	Yes	0.345	Yes	0.345	Yes
Big	ROSCI0075	3+950	4+550	viaduct	600	DE and Mitoc Lake runoff channel 2	15	14	35	14.4	23.5	346.21	Very good	Very good	Very good	0.25	Yes	0.25	Yes	0.25	Yes
Moderate	ROSCI0075	4+800	5+080	bridge	280	Mitocul River	1	0	0	13.4	23.5	159.66	Very good	Very good	Very good	9,845	Yes	2,895	Yes	0.37	Yes
Moderate	ROSCI0075	5+450	5+452	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	9,473	Yes	2,523	Yes	0.673	Yes
Moderate	ROSCI0075	6+125	6+127	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	8,798	Yes	1,848	Yes	0.498	Yes
Moderate	ROSCI0075	6+625	6+627	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	8,298	Yes	1,348	Yes	0.448	Yes
Moderate	ROSCI0075	7+075	7+077	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	7,848	Yes	0.898	Yes	0.773	Yes
Moderate	ROSCI0075	7+850	7+855	culvert	5		1	0	0	1.2	23.5	0.26	No functionality	No functionality	Minimal	7.07	Yes	0.12	Yes	0.12	Yes
Moderate	ROSCI0075	7+975	8+005	bridge	30	Dragomirna River	1	0	0	6.3	23.5	8.04	Average	Very good	Very good	6.92	Yes	0.125	Yes	0.125	Yes
Moderate	ROSCI0075	8+130	8+142	passage	12	Passage over DC57	0	0	0	6.03	23.5	3.08	Minimal	Average	Very good	6,783	Yes	3,458	Yes	1,283	Not
small	ROSCI0075	9+425	9+428	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	5,497	Yes	2,172	Yes	0.247	Yes
small	ROSCI0075	9+675	9+715	passage	40	VO 2P (Suceava Belt)	1	30	30	1.2	23.5	0.51	No functionality	No functionality	Minimal	5.21	Yes	1,885	Yes	0.06	Yes
Moderate	ROSCI0075	9+775	9+777	culvert	2		1	0	0	2	23.5	0.17	No functionality	No functionality	Minimal	5,148	Yes	1,823	Yes	0.408	Yes
Moderate	ROSCI0075	10+185	10+188	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	4,737	Yes	1,412	Yes	0.232	Yes
Moderate	ROSCI0075	10+420	10+422	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	4,503	Yes	1,178	Yes	0.1	Yes
Moderate	ROSCI0075	10+522	10+526	culvert	4		1	0	0	1.4	23.5	0.24	No functionality	No functionality	Minimal	4,399	Yes	1,074	Yes	1,074	Not
Moderate	ROSCI0075	11+600	11+630	bridge	30	Patrăuţeanca River	1	0	0	2.81	23.5	3.59	Minimal	Average	Very good	3,295	Yes	0.07	Yes	0.07	Yes
Big	ROSCI0075	11+700	11+712	passage	12	DL relocation (com Pătrăuţi)	0	0	0	4.52	23.5	2.31	Minimal	Average	Very good	3,213	Yes	0.723	Yes	0.723	Yes
small	ROSCI0075	12+435	12+465	bridge	30	Channel and relocation DE	1	10	10	3	23.5	2.55	Minimal	Average	Very good	2.46	Yes	1,585	Yes	0.455	Yes
Moderate	ROSCI0075	12+920	12+925	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	2	Yes	1,125	Yes	1,097	Not
Moderate	ROSCI0075	14+022	14+024	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	0.901	Yes	0.026	Yes	0.026	Yes
Moderate	ROSCI0075	14+050	14+062	passage	12	Relocation OF	0	0	0	4.64	23.5	2.37	Minimal	Average	Very good	0.863	Yes	0.298	Yes	0.298	Yes
Moderate	ROSCI0075	14+360	14+380	bridge	20	Hatnuţa river tributary	1	0	0	3.56	23.5	3.03	Minimal	Average	Very good	0.545	Yes	0.545	Yes	0.4	Yes
Moderate	ROSCI0075	14+780	14+782	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	0.143	Yes	0.143	Yes	0.143	Yes
Moderate	ROSCI0075	14+925	15+019	bridge	94	Hatnuţa River and CF300;	2	10	11.5	9.4	23.5	33.00	Good	Very good	Very good	3,006	Yes	2.106	Yes	0.236	Yes
Moderate	ROSCI0075	15+255	15+260	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	2,765	Yes	1,865	Yes	0.565	Yes
Moderate	ROSCI0075	15+825	15+828	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	2,197	Yes	1,297	Yes	0.197	Yes
Moderate	ROSCI0075	16+025	16+027	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	1,998	Yes	1,098	Yes	0.273	Yes
Moderate	ROSCI0075	16+300	16+303	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	1,722	Yes	0.822	Yes	0.092	Yes
Moderate	ROSCI0075	16+395	16+397	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	1,628	Yes	0.728	Yes	0.033	Yes
Moderate	ROSCI0075	16+430	16+442	passage	12	DJ209D	0	10	10	8.53	23.5	0.73	No functionality	Minimal	Average	1,583	Yes	0.683	Yes	0.203	Yes
Moderate	ROSCI0075	16+645	16+647	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	1,378	Yes	0.478	Yes	0.278	Yes
Moderate	ROSCI0075	16+925	16+930	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	1,095	Yes	0.195	Yes	0.195	Yes
Moderate	ROSCI0075	17+125	17+165	passage	40	DE and CF 513 Darmăneşti-Gura Humorului	1	29	29	9.06	23.5	4.24	Average	Good	Very good	0.86	Yes	0.385	Yes	0.21	Yes
Moderate	ROSCI0075	17+375	17+377	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	0.648	Yes	0.173	Yes	0.173	Yes
Moderate	ROSCI0075	17+550	17+562	passage	12	Relocation OF	0	0	0	6.7	23.5	3.42	Minimal	Average	Very good	0.463	Yes	0.463	Yes	0.193	Yes
Moderate	ROSCI0075	17+755	17+757	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	0.268	Yes	0.268	Yes	0.268	Yes

Sensitivity	Intersected or adjacent protected area	Kilometer position		Structure type	Length (m)	Obstacles that limit movement	Number of openings (bridges and viaducts)	Other travel limitations (m)	Total movement restrictions in the area of structures (m)	Average height (m)	Width (m)	IO	Functionality			Fulfilling the conditionsÞDISCLOSURES					
		km start	end km										Large mammals	Medium mammals	Small mammals	Distance to a functional structure (km)	Large mammals	Distance to a functional structure (km)	Medium mammals	Distance to a functional structure (km)	Small mammals
Moderate	ROSCI0075	18+025	18+065	passage	40	CF500 bus	1	6	6	7.52	23.5	10.88	Good	Very good	Very good	4.11	Yes	2,235	Yes	0.14	Yes
Moderate	ROSCI0075	18+205	18+209	culvert	4		1	0	0	2.6	23.5	0.44	No functionality	No functionality	Minimal	3,966	Yes	2,091	Yes	2,091	Not
Moderate	ROSCI0075	20+300	20+330	bridge	30	Nameless valley	1	0	0	5.72	23.5	7.30	Average	Good	Very good	1,845	Yes	1.62	Yes	1,115	Not
Moderate		21+445	21+448	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	0.727	Yes	0.502	Yes	0.357	Yes
Moderate		21+805	21+810	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	0.365	Yes	0.14	Yes	0.14	Yes
Moderate		21+950	21+962	passage	12	DL (Sârghiesti village - Măriței village)	0	0	0	5.04	23.5	2.57	Minimal	Average	Very good	0.213	Yes	0.213	Yes	0.213	Yes
Moderate		22+175	22+215	bridge	40	The Sârghiesti River	1	0	0	6.15	23.5	10.47	Good	Very good	Very good	2,985	Yes	0.775	Yes	0.535	Yes
small		22+750	22+762	passage	12	DC38C (Dănila village)	0	10	10	4.39	23.5	0.37	No functionality	No functionality	Minimal	2,438	Yes	0.228	Yes	0.228	Yes
small		22+990	23+002	bridge	12	Dănila Stream	0	0	0	3.72	23.5	1.90	Minimal	Average	Good	2,198	Yes	2,198	Yes	0.548	Yes
Moderate		23+550	23+570	bridge	20	Danilă River	1	0	0	0.74	23.5	0.63	No functionality	No functionality	Minimal	1.63	Yes	1.63	Yes	0.475	Yes
Moderate		24+045	24+047	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	1,153	Yes	1,153	Yes	0.153	Yes
Moderate		24+200	24+212	passage	12	DC 40B (Iacobești village)	1	6	6	4.94	23.5	1.26	No functionality	Minimal	Average	0.988	Yes	0.988	Yes	0.988	Yes
Moderate		25+200	25+230	bridge	30	Horaiț River (Grănicesti)	1	0	0	10.89	23.5	13.90	Good	Very good	Very good	8.29	Yes	0.32	Yes	0.32	Yes
small		25+550	25+610	passage	60	DN 2H and DN2	1	30	30	5.14	23.5	6.56	Average	Good	Very good	7.91	Yes	2.3	Yes	0.045	Yes
Moderate		25+655	25+657	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	7,863	Yes	2,253	Yes	1,443	Not
Moderate		27+100	27+102	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	6,418	Yes	0.808	Yes	0.403	Yes
Moderate		27+505	27+510	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	6.01	Yes	0.4	Yes	0.4	Yes
Moderate		27+910	27+940	bridge	30	Săcari River	1	0	0	6.13	23.5	7.83	Average	Good	Very good	5.58	Yes	0.65	Yes	0.65	Yes
Moderate		28+590	28+620	bridge	30	Nameless valley	1	0	0	2.57	23.5	3.28	Minimal	Average	Very good	4.9	Yes	2,355	Yes	0.35	Yes
Moderate		28+970	28+972	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	4,548	Yes	2,003	Yes	0.228	Yes
Moderate		29+200	29+203	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	4,317	Yes	1,772	Yes	0.372	Yes
Moderate		29+575	29+578	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	3,942	Yes	1,397	Yes	0.352	Yes
Moderate		29+930	29+935	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	3,585	Yes	1.04	Yes	0.44	Yes
Moderate		30+375	30+395	bridge	20	The Widow River	1	0	0	1.32	23.5	1.12	No functionality	Minimal	Average	3,125	Yes	0.58	Yes	0.58	Yes
Moderate		30+975	30+995	bridge	20	The Deep Stream	1	0	0	6.43	23.5	5.47	Average	Good	Very good	2,525	Yes	1.53	Yes	0.335	Yes
small		31+330	31+334	culvert	4		1	0	0	2.6	23.5	0.44	No functionality	No functionality	Minimal	2,186	Yes	1,191	Yes	0.326	Yes
small		31+660	31+663	culvert	3		1	0	0	3	23.5	0.38	No functionality	No functionality	Minimal	1,857	Yes	0.862	Yes	0.587	Yes
Moderate		32+250	32+255	culvert	5		1	0	0	1.4	23.5	0.30	No functionality	No functionality	Minimal	1,265	Yes	0.27	Yes	0.27	Yes
Moderate		32+525	32+545	bridge	20	Fountain Stream	1	0	0	7.09	23.5	6.03	Average	Good	Very good	0.975	Yes	0.975	Yes	0.415	Yes
Moderate		32+960	32+962	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	0.558	Yes	0.558	Yes	0.558	Yes
Moderate		33+520	33+560	bridge	40	Kalina Stream	1	0	0	6.76	23.5	11.51	Good	Very good	Very good	5.24	Yes	1.56	Yes	1,465	Not
Moderate		35+025	35+027	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	3,773	Yes	0.093	Yes	0.043	Yes
Moderate		35+070	35+082	passage	12	DC 39 (Calafindești commune - DN2)	1	10	10	5.76	23.5	0.49	No functionality	No functionality	Minimal	3,718	Yes	0.038	Yes	0.038	Yes
Moderate		35+120	35+150	bridge	30	Horaiț River	1	0	0	6.34	23.5	8.09	Average	Very good	Very good	3.65	Yes	0.875	Yes	0.875	Yes
Moderate		35+972	35+977	undercrossing domestic animals	5		1	0	0	4.5	23.5	0.96	No functionality	Minimal	Average	2,823	Yes	0.048	Yes	0.048	Yes
Moderate		36+025	36+040	bridge	15	Horaiț river tributary	1	0	0	5.35	23.5	3.41	Minimal	Average	Very good	2.76	Yes	0.54	Yes	0.54	Yes
Moderate		36+058	36+063	undercrossing domestic animals	5		1	0	0	5	23.5	1.06	No functionality	Minimal	Average	2,737	Yes	0.517	Yes	0.517	Yes
Moderate		36+580	36+610	bridge	30	Horaiț River	1	0	0	5.12	23.5	6.54	Average	Good	Very good	2.19	Yes	2.19	Yes	0.94	Yes
Moderate		37+550	37+555	culvert	5		1	0	0	2.2	23.5	0.47	No functionality	No functionality	Minimal	1,245	Yes	1,245	Yes	0.195	Yes
Moderate		37+750	37+755	culvert	5		1	0	0	2.2	23.5	0.47	No functionality	No functionality	Minimal	1,045	Yes	1,045	Yes	0.825	Yes
Moderate		38+580	38+585	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	0.215	Yes	0.215	Yes	0.215	Yes

