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PRESENTATION MEMORY

SUCEAVA HIGHWAY - DN2H and EXPRESS ROAD DN2H - Siret BORDER

Beneficiary

NATIONAL ROAD INFRASTRUCTURE ADMINISTRATION COMPANY (CNAIR) SA

PRESENTATION MEMORANDUM NECESSARY FOR THE ISSUANCE OF THE ENVIRONMENTAL PERMIT

"Suceava - DN2H motorway and DN2H - Siret border Express Road "

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ABBREVIATIONS AND ACRONYMS

ANAR	National Administration of Romanian Waters
CE	Development team
CF	Railroad
CIC	Maintenance and coordination center
CNAIR	Romanian National Company Road Infrastructure Administration
COV	Volatile organic compounds
DC	Communal road
DJ	County Road
DL	Local road
DN	National road
EMEP/EEA	Air pollutant emission inventory guidebook
HG	Government decision
IPPC	Installations that fall under the scope of the Industrial Emissions Directive
ITS	Intelligent transport systems
LEA	Aerial power line
MP	Presentation memorandum
MPGT	Romania's General Transport Master Plan
OUG	Government emergency ordinance
PSD	Short-term parking
PVC	Polyvinyl chloride
RIM	Environmental impact report
SCI	Site of community importance
SPA	Area of special avifaunistic protection
TEM	Trans-European Motorway
TEN-T	Trans-European transport networks
UAT	Territorial Administrative Unit
UE	European Union
UNESCO	United Nations Educational, Scientific and Cultural Organization

ANNEXES

APPENDIX A **Documents**

APPENDIX B **PLANS AND MAPS**

APPENDIX C **IMPACT ASSESSMENT TABLE BASED ON SPECIFIC CONSERVATION OBJECTIVES**

1 PROJECT NAME

"SUCEAVA - DN2H MOTORWAY and DN2H - SIRET BORDER EXPRESS ROAD "

The presentation memorandum is prepared in accordance with Law no. 292/2018, respectively Annex no. 5E "Framework content of the Presentation Memorandum", completed with the information contained in Order 19/2010 for the approval of the Methodological Guide regarding the adequate assessment of the potential effects of plans or projects on natural areas protected by community interest, modified by Order no. 262/2020.

The project falls under Annex no. 1 of Law 292/2018 regarding the assessment of the impact of certain public and private projects on the environment, at point 7, letter b) "Construction of motorways and express roads".

According to the initial evaluation decision, the proposed project does not fall under the provisions of OUG no. 57/2007 regarding the regime of natural protected areas, conservation of natural habitats, flora and fauna, with subsequent amendments and additions.

The proposed project falls under the provisions of art. 48 and art. 54 of the Water Law no. 107/1996, with subsequent amendments and additions.

2 PROJECT OWNER

Name of the investment objective:	**Suceava – DN2H motorway and DN2H – Siret border Express Road**
Objective location and address:	**Suceava county**
Beneficiary of the works:	**CNAIR 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
The designer of the works	**Association SEARCH CORPORATION – EGIS ROMANIA – EGIS INTERNATIONAL** 65, Caderea Bastiliei St, sector 1, Bucharest Phone: 316.40.18, fax: 316.52.71 E-mail:office@searchltd.ro Contact person: Ana-Maria MOLDOVEANU, Design Director
The developer of the Presentation Memorandum	**EPC Environmental Consultancy SRL** Bucharest Registered office address: 16, Nicolae Titulescu st, 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 Director, tel. 0745 084 444; Eng. Alexandra Doba – Technical Director, tel. 0751 129 999

3 DESCRIPTION OF THE PHYSICAL CHARACTERISTICS OF THE ENTIRE PROJECT

3.1 PROJECT SUMMARY

3.1.1 General information

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 the 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 A7 Motorway (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 following figure shows the general location of the project in relation to the localities in the area.

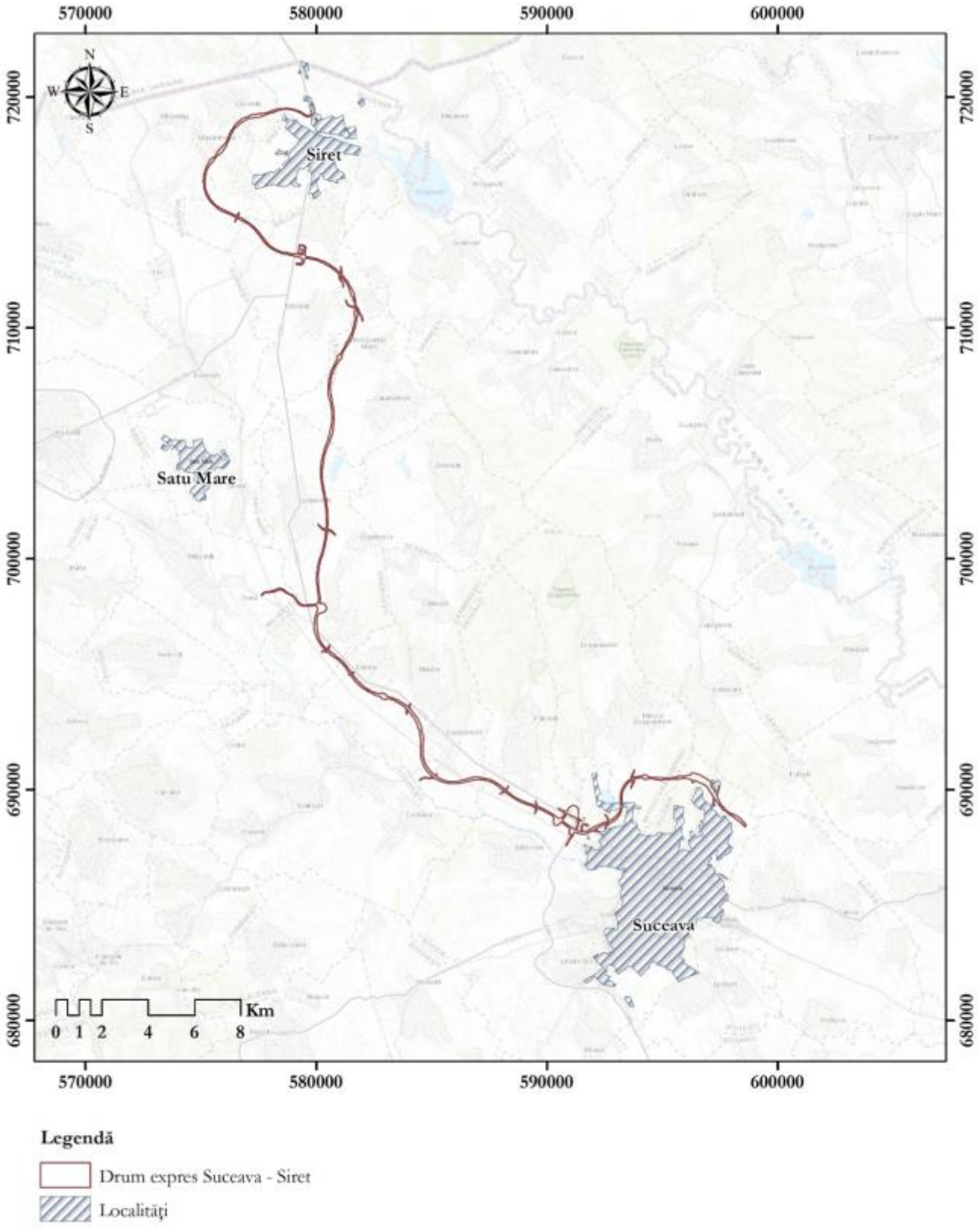

Figure no.3-1Spatial location of the Suceava – DN2H motorway project and DN2H Express Road – Siret border

3.1.2 Route in plan

The Suceava - DN2H motorway and DN2H - Siret Border Express Road project will have a total length of approx. 56 km.