Sensitivity	Intersected or adjacent protected area	Kilometer position		Structure type	Length (m)	Obstacles that limit movement	Number of openings (bridges and viaducts)	Other travel limitations (m)	Total movement restrictions in the area of structures (m)	Average height (m)	Width (m)	IO	Functionality			Fulfilling the conditionsÞDISCLOSURES					
		km start	end km										Large mammals	Medium mammals	Small mammals	Distance to a functional structure (km)	Large mammals	Distance to a functional structure (km)	Medium mammals	Distance to a functional structure (km)	Small mammals
Moderate		38+800	38+920	viaduct	120	Nameless valley	3	0	3	8.6	23.5	42.82	Very good	Very good	Very good	0.705	Yes	0.705	Yes	0.705	Yes
Moderate		39+625	39+945	viaduct	320	Relocation DJ 209D and Nameless Valley	8	20	30.5	23.9	23.5	294.43	Very good	Very good	Very good	3.73	Yes	2,155	Yes	0.805	Yes
small		40+750	40+753	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	2,922	Yes	1,347	Yes	0.957	Yes
small		41+710	41+713	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	1,962	Yes	0.387	Yes	0.387	Yes
Moderate		42+100	42+130	bridge	30	Rudeşti stream	1	0	0	5.33	23.5	6.80	Average	Good	Very good	1,545	Yes	1,545	Yes	0.595	Yes
Moderate		42+725	42+728	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	0.947	Yes	0.947	Yes	0.947	Yes
Moderate		43+675	43+835	bridge	160	Bălcăuți Stream and DL (Negostina village - Dornești commune)	4	0	4.5	9.62	23.5	63.66	Very good	Very good	Very good	5,015	Yes	0.965	Yes	0.29	Yes
small		44+125	44+128	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	4,722	Yes	0.672	Yes	0.672	Yes
small		44+800	44+840	passage	40	CF 518 (Dornesti - Siret) - closed	1	16	16	2.54	23.5	2.59	Minimal	Average	Very good	4.01	Yes	4.01	Yes	0.14	Yes
Moderate		44+980	44+982	culvert	2		1	0	0	1.2	23.5	0.10	No functionality	No functionality	Minimal	3,868	Yes	3,868	Yes	0.803	Yes
Moderate		45+785	45+788	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	3,062	Yes	3,062	Yes	1,262	Not
Moderate		47+050	47+053	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	1,797	Yes	1,797	Yes	0.347	Yes
Moderate		47+400	47+403	culvert	3		1	0	0	2.6	23.5	0.33	No functionality	No functionality	Minimal	1,447	Yes	1,447	Yes	0.527	Yes
Moderate		47+930	47+935	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	0.915	Yes	0.915	Yes	0.915	Yes
Moderate		48+850	49+010	viaduct	160	Nameless valley	4	40	44.5	12.2	23.5	59.96	Very good	Very good	Very good	4.53	Yes	1.98	Yes	1.07	Not
Moderate		50+080	50+085	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	3,455	Yes	0.905	Yes	0.905	Yes
Moderate		50+990	51+010	Crossing	20		1	0	0	2	23.5	1.70	Minimal	Average	Good	2.53	Yes	2.53	Yes	0.27	Yes
Moderate		51+280	51+285	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	2,255	Yes	2,255	Yes	0.2	Yes
Moderate		51+485	51+490	culvert	5		1	0	0	2.6	23.5	0.55	No functionality	No functionality	Minimal	2.05	Yes	2.05	Yes	2.05	Not
Moderate	ROSPA0110	53+540	54+500	bridge	960	DL (Văscăuți village - Siret); Siret river	24	0	34.5	9.3	23.5	366.26	Very good	Very good	Very good	0.6	Yes	0.6	Yes	0.6	Yes
Moderate	ROSPA0110	55+100	55+120	bridge	20	Siret stream	1	0	0	0.53	23.5	0.45	No functionality	No functionality	Minimal	0	Yes	0	Yes	0	Yes

6.2 EVALUATION OF THE SIGNIFICANCE OF THE IMPACT

The detailed analysis of the significance of the impact is presented for each habitat and species in the Natura 2000 sites potentially affected by the project in the table annexed to this study.

In the table attached to this study, the situation of the potential impacts in case of non-implementation of the proposed measures is represented. The following chapters of the study present the necessary measures and analyze the residual impact level, remaining after their implementation.

6.2.1 ROSCI0075 Pătrăuţi Forest

6.2.1.1 Loss of habitats

The site is not intersected by the Suceava DN2H highway and the Siret border DN2H expressway and no works will be carried out inside it. The area of the habitats of community interest and the habitats of the species of community interest that are the object of conservation in the analyzed site will not be reduced.

For the construction of the highway/express road, no cleaning or clearing of vegetation will be carried out on this site. Thus, it can be considered that the parameters related to forest habitats (eg: "Characteristic tree species", "Composition of the grassy layer (characteristic species)", etc.) will not be affected by the project.

Details regarding the lack of these forms of impact as a result of the project, for each individual habitat and species of community interest (for each parameter), can be found in the table attached to this study.

6.2.1.2 Alteration of habitats

At the various stages of the project, the motorway/expressway is not in a position to contribute to the alteration of Natura 2000 habitats or to the alteration of habitats favorable to Natura 2000 species on this site. Due to the large distance between the project and the site, namely 1300 m, as well as other factors, it is not possible to affect the parameters related to the composition of Natura 2000 habitats or habitats favorable to Natura 2000 species.

Considering the distance between the project and areas with Natura 2000 habitats/habitats favorable to Natura 2000 species, but also the fact that no possible ways of dispersal of alien invasive plants have been identified, it is considered that there is no risk of dispersion, installation and development for them. Invasive alien plants cannot disperse randomly as a result of the construction and operation of the highway/express road, because the distance between it and Natura 2000 habitats or those favorable to Natura 2000 species is large, and between them there are forest areas as well as anthropogenic areas (they can function as a barrier for anemochorous dispersal of invasive plants). It is considered that invasive plants will not reach Natura 2000 habitats or those of Natura 2000

species due to the project, because either there is no hydrological connectivity between them, or if there is hydrological connectivity, the habitats are located upstream (see the attached evaluation table).

Considering the fact that the project will not lead to the alteration of water quality, it was considered that the project will not contribute either to favoring the appearance or the dispersion of invasive aquatic species.

Considering the fact that the project will not intersect the site, and the Natura 2000 habitats and the habitats of the Natura 2000 species are located at a sufficiently large distance from it, it was considered that the soil will not be altered as a result of the works in the construction phase, nor as a result of the activities in the operating stage.

In the case of atmospheric emissions and dust particles from the construction and operation stage, it was considered that they will not alter the habitats on the site, because the distance between them is large enough and there are forest habitats between them, which are able to contribute to preventing the dispersion of pollutants in the air and the filtering of air masses.

Details about the lack of this type of impact caused by the project (for the analyzed site), for each individual Natura 2000 habitat and species (for each parameter), are in the table attached to this study.

6.2.1.3 Fragmentation of habitats

The project will not generate fragmentation of Natura 2000 habitats or habitats favorable to Natura 2000 species present in this site, mainly because the site will not be intersected by it.

The project crosses areas with a potential local migration corridor for the purpose of feeding for the species *Myotis myotis, Myotis dasycneme* and *Barbastella barbastellus*, but also agricultural land (the species is typical of agricultural land, in terms of feeding).

Details about the presence or absence of this type of impact for each Natura 2000 species (from the analyzed site) separately (for each parameter) are in the attached table of this study.

6.2.1.4 Disturbance of species activity

The project will not cause the disturbance of fauna species of community interest from the site due to the reduction of the amount of food resources, due to noise and vibrations or due to atmospheric emissions. The distance from the project to the site is large enough for these effects not to produce impacts at the site level.

6.2.1.5 Reduction of the population

There is a possibility that the project will produce accidental victims of invertebrate species (*Carabus variolosus* and *Lucanus cervus*) and mammals (*Myotis myotis, Myotis dasycneme, Barbastella barbastellus*)

especially during the operation stage, as a result of the risk of collision with car traffic, because the species shows nocturnal activity, which makes the frequency of occurrence in the risk area lower during the day.

In the case of the invertebrate species, *Carabus variolosus* and *Lucanus cervus*, the operation stage of the project may have an impact on the size of the populations, as a result of the collision, but the risk is low, and the level of the potential impact is considered to be insignificant.

In the case of bat species (*Myotis myotis, Myotis dasycneme, Barbastella barbastellus*), although the project does not intersect the habitat of the species, the risk of collision cannot be excluded, due to the fact that they are very mobile. The risk of collision is considered relatively high, especially in the operation stage considering the ecology of the species (individuals of the species can travel significant distances, over 10 km), and the estimated number of victims is high, taking into account the minimum value, being considered as such a significant negative impact. In the case of the species *Barbastella barbastellus*, a non-significant impact was estimated.

6.2.2 ROSAC0391 Siretul Mijlociu - Bucecea

6.2.2.1 Loss of habitats

The site is not intersected by the project and no works will be carried out inside it (neither in the construction stage nor in the operation stage), so the surface of the Natura 2000 habitats and the habitats of the Natura 2000 species present in the analyzed site will not be reduced.

For the construction of the highway/express road, no cleaning or deforestation activities will be carried out on this site. Thus, it can be considered that the parameters related to the Natura 2000 habitat code 6430 or the favorable habitats of some Natura 2000 species will not be affected by the project.

6.2.2.2 Alteration of habitats

In the various stages of the project, the highway/express road is not able to contribute to the alteration of the Natura 2000 6430 habitat or to the alteration of the habitats favorable to the Natura 2000 species of this site. Due to the large distance between the project and the site, namely 8000 m, as well as other factors, it is not possible to affect the parameters related to the composition of the Natura 2000 habitat or habitats favorable to Natura 2000 species.

Considering the distance between the project and the area with the Natura 2000 habitat/habitats favorable to Natura 2000 species, but also the fact that no possible ways of dispersal of alien invasive plants have been identified, it is considered that there is no risk of dispersion, installation and development for them. Allogeneic invasive plants cannot disperse randomly as a result of the construction and operation of the highway/express road, because the distance between the project and the Natura 2000 habitat or those favorable to Natura 2000 species is large, and between them there are forest areas as well as anthropogenic areas (they can function as a barrier for anemochorous dispersal of invasive plants). It is considered that invasive plants will not reach the

Natura 2000 habitat or those of Natura 2000 species due to the project, because there is no hydrological connectivity between them.

Considering the fact that the project will not intersect the site, and the Natura 2000 habitat and the habitats of the Natura 2000 species are located at a great distance from it, it was considered that the soil will not be altered as a result of the works during the construction stage, but neither as a result of the activities in the operation stage.

In the case of atmospheric emissions and dust particles from the construction and operation stage, it was considered that they will not alter the habitats on the site, because the distance between them is large enough and there are forest habitats between them, which are able to contribute to preventing the dispersion of pollutants in the air and the filtering of air masses.

6.2.2.3 Fragmentation of habitats

The project will not generate the fragmentation of the Natura 2000 habitats or the habitats favorable to the Natura 2000 species present in this site, mainly because the site will not be intersected by it, and it will not intersect the ecological corridors of fauna species of community interest either.

Details about the absence of this type of impact for each Natura 2000 species (from the analyzed site) separately (for each parameter) are in the attached table of this study.

6.2.2.4 Disturbance of species activity

The project will not cause the disturbance of fauna species of community interest from the site due to the reduction of the amount of food resources, due to noise and vibrations or due to atmospheric emissions. The distance from the project to the site is large enough for these effects not to produce impacts at the site level. During the construction and operation period, fish (the main food source of the *Lutra lutra* species) will not be affected by the project works or activities, so it will not be disturbed due to the reduction in the amount of food. The distance between this section and the distribution of fauna species of community interest is large.

6.2.2.5 Reduction of the population

The *Lutra lutra* may be affected by the project, due to site traffic and machinery during the construction period and due to the risk of collision during the operation phase. Even if the size of the population in the site is not known, the impact of the project on the size of the population in the site will not be significant, because the risk of this species reaching the project area is very low, considering that there is no hydrological connectivity between the project and the site. The individuals of this species have the ability to move from one river to another, so there is a possibility that the individuals from the site, on the Grigoreşti River, can travel the distance between this river and the Vătafului River, crossed by the project (the distance between these two rivers is small, about 1.5 km). The presence of the species is an indicator of clean waters, the species being sensitive to pollution, living on the banks of waters with low levels of pollution. The project will not lead to

water pollution, neither during the construction stage (water turbidity, potential oil leaks, dangerous substances, etc. from the machines used), nor during the operation stage (potential oil leaks, dangerous petroleum substances, etc.), because there is no hydrological connectivity between the project and the habitat of the species. The species has nocturnal and crepuscular activity, being active at night especially in habitats disturbed by human activities, during the day resting in the galleries by the water's edge, but this does not mean that in the day it does not leave its shelter, but the risk that the species appears during the day in the project area and it is reduced. The construction works will be carried out mainly during the day. The project does not propose deforestation of the forest areas that are a favorable habitat for the species, so the dens and galleries of the species will not be damaged, therefore the project cannot cause the removal of the species from the area, nor the mortality or injury of the young. Considering the above, it is considered that the population size of the species in this site will not be significantly affected

6.2.3 ROSPA0110 Accumulations from Rogojeşti - Bucecea

6.2.3.1 Loss of habitats

The site is not intersected by the project boundary and no works will be carried out inside it. The surface of the habitats of bird species of community interest that are the object of conservation in the analyzed site will not be reduced.

6.2.3.2 Alteration of habitats

During the construction stage, works will be carried out on the banks of the Siret River, for the construction of a bridge, with the possibility of toxic substances from the used equipment entering the river water, thus resulting in victims of fish species, which are the main source of food for the bird species, thus leading to the reduction of their quantity of food.

6.2.3.3 Fragmentation of habitats

The project is not able to generate habitat fragmentation, or disruption of connectivity for bird species characteristic of this site, in any of the stages of the project.

6.2.3.4 Disturbance of species activity

Both the construction stage and the operation stage can generate a potential impact in terms of disrupting the activity of the species. During the construction stage, the implementation of the interventions can lead to the disturbance of the bird species due to the presence of the machines and the noise produced by them. In the case of the operating period, the disturbance may occur as a result of the noise produced by the car traffic. The level of impact was considered non-significant, with noise modeling indicating a small propagation distance of noise Laeq values above 49 dB (values considered to have the potential to disturb the activity of bird species), about 500 m in the most extensive area.

The potential impact generated by noise can affect bird species associated with aquatic habitats and bird species associated with agricultural land.

During the construction stage, works will be carried out on the banks of the Siret River, for the bridge, with the possibility of toxic substances from the used equipment entering the river water, thus resulting in victims of fish species, which are the main source of food for the dependent birds by water bodies, leading to the reduction of their food quantity.

6.2.3.5 Reduction of the population

The construction stage of the project may lead to the reduction of the population of some species of birds on the site, as a result of the collision with construction site traffic.