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 speed of design is 120 km/h.

The Suceava - DN2H motorway and DN2H - Siret Border Express Road cross the administrative territory of several UATs, respectively: 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), Milisauti (km 26+375), Calafindeşti (km 33+925), Bălcăuţi (km 39+400), Siret (km 46+240), Muşeniţa (km 48+210), Siret (km 49+475), Museniţa (km 51+150), Siret (km 53+860).

Suceava - DN2H motorway and DN2H - Siret Border Express Road are part of the Pascani - Suceava - Siret road project. The Express Road 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.

It is important to mention that although the presentation of the project in this Presentation Memorandum is carried out taking into account the analyzed project, the assessment of the impact on the environmental components was carried out integrated, considering the cumulative potential impacts of the entire project.

The following figure shows the UAT intersected by the Suceava - DN2H Motorway and DN2H - Siret Border Express Road project.

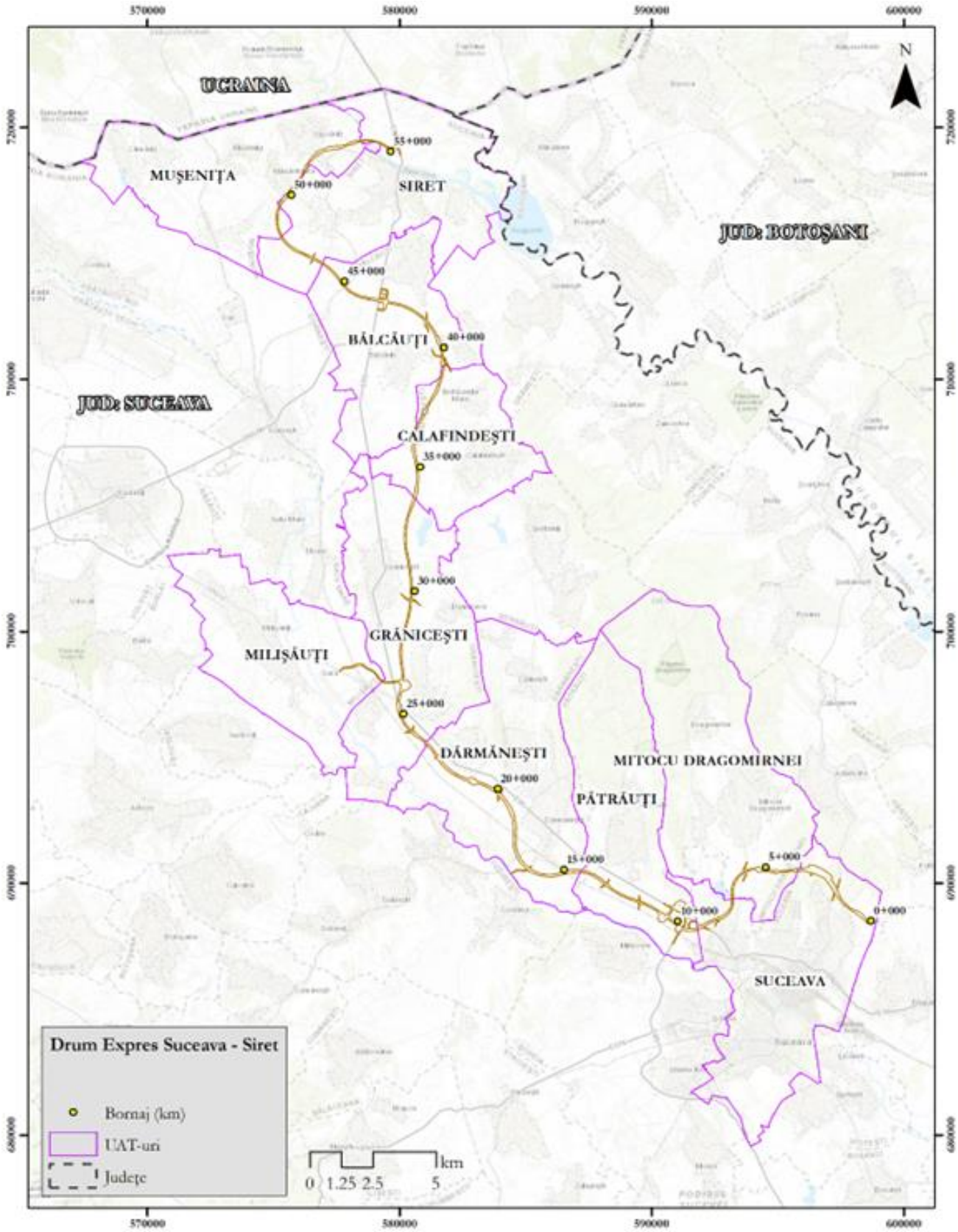

Figure no.3-2 Territorial administrative units intersected by the project

For the Suceava - DN2H Motorway and DN2H - Siret Border Express Road, the characteristics of the design theme were established as follows:

- The proposed type transverse profile is in accordance with the TEM norms for motorways with two traffic lanes in each direction, the median lane, abutments and the emergency lane, and in the case of the transverse profile for the Express Road we find two traffic lanes in each direction , median strip, and abutments;
- The route will be surrounded by a protective fence on both sides;
- Parking and service spaces will be provided along the entire route according to the regulations in force;
- All intersections of the project with other public roads will be designed unevenly;
- Crossing the railways is done through underpasses;
- The necessary hydrotechnical works were designed to ensure the optimal water drainage conditions and the safety of the bridge structures.

3.1.3 Transverse profile

The transversal profile of the motorway has a platform width of 28.00 m from which:

- carriageway (2 lanes per direction): 4 x 3.75 m = 15.00 m;
- median strip (waterproofed): 3.00 m;
- stationary emergency lane, one for each traffic direction: 2 x 2.50 m = 5.00 m;
- abutments: 2 x 0.50 m = 1.00 m;
- guide strips: 4 x 0.50 m=2.00 m;
- space for parapets (outside the platform): 2 x 1.00 m.

The transverse profile of the Express Road has a platform width of 23.50 m from which:

- carriageway (2 lanes per direction): 4 x 3.50 m = 14.00 m;
- median strip (waterproofed): 3.00 m;
- abutments: 2 x 1.50 m = 3.00 m;
- guide strips: 2 x 0.75 m = 1.50 m;
- space for parapets (outside the platform): 2 x 1.00 m = 2.00 m.

The transverse profile of the loops and ramps has the following characteristics:

- for loops and unidirectional ramps: the 6.00 m platform, including 4.00 m roadway and two abutments of 1.00 m each, 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 ramps: the 10.50 m platform, including 7.00 m roadway and two 1.00 m abutments, 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.