Considering the construction activities of the bridge over the Siret river from km 53+875, there is a possibility that in order to achieve it, the bridges, nests, juveniles and individuals of the species that may have feeding or nesting areas inside the site will be killed or removed of the project, due to the activities of cleaning the vegetation on the banks of the river, during the construction period.

During the operational stage, car traffic can lead to a collision risk for bird species associated with agricultural habitats.

In the case of bird species with small populations (eg: *Alcedo atthis* - between 7 and 10 pairs, *Ardea purpurea* - between 1 and 2 pairs, *Gavia stellata* - between 2 and 7 pairs, *Aythya nyroca* - between 5 and 45 pairs, etc.) the occurrence of any accidental victim as a result of the realization of the project may lead to the occurrence of a significant impact on the population.

6.2.4 ROSCI0380 Suceava Liteni River

6.2.4.1 Loss of habitats

The site is not intersected by the project and no works will be carried out inside it (neither in the construction stage nor in the operation stage), so the area of habitats of the Natura 2000 species present in the analyzed site will not be reduced. For the construction of the highway/express road, no cleaning or deforestation activities will be carried out on this site.

6.2.4.2 Alteration of habitats

In the different stages of the project, the highway/express road is not able to contribute to the alteration of the habitats favorable to the Natura 2000 species in this site. Due to the large distance between the project and the site, namely 4100 m, as well as other factors, it is not possible to affect the parameters related to habitats favorable to Natura 2000 species.

Considering the distance between the project and the areas with favorable habitats for Natura 2000 species, but also the fact that no possible ways of dispersal of alien invasive plants have been identified, it is considered that there is no risk for their dispersal, installation and development.

Invasive alien plants cannot disperse randomly as a result of the construction and operation of the highway/express road, because the distance between it and Natura 2000 habitats or those favorable to Natura 2000 species is large, and between them there are forest areas as well as anthropogenic areas (they can function as a barrier for anemochorous dispersal of invasive plants). It is not possible through hydrochorous means, because even if the project intersects the Podul Vătafului river, the intersection is at a great distance from the site boundary, and the Suceava river is not crossed by the project from the site and the Dragomirna river first flows into the Mitoc river, which flows into the Suceava river and then reaches the site (the distance being about 6 km between the site boundary and the intersection of the Dragomirna river with the project).

Considering the fact that the project will not intersect the site, and the Natura 2000 habitats and the habitats of the Natura 2000 species are located at a great distance from it, it was considered that the soil will not be altered as a result of the works during the construction stage, but neither as a result of the activities in the operation stage.

In the case of atmospheric emissions and dust particles from the construction and operation stage, it was considered that they will not alter the habitats on the site, because the distance between them is large enough and there are forest habitats between them, which are able to contribute to preventing the dispersion of pollutants in the air and the filtering of air masses.

6.2.4.3 Fragmentation of habitats

In the case of the *Myotis myotis* species, the project intersects areas with a potential local migration corridor of the species for the purpose of feeding, but also agricultural land (the species is typical of agricultural land, in terms of feeding), being considered a length of about 7.5 km as risk area for this species.

For fish and otter, the project does not intersect the site, so the longitudinal connectivity of the water course will not be affected by it. The Suceava River, the river with the largest area in the site, is not crossed by the project. The only river inside the site that is crossed by the project is the river Podul Vătafului, but this river is only in the lower part inside the site, respectively at the discharge into the river Suceava. The project also intersects the Dragomirna and Mitoc rivers, but they are not inside the site, but individuals of the species can use these rivers for movement, because the Dragomirna river flows into the Mitoc river, which in turn flows into the Suceava river, so it has connectivity with the river from the site.

6.2.4.4 Disturbance of species activity

The project will not cause the disturbance of fauna species of community interest from the site due to the reduction of the amount of food resources, due to noise and vibrations or due to atmospheric emissions. The distance between the project and the distribution areas of fauna species of community interest is large.

During the construction and operation period, fish (the main source of food for the *Lutra lutra* species) will not be affected by the works or activities of the project, so it will not be disturbed due to the reduction in the amount of food. The presence of the species is an indicator of clean waters, the species being sensitive to pollution, living on the banks of lightly polluted waters. The project will not lead to water pollution, neither during the construction stage (water turbidity, potential leaks of oils, dangerous substances, etc. from the machinery used), nor during the operation stage (potential leaks of oils, dangerous substances, oil, etc.), so that the individuals of the species will not have to go to another area, where the water is clean.

6.2.4.5 Reduction of the population

The *Lutra lutra* species may be affected by the project, due to site traffic and machinery during the construction period and due to the risk of collision during the operation phase. Even if the size of the population in the site is not known, the impact of the project on the size of the population in the site will not be significant. The Suceava River, the river with the largest proportion of the site surface, is not crossed by the project. The only river inside the site that is crossed by the project is the river Podul Vătafului, but this river is only in the lower part inside the site, respectively at the discharge into the river Suceava. The project also intersects the Dragomirna and Mitoc rivers, but they are not inside the site, but individuals of the species can use these rivers for movement, because the Dragomirna river flows into the Mitoc river, which in turn flows into the Suceava river, so it has connectivity with the river from the site. The species has nocturnal and crepuscular activity, being active at night especially in habitats disturbed by human activities, during the day resting in the galleries by the water's edge, but this does not mean that the day does not leave the shelter, but the risk that the species is during the day in the project area is reduced, and the construction works will be carried out mainly during the day. The project does not envisage deforestation of the forest areas that are a favorable habitat for the species, so the dens and galleries of the species will not be damaged, therefore the project cannot cause the removal of the species from the area, nor the mortality or injury of the young due to these activities. Both during the construction period and during the operation period, the main food source of the species (fish) will not be affected by the project, so the otter will not be indirectly affected by this phenomenon either. Considering the above, it is considered that the species will not be significantly affected by the project.

In the case of the *Myotis myotis* species, the size of the population in the site is not known, and the state of conservation at the site level is unfavorable, therefore, it is cautiously considered that the project could have a significant impact on this species. The project will not intersect the favorable habitat of the species within the site, but considering the fact that individuals of the species can travel significant distances, over 10 km, it is considered that there is a risk of collision with traffic during the operation phase, mainly, but also during construction if working at night. Considering the fact that it is a nocturnal and crepuscular species, during the construction period the risk of mortality is reduced, and during the operation stage, the risk of collision is increased, but it is present only during the night and at dusk. During the night, the number of vehicles traveling on the expressway is generally lower than the number of vehicles during the day. Near the site, the project is provided with bridges, so in the areas with bridges, the probability that the individuals of the species will fly under the bridge, along the vegetation is higher, than to fly over the bridge, in the risk area.

7 MEASURES TO AVOID AND REDUCE THE IMPACT

7.1 PROPOSED MEASURES TO AVOID AND REDUCE THE IMPACT

The principles applied in identifying and establishing to avoid and reduce impact are represented by:

- General principles:

1. **Monitoring**. Permanent monitoring, in the implementation stages (during construction, in the first years of operation - at least 3 years), is necessary to ensure the updating of the database and knowledge and thus be able to make informed decisions;
2. **Adaptive management**. Avoidance and reduction measures must be continuously adapted based on the latest information available in the project implementation area (see Monitoring);
3. **Providing specialized expertise**. For the entire route of section 1, during construction phase, the presence of biodiversity officers must be ensured (preferably a team that can provide expertise on the main community interest groups). It is preferable for those responsible for biodiversity to differ from those responsible for the environment, in order to ensure that the requirements for the protection of biodiversity components are adequately addressed;
4. **Permanent consultation with stakeholders**. During construction and operation, it is necessary to ensure a permanent collaboration framework with the main stakeholders regarding biodiversity management (at least managers/custodians of Natura 2000 sites) and representatives of hunting funds and forest districts. Collaboration should be focus on sharing recent data and information, as well as details of the implementation of measures to avoid and reduce impact;
5. **Effectiveness and complementarity of the measures.**Any of the implemented measures must achieve its purpose through a high degree of effectiveness, without hindering/limiting the effectiveness of other measures and without creating other forms of significant impact or risks on biodiversity or the human population;
6. **Control of impact forms**. The measures formulated and implemented must directly address the identified forms of impacts, ensuring that these impacts are kept below materiality thresholds at all timesc.

- For habitat loss and alteration:

7. **Avoiding affecting additional areas** (outside the expropriation corridor) within Natura 2000 sites as well as in the area of natural habitats located outside the sites, except locations for carrying out measures to avoid and reduce impact;
8. **Reducing pollutant concentrations**at in areas adjacent to the highway;
9. **Rehabilitation of all temporarily affected areas** using only native species and ensuring ecological functionality of rehabilitated surfaces.

- Habitat fragmentation:

10. **Maintain ecological connectivity** for all species of fauna (especially those that are not capable of flying), through highway crossing measures.

- Disturbance of fauna species activity:

11. Minimizing the effects associated with human presence, noise and lighting during the construction and operation of the highway.

- Population reduction:

12. Minimise mortality rates due to collision of wildlife with road traffic.

The formulation of measures to avoid and reduce the impact took into account the following aspects:

- Addressing those impacts whose production is a clear consequence of the activities proposed by the project (in this case they are more specific and better quantified/localized);
- A precautionary approach related to the protection of sensitive components that could be affected during construction or operation by certain design changes or momentary decisions;
- Specifying precisely only those parameters absolutely necessary to ensure the functionality of the proposed measures, without providing details that may limit the options during the design and construction period.

Some of the measures formulated address several components of Community interest, but in order to avoid duplication they have been described only once and then only mentioned within the other components.

The measures presented below are based both on the recommended good practices for carrying out road infrastructure projects, as well as on the analysis and adaptation of experiences and solutions identified at national and international level for different situations encountered in the construction and operation of the motorway. The feasibility of the measures is indicated both by the content of the measure (eg. measures related to the way of carrying out the works) and by exemplifying, based on national and international experience, the main measures related to the configuration of the road route or additional structures (eg. undercrossings, overcrossings)).

All measures formulated for the construction phase are valid in case of a possible decommissioning phase, as well as in the case of the rehabilitation/modernization stages of the highway/express road.

Table no.7-1Proposed measures for the protection of biodiversity

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	Period of implementation of the measure	Location of the of the measure's implementation
General measures							
M1	The hydrotechnical works will be carried out in compliance with the provisions of the Technical Norm for hydrotechnical works NTLH-001 "Criteria and principles for evaluating and selecting technical solutions for designing and carrying out hydrotechnical works for arranging/redeveloping water courses, in order to achieve environmental objectives in the field of waters" approved by Order no. 1215/2008.	Avoidance	*Lutra Lutra*	Population size, population size trend	REP	Pre-construction	In the locations where hydrotechnical works are proposed
M2	For the execution of the project, Environmental Management Plan (EMP) is developed, which will detail the ways to implement all measures to avoid and reduce the impact (along with other requirements) provided in the Adequate Assessment Study, Environmental Impact Report, Water Body Impact Assessment Study, Environmental Agreement and Water Management Approval. The PMM is developed after the issuance of the Environmental Agreement and is reviewed as follows: 1. Before starting construction works; 2. Every 6 months during the construction works; 3. Before the highway is put into operation; 4. Any modification of the project related to constructive solutions or measures to avoid and reduce impact, as well as to the revision of the regulatory acts; 5. When decommissioning the highway	Avoidance	All Natura 2000 components	Population size Population size trend	All forms of impact	Pre-construction, Construction, Operation	-
M3	Conducting regular training for all personnel involved in construction / decommissioning works, on general environmental issues, protected habitats and species and measures to avoid and reduce impacts. Increased attention will be paid to issues related to the prohibition of collecting plants and animals or deliberate	Avoidance	All Natura 2000 components	Population size Population size trend	REP	Construction	-

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	Period of implementation of the measure	Location of the of the measure's implementation
	injury/killing of protected species.						
M4	In order to limit the risk of water contamination of the rivers intersected by the highway and expressway, before the start of construction and during construction and operation, a Plan for prevention and intervention in case of accidental pollution will be developed, reviewed and implemented, with clear provisions regarding rainwater management (including runoff) and maintenance of oil separators. Both turbidity and the quality parameters of the river water will have to be monitored at the beginning of the operating period (preferably minimum 3 years).	Avoidance	All Natura 2000 components	Population size Population size trend	REP	operating	-
Specific measures							
M5	Before starting the construction works, an updated Inventory of fauna species of Community interest and bird species inside and in the vicinity of the project area will be made (20 m left- right of the project limit). The inventory will represent the baseline to which the results of the monitoring program during construction and operation will relate. Any additional information provided by the inventory will be reflected in the PMM in terms of applicability of measures to avoid and reduce impacts.	Avoidance	All animal species of community interest	Population size Population size trend	REP	Construction	Along the entire length of the highway and the expressway
M6	The opening of any work front must be done after persons accredited for biodiversity monitoring have previously assessed the presence of species of Community interest in the area to be affected and can guarantee that all measures have been taken to avoid/reduce the impact on these species, including relocation operations, where appropiate, in compliance with the legal requirements in force	Avoidance	All Natura 2000 components	Population size Population size trend	REP	Construction	Along the entire length of the highway and the expressway
M7	Work fronts shall be regularly checked by persons accredited for biodiversity monitoring to ensure that all measures have been taken to avoid the establishment of fauna species in temporarily dormant	Avoidance	All Natura 2000 components	Population size	REP	Construction	Along the entire length of the highway and the