3.1.4 Road structure

The road structure was proposed in accordance with the norms regarding the dimensioning of road structures as well as those regarding the asphalt mixtures executed hot, and for its realization the raw materials and natural resources provided in this memorandum will be used.

Thus, the semi-rigid road system, consisting of the following materials, is provided for the motorway and the shoulders at road interchanges:

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

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

- asphalt concrete wear;
- natural aggregates stabilized with cement;
- ballast;
- form layer of stabilized soil.

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

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

3.1.5 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 interchanges were designed on the road route, respectively those in the table below.

Table no.3-1 The interchanges provided for in the project

No. Crt.	Name	Interval provided for the completion of the work		Remarks	Distance to the nearest protected natural area (km)
1.	North Suceava interchange	1+450	2+825	It ensures the connection with DN29A and serves as a bypass option for the Municipality of Suceava	ROSCI0075 Pătrăuti Forest (3.4 km)
2.	Suceava West interchange	8+750	11+000	It ensures the connection with DN2 (E85) and access road to Suceava Municipality	ROSCI0075 Pătrăuti Forest (1.5 km)
3.	Radauti Interchange	25+825	26+625	It provides the connection with DN2 (E85) and DN2H and access road to the site. Rădăuți (Suceava county)	ROSCI0379 Suceava River (2.9 km)
4.	South Siret Interchange	42+850	43+275	It ensures the connection with DN2 (E85) and access road to the place. Siret (Suceava county)	ROSPA0110 Rogojești – Bucecea (4.8 km)
5.	North Siret interchange	55+150	55+700	It ensures the connection with DN2 (E85) between the Siret locality (Suceava county) and the border with Ukraine	ROSPA0110 Rogojești – Bucecea (0.5 km)

3.1.5.1 *Interchange Suceava North (1+800) / intersection DN29A*

This 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 located on the border with the Republic of Moldova, near the town of Lipcani, and through the completion of this interchange, access to the mentioned localities to the new motorway will be ensured.

The Suceava North interchange is "roundabout" type. It ensures all the connections with the neighboring localities 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 dip with Hmax 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 relocate locally. The proposed roundabout will be located at the new elevation of the national road and will cross the express road by means of two passageways with the provision of gauge on the express road. Therefore, the DN29A will remain "level", and the express road will pass unevenly below.

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

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

Table no.3-2 One-way ramps provided within the interchange

Way	Direction	Elements	Slope traversed		Design speed and geometric elements
			ramp	slope	
1.	exit	ramp	X		V=60km/h, R=260m, i=4.5%
	entry	ramp		X	Alignment
2.	exit	ramp	X		V=60km/h, R=260m, i=4.5%
	entry	ramp		X	V=60km/h, R=450m, i=2.5%

3.1.5.2 *Interchange Suceava West (10+600)/ intersection DN2 – DN2P*

This road interchange is proposed at km 10+600 of the motorway, west of the municipality of Suceava, which will ensure the connection with the existing road interchange between DN2 and DN2P by means of a link road.

Connections with both the localities and the existing roads in the area are ensured in the same way as in variant 1 of the road interchange related to the same location (Suceava West) - DN2, DN2P, DN17, DJ209C.

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 Suceava.

The Suceava West interchange is a T-type "trumpet" with an inflow loop. It is found between DN2 and the CFR500 Main Line (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 interchnage area presents a concave connection (the radius that also ensures optical comfort) composed at the entrance of a slope of -1.26% and 0.5% at the exit, at the same time the red line is found in an embankment with Hmax 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 geometric elements respecting this speed).

The modernization and completion of the existing interchange will be minimally invasive, with the preservation of the existing accesses - DN2-DN2P (municipality of Suceava-DN2P), DN2P-DN2 (DN2P - Rădăuți), as well as the passage, 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 ramps, a loop, respectively a succession of loops-ramps related to each path for which the design speed is 60 km/h.

Table no.3-3 One-way rsamps provided within the interchange

Way	Direction	Elements	Slope traversed		Design speed and geometric elements
			ramp	slope	
1.	exit	ramp		X	V=60km/h, R=155m, i=5% (k=2.66)
	entry	ramp	X		V=60km/h, R=155m, i=5% (k=2.66)
2.	exit	ramp		X	V=60km/h, R=230m, i=5%
	entry	ramp	X		V=60km/h, R=125m, i=6% (k=2.78)

The design speeds of the existing interchange ramps (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 ramps are proposed on some connections, respectively those in the table below.

Table no. 3-4 One-way ramps provided within the interchange

Way	Direction	Elements	Links,		Design speed and geometric elements
			Road	CITY	
1.	exit	ramp	DN2	Suceava	V=60km/h, R=155m, i=5% (k=2.66)
	entry	ramp	DN2	Radauti	V=60km/h, R=155m, i=5% (k=2.66)
2.	exit	ramp	DN2	Suceava	V=60km/h, R=230m, i=5%
	entry	ramp	DN2P	Suceava	V=50km/h, R=105m, i=5% (k=2.75)

A sorting sector of approx. 770 m is provided between the entry loop and the exit ramp related to the secon way.

3.1.5.3 *Rădăuţi interchange (km 33+320)*

This interchange is proposed near the town of Romăneşti 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 loop entering the flow, 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 Main line. At the end of this connecting road, a turn (Rint=15m) is provided at the level at the intersection with DN2H. To avoid the turn, a direct ramp is proposed before this (in the direction of DN2H – Rădăuţi motorway) with a design speed of 60 km/h.

By making this connection, the crossing of the CFR500 Main line for the important traffic flow will be uneven (in the current phase, DN2H crosses the Main line 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 Autostrada and the Rădăuţi Ring Road.

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

Table no.3-5 One-way ramps provided within the interchange

Way	Direction	Elements	Slope traversed		Design speed and geometric elements
			ramp	slope	
1.	exit	ramp		X	V=60km/h, R=155m, i=5% (k=2.66)
	entry	ramp		X	V=60km/h, R=230m, i=5%
2.	exit	ramp	X		V=60km/h, R=230m, i=5%
	entry	ramp		X	V=60km/h, R=155m, i=5% (k=2.78)

3.1.5.4 *Siret South interchange (km 51+215)*

This interchange is proposed at the intersection of the Express Road (km 43+200) 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 interchange Siret South (DN2) is of the "simple rhombus" type. Ensures all 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, at the same time the red line is found in a cut with Hmax 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 ramps 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 DN2), four ramps are proposed (V=40km/h, R=90m, i=5% for k=1.79) connected to the exit,

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 ramp alignment. This, through the two roundabouts, will be able to provide service to both ways 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 directions Rădăuți motorway way 2 and Suceava-motorway way 1, two direct ramps with R=90 m and R=140 m respectively are proposed in order to avoid entering the turn in these directions.