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	Period of implementation of the measure	Location of the of the measure's implementation
	areas where the resumption of work could lead to the destruction of nests and shelters and/or the appearance of victims. Solutions to avoid the installation of species may consist of: installation of nets/tarpaulins, temporary fences, etc.						expressway
M8	In order to avoid the destruction of bird nests, on the areas within the expropriation limit, the opening of the work fronts (vegetation cleaning / soil stripping) will not be done between March and July.	Avoidance	Birds	Population size	REP	Construction	Area of work fronts
M9	A system for identifying and collecting potential victims of animal on the highway must be implemented in the vicinity of the ROSPA0110 site, between km 49+900 - km-55+700. The role of this system is to reduce the risk of collision for birds that could be attracted by the existence of carcasses to risk areas.	Reduction	Birds	Population size	REP	operating	km 49+900 - km-55+700
M10	Avoiding the handling of vehicles and machinery in the area of night work lanes in the highway sector between km 8+000 and km 12+000, so as to minimize the activity of twilight and nocturnal species (bats).	Avoidance	Bats	Population size	REP	Construction	km 8+000 and km 12+000
M11	Both in the construction stage and at the operation stage, it is necessary, for all components of the project, to implement one or more of the following solutions: 1. Reducting over-lighting (too bright lights); 2. Orientation and shielding of light sources (keeping light within the property or designated area for lighting); 3. Avoiding excessive grouping of light (illuminating only areas where it is really necessary); 4. Reducing lighting duration (use of timers, motion sensors, adaptive lighting that dims or turns off lights when they are no longer needed, etc.); Provision of lighting sources with warm light, without blue color (color temperature not to exceed 3000 Kelvin). These lighting	Reduction	For chiroptera species and nocturnal bird species	Population size, population size trend	STEP, REP	Construction and operation	Along the entire length of the expropriation corridor

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	Period of implementation of the measure	Location of the of the measure's implementation
	systems have a low degree of attractiveness for flying invertebrates (consequently having effects on chiroptera and avifauna) and should ensure that light exclusively to highway activity areas and limit light scattering in natural habitats						
M12	The works of crossing water bodies will be carried out with minimum damage to the riparian vegetation on the banks of rivers and canals crossed by the highway, exclusively inside the expropriation corridor.	Reduction	Riparian habitats in the vicinity of Natura 2000 sites favorable for species of community interest (Lutra lutra, birds)	Population size	AH	Construction	Areas of intersection of the proposed route with water bodies
M13	In order to avoid the enetery of *Lutra lutra*, but also of other species in the area of the works and implicitly of the site traffic, the work fronts will be fenced with temporary fence during the construction works. The fencing system must not fragment the habitats of species, in this sense it must be taken into account that the fences do not obstruct wetlands, and in the areas with intense activity for these species, small undercrossings of technological/access roads can be provided.	Avoidance	*Lutra Lutra*	Population size	REP	Construction	In the work area
M14	During construction phase, it will be avoided to keep open any pools, ditches, digging for foundations, etc., in which fauna specimens can remain trapped. These potential traps must be inventoried and inspected regularly to avoid casualties. The areas where work will be carried out will be fenced with temporary fences to avoid individuals from entering these areas.	Avoidance	*Lutra Lutra*	Population size	REP	Construction	In the work area
M15	In order to reduce the risk of collision of avifauna, mammals species (especially bat species), with highway traffic, it is necessary to place some anti-collision panels. Anti-collision panels will be implemented in areas commonly used by species for movement, between the following kilometer intervals:	Reduction	Bird species, chiroptera	Population size	REP	Construction	Kilometer intervals mentioned in measure

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	Period of implementation of the measure	Location of the of the measure's implementation
	- km 1+400 - km 1+550 on the left side - km 6+075 - km 7+050 on the right side - km 11+ 100 - km 11+700 on the left side - km 14+075 - km 17+550 on the left side - km 22+125 - km 23+625 on the left side - km 24+075 - km 24+975 on the left side - km 25+000 - km 25+900 on the right side - km 28+500 - km 28+700 on the left side - km 28+500 - km 28+700 on the right side - km 29+000 - km 29+875 on the right side - km 29+000 - km 29+875 on the left side - km 30+900 -km 31+050 on the right side - km 32+450 - km 32+700 on the left side - km 32+450 - km 32+700 on right side - km 33+425 - km 33+625 on the left side - km 33+425 - km 33+625 on the right side - km 34+950 - km 35+300 on the left side - km 34+900 - km 35+ 300 on the right side - km 35+875 - km 36+175 on the left side - km 35+875 - km 36+175 on the right side - km 42+000 - km 42+225 on the left side - km 42+000 - km 42+225 on the right side						
M16	In addition to the motorway/expressway fence, it is necessary to install a mesh fence with very small meshes and the upper part bent outwards, to prevent amphibians and reptiles from entering the roadway. The fence will have a minimum height of 60 cm and will have as a secondary role of guidance of small fauna to undercrossing (including bridges and viaducts). The fence for amphibians and reptiles is installed along the entire length of the	Avoidance	*Lutra Lutra*	Population size	REP	Construction	Along the entire length of the highway and the expressway.

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	Period of implementation of the measure	Location of the of the measure's implementation
	highway fence, glued to it. The role of this additional fence is to avoid accidental victims (amphibians, reptiles, small mammals) on the highway roadway. Their appearance could attract raptor species to areas at risk of collision with cars.						
M17	In order to reduce the risk of wildlife entering the roadway area of the highway through road interchanges, animal fences will be installed (at the road level) on their brances. Depending on the installation position, the width of the grid must be set so as not to allow animals (e.g. deer, otter) to jump over the structure.	Avoidance	*Lutra lutra*, other mammal species	Population size	REP	Construction	In the area of routing nodes
M18	All areas affected during construction under structures (bridges and viaducts) will be rehabilitated. The rehabilitation works will also include the installation of vegetation cordons (native shrubs of various sizes, possibly trees whose height does not affect the built structures) to guide the movement of as many species of fauna as possible under the structures, including some species of birds and bats. Native plant species will also be used to arrange highway facilities.	Reduction	All species of fauna with high mobility	Population size	REP	Construction	In the area of bridges, viaducts
M19	For construction activities, mobile sound-absorbing panels are installed and maintained near the work fronts. The panels shall have a minimum height of 3 m, a noise reduction efficiency of at least 10 dB(A) and be mounted as close as possible to noise sources. The effectiveness of the panels will be assessed by noise measurements.	Reduction	All species of fauna	Population size	STEP	Construction	In the work fronts
M20	The installation of permanent sound-absorbing panels with a height of 3 m is required at the following locations along the motorway and expressway, for the protection of Natura 2000 sites: - km 0+675 - 1+400 on the left side - km 0+975 - 1+600 on the right side - km 3+475 - 3+650 on the left side	Reduction	Bird species	Population size	STEP	Construction	Kilometer intervals mentioned in measure

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	Period of implementation of the measure	Location of the of the measure's implementation
	- km 3+475 + 3+650 on the right side - km 3+850 - 4+750 on the left side - km 3+850 - 3+950 on the side right - km 3+950 - 4+575 on the right side - km 5+450 - 6+075 on the right side - km 5+425 - 7+325 on the left side - km 7+050 - 8+025 on the right side - km 7+325 - 7+550 on the left side - km 7+550 - 8+250 on the left side - km 9+025 - 9+825 on the left side - km 11+725 - 12+375 on the right side - km 12 +850 - 13+875 on the right side - km 14+075 - 15+000 on the right side - km 15+000 - 17+175 on the right side - km 17+800 - 18+700 on the right side - km 21+450 - 23+600 on the right side - km 20+850 - 20+200 on the right side (SS type S1) - km 24+175 -24+975 on the right side - km 24+975 -26+350 on the left side - km 26+425 - 27+900 on the right side - km 26+350 - 27+450 on the left side - km 30+800 - 31+350 on the left side - km 38+625 - 39+075 on the left side - km 38+ 625 - 39+075 on the right side - km 39+575 - 40+075 on the left side - km 39+575 - 40+075 on the right side - km 40+625 - 40+975 on the left side - km 43+050 - 43+275 on the right side - km 43+550 - 44+075 on the left side						

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	Period of implementation of the measure	Location of the of the measure's implementation
	- km 49+900 - 50+125 on the right side - km 49+900 - 50+125 on the left side - km 54+975 - 55+ 425 on the right side - km 55+450 - 55+700 on the right side						
M21	The long-term effectiveness of impact reduction measures depends during project operation on ensuring the integrity and functionality of all their components. In this sense, it is necessary to provide a program for periodic verification and maintenance of construction elements, as well as to ensure the viability of the plant specimens planted during the construction stage (including additions where necessary).	Reduction	All Natura 2000 components	Population size	REP	operating	Along the entire length of the expressway

Additional elements regarding the proposed measures

M11 –The implementation of lighting systems with a low degree of attractiveness and with exclusive dispersion on the roadway

From the point of view of the configuration of the lighting poles, it is recommended that it follow the example considered the best in the figure below. This configuration has the added benefit of reducing overall power consumption.

To reduce the risks of collision of chiroptera species, it is also recommended to use lights with cold color temperatures for lighting (excluding incandescent bodies that generate heat), which will have the effect of reducing the activity of invertebrates and consequently chiropterans in the area.

Figure no.7-1Example of a lighting system suitable for concentrating the dispersion exclusively on the roadway
(source: Rieswijk, 2014)

M15 – Anti-collision mesh panels

The most important characteristics of the mesh anti-collision panels, necessary to be considered for this project are:

- height: 3 m, to ensure the optimal deviation of the animals' flight over the collision risk area;
- anchoring in a solid foundation with the application of a constructive solution to discourage theft;
- made of a net dense enough to ensure its visibility for the widest possible spectrum of flying species (mesh < 5 cm).

Figure no.7-2Example of anti-collision panels
(attention, the panels in the example are not 3m high)

M17 – Installation of wildlife fences near road junctions

The wildlife fences will aim to limit the possibility of entering the road in areas where fences cannot be provided (eg: road junction areas), mainly for large herbivores.

In the first phase, it is recommended that these structures be mounted without additional elements. Based on monitoring the efficiency of the implementation of this measure, in conjunction with the measure to install reinforced fences, the need to add some additional features (eg electrification of the grids) will be subsequently analyzed and adopted if deemed necessary.

In order to avoid the creation of traps and mortality situation of small fauna species (eg: small mammals, reptiles or amphibians) it is necessary that the grids be provided with openings on both sides of the roadway, allowing the safe exit of any small fauna specimens entered through the bars of the structure.

An extremely important aspect of these structures is that they pose a specific accident hazard for motorcycles, especially in high humidity conditions. In order to reduce these risks, structures must be installed exclusively in straight road areas (not curves) and be accompanied by warninig signs located at distances large enough to allow a motorcycle to reduce its running speed to a level that ensures safety.

An example of such barriers is shown in the figure below, along with an example of a signpost for them.

Figure no.7-3A. Example of an electrified wildlife fence; B Example of a warning sign on a road in Wales to alert drivers to the presence of a grating; C. Fence installed to keep wildlife out of the roadway on a road in Washington, USA

(sources: https://www.travelblog.org/Photos/2520702, https://www.dailypost.co.uk/news/north-wales-news/cattle-grid-llan-ffestiniog-dangerous-10129540, https ://www.wsdot.wa.gov/sites/default/files/2018/01/31/Env-FW-WildlifeGuard.jpg)

M18 –Rehabilitation with vegetation of the areas under the structures

It is recommended to make a mosaic of vegetation in areas under structures, especially under viaducts, including both trees and grassy vegetation. An important adaptation of these areas, recommended for chiroptera species, is the inclusion in the mosaic of transverse linear alignments of bushes and shrubs, which can be a guide for bats and increase the chances that they will use those linear routes.

An example of vegetation layo and heterogeneous arrangement of the area under a viaduct is shown in the figure below.

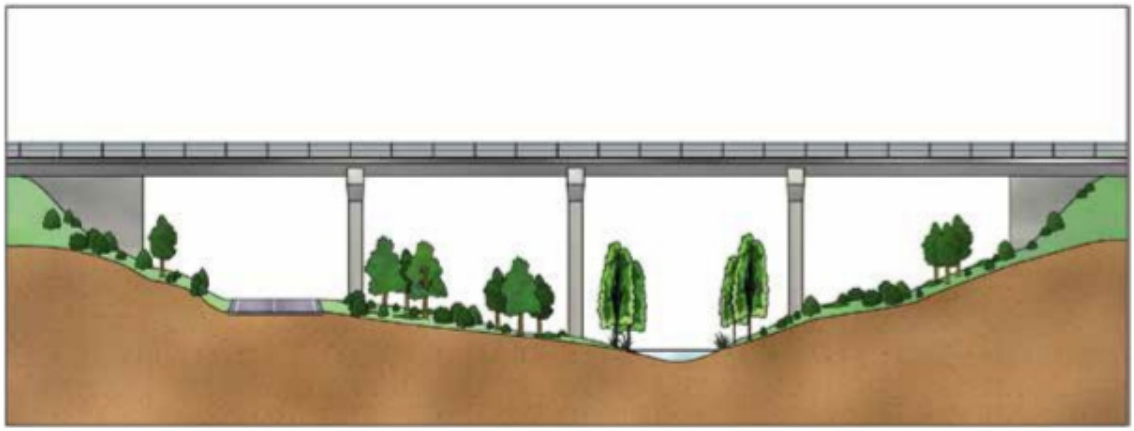


Figure no.7-4Example of vegetation differentiation in the areas under the viaducts
(source: Ministry of Agriculture, Food and the Environment, 2016)

M19 – Placement of mobile sound-absorbing panels

The panels aim to reduce the noise level generated during the construction period and reduce the level of disturbance to bird species. A recommendation on the type of panel used is shown in the figure below.

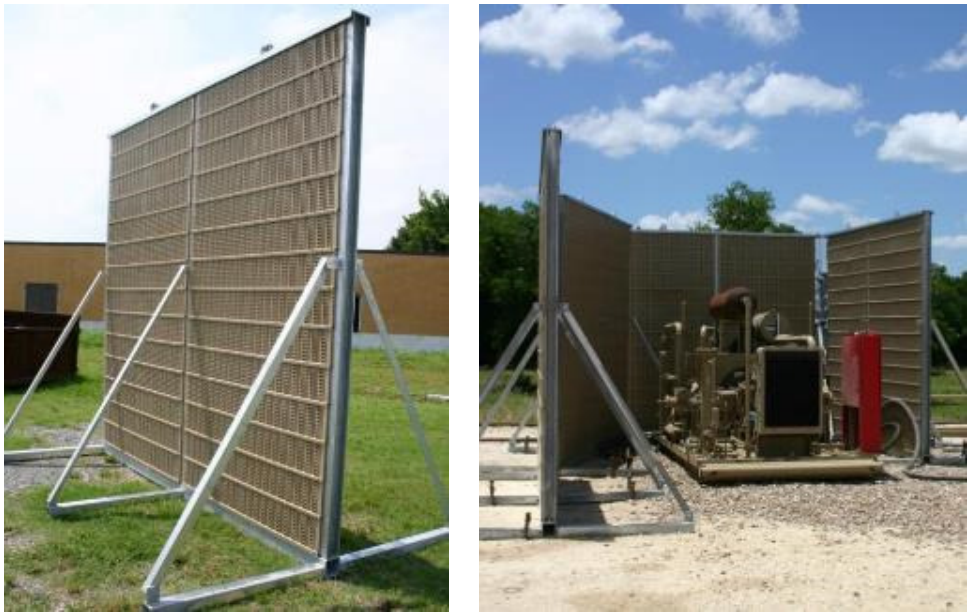


Figure no.7-5Example of mobile sound-absorbing panels recommended for the construction works of the Suceava DN2H highway and the Siret border DN2H expressway
(source: https://www.soundfighter.com/wp-content/uploads/2015/09/1117.jpg, https://www.soundfighter.com/wp-content/uploads/2015/09/1612.jpg)

M20 – Placement of fixed sound-absorbing panels

The main purpose of the sound-absorbing panels is to reduce the noise level generated by the project and implicitly to reduce the level of disturbance on fauna species. They also have a secondary role, to prevent fauna species from entering the road, but also to maintain the flight of birds, bats and flying invertebrates at the level of the panels, so that they do not reach the risk area, thus decreasing the mortality rate by collision.

An example of the type of panel that can be used is shown in the figure below.

Figure no.7-6Example of sound-absorbing panels recommended for the Suceava DN2H highway and the Siret border DN2H expressway

(source:https://www.soundfighter.com/wp-content/uploads/2015/08/DSC00327-e1440632188674.jpg)

7.2 THE CALENDAR FOR THE IMPLEMENTATION OF MEASURES AND MONITORING

The following tables show the timetable for implementing the measures foreseen in this project for its different phases, together with the relevant monitoring component.

Table no.7-2The calendar for the implementation of the measures associated with the pre-construction and execution stages

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	Parameter to which the measure is addressed	Impact of the measure	Period of implementation of the measure	Location of the measure's implementation	The calendar for the implementation of the measures	responsive	Budget (EUR)
								projection: 1 2 3 4 5 6 / Execution: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2.3 24 25 26 27 28 29 30		
General measures										
M1	The hydrotechnical works will be carried out in compliance with the provisions of the Technical Norm for hydrotechnical works NTLH-001 "Criteria and principles for evaluating and selecting technical solutions for designing and carrying out hydrotechnical works for arranging/redeveloping water courses, in order to achieve environmental objectives in the field of waters" approved by Order no. 1215/2008.	Avoidance	*Lutra lutra*	Population size, population size trend	REP	Pre-construction	In the locations where hydrotechnical works are proposed		Entrepreneur	-
M2	For the execution of the project, Environmental Management Plan (EMP) is developed, which will detail the ways to implement all measures to avoid and reduce the impact (along with other requirements) provided in the Adequate Assessment Study, Environmental Impact Report, Water Body Impact Assessment Study, Environmental Agreement and Water Management Approval. The PMM is developed after the issuance of the Environmental Agreement and is reviewed as follows: 1. Before starting construction works; 2. Every 6 months during the construction works; 3. Before the highway is put into operation; 4. Any modification of the project related to constructive solutions or measures to avoid and reduce impact, as well as to the revision of the regulatory acts; 5. When decommissioning the highway	Avoidance	All Natura 2000 components	Population size Population size trend	All forms of impact	Pre-construction, Construction, Operation	-		Entrepreneur	**€6,300.00**
M3	Conducting regular training for all personnel involved in construction / decommissioning	Avoidance	All Natura 2000 components	Population size Population	REP	Construction	-		CNAIR, Entrepreneur	**€3,000.00**

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	Parameter to which the measure is addressed	Impact of the measure	Period of implementation of the measure	Location of the measure's implementation	The calendar for the implementation of the measures	responsive	Budget (EUR)
	works, on general environmental issues, protected habitats and species and measures to avoid and reduce impacts. Increased attention will be paid to issues related to the prohibition of collecting plants and animals or deliberate injury/killing of protected species.			size trend				projection: 1 2 3 4 5 6 / Execution: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2.3 24 25 26 27 28 29 30		
Specific measures										
M5	Before starting the construction works, an updated Inventory of fauna species of Community interest and bird species inside and in the vicinity of the project area will be made (20 m left-right of the project limit). The inventory will represent the baseline to which the results of the monitoring program during construction and operation will relate. Any additional information provided by the inventory will be reflected in the PMM in terms of applicability of measures to avoid and reduce impacts.	Avoidance	All animal species of community interest	Population size Population size trend	REP	Construction	Along the entire length of the highway and the expressway		Entrepreneur	**€75,000.00**
M6	The opening of any work front must be done after persons accredited for biodiversity monitoring have previously assessed the presence of species of Community interest in the area to be affected and can guarantee that all measures have been taken to avoid/reduce the impact on these species, including relocation operations, where appropiate, in compliance with the legal requirements in force	Avoidance	All Natura 2000 components	Population size Population size trend	REP	Construction	Along the entire length of the highway and the expressway		CNAIR, Contractor	**€22,500.00**
M7	Work fronts shall be regularly checked by persons accredited for biodiversity monitoring to ensure that all measures have been taken to avoid the establishment of fauna species in temporarily dormant areas where the resumption of work could lead to the destruction of nests and shelters and/or the	Avoidance	All Natura 2000 components	Population size	REP	Construction	Along the entire length of the highway and the expressway		CNAIR, Contractor	**€45,000.00**

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	Parameter to which the measure is addressed	Impact of the measure	Period of implementation of the measure	Location of the measure's implementation	The calendar for the implementation of the measures																															responsive	Budget (EUR)
								projection						Execution																												
								1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	2.3	24	25	26	27	28	29	30		
	appearance of victims. Solutions to avoid the installation of species may consist of: installation of nets/tarpaulins, temporary fences, etc.																																								
M8	In order to avoid the destruction of bird nests, on the areas within the expropriation limit, the opening of the work fronts (vegetation cleaning / soil stripping) will not be done between March and July.	Avoidance	Birds	Population size	REP	Construction	Area of work fronts																																	CNAIR, Contractor	**€0.00**
M10	Avoiding the handling of vehicles and machinery in the area of night work lanes in the highway sector between km 8+000 and km 12+000, so as to minimize the activity of twilight and nocturnal species (bats).	Avoidance	Bats	Population size	REP	Construction	km 8+000 and km 12+000																																	CNAIR, Contractor	**€0.00**
M11	Both in the construction stage and at the operation stage, it is necessary, for all components of the project, to implement one or more of the following solutions: 1. Reducting over-lighting (too bright lights); 2. Orientation and shielding of light sources (keeping light within the property or designated area for lighting); 3. Avoiding excessive grouping of light (illuminating only areas where it is really necessary); 4. Reducing lighting duration (use of timers, motion sensors, adaptive lighting that dims or turns off lights when they are no longer needed, etc.); Provision of lighting sources with warm light, without blue color (color temperature not to exceed 3000 Kelvin). These lighting systems have a low degree of attractiveness for flying invertebrates (consequently having effects on chiroptera and avifauna) and should ensure that light exclusively to highway activity areas and limit light scattering in natural habitats	Reduction	For chiroptera species and nocturnal bird species	Population size, population size trend	STEP, REP	Construction and operation	Along the entire length of the expropriation corridor																																	CNAIR, Contractor	**€0.00**

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	Parameter to which the measure is addressed	Impact of the measure	Period of implementation of the measure	Location of the measure's implementation	The calendar for the implementation of the measures	responsive	Budget (EUR)
								projection: 1 2 3 4 5 6 / Execution: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2.3 24 25 26 27 28 29 30		
M12	The works of crossing water bodies will be carried out with minimum damage to the riparian vegetation on the banks of rivers and canals crossed by the highway, exclusively inside the expropriation corridor.	Reduction	Riparian habitats in the vicinity of Natura 2000 sites favorable for species of community interest (Lutra lutra, birds)	Population size	AH	Construction	Areas of intersection of the proposed route with water bodies		CNAIR, Contractor	**€0.00**
M13	In order to avoid the enetery of *Lutra lutra*, but also of other species in the area of the works and implicitly of the site traffic, the work fronts will be fenced with temporary fence during the construction works. The fencing system must not fragment the habitats of species, in this sense it must be taken into account that the fences do not obstruct wetlands, and in the areas with intense activity for these species, small undercrossings of technological/access roads can be provided.	Avoidance	*Lutra lutra*	Population size	REP	Construction	In the work area		CNAIR, Entrepreneur	**€1,200.00**
M14	During construction phase, it will be avoided to keep open any pools, ditches, digging for foundations, etc., in which fauna specimens can remain trapped. These potential traps must be inventoried and inspected regularly to avoid casualties. The areas where work will be carried out will be fenced with temporary fences to avoid individuals from entering these areas.	Avoidance	*Lutra lutra*	Population size	REP	Construction	In the work area		CNAIR, Entrepreneur	-
M15	In order to reduce the risk of collision of avifauna, mammals species (especially bat species), with highway traffic, it is necessary to place some anti-collision panels. Anti-collision panels will be implemented in areas commonly used by species for movement, between the following kilometer intervals: - km 1+400 - km 1+550 on the left side - km 6+075 - km 7+050 on the right side	Reduction	Bird species, chiroptera	Population size	REP	Construction	Kilometer intervals mentioned in measure		CNAIR, Entrepreneur	**€2,700,000.00**

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	Parameter to which the measure is addressed	Impact of the measure	Period of implementation of the measure	Location of the measure's implementation	The calendar for the implementation of the measures	responsive	Budget (EUR)
	- km 11+ 100 - km 11+700 on the left side - km 14+075 - km 17+550 on the left side - km 22+125 - km 23+625 on the left side - km 24+075 - km 24+975 on the left side - km 25+000 - km 25+900 on the right side - km 28+500 - km 28+700 on the left side - km 28+500 - km 28+700 on the right side - km 29+000 - km 29+875 on the right side - km 29+000 - km 29+875 on the left side - km 30+900 -km 31+050 on the right side - km 32+450 - km 32+700 on the left side - km 32+450 - km 32+700 on the left side - km 32+450 - km 32+700 on right side - km 33+425 - km 33+625 on the left side - km 33+425 - km 33+625 on the right side - km 34+950 - km 35+300 on the left side - km 34+900 - km 35+ 300 on the right side - km 35+875 - km 36+175 on the left side - km 35+875 - km 36+175 on the right side - km 42+000 - km 42+225 on the left side - km 42+000 - km 42+225 on the right side							projection: 1 2 3 4 5 6 Execution: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2.3 24 25 26 27 28 29 30		
M16	In addition to the motorway/expressway fence, it is necessary to install a mesh fence with very small meshes and the upper part bent outwards, to prevent amphibians and reptiles from entering the roadway. The fence will have a minimum height of 60 cm and will have as a secondary role of guidance of small fauna to	Avoidance	*Lutra lutra*	Population size	REP	Construction	Along the entire length of the highway and the expressway.		CNAIR, Entrepreneur	**€6,000,000.00**

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	Parameter to which the measure is addressed	Impact of the measure	Period of implementation of the measure	Location of the measure's implementation	The calendar for the implementation of the measures	responsive	Budget (EUR)
	undercrossing (including bridges and viaducts). The fence for amphibians and reptiles is installed along the entire length of the highway fence, glued to it. The role of this additional fence is to avoid accidental victims (amphibians, reptiles, small mammals) on the highway roadway. Their appearance could attract raptor species to areas at risk of collision with cars.									
M17	In order to reduce the risk of wildlife entering the roadway area of the highway through road interchanges, animal fences will be installed (at the road level) on their brances. Depending on the installation position, the width of the grid must be set so as not to allow animals (e.g. deer, otter) to jump over the structure.	Avoidance	*Lutra lutra*, other mammal species	Population size	REP	Construction	In the area of routing nodes		CNAIR, Entrepreneur	**€15,000.00**
M18	All areas affected during construction under structures (bridges and viaducts) will be rehabilitated. The rehabilitation works will also include the installation of vegetation cordons (native shrubs of various sizes, possibly trees whose height does not affect the built structures) to guide the movement of as many species of fauna as possible under the structures, including some species of birds and bats. Native plant species will also be used to arrange highway facilities.	Reduction	All species of fauna with high mobility	Population size	FH, REP	Construction	In the area of bridges, viaducts		CNAIR, Contractor	**€0.00**
M19	For construction activities, mobile sound-absorbing panels are installed and maintained near the work fronts. The panels shall have a minimum height of 3 m, a noise reduction efficiency of at least 10 dB(A) and be mounted as close as possible to noise sources. The effectiveness of the panels will be assessed by noise measurements.	Reduction	All species of fauna	Population size	STEP	Construction	In the work fronts		CNAIR, Entrepreneur	**€300,000.00**
M20	The installation of permanent	Reduction	Bird species	Population	STEP	Construction	Kilometer		CNAIR,	**€9,633,000.00**

The calendar for the implementation of the measures

projection						Execution																														
1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	2.3	24	25	26	27	28	29	30

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	Parameter to which the measure is addressed	Impact of the measure	Period of implementation of the measure	Location of the measure's implementation	The calendar for the implementation of the measures																																responsive	Budget (EUR)
								projection						Execution																													
								1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	2. 3	24	25	26	27	28	29	30		
	sound-absorbing panels with a height of 3 m is required at the following locations along the motorway and expressway, for the protection of Natura 2000 sites: - km 0+675 - 1+400 on the left side - km 0+975 - 1+600 on the right side - km 3+475 - 3+650 on the left side - km 3+475 + 3+650 on the right side - km 3+850 - 4+750 on the left side - km 3+850 - 3+950 on the side right - km 3+950 - 4+575 on the right side - km 5+450 - 6+075 on the right side - km 5+425 - 7+325 on the left side - km 7+050 - 8+025 on the right side - km 7+325 - 7+550 on the left side - km 7+550 - 8+250 on the left side - km 9+025 - 9+825 on the left side - km 11+725 - 12+375 on the right side - km 12 +850 - 13+875 on the right side - km 14+075 - 15+000 on the right side - km 15+000 - 17+175 on the right side - km 17+800 - 18+700 on the right side - km 21+450 - 23+600 on the right side - km 20+850 - 20+200 on the right side (SS type S1) - km 24+175 -24+975 on the right side - km 24+975 -26+350 on the left side - km 26+425 - 27+900 on the			size			intervals mentioned in measure																																			Entrepreneur	