Table no.3-6 One-way ramps provided within the interchange

Way	Direction	Elements	Slope traversed		Design speed and geometric elements
			ramp	slope	
1.	exit	ramp		X	V=60km/h, R=155m, i=5% (k=2.66)
	entry	ramp		X	V=60km/h, R=155m, i=5% (k=2.66)
2.	exit	ramp		X	V=60km/h, R=155m, i=5% (k=2.66)
	entry	ramp	X		V=60km/h, R=155m, i=5% (k=2.66)

3.1.5.5 *Siret North interchange (km 61+125)*

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 between the express road and DN2 is ensured by means of a roundabout with Rint=45 m. All the connection relations are satisfied both with DN2 (to the city of Siret and to the border point), as well as with the access to the proposed location of a space of services Type S3 (located on the right side of DN2 with access from the roundabout). The longitudinal profile of the motorway in the interchnage area is found in a slope of -0.65%.

On the Border – Express road direction, in order to avoid entering the roundabout, a ramp with two unidirectional lanes is proposed, the direct ramp with R=150m, V=60km/h, i=5% (k=2.78).

The access from the roundabout to the Express Road is proposed to be made on a single lane.

In the direction of the Express Road- Siret Customs-Porubne/Service space, the access to the roundabout is ensured by lane 1 of the Express Road through the two traffic lanes and, separate from it, for the right turn (towards the town of Siret) a direct ramp is proposed that separates from the Express Road by means of a 75m wedge, an exit sector with L=75m and a deceleration lane with a length of 200m, the geometric elements of this ramp being for V=60km/h (R=150m , i=5% for k=2.78), following that it enters the DN2 flow through a sector with a length of 75 m and a length of up to 35 m.

The following map shows the interchanges included in the project.

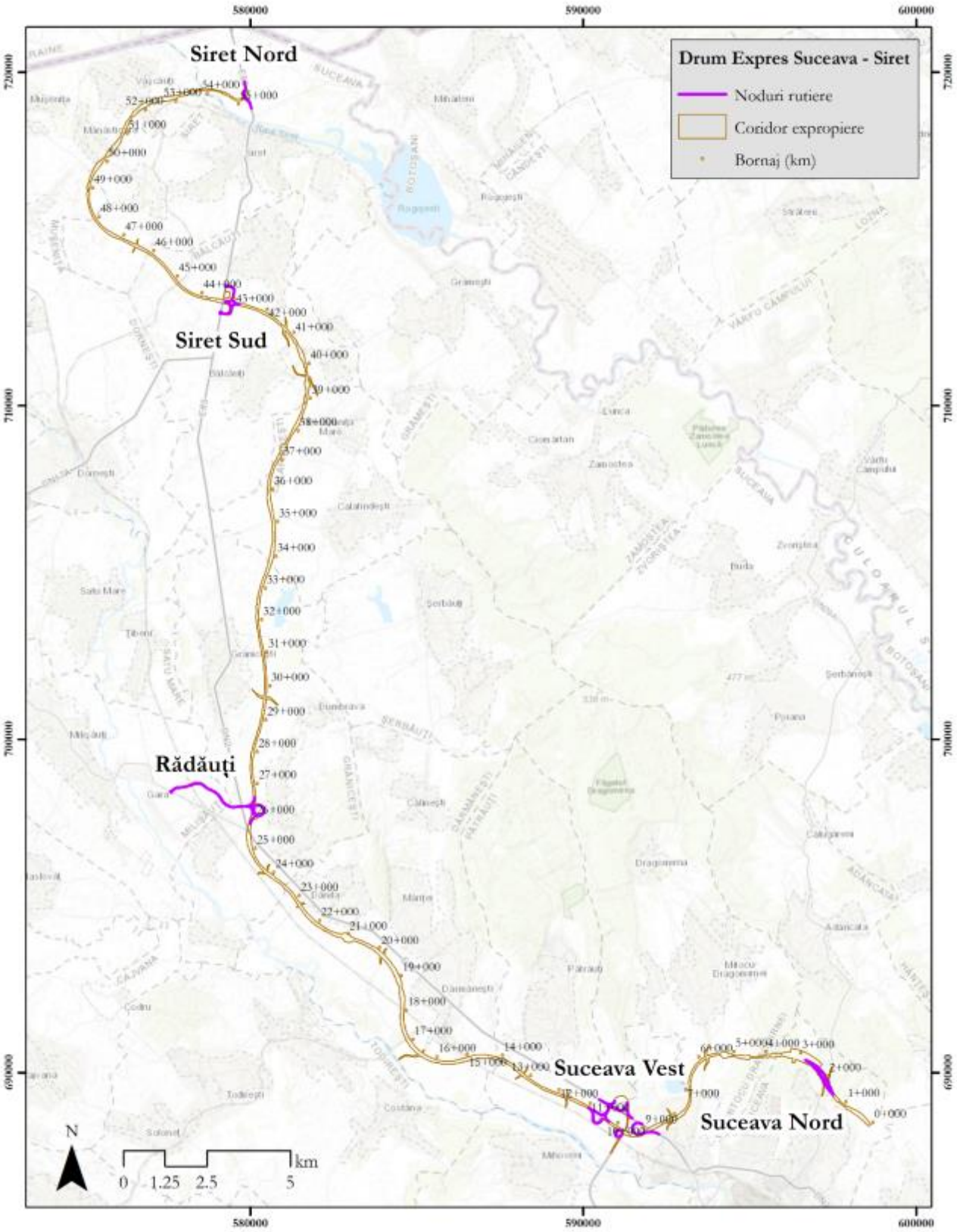

Figure no.3-3 The interchanges proposed for the Suceava – DN2H motorway and DN2H – Siret border Express Road

3.1.6 Works of art

In the following sections, the works of art provided in the analyzed project are presented.

3.1.6.1 *Bridges*

On the Suceava-DN2H motorway route and DN2H-Siret border express road a series of bridges were designed and are presented in the following table.