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	Parameter to which the measure is addressed	Impact of the measure	Period of implementation of the measure	Location of the measure's implementation	The calendar for the implementation of the measures	responsive	Budget (EUR)
	right side - km 26+350 - 27+450 on the left side - km 30+800 - 31+350 on the left side - km 38+625 - 39+075 on the left side - km 38+ 625 - 39+075 on the right side - km 39+575 - 40+075 on the left side - km 39+575 - 40+075 on the right side - km 40+625 - 40+975 on the left side - km 43+050 - 43+275 on the right side - km 43+550 - 44+075 on the left side - km 49+900 - 50+125 on the right side - km 49+900 - 50+125 on the left side - km 54+975 - 55+ 425 on the right side - km 55+450 - 55+700 on the right side							projection: 1 2 3 4 5 6 Execution: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2.3 24 25 26 27 28 29 30		

Table no.7-3The calendar for the implementation of the measures associated with the operation stage

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure	The calendar for the implementation of the measures	responsive	Budget (EUR)
General measures										
M4	In order to limit the risk of water contamination of the rivers crossed by the highway and the expressway, before the start of construction and during construction and operation, a Prevention and Intervention Plan in case of accidental pollution will be developed, revised, and	Avoidance	All Natura 2000 components	Population size Population size trend	REP	operating	-	operating: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2.3 24 25 26 27 28 29 30 31 32 33 34 35 36	CNAIR/Contractor	**€1,500.00**

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure	The calendar for the implementation of the measures (operating: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2.3 24 25 26 27 28 29 30 31 32 33 34 35 36)	responsive	Budget (EUR)
	implemented, with clear provisions regarding to the management of rainwater (including runoff) and the maintenance of hydrocarbon separators. Both turbidity and river water quality parameters will have to be monitored at the beginning of the operating period (preferably at least 3 years).									
Specific measures										
M9	A system for the identification and collection of potential animal victims on the highway must be implemented in the vicinity of the ROSPA0110 site, in the interval km 49+900 - km-55+700. The role of this system is to reduce the risk of collision for birds that could be attracted by the existence of carcasses to risk areas.	Reduction	Birds	Population size	REP	operating	km 49+900 - km-55+700		CNAIR/Contractor	**€6,000.00**
M11	Both in the construction stage and in the operation stage, it is necessary, for all project components, to implement one or more of the following solutions: 1. Reduction of over-illumination (too strong lights); 2. Orientation and screening of light sources (keeping the light within the limit of the property or the area designated for lighting);	Reduction	For chiroptera species and nocturnal bird species	Population size, population size trend	STEP, REP	Construction and operation	Along the entire length of the expropriation corridor		CNAIR/Contractor	**€0.00**

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure	The calendar for the implementation of the measures	responsive	Budget (EUR)
	3. Avoiding excessive grouping of light (lighting only the areas where it is really necessary); 4. Reducing the duration of lighting (use of timers, motion sensors, lighting adaptive that dims or turns off the lights when they are no longer needed, etc.); Provision of lighting sources with warm light, without blue color (color temperature not to exceed 3000 Kelvin). These lighting systems have a low degree of attractiveness for flying invertebrates (with consequent effects on chiroptera and avifauna) and should ensure that light is directed exclusively to the highway activity areas and that light dispersion is limited in natural habitats							operating		
M21	The long-term effectiveness of the impact reduction measures depends during the operation of the project on ensuring the integrity and functionality of all their component elements. In this sense, it is necessary to provide a program for periodic verification and maintenance of the constructive elements, as well as to ensure the viability of the plant specimens planted during the construction stage (including additions where	Reduction	All Natura 2000 components	Population size	REP	operating	Along the entire length of the expressway		CNAIR	**€0.00**

Measure code	Measure text	Measure type (P/E/R)	Affected species/habitat	The parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure	The calendar for the implementation of the measures operating																																		responsive	Budget (EUR)
								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	2.3	24	25	26	27	28	29	30	31	32	33	34	35	36		
	necessary).																																											

8 MONITORING

Monitoring the impact that the construction and operation of the highway will have on the environmental components has the role, on the one hand, to confirm or deny the quantifications of the residual impact made before the implementation of the project, to quantify the efficiency of the measures already implemented and to identify, after case, the need for additional measures or new locations where it is necessary to implement measures to reduce the impact.

The monitoring activities presented here focus on Natura 2000 sites and the species and habitats that are protected in them. The complete monitoring program will be included in the RIM and completed with cthe requirements for the other environmental components that may be affected by the implementation of the project (including the requirements arising from the assessment of the impact on water bodies).

The monitoring program contains requirements for the pre-construction period (the period in which the Technical Project and execution details are drawn up), the period ofconstruction and for the period of operation. The requirements related to the construction period are also valid for possible stages of rehabilitation, modernization or decommissioning of the highway.

The implementation of the monitoring program requires the existence of a dedicated team, which includes at least one expert for each Natura 2000 component (habitats/plants, fish, amphibians and reptiles, birds, mammals (including bats). The consistent volume, the large area of the project, but also the high number of Natura 2000 sites in its area require a sustained effort from the experts, especially during the construction period and the first three years of operation.

The results of the monitoring will feed a database and information with the help of which the following objectives can be achieved:

- Reporting the results to the competent authorities for environmental protection and other interested factors (e.g. administrators/custodians of protected natural areas);
- Data analysis in order to assess the real residual impact;
- Substantiating the need for potential additional measures or additional implementation locations.

The team/teams designated to carry out the monitoring have/have the following obligations:

- Carrying out monitoring activities in accordance with best practices and with the requirements of the monitoring guidelines (see below);
- Elaboration of monitoring reports: semiannually in the construction phase and annually in the operation phase;
- Elaboration of residual impact assessment reports: annually and upon completion of construction (in the construction phase), as well as annually and at the end of the first three years of operation (in the operational phase).

Regardless of the monitoring program, the owner/contractors have the obligation to report, according to the legal requirements in force, any accidental killing of bird species, as well as strictly

protected species provided in annexes no. 4A and 4B of GEO no. 57/2007 (both during the construction period and during the operation period).

For the monitoring activities of habitats and species of community interest, the methodological requirements of the guidelines for monitoring the state of conservation of species and habitats in Romania will be strictly applied, based on article 17 of the Habitats Directive, published on the website of the Bucharest Institute of Biology of of the Romanian Academy (http://www.ibiol.ro/posmediu/rezultate.htm), respectively:

- Synthetic monitoring guide for habitats of community interest (salt flats, continental dunes, meadows, fresh water) in Romania;
- The synthetic monitoring guide for habitats of community interest: thickets, peatlands and marshes, rocky outcrops, forests;
- The synthetic guide for monitoring invertebrate species of community interest in Romania;
- Synthetic guide for monitoring community species of reptiles and amphibians in Romania;
- The synthetic guide for monitoring community fish species in Romania;
- The synthetic monitoring guide for mammal species of community interest in Romania;
- Guide for monitoring the state of conservation of caves and bat species of community interest in Romania;

as well as of:

- The standard guide for monitoring bird species of community interest in Romania, developed by the Romanian Ornithological Society and the Milvus Group in 2014,http://monitorizareapasarilor.cndd.ro/documents/Ghid-standard-de-monitorizare-pasari-2014.pdf.

The selected study methods will have to cover all the particularities related to the identity of the analyzed species, phenology and the particularities/limitations of the different study areas.

The amount of effort made for any of the monitoring activities must be sized so that the data and information collected are representative, from the point of view of the methods applied, for the entire studied territory.

In order to monitor the impact that the construction and operation of the highway will have on the environmental components, a monitoring plan is proposed that includes monitoring components and sub-components, indicators, the minimum duration, the minimum frequency of field campaigns and the frequency of reports, both for the period of construction as well as for the operating period (presented in the following table). The monitoring program is accompanied by the proposed monitoring locations for each component and subcomponent. All these elements are also presented for the pre-construction stage.

In the meaning of this report, a "field campaign" represents a field trip that ensures the complete coverage of all locations to be monitored, within the entire study territory and with the application of all appropriate study methods.

It is very important that during the entire construction period and at least in the first three years of operation, the administrators and custodians of the potentially affected Natura 2000 sites have access to the detailed monitoring results in order to be able to correlate this data and information with the activities related to the assessment of the state of conservation of habitats and species within the sites.

Responsibilitythe implementation of the monitoring program belongs as follows:

- During the execution period:
  - The designers/builders, who will contract the teams of experts in biodiversity;
  - To the project owner (CNAIR), who will ensure the integration of data received from different teams/contracts, etc., for the purpose of unitary reporting to the competent environmental authority;
- During the operating period:
  - To the project holder (CNAIR), which will ensure the contracting of the team/teams of experts in biodiversity, data integration and unitary reporting to the competent environmental authority.

The responsibility for the quality of the data collected and reported rests with the experts involved in the monitoring activities and the authors of the monitoring reports. In order to ensure a high quality level of monitoring activities, the project owner must ensure that the terms of reference for the execution of these services include the requirements expressed in this report, as well as that the available budget is sufficient.

All the data and information collected within the monitoring program must be expressed quantitatively, with a clear specification of the measurement units, the size of the investigated surfaces, the applied method and the time periods (including timetables) in which the field activities were carried out. The information must be presented both in the form of raw data (tabular) and in graphic form (representation on maps of all collected data). Each set of data must be accompanied by an interpretation of the results as well as qualitative and quantitative assessments regarding the trends recorded and the prospects for value changes of the monitored indicators.

For the stages of pre-construction, construction and operation of the highway, the beneficiary of the project will carry out the monitoring of environmental factors, including biodiversity, according to the monitoring plan approved by the competent environmental authority. The responsibility for monitoring the quality of the environmental components, including the habitats and species of conservation interest, which constitute conservation objectives of the Natura 2000 sites, existing in the vicinity of the highway route and the expressway, is the responsibility of the project beneficiary, Compania Nationala de Administrare a Infrastructurii Rutiere SA and the contractor based on the contract concluded for the execution of the works.

The monitoring reports will be drawn up by the team/teams designated to carry out the monitoring and will be made available to the Beneficiary and upon request to the interested public and the competent Authority for environmental protection.

The following table presents the proposed monitoring program for the Suceava – DN2H highway and the DN2H expressway - Siret border.

Table no.8-1The proposed monitoring program for the highway and expressway

Natura 2000 site	Conservation objective / Species / Affected habitat / parameter	Form of impact	Reduction measure	The period of implementation of the measure	The location of the measure	Monitoring indicators	Measurement units	Monitoring frequency	Monitoring locations	Duration of monitoring	Degree of effectiveness of the measure	Budget (EUR)	Responsible for monitoring
ROSCI0075 Pătrăuți Forest	*Carabus variolosus, Lucanus cervus, Myotis myotis, Myotis dasycneme, Barbastella barbastellus*	REP	M5, M6, M7	Construction	Along the entire length of the highway and the expressway (in the working lane)	Fauna species inventory: By reference to the pre-construction situation: Changes in the list of habitats and species + presence locations of habitats and species + changes in breeding habitats + changes in the main transit areas.	No. species, no. locations of presence, no. breeding habitats, no. individuals, density	Monthly	In the work fronts	The entire construction stage	No changes compared to the pre-construction situation.	**€75,000.00**	CNAIR, Contractor
			M3, M10, M11, M15, M16, M18, M19, M20	Construction	Along the entire length of the highway and the expressway (in the working lane)	Accidental victims: Species, cause of death, date, location.	No. accidental victims, esp	If appropriate	In the areas of the work fronts and along the entire route between the site organizations and the work fronts.	The entire construction stage	0 accidental casualties	**€7,500.00**	CNAIR, Contractor
			M21	operating	On the whole route	Accidental victims: Species, cause of death, density of individuals (no. of individuals / area) identified.	No. accidental victims, esp	Quarterly	Along the entire route (relevant for ROSCI0075: Between km 4+000 - km 28+000)	The first 3 years after the completion of construction	0 accidental casualties	**€36,000.00**	CNAIR
ROSCI0380 Suceava Liteni River	*Lutra lutra, Myotis myotis*	REP	M3, M10, M11, M15, M16, M18, M19, M20	Construction	Along the entire length of the highway and the expressway (in the working lane)	Accidental victims: Species, cause of death, date, location.	No. accidental victims, esp	If appropriate	In the areas of the work fronts and along the entire route between the site organizations and the work fronts.	The entire construction stage	0 accidental casualties	**€7,500.00**	CNAIR, Contractor
			M21	operating	On the whole route	Accidental victims: Species, cause of death, density of individuals (no. of individuals / area) identified.	No. accidental victims, esp	Quarterly	On the entire route (relevant for ROSCI0380 between km 0+000 - km 4+000).	The first 3 years after the completion of construction	0 accidental casualties	**€12,000.00**	CNAIR
ROSPA0110 Accumulations Rogojesti - Bucecea	All species subject to conservation in ROSPA0110	REP	M5, M6, M7	Construction	Along the entire length of the highway and the expressway (in the working lane)	Fauna species inventory: By reference to the pre-construction situation: Changes in the list of habitats and species + presence locations of habitats and species + changes in breeding habitats + changes in the main transit areas.	No. species, no. locations of presence, no. breeding habitats, no. individuals, density	Monthly	In the work fronts	The entire construction stage	No changes compared to the pre-construction situation.	**€15,000.00**	CNAIR, Contractor
			M3, M10, M11, M15, M16, M18, M19, M20	Construction	Along the entire length of the highway and the expressway (in the working lane)	Accidental victims: Species, cause of death, date, location.	No. accidental victims, esp	If appropriate	In the areas of the work fronts and along the entire route between the site organizations and the work fronts.	The entire construction stage	0 accidental casualties	**€7,500.00**	CNAIR, Contractor
			M21	operating	On the whole route	Accidental victims: Species, cause of death, density of individuals (no. of individuals / area) identified.	No. accidental victims, esp	Quarterly	Along the entire route (relevant for ROSPA0110 between km 53+000 - km 55+700)	The first 3 years after the completion of construction	0 accidental casualties	**€9,000.00**	CNAIR