Table no.3-7 The proposed bridges within the project

No. crt.	Name	Interval provided for the completion of the work		Obstacle	The distance from the nearest protected natural area	
		Km started	Km over		[km]	Name
1.	Bridge over the Mitocul river Km 4+940	4+740	5+140	Mitocul River	3.2 km	ROSCI0075 Pătrăuți Forest
2.	Bridge over the Dragomirna river Km 7+990	7+910	8+070	Dragomirna River	2.5 km	ROSCI0075 Pătrăuți Forest
3.	Bridge over the river Patrăuţeanca Km 11+605	11+530	11+680	Patruteanca River	2 km	ROSCI0075 Pătrăuți Forest
4.	Bridge over the canal Km 12+440	12+360	12+520	Canal and relocated DE	2.1 km	ROSCI0075 Pătrăuți Forest
5.	Bridge over Hatnuta river tributary Km 14+370	14+300	14+440	Hatnuţa river tributary	2.9 km	ROSCI0075 Pătrăuți Forest
6.	Bridge over the Hatnaţiu river and CF 300 Km 14+961	14+850	15+070	Raul Hatnuţa and CF300	3.4 km	ROSCI0075 Pătrăuți Forest
7.	Bridge on DEX over the valley Km 20+315	20+240	20+390	Nameless valley	2.9 km	ROSCI0075 Pătrăuți Forest
8.	Bridge on DEX over the Sărghiesti river Km 22+193	22+110	22+280	The Sârghiesti River	4.2 km	ROSCI0075 Pătrăuți Forest
9.	Bridge over the Dănilă stream Km 22+995	22+920	23+070	Dănila stream	4.6 km	ROSCI0075 Pătrăuți Forest
10.	Bridge over the river Dănilă Km 23+554	23+480	23+630	Danila River	4.9 km	ROSCI0075 Pătrăuți Forest
11.	Bridge over Horaiţ River (Grăniceşti) Km 25+212	25+130	25+290	Raul Horait (Granicesti)	5.6 km	ROSCI0379 Suceava River
12.	Bridge over the river Săcari Km 27+920	27+840	28+000	Săcari River	4.3 km	ROSCI0379 Suceava River
13.	Bridge over the valley Km 28+590	28+510	28+670	Nameless valley	4.4 km	ROSCI0379 Suceava River
14.	Bridge over the river Văduvul Km 30+375	30+300	30+450	The Vaduvul River	4.5 km	ROSCI0379 Suceava River
15.	Bridge over the deep stream Km 30+975	30+900	31+050	Adanc Stream	4.2 km	ROSCI0379 Suceava River
16.	Bridge over the stream of Fântânilor Km 32+535	32+460	32+610	Fantanilor Stream	3.7 km	ROSCI0379 Suceava River
17.	Bridge over the Calina stream Km 33+520	33+440	33+600	Călina Stream	3.7 km	ROSCI0379 Suceava River
18.	Bridge over the Horaiţ River Km 35+120	35+040	35+200	Horaiţ River	3.8 km	ROSCI0379 Suceava River
19.	Bridge over Horaiţ river tributary Km 36+020	35+950	36+090	Horaiţ river tributary	3.8 km	ROSCI0379 Suceava River
20.	Bridge over the Horaiţ river Km 36+575	36+500	36+650	Horaiţ River	4.2 km	ROSCI0379 Suceava River
21.	Bridge over the Rudeşti stream Km 42+100	42+020	42+180	Rudeşti stream	4.5 km	ROSPA0110 Accumulations Rogojesti - Bucecea

No. crt.	Name	Interval provided for the completion of the work		Obstacle	The distance from the nearest protected natural area	
		Km started	Km over		[km]	Name
22.	Bridge over the Balcauti stream Km 43+750	43+610	43+890	Bălcăuţi Stream and DL (Negostina village - Dornești commune)	4.8 km	ROSCI0379 Suceava River
23.	Bridge over the Siret river Km 54+030	53+490	54+570	DL (Văscăuti village - Siret); Siret river	1.2 km	ROSPA0110 Accumulations Rogojesti - Bucecea
24.	Bridge over the Siret stream Km 55+115	55+040	55+190	Siret stream	0.8 km	ROSPA0110 Accumulations Rogojesti - Bucecea
25.	Bridge on Br. 2 Km 2+985 (Km br.) over the Horoit river (Interchange3-DN2-DN2H)	2+910	3+060	Horait River	3.4 km	ROSCI0075 Pătrăuţi Forest
26.	Bridge on Br.2 Km 3+466 (Km br.) over the Horoit river (Interchange3-DN2-DN2H)	3+400	3+540	Horait River	3.2 km	ROSCI0075 Pătrăuţi Forest

3.1.6.2 *Passages*

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

Table no.3-8 The passages proposed in the project

No. crt.	Name	Extended interval provided for the completion of the work		Obstacle	The distance from the nearest protected natural area	
		km start	end km		[km]	Name
1.	Passage over DC57 Km 8+120	8+050	8+190	Relocation Lipoveni Street (DC 57)	2.4 km	ROSCI0075 Pătrăuţi Forest
2.	Passage over VO 2P Km 9+690	9+610	9+770	VO 2P (Suceava Belt)	2.3 km	ROSCI0075 Pătrăuţi Forest
3.	Passage over DL Km 11+700	11+630	11+770	DL relocation (com Pătrăuţi)	2 km	ROSCI0075 Pătrăuţi Forest
4.	Passage over DE km 14+070	14+000	14+140	Relocation OF	2.6 km	ROSCI0075 Pătrăuţi Forest
5.	Passage over DJ209D Km 16+495	16+420	16+570	DJ209D	4 km	ROSCI0075 Pătrăuţi Forest
6.	Passage over CF 513 Km 17+130	17+050	17+210	DE and CF 513 Darmăneşti-Gura Humorului	5.2 km	ROSCI0075 Pătrăuţi Forest
7.	Passage over DE Km 17+550	17+480	17+620	Exploitation road	3 km	ROSCI0075 Pătrăuţi Forest
8.	Passage over CF 500 Km 18+030	17+950	18+110	CF500 bus	4 km	ROSCI0075 Pătrăuţi Forest
9.	Passage over DL Km 21+950	21+9880	22+020	DL (Sârghiesti village - Măriţei village)	4 km	ROSCI0075 Pătrăuţi Forest
10.	Passage over DC38C Km 22+770	22+700	22+840	DC38C (Dănila village)	4.6 km	ROSCI0075 Pătrăuţi Forest
11.	Passage over DC40B Km 24+200	24+130	24+270	DC 40B (Iacobeşti village)	5.4 km	ROSCI0075 Pătrăuţi Forest
12.	Passage over DN2H and DN2 Km 25+555	25+460	25+650	DN 2H and DN2	6 km	ROSCI0075 Pătrăuţi Forest
13.	Passage over DC39 Km 35+063	34+990	35+130	DC 39 (Calafindeşti commune - DN2)	3.8 km	ROSCI0379 Suceava River

No. crt.	Name	Extended interval provided for the completion of the work		Obstacle	The distance from the nearest protected natural area	
		km start	end km		[km]	Name
14.	Passage over CF 518 Siret - Domneşti Km 44+817	44+730	44+900	CF 518 (Dornesti - Siret) - closed	5.8 km	ROSCI0379 Suceava River
15.	Passage for wildlife crossing Km 51+000	50+930	51+070	-	3.8 km	ROSPA0110 Accumulations Rogojesti - Bucecea
16.	Passage on DE over Motorway Km 0+250	0+190	0+310	Suceava - Siret motorway	4.7 km	ROSCI0380 Suceava Liţeni River
17.	Passage on DJ208D over Motorway Km 5+810	5+750	5+870	Suceava - Siret motorway	2.3 km	ROSCI0075 Pătrăuţi Forest
18.	Passage on DN2 over DEX Km 8+833.20	8+770	8+900	Suceava - Siret motorway	2.4 km	ROSCI0075 Pătrăuţi Forest
19.	Passage on DE over Motorway Km 13+220	13+160	13+280	Suceava - Siret motorway	3 km	ROSCI0075 Pătrăuţi Forest
20.	Passage on the DL over the Motorway Km 19+790	19+730	19+850	Suceava - Siret motorway	2.6 km	ROSCI0075 Pătrăuţi Forest
21.	Passage on DC 40C over DEX Km 29+650	29+590	29+710	Express Road Suceava - Siret	4.6 km	ROSCI0379 Suceava River
22.	Passage on DJ178B over DEX Km 31+520	31+460	31+580	Express Road Suceava - Siret	3.9 km	ROSCI0379 Suceava River
23.	Passage on DC35 over DEX Km 40+473.10	40+410	40+540	Express Road Suceava - Siret	4.3 km	ROSCI0075 Pătrăuţi Forest
24.	Passage on DJ209D over DEX Km 41+250.35	41+190	41+320	Express Road Suceava - Siret	4 km	ROSPA0110 Accumulations Rogojesti - Bucecea
25.	Passage on DE over DEX Km 46+530	46+470	46+590	Express Road Suceava - Siret	3.1	ROSCI0379 Suceava River
26.	Passage on DJ 291A over DEX Km 49+813.65	49+750	49+880	Express Road Suceava - Siret	3.1 km	ROSCI0379 Suceava River
27.	Passage on DL over DEX Km 50+325.35	50+260	50+400	Express Road Suceava - Siret	4.2 km	ROSPA0110 Accumulations Rogojesti - Bucecea
28.	Passage on DC 52 over DEX Km 51+878.36	51+810	51+940	Express Road Suceava - Siret	3.3 km	ROSPA0110 Accumulations Rogojeşti-Bucecea
29.	Passage on br. DN2 Km 55+203.22 (Interchange 5 – Siret Nord)	55+140	55+270	DEX Suceava - Siret	0.8 km	ROSPA0110 Accumulations Rogojeşti-Bucecea
30.	Passage on DN29A (detour) over the Motorway Km 1+962 (Interchange 2 DN2-DN2P)	1+900	2+030	Suceava - Siret motorway	4.3 km	ROSCI0075 Pătrăuţi Forest
31.	Passage on br. 10 (Interchange DN2-DN2P) over the Motorway Km 10+451.36	10+390	10+520	Suceava - Siret motorway	2 km	ROSCI0075 Pătrăuţi Forest
32.	Passage on Br.10 Km13+460.37 (km br.) over DN2 (Interchange 2 - DN2 - DN2P)	13+390	13+540	DN2	2.2 km	ROSCI0075 Pătrăuţi Forest
33.	Passage br. 2 over the Motorway Km 26+357.65 (Nod 3 DN2-DN2H)	26+290	26+420	Suceava - Siret motorway	5 km	ROSCI0379 Suceava River
34.	Passage br.2 Km 2+463 (km br.) over DN2 (Interchange 3 DN2-DN2H)	2+380	2+540	DN 2 (E85)	4.7 km	ROSCI0379 Suceava River
35.	Passage on Br.2 Km 0+625 (Km br.) over CF 500, (Interchange3-DN2-DN2H)	0+540	0+710	CF 500 Main line	4.4 km	ROSCI0380 Suceava Liteni River
36.	Passage on Br.2 Km 1+960 (Km br.) over the canal and relocated DL (Nod3-DN2-DN2H)	1+900	2+020	Canal and DL relocated	4.2 km	ROSCI0075 Pătrăuţi Forest

No. crt.	Name	Extended interval provided for the completion of the work		Obstacle	The distance from the nearest protected natural area	
		km start	end km		[km]	Name
37.	Passage on DN 2 over DEX Km 43+320 (Nod 4 Siret Sud)	43+260	43+380	Express Road Suceava - Siret	5.5 km	ROSPA0110 Accumulations Rogojeşti-Bucecea

3.1.6.3 *Viaducts*

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

Table no.3-9 Viaducts proposed within the project

No. crt.	Name	Interval provided for the completion of the work		Obstacle		
		km start	end km		[km]	Name
1.	Viaduct Km 1+035	0+790	1+280	AdancataValley - Suceava; DJ208T	4.6 km	ROSCI0380 Suceava Liteni River
2.	Viaduct Km 4+255	3+890	4+620	DE and Mitoc 2 Lake channel	3.6 km	ROSCI0075 ROSCI0075 Pătrăuți Forest
3.	Viaduct Km 38+840	38+720	38+960	Nameless valley	3.2 km	ROSCI0075 ROSCI0075 Pătrăuți Forest
4.	Viaduct Km 39+790	39+570	40+010	Relocation DJ 209D and Nameless Valley	3.6 km	ROSCI0075 ROSCI0075 Pătrăuți Forest
5.	Viaduct Km 48+910	48+770	49+050	Nameless valley	2.5 km	ROSCI0379 Suceava River

3.1.6.4 *Culverts*

The following table shows the culverts provided for the Suceava - DN2H motorway project and DN2H-Siret border express road.

Table no.3-10 Coffered culverts provided on the motorway/express road

No. crt.	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)
			km start	end km	
1	2	2	1+495	1+505	4.6 km - ROSCI0075 Pătrăuți Forest
2	2	2	5+435	5+445	2.7 km - ROSCI0075 Pătrăuți Forest
3	2	2	5+995	6+005	2.2 km - ROSCI0075 Pătrăuți Forest
4	2	2	6+100	6+110	2.1 km - ROSCI0075 Pătrăuți Forest
5	2	2	6+745	6+755	2.1 km - ROSCI0075 Pătrăuți Forest
6	2	2	6+997	7+007	2.2 km - ROSCI0075 Pătrăuți Forest
7	2	2	7+822	7+832	2.5 km - ROSCI0075 Pătrăuți Forest
8	2	2	8+195	8+205	2.4 km - ROSCI0075 Pătrăuți Forest
9	2	2	9+300	9+310	2.5 km - ROSCI0075 Pătrăuți Forest
10	2	2	9+995	10+005	2.2 km - ROSCI0075 Pătrăuți Forest
11	2	2	10+195	10+205	2.1 km - ROSCI0075 Pătrăuți Forest
12	2	2	10+428	10+438	2 km - ROSCI0075 Pătrăuți Forest
13	2	2	12+435	12+445	2 km - ROSCI0075 Pătrăuți Forest
14	2	2	12+654	12+664	2.1 km - ROSCI0075 Pătrăuți Forest
15	2	2	12+924	12+934	2.1 km - ROSCI0075 Pătrăuți Forest
16	2	2	14+055	14+065	2.6 km - ROSCI0075 Pătrăuți Forest
17	2	2	15+245	15+255	3.2 km - ROSCI0075 Pătrăuți Forest
18	2	2	15+807	15+817	3.7 km - ROSCI0075 Pătrăuți Forest
19	2	2	16+286	16+296	3.9 km - ROSCI0075 Pătrăuți Forest