Natura 2000 site	Conservation objective / Species / Affected habitat / parameter	Form of impact	Reduction measure	The period of implementation of the measure	The location of the measure	Monitoring indicators	Measurement units	Monitoring frequency	Monitoring locations	Duration of monitoring	Degree of effectiveness of the measure	Budget (EUR)	Responsible for monitoring
	Alcedo atthis, Ardea purpurea, Aythya nyroca, Botaurus stellaris, Chlidonias hydribus, Chlidonias niger, Cygnus cygnus, Egretta alba, Egretta garzetta, Gavia arctica, Gavia stellata, Haliaeetus albicilla, Ixobrychus minutus, Mergus albellus, Phalacrocorax pygmeus, Sterna hirundo, Anas acuta , Anas crecca, Anas penelope, Anas platyrhynchos, Anas querquerdula, Anas strepera, Aythya ferina, Aythya fuligula, Aythya marila, Cygnus olor, Fulica atra, Larus cachinnans, Larus ridibundus, Phalacrocorax carbo, Ardea cinerea	AH	M1, M4	Construction	The intersection of the highway and the expressway with the rivers	Water quality: At least pH, conductivity, dissolved oxygen, turbidity (preferably also petroleum product).	pH, concentrations	Monthly (during the periods when works are carried out in the river area)	At least 2 monitoring points upstream and downstream of the intersection with the Siret river	The entire construction stage	No exceeding pre-construction values	**€25,000.00**	CNAIR, Contractor
				operating				Quarterly		The first 3 years after the completion of construction		**€27,500.00**	CNAIR

9 EVALUATION OF THE RESIDUAL IMPACT

For the residual impact analysis, a quantification of the remaining potential impacts after the implementation of the avoidance and reduction measures proposed in this study was carried out. The analysis was carried out for each form of impact separately:

1. **Loss of habitat**

The project will not lead to the loss of habitat surfaces, not intersecting Natura 2000 sites. The measures are not addressed to this form of impact, as it is not relevant in the context of the appropriate assessment for this project.

2. **Alteration of habitats**

In the context of the lack of avoidance and reduction measures, the project can contribute to habitat alteration only by generating (accidental) surface water pollution risks. This risk was addressed by the measures proposed in the study (mainly M4), the risk being significantly reduced.

3. **Fragmentation of habitats**

The project does not cross ecological corridors, and is not able to generate habitat fragmentation or favorable habitats of the species in the analyzed Natura 2000 sites. There is a potential for local migration corridors to be affected, especially for bats, as a result of increased lighting levels on the highway and expressway. This risk is addressed by the proposed measures (M11), the residual impact being considered insignificant.

4. **Disturbance of species activity**

The disturbance of the activity of the species can occur as a result of the increase in the noise level, the increase in the light level and the damage to the food resource. In the case of the present project, the disturbance of the activity of the species may occur in the case of the ROSPA0110 site, as a result of the increase in the noise level in this area. In order to address this form of impact, specific measures were proposed in the EA study (e.g.: the proposal of sound-absorbing panels).

5. **Reduction of the population**

The reduction of population numbers can occur most frequently as a result of the collision with road traffic. The quantification of this form of impact was estimated using a risk zone. This risk area decreases in the context of the placement of the proposed anti-collision and sound-absorbing panels, decreasing to insignificant values. The residual impact analysis was carried out by recalculating the risk area for each type of species analyzed. The following table shows some examples of quantifying the risk of mortality for different species of fauna, in the context without measures to avoid and reduce the impact, respectively with measures to avoid and reduce.

Table no.9-1Residual impact following the implementation of the measures

Natura 2000 site	Habitat / species code	Species	Mortality in the context without measures (No. ind./year)	Mortality in the context with measures (No. ind./year)
ROSCI0075	1324	*Myotis myotis*	55 ind/year	19 ind/year
	1318	*Myotis dasycnema*	16 ind/year	5 ind/year
	1308	*Barbastella barbastellus*	23 ind/year	8 ind/year
ROSPA0110	A229	*Alcedo atthis*	1 ind/year	0 ind.
	A029	*It was burning purple*	1 ind./100 years	0 ind.
	A060	*Aythya nyroca*	1 ind./50 years	0 ind.
	A021	*Botaurus stellaris*	1 ind./30 years	0 ind.
	A082	*Circus cyneus*	1 ind./40 years	0 ind.
	A338	*Lanius collurio*	1 ind. /30 years	0 ind.
	A339	*Lanius minor*	1 ind./40 years	0 ind.
	A125	*The coot attracts*	1 ind./30 years	0 ind.
	A142	*Vanellus vanellus*	1 ind./10 years	0 ind.
ROSCI0380	1355	*Otter otter*	1 ind./10 years	1 ind./50 years

It is important to mention that the insignificant level of the residual impact can be reached only in the context of the implementation of the measures to avoid and reduce the impact proposed in the present study. Any modification of these measures and their implementation method requires the reanalysis of the potential residual impact, in order to determine its significance.

10 METHODS USED TO COLLECT INFORMATION ON POTENTIALLY AFFECTED SPECIES OF COMMUNITY INTEREST

The data on the biodiversity present within the scope of the project, but also in its immediate vicinity, were collected both following visits to the field, being carried out intermittent trips, covering several periods of the year, as well as from the verification of specialized online databases.

10.1 DATA COLLECTION FOR PLANT HABITATS/COMMUNITIES AND FLORA SPECIES

The collection of data in the field for the types of habitats in the project area aimed to identify favorable areas for the species of community interest in the analysed Natura 2000 sites. The project does not cross any Natura 2000 site, but the proposed route passes through areas with various types of vegetation that are preferred by some species of community interest.

The first stage, that of the office study, consisted in consulting the existing data contained in the management plans of the potentially affected sites (if available) and the updated standard forms of the protected natural areas potentially affected by the project. At the same time, scientific articles were analysed that had as their subject the flora and fauna of the areas of interest and data from Romania's reports under the obligation of article 17 of the Habitats Directive.

This information was later supplemented with spatial data, where we benefited from it.

The second stage of data collection included field research, which required multiple trips during the growing seasons. For the analysis of the horizontal structure of plant phytocenosis, the method of linear transects supplemented with the phytocenological survey method was used.

The method of linear transects involves the identification and notation of plant species/plant associations along a line whose length is established according to the complexity of the habitat.

The survey method is based on the notation of species abundance-dominance indices, according to the methodology developed by the Central European Floristic School (Braun-Blanquet), in order to graphically transpose relevant elements for the description of floristic associations.

On the highway route, the critical points identified after the first stage, that of the office study, were analysed, where there would be the possibility of a significant impact. Different areas were traversed and observations through reliefs were arranged to capture all the relevant aspects from the point of view of plant associations.

- The survey includes the list of plant species recorded in the sample area accompanied by the notation of the abundance-dominance index (AD) for each species. The abundance-dominance index is assessed according to the Braun-Blanquet scale, completed by Tüxen and Ellenberg, a scale that includes seven main steps as follows: r = rare or isolated individuals (0.01-0.1%);
- + = rare individuals with very low degree of coverage (0.1-1%);

- 1 = numerous individuals but with low coverage or rare but with high coverage (1-10%);
- 2 = very numerous individuals or covering 10-25% of the sample area;
- 3 = coverage of 25-50% of the sample area, the number of individuals is indifferent;
- 4 = coverage of 50-75% of the sample area, the number of individuals is indifferent;
- 5 = coverage of 75-100% of the sample area, number of individuals regardless.

Field observations are standardized, using field sheets.

Plant species were identified by using specialized works such as Flora of Romania vol. I-XIII (Săvulescu et al., 1952-1976), Illustrated Flora of Romania. Pteridophyta et Spermatophyta (Ciocârlan, 2009), Vascular plants from Romania: illustrated determinant of terrain (Sârbu I., Ştefan N., Oprea A., 2013), Red List of Higher Plants from Romania (Oltean et al., 1994), Red book of vascular plants from Romania (Dihoru, G., & Negrean, G. (2009), Critical list of vascular plants from Romania (Oprea, A., 2005), Red list of extinct, endangered, vulnerable and rare vascular plants from the flora of Romania (Boşcaiu N. Şi et al., 1994). The nomenclature used to name the plant species is in accordance with the current regulations regarding aspects of taxonomy and systematic botany (www.theplantlist.org, www.emplantbase.org). Plant associations and natural habitats were identified by using specialized works such as the Phytocoenoses of Romania (Sanda et al., 2008), the Manual for the interpretation of Natural habitats from the European Union (EUR 28), completed with the national classification of habitats - the habitats of Romania (Doniţă et al., 2005).

The registration of the presence and distribution points was carried out with the help of a GPS receiver, the information on the plant individuals was captured with the help of the camera, all the information being included in the project database.

Data collected in the field were analyzed using ArcGIS Desktop 10.4 software. The processing of the data collected in the field involved the transformation of GPS points and tracks (recorded in the GPS device in the geographic projection system with WGS84 datum) in STEREO 1970, the determination based on the photographs and the collected material of the unidentified species in the field and the compilation of the database final data.

In the images below you can see aspects from the collection of data from the field regarding the vegetation.


Figure no.10-1Aspects during the collection of data from the field regarding the vegetation

10.2 DATA COLLECTION FOR INVERTEBRATES

Visual transects

The principle of the method is to walk along a transect over a fixed distance. The person performing the monitoring moves for a determined period of time in terrestrial habitats, visually detecting individuals or traces of their activity. The data collection methodology was drawn up according to the diurnal visual transect model used mainly for data collection for the Orthoptera, Coleoptera, Odonata and Lepidoptera orders, according to the Synthetic Guide for monitoring invertebrate species of community interest in Romania (Pârvulescu L. et al., 2015). The collection of data on the presence of invertebrate species involved the realization of diurnal visual transects, as well as the identification and thorough investigation of microhabitats favourable to invertebrate species of community interest, but also of other species present in the area. The areas of microhabitat associated with species of community interest reported in the area, forest edges, wet habitats, riverbanks, irrigation canals, etc., were mainly investigated.

Capture with the entomological net on a predetermined transect

This method was used especially for species associated with meadows or those characteristic of tall grassy vegetation and involves moving along a pre-established transect, making "mows" of the vegetation with the help of the entomological net, with the aim of the temporary containment of the individuals. After completing the transect, the net is visually examined and the individuals are subsequently released. Later, the identified species are registered in the application, for the generation of GPS points.

All the observations made were based on data recording (transects and species presence points) using the GPS Locus Map application and on photo captures. The obtained data were processed and entered into an electronic database.

To identify the species of invertebrates that were observed following field research, the Illustrated Determinator Butterflies of Britain and Europe (Haahtela el al., 2019) and the Illustrated Determinator Insects of Britain and Western Europe (Chiney, 2007) were used.

The information collected as a result of field observations was recorded in a database, and later analyzed using the ArcGIS Desktop 10.4 software. GPS waypoints were converted from WGS84 geographic projection to STEREO 1970.

Figure no.10-2Aspects during field data collection on invertebrates

10.3 COLLECTING DATA FOR AMPHIBIANS AND REPTILES

The diurnal aquatic visual transect

Method developed for the assessment of species of amphibians and aquatic reptiles for the determination of which no immobilisation of specimens is required. The specialist systematically searches for the specimens present along a transect arranged parallel to the shore line, over a determined period of time, with the help of a trowel.

The diurnal terrestrial visual transect

Method developed for the identification of terrestrial reptile species. The specialist moves for a determined period of time in terrestrial habitats, visually detecting specimens.

These diurnal transect methods are according to the Synthetic Guide for monitoring reptile and amphibian species in Romania (Török (Zs.) et al., 2013).

The collection of data on fauna species was carried out with the ObsMapp (Android) application from The Observation International Foundation, and for the rest of the points required for the report, the GPS Essentials (Android) application from Schollmeyer Software Engineering was used. Most of the species present in the vicinity of the site were also photographed with the help of a Nikon D850 camera and a Nikon AF-S Nikkor 200-400mm f/4G IF-ED VR II lens.

The information collected from the field was added, processed in a database and analysed using the ArcMap 10.4.1 application. The data analysis consisted in the transformation of the coordinates of the GPS points resulting from the ObsMaps application from the WGS 84 coordinate system to Stereo 70. Also, all the species photographed in the report were identified and entered into the database.


Figure no.10-3Aspects during field data collection of herpetopauna

10.4 DATA COLLECTION FOR ICHTHYOFAUNA

Regarding the investigations of the online databases and specialized literature regarding the presence of fish species in the project area, the investigations focused mainly on the Siret River and the

Moldova River, these being the main bodies of water in the area with natural characteristics, optimal for the presence of ichthyofauna.

The analysis was based on existing data in databases and literature. In general, it was considered that the watercourses intersected by the project have the potential for the presence of all fish species characteristic of the analysis area.

10.5 DATA COLLECTION FOR AVIFAUNA

Given the relatively long length of the project and the variety of habitat types that the project crosses, several monitoring methods were used to obtain a satisfactory quality and quantity of bird data.

Linear transect method

In the case of open areas, with arable land, meadows or river courses, the daily linear transect method was mainly used, according to the *Standard Guide for Monitoring Bird Species of Community Interest in Romania* (Domşa et al., 2014), which consists of traveling a predetermined route with the aim of identifying all individuals and families of species present in the project area, at the time of travel. The transect was traveled by car, where possible, or on foot, with the observer traveling at a low speed to ensure the observation of all individuals present. The advantage of this method is that it can cover a relatively large area of land in a relatively short time.

Fixed point method

For closed, forest-type habitats, but also for agglomerations of aquatic species, the method of observations from a fixed point was used. The method involves the initial establishment of some points in the field where the visibility of the habitat is optimal and later making observations on the avifauna from the predetermined points for a given period of time. The method is especially useful when dealing with a large number of species and/or a large number of individuals.