No. crt.	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)
			km start	end km	
20	2	2	16+645	16+655	3.8 km - ROSCI0075 Pătrăuți Forest
21	2	2	16+915	16+925	3.7 km - ROSCI0075 Pătrăuți Forest
22	2	2	17+395	17+405	3.5 km - ROSCI0075 Pătrăuți Forest
2. 3	2	2	18+272	18+282	2.8 km - ROSCI0075 Pătrăuți Forest
24	2	2	21+395	21+405	2.8 km - ROSCI0075 Pătrăuți Forest
25	2	2	21+555	21+565	2.9 km - ROSCI0075 Pătrăuți Forest
26	2	2	21+803	21+813	4 km - ROSCI0075 Pătrăuți Forest
27	2	2	22+322	22+332	4.3 km ROSCI0075 Pătrăuți Forest
28	2	2	23+670	23+680	5 km - ROSCI0075 Pătrăuți Forest
29	2	2	24+045	24+055	5.3 km - ROSCI0075 Pătrăuți Forest
30	2	2	24+400	24+410	5.5 km - ROSCI0075 Pătrăuți Forest
31	2	2	24+695	24+705	5.7 km - ROSCI0075 Pătrăuți Forest
32	2	2	24+995	25+005	5.7 km - ROSCI0379 Suceava River
33	2	2	25+645	25+655	5.4 km - ROSCI0379 Suceava River
34	2	2	25+920	25+930	5.2 km - ROSCI0379 Suceava River
35	2	2	26+050	26+060	5.1 km - ROSCI0379 Suceava River
36	2	2	26+186	26+196	5.1 km - ROSCI0379 Suceava River
37	2	2	27+070	27+080	4.6 km - ROSCI0379 Suceava River
38	2	2	27+285	27+295	4.6 km - ROSCI0379 Suceava River
39	2	2	27+492	27+502	4.4 km - ROSCI0379 Suceava River
40	2	2	27+735	27+745	4.4 km - ROSCI0379 Suceava River
41	2	2	28+733	28+743	4.4 km - ROSCI0379 Suceava River
42	2	2	28+945	28+955	4.5 km - ROSCI0379 Suceava River
43	2	2	29+170	29+180	4.6 km - ROSCI0379 Suceava River
44	2	2	29+533	29+543	4.6 km ROSCI0379 Suceava River
45	2	2	29+645	29+655	4.6 km - ROSCI0379 Suceava River
46	2	2	29+925	29+935	4.6 km - ROSCI0379 Suceava River
47	2	2	30+115	30+125	4.7 km - ROSCI0379 Suceava River
48	2	2	31+320	31+330	3,9 km - RONPA0751 Fânaţele seculare de la Calafindeşti
49	2	2	31+655	31+665	3,6 km - RONPA0751 Fânaţele seculare de la Calafindeşti
50	2	2	32+245	32+255	3,1 km - RONPA0751 Fânaţele seculare de la Calafindeşti
51	2	2	32+955	32+965	2,4 km - RONPA0751 Fânaţele seculare de la Calafindeşti
52	2	2	35+015	35+025	1 km - RONPA0751 Fânaţele seculare de la Calafindeşti
53	2	2	35+480	35+490	0,9 km - RONPA0751 Fânaţele seculare de la Calafindeşti
54	2	2	36+570	36+580	1,2 km - RONPA0751 Fânaţele seculare de la Calafindeşti
55	2	2	37+732	37+742	1,9 km - RONPA0751 Fânaţele seculare de la Calafindeşti
56	2	2	38+095	38+105	2,1 km - RONPA0751 Fânaţele seculare de la Calafindeşti
57	2	2	38+570	38+580	2,6 km - RONPA0751 Fânaţele seculare de la Calafindeşti
58	2	2	40+745	40+755	4.4 km - ROSCI0075 Pătrăuți Forest
59	2	2	41+702	41+712	4.3 km -ROSPA0110 Accumulations Rogojești-Bucecea
60	2	2	42+715	42+725	4.9 km -ROSPA0110 Accumulations Rogojești-Bucecea
61	2	2	44+117	44+127	4.5 km - ROSCI0379 Suceava River
62	2	2	47+045	47+055	2.8 km - ROSCI0379 Suceava River
63	2	2	47+385	47+395	2.6 km - ROSCI0379 Suceava River
64	2	2	47+936	47+946	2.3 km - ROSCI0379 Suceava River
65	2	2	50+070	50+080	3.3 km - ROSCI0379 Suceava River
66	2	2	51+270	51+280	3.7 km -ROSPA0110 Accumulations Rogojești-Bucecea
67	2	2	51+470	51+480	3.6 km -ROSPA0110 Accumulations Rogojești-Bucecea

Table no.3-11 Culverts provided at interchanges

No. crt.	Section	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)
				km start	end km	
Interchange Suceava West						
1	Way 2 exit towards DN2 - Mun. Suceava	2	2	0+195	0+205	4.3 km - ROSCI0380 Suceava Liteni River
2	Way 1 exit towards DN2 - Mun. Suceava	2	2	0+220	0+230	4.3 km - ROSCI0380 Suceava Liteni River
3	Entrance Route 2 from DN2P - Siret	2	2	0+095	0+105	4.3 km - ROSCI0380 Suceava Liteni River
4				0+415	0+425	4.4 km - ROSCI0380 Suceava Liteni River
5	Exit Way 2 towards DN2P	2	2	0+175	0+185	4.3 km - ROSCI0380 Suceava Liteni River
6				0+255	0+265	4.3 km - ROSCI0380 Suceava Liteni River
7	Exit from DN2P to DN2 - Siret	2	2	0+220	0+230	4.3 km - ROSCI0380 Suceava Liteni River
8	Entrance Way 1 from DN2P - Siret	2	2	0+459	0+469	4.4 km - ROSCI0380 Suceava Liteni River
9	Entrance Way 2 from DN2P	2	2	0+245	0+255	4.3 km - ROSCI0380 Suceava Liteni River
10	Exit Way 1 and 2 towards DN2 Siret	2	2	0+145	0+155	4.3 km - - ROSCI0380 Suceava Liteni River
11				0+345	0+355	4.3 km - ROSCI0380 Suceava Liteni River
12	Exit Way 1 towards DN2 and DN2P	2	2	0+245	0+255	4.3 km - ROSCI0380 Suceava Liteni River
Interchange Radauti						
13	Exit Way 2	2	2	0+175	0+185	5.3 km -ROSPA0110 Accumulations Rogojești-Bucecea
14	Entrance Way 2	2	2	0+235	0+245	5.3 km -ROSPA0110 Accumulations Rogojești-Bucecea
15	Exit Way 1	2	2	0+170	0+180	5.3 km -ROSPA0110 Accumulations Rogojești-Bucecea
16	Connection road	2	2	0+140	0+150	5.3 km -ROSPA0110 Accumulations Rogojești-Bucecea
17				1+245	1+255	5.3 km -ROSPA0110 Accumulations Rogojești-Bucecea
18		2	2	1+965	1+975	5.5 km -ROSPA0110 Accumulations Rogojești-Bucecea
Siret South interchange						
19	Entrance Way 2	2	2	0+015	0+025	0.8 km -ROSPA0110 Accumulations Rogojești-Bucecea
20				0+505	0+515	0.6 km -ROSPA0110 Accumulations Rogojești-Bucecea
21	Exit Way 1	2	2	0+235	0+245	0.7 km -ROSPA0110 Accumulations Rogojești-Bucecea
22				0+295	0+305	0.7 km -ROSPA0110 Accumulations Rogojești-Bucecea
2. 3				0+585	0+595	0.5 km -ROSPA0110 Accumulations Rogojești-Bucecea
Siret North interchange						
24	Crossing ramp DX Porubne Customs – Siret municipality	2	2	0+195	0+205	0.9 km -ROSPA0110 Accumulations Rogojești-Bucecea
25		2	2	0+655	0+665	1.3 km -ROSPA0110 Accumulations Rogojești-Bucecea