For each individual or group of individuals, data were noted, such as: the position of the species through a static point using the iObs (iPhone) application, developed by Stichting Observation International, information on behaviour, age, date and time when it was observed the individual. Also, photographs were taken for most of the observations made. The data resulting from the field was then included in a database. Species identifications were made using the ornithological determinant Collins Bird Guide, 2nd edition (Svensson et al., 2011).

The equipment used for the observations consisted of a GPS device (Garmin E-trek 10), optical instruments (VANGUARD 10×42 binoculars, LEICA telescope) and a camera (Nikon D800E with AF-S Nikkor 80-400 mm f/4.5-5.6 G ED telephoto lens).

The information collected from the field was added, processed in a database and analysed using the ArcGIS Pro 2.5.0 application. The data analysis consisted in the transformation of the coordinates of the GPS points resulting from the transects from the WGS 84 coordinate system into Stereo 70, the processing of the photos taken, all the species photographed in the report being identified and entered into a project database.


Figure no.10-4Aspects during transects (left) and fixed point observations (right) for avifauna

The method of passive bioacoustic observations

In addition to the diurnal transects carried out at the site, sound recording devices for avifauna were placed in their agglomeration areas. Recordings took place 90 minutes before and after sunrise, with the same settings being used for sunset.

Sound recording was performed using bioacoustics devices with external microphones (Titley Scientific Anabat Chorus 1.0). The analysis of the collected data consisted in the determination of the registered species with the Kaleidoscope 5.4.8 program and BirdNET-Analyzer, and the identifications were then entered into the project's database.


Figure no.10-5Aspects during the installation of sound recorders for avifauna

10.6MAMMAL DATA COLLECTION

To analyse the presence of mammal species in the project area, the following methods were used, adapted according to the recommendations of the Synthetic Monitoring Guide for mammal species of community interest in Romania, developed by the Institute of Biology in Bucharest:

- For diurnal mammals – diurnal transects to identify tracks, individuals and camera trapping.

- For diurnal mammals – diurnal transects to identify tracks, individuals and camera trapping.
- For chiroptera – ultrasound recordings within dedicated transects and investigations of optimal areas for colonies or individuals (e.g: abandoned buildings, tree hollows);

Diurnal transect method

This method consists in following a predetermined route with the aim of identifying all the individuals and families of species present within the location of the station, at the time of travel. The transect was traversed at a walking pace, with the observer traveling at a low speed to ensure observation of all individuals or tracks present.

For each individual or track, data were noted, such as: the position in the site through a static point with the help of a GPS device (Garmin E-trek 30), information regarding behaviour, age, date and time when the individual was observed. Photographs were also taken for most of the observations made within the project. The data resulting from the field was then included in a database.

The equipment used for the observations consisted of a GPS device (Garmin E-trek 30), optical instruments (Nikon Monarch 10×42 5.5° binoculars) and a camera (Nikon D7500 with AF-S Nikkor 50-500 mm f/4.5-6.3 APO DG OS HSM telephoto lens).

The information collected from the field was added, processed in a database and analysed using the ArcGIS Pro 2.5.0 application. The data analysis consisted in the transformation of the coordinates of the GPS points resulting from the transects from the WGS 84 coordinate system into Stereo 70, the processing of the photos taken, all the species photographed in the report being identified and entered into a project database.

Figure no.10-6Aspects during the collection of field data on mammals by the diurnal transect method

Camera with motion sensor

For this method, recording cameras with a motion sensor (WiFi830 Trap Camera) were used in areas of favourable habitat for fauna in the locations investigated within the project, they record information on the movements of fauna both during the day and at night, being activated by the infrared sensor.

For each individual identified in the resulting images, data such as the position relative to the camera in GPS coordinates were noted, the data being processed in a database and analysed using the ArcGIS Pro 2.5.0 application. The data analysis consisted in transforming the coordinates of the resulting GPS points from transects in the WGS 84 coordinate system in Stereo 70, the processing of the photos taken, all the species photographed in the report being identified and entered into a database of the project.

Figure no.10-7Aspects during the installation of motion sensor cameras for mammals

Passive bioacoustics observations

In order to have a complete picture of the presence of chiropteran species, sound recording devices for bats were used.

Sound recording was performed using bioacoustics devices with external microphones (Titley Scientific Anabat Chorus 1.0). The analysis of the collected data consisted in the determination of the recorded species with the Kaleidoscope 5.4.8 program, and the identifications were then entered into the project's database. Recordings with the Anabat Chorus device took place 90 minutes before and after sunrise, with the same settings being used for sunset.

Figure no.10-8Aspects during the installation of sound recorders for chiroptera

The analysis of the presence of mammals in the project area was carried out based on data and information from specialized literature, as well as online databases.

10.7THE PERSONNEL INVOLVED IN THE DEVELOPMENT OF THE STUDY

The people presented in the following table were part of the team that developed this study.

Table no.10-1The development team of the appropriate assessment study

No. crt.	Name	studied	The main responsibilities
1.	Silvia Borlea	Graduated in Environmental Science, majoring in Ecology and Environmental Protection, Faculty of Biology, University of Bucharest. Master in Applied Geobiology in Natural and Cultural Heritage Conservation, Faculty of Geology and Geophysics, University of Bucharest.	- Checking the quality of the deliverable - Identification and quantification of project effects - Establishing measures - Development of the monitoring program
2.	Răzvan Dumitru	Graduated in Environmental Engineering, Faculty of Land Improvements and Environmental Engineering, University of Agronomic Sciences and Veterinary Medicine Bucharest	- Analysis of project interventions - Modelling of dispersions of potential pollutants and changes in noise level
3.	Ingrid Ioana Butunoi	Graduated in Environmental Science, majoring in Ecology, Faculty of Biology, University of Bucharest. Master in Integrated Management of Natural Capital, Faculty of Biology, University of Bucharest	- Modelling the dispersion of pollutants in the air and the changes in the noise level
4.	Theodore Lupei	Graduated in Meteorology and Hydrology Master in Climatology and Hydrology	- Project database management
5.	Denisa Burcioiu	Graduated in Environmental Science, majoring in Ecology and Environmental Protection, Faculty of Biology, University of Bucharest.	- Description of Natura 2000 sites - Analysis of project interventions in relation to Natura 2000 sites
6.	Cristina – Doinița Răducanu	Graduated in Biology, majoring in Biology, Faculty of Biology, University of Bucharest. Master in Applied Geobiology in Natural and Cultural Heritage Conservation, Faculty of Geology and Geophysics, University of Bucharest.	- Collection, processing and interpretation of data on plants and habitats
7.	Alexandru Ciubotariu	Graduated in the profile and specialization of Ecology and Environmental Protection, Faculty of Biology, "Alexandru Ioan Cuza" University in Iasi Master in Biodiversity Conservation, Faculty of Biology, "Alexandru Ioan Cuza" University in Iasi	- Data collection, processing and interpretation for the avifauna component
8.	Maria Vlad	Graduated in Environmental Science, specialization Environmental Science, Faculty of Natural Sciences and Agricultural Sciences, Ovidius University of Constanta. Master in Biodiversity Conservation, Faculty of Natural Sciences and Agricultural Sciences, Ovidius University of Constanta	- Evaluation of the impact of the project on the Specific Conservation Objectives
9.	Mirabella Perju	Graduated in Environmental Science, Faculty of Sciences, "Lucian Blaga" University Sibiu Master in Environmental Science, Faculty of Sciences, "Lucian Blaga" University Sibiu Doctorate in Industrial Engineering, "Lucian Blaga" University Sibiu	- Evaluation of the impact of the project on the Specific Conservation Objectives - Identification and quantification of project effects

No. crt.	Name	studied	The main responsibilities
10.	Lucian Bean - Matăsaru	Graduated in Ecology, "Alexandru Ioan Cuza" University Iasi Master in General Biology, "Alexandru Ioan Cuza" University Iasi Doctorate in Biology, "Alexandru Ioan Cuza" University Iasi	- Data collection, processing and interpretation for the birds and mammals component
11.	Dragoş - Ştefan Măntoiu	Graduated in Environmental Science, specialization in Environmental Geography, Faculty of Geography, University of Bucharest. Master in Integrated Assessment of the State of the Environment, Faculty of Geography, University of Bucharest. Doctor in Biology, "Emil Racoviță" Speleology Institute, Bucharest.	- Carrying out connectivity analyses for the project
12.	Andrea Badea	Graduated in Biology, majoring in Biology, Faculty of Biology, University of Bucharest. Master in Integrated Management of Natural Capital, Faculty of Biology, University of Bucharest	- Data collection, processing and interpretation for the invertebrate component
13.	Alexandra Doba	Graduate engineer, graduated in the profile and specialization of Environmental Engineering, Faculty of Energy, Polytechnic University of Bucharest.	- Assessment of the impact on the Specific Conservation Objectives - Establishing measures to avoid and reduce the impact
14.	Marius Costin Nistorescu	Graduated in Biology, majoring in Ecology, Faculty of Ecology, Bucharest Ecological University. Master in Systemic Ecology and Ecotechnics, Faculty of Biology, University of Bucharest. Doctor in Ecology, University of Bucharest.	- Assessment of the impact on the Specific Conservation Objectives - Cumulative impact analysis - Checking the quality of the deliverable

11 Conclusions

This document represents the Appropirate Assessment Study regarding the potential effects that the implementation of the project "Suceava DN2H and Siret border DN2H expressway" can generate on the protected natural areas of community interest in its area. The study was developed in order to obtain the Environmental Approval for the investment.

The appropriate assessment study was developed according to the requirements of the Methodological Guide regarding the appropriate assessment of the potential effects of plans or projects on natural areas protected by community interest (Order no. 262/2020 amended by Order no. 1682/2023) and in accordance with the provisions of art. 28 of the Government's Emergency Ordinance no. 57/ 2007 regarding the regime of natural protected areas, conservation of natural habitats, flora and fauna, approved by Law no. 49/ 2011, with subsequent amendments and additions.

From an administrative point of view, the route of this highway is located in Suceava county.

The Suceava DN2H highway and the Siret border expressway DN2H have a length of 56 km. This is part of the Paşcani - Suceava - Siret highway project. The highway will be part of the Bucharest - Ukraine corridor, which will ensure a fast connection between the south of the country via the A7 highway to the north in the Moldova region and to the neighboring country in the north, Ukraine.

The Suceava DN2H highway and the DN2H expressway border Siret does not intersect any Natura 2000 site, but is adjacent to 4 Natura 2000 sites that have the potential to be influenced by its construction: ROSCI0075 Pădurea Pătrăuţi, ROSAC0391 Siretul Mijlociu – Bucecea, ROSPA0110 Accumulations Rogojeşti – Bucecea, ROSCI0380 Suceava Liteni River.

These sites were analyzed in the present study, from the point of view of the impact of the project on their integrity.

The assessment of the impact of the project on the Natura 2000 sites that may be affected was carried out on the basis of the Specific Conservation Objectives established by ANANP for all sites considered in the assessment. The assessment took into account the potential cumulative impact with other large infrastructure projects proposed in the area (including DX5B Suceava – Botoşani, Paşcani – Suceava highway, CF modernization: Ilva Mica – Suceava, CF modernization: Paşcani – Dărmăneşti, DX5B Suceava – Botoşani, CF Paşcani-Dărmăneşti, CF electrification: Darmanesti – Vicşani, etc.).

Following the evaluation, it was concluded that the Suceava DN2H Highway and the Siret border DN2H expressway (in some cases cumulatively with the other projects included in the analysis) are able to generate significant impacts and affect the integrity of the Natura 2000 sites ROSCI0075, ROSCI0380 and ROSPA0110.

Considering the fact that the highway does not intersect Natura 2000 sites, the project will not lead to losses of the surface of the habitats of community interest within the sites or of the favorable habitats of the species of community interest in the sites. A potential risk of altering aquatic habitats

may occur in the event of accidental pollution, but the impact was considered nonsignificant, taking into account its accidental nature and the large distance between the intersection of the highway with rivers that reach the site and the project area.

From the point of view of habitat fragmentation, the main impacts are related to the interruption of some ecological corridor areas by the highway. These were addressed by improving the permeability of the highway, resulting in a project that ensures, in the current configuration, the permeability necessary for the movement of fauna.

A potential disturbance to the activity of bird species may occur in the adjacent area between the project and ROSPA0110, as a result of the increase in the noise level during the construction period and during the operation period. In order to reduce this potential impact, the implementation of sound-absorbing panels were proposed, which will also have a role in reducing the noise level in the area of the localities in the vicinity of the highway and reducing the risk of collision of flying fauna species (invertebrates, bats, birds).

The most important potential form of impact associated with the project is represented by the reduction of fauna populations, which may occur during the construction and operation stages, as a result of the works, the collision with construction site traffic or car traffic. This form of impact can mainly affect mammal species in Natura 2000 sites (including remote sites) and birds. The reduction of population numbers is able to have a significant level on the populations of fauna species and affect the parameters related to the population size of the specific conservation objectives established for the species.

The measures proposed in this study to avoid and reduce the impact cover all the identified forms of impact.

Among the most important measures proposed are a series of sound-absorbing and anti-collision panels, proposed along the highway, in sensitive areas from the point of view of fauna, such as areas adjacent to protected areas or areas where it is possible to move fauna species for feeding. The sound-absorbing panels have the role of reducing the noise level in these sensitive areas for fauna, and the anti-collision panels will reduce the level of impact caused by the collision of birds and chiroptera with road traffic, during the operation period of the project. Measures were also proposed to avoid some traps during the construction of the highway and to enclose it with an additional small fence, aimed at small fauna.

The measures to avoid and reduce the impact have been dimensioned in such a way as to ensure either avoiding the occurrence of impacts or reducing them to an insignificant level. It is estimated that the residual impact will be insignificant for all habitats and species in the analyzed sites. This also assumes that the implementation of the measures will ensure the avoidance of affecting the integrity of the Natura 2000 sites, in the context in which they are implemented in accordance with the requirements of the environmental studies.

The appropriate assessment study identified the need to implement some measures that can ensure the maintenance of an insignificant residual impact. To validate the effectiveness of the avoidance and reduction measures, a monitoring program was proposed that includes provisions for both the construction period and the operation period. The implementation of the monitoring program is

essential to be able to ensure the correct implementation and functionality of the measures to avoid and reduce the impact.

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