Table no.3-12 Coffered culverts provided for the relocation of local roads

No. crt.	Name	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)
				km start	end km	
1	Relocation DJ208D (Km 5+810)	2	2	0+145	0+155	4.3 km - ROSCI0380 Suceava Liteni River
2				0+700	0+710	4.4 km - ROSCI0380 Suceava Liteni River
3	Relocation Str. Lipoveni (KM 8+120)	2	2	0+295	0+305	4.3 km - ROSCI0380 Suceava Liteni River
4				0+425	0+435	4.3 - ROSCI0380 Suceava Liteni River
5	Relocation DJ209D (KM 39+650)	2	2	0+575	0+585	4.5 km - ROSCI0380 Suceava Liteni River
6	Relocation DJ209D (KM 41+250)	2	2	0+464	0+474	4.5 km - ROSCI0380 Suceava Liteni River

Table no.3-13 Culverts provided on maintenance roads

No. crt.	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)
			km start	end km	
1	2	2	1+490	1+510	4.6 km - ROSCI0075 Pătrăuți Forest
2	2	2	5+430	5+450	2.7 km - ROSCI0075 Pătrăuți Forest
3	2	2	5+990	6+010	2.2 km - ROSCI0075 Pătrăuți Forest
4	2	2	6+095	6+115	2.2 km - ROSCI0075 Pătrăuți Forest
5	2	2	6+740	6+760	2.1 km - ROSCI0075 Pătrăuți Forest
6	2	2	6+992	7+012	2.1 km - ROSCI0075 Pătrăuți Forest
7	2	2	7+817	7+837	2.5 km - ROSCI0075 Pătrăuți Forest
8	2	2	8+190	8+210	2.6 km - ROSCI0075 Pătrăuți Forest
9	2	2	9+295	9+315	2.5 km - ROSCI0075 Pătrăuți Forest
10	2	2	9+990	10+010	2.2 km - ROSCI0075 Pătrăuți Forest
11	2	2	10+190	10+210	2.2 km - ROSCI0075 Pătrăuți Forest
12	2	2	10+423	10+443	2 km - ROSCI0075 Pătrăuți Forest
13	2	2	12+430	12+450	2 km - ROSCI0075 Pătrăuți Forest
14	2	2	12+649	12+669	2 km - ROSCI0075 Pătrăuți Forest
15	2	2	12+919	12+939	2.1 km - ROSCI0075 Pătrăuți Forest
16	2	2	14+050	14+070	2.6 km - ROSCI0075 Pătrăuți Forest
17	2	2	15+240	15+260	3,3 - ROSCI0075 Pătrăuți Forest
18	2	2	15+802	15+822	3.7 km - ROSCI0075 Pătrăuți Forest
19	2	2	16+281	16+301	3.9 - ROSCI0075 Pătrăuți Forest
20	2	2	16+640	16+660	4.1 km - ROSCI0075 Pătrăuți Forest
21	2	2	16+910	16+930	4.1 km - ROSCI0075 Pătrăuți Forest
22	2	2	17+390	17+410	4.1 km - ROSCI0075 Pătrăuți Forest
2. 3	2	2	18+267	18+287	3.9 km - ROSCI0075 Pătrăuți Forest
24	2	2	21+390	21+410	3.7 - ROSCI0075 Pătrăuți Forest
25	2	2	21+550	21+570	2.9 km - ROSCI0075 Pătrăuți Forest
26	2	2	21+798	21+818	4 km - ROSCI0075 Pătrăuți Forest
27	2	2	22+317	22+337	4.3 km ROSCI0075 Pătrăuți Forest
28	2	2	23+665	23+685	5 km - ROSCI0075 Pătrăuți Forest
29	2	2	24+040	24+060	5.3 km - ROSCI0075 Pătrăuți Forest
30	2	2	24+395	24+415	5.5 km - ROSCI0075 Pătrăuți Forest
31	2	2	24+690	24+710	5.7 km - ROSCI0075 Pătrăuți Forest
32	2	2	24+990	25+010	5.7 km - ROSCI0379 Suceava River
33	2	2	25+640	25+660	5.4 km - ROSCI0379 Suceava River
34	2	2	25+915	25+935	5.1 km - ROSCI0379 Suceava River
35	2	2	26+045	26+065	5.1 km - ROSCI0379 Suceava River
36	2	2	26+181	26+201	5.1 km - ROSCI0379 Suceava River
37	2	2	27+065	27+085	4.6 km - ROSCI0379 Suceava River
38	2	2	27+280	27+300	4.6 km - ROSCI0379 Suceava River

No. crt.	Width (m)	Height (m)	Interval provided for the completion of the work		Distance to the nearest protected natural area (km)
			km start	end km	
39	2	2	27+487	27+507	4.4 km - ROSCI0379 Suceava River
40	2	2	27+730	27+750	4.4 km - ROSCI0379 Suceava River
41	2	2	28+728	28+748	4.4 km - ROSCI0379 Suceava River
42	2	2	28+940	28+960	4.5 km - ROSCI0379 Suceava River
43	2	2	29+165	29+185	4.6 km - ROSCI0379 Suceava River
44	2	2	29+528	29+548	4.6 km ROSCI0379 Suceava River
45	2	2	29+640	29+660	4.6 km ROSCI0379 Suceava River
46	2	2	29+920	29+940	4.6 km ROSCI0379 Suceava River
47	2	2	30+110	30+130	4.7 km - ROSCI0379 Suceava River
48	2	2	31+315	31+335	3,9 km - RONPA0751 Fânaţele seculare de la Calafindeşti
49	2	2	31+650	31+670	3,6 km - RONPA0751 Fânaţele seculare de la Calafindeşti
50	2	2	32+240	32+260	3,1 km - RONPA0751 Fânaţele seculare de la Calafindeşti
51	2	2	32+950	32+970	2,4 km - RONPA0751 Fânaţele seculare de la Calafindeşti
52	2	2	35+010	35+030	1 km - RONPA0751 Fânaţele seculare de la Calafindeşti
53	2	2	35+475	35+495	0,9 km - RONPA0751 Fânaţele seculare de la Calafindeşti
54	2	2	36+565	36+585	1,2 km - RONPA0751 Fânaţele seculare de la Calafindeşti
55	2	2	37+727	37+747	1,9 km - RONPA0751 Fânaţele seculare de la Calafindeşti
56	2	2	38+090	38+110	2,1 km - RONPA0751 Fânaţele seculare de la Calafindeşti
57	2	2	38+565	38+585	2,6 km - RONPA0751 Fânaţele seculare de la Calafindeşti
58	2	2	40+740	40+760	4.4 km - ROSCI0075 Pătrăuţi Forest
59	2	2	41+697	41+717	4.3 km -ROSPA0110 Accumulations Rogojești-Bucecea
60	2	2	42+710	42+730	4.9 km -ROSPA0110 Accumulations Rogojești-Bucecea
61	2	2	44+112	44+132	4.5 km - ROSCI0379 Suceava River
62	2	2	47+040	47+060	2.8 km - ROSCI0379 Suceava River
63	2	2	47+380	47+400	2.6 km - ROSCI0379 Suceava River
64	2	2	47+931	47+951	2.3 km - ROSCI0379 Suceava River
65	2	2	50+065	50+085	3.3 km - ROSCI0379 Suceava River
66	2	2	51+265	51+285	3.7 km -ROSPA0110 Accumulations Rogojești-Bucecea
67	2	2	51+465	51+485	3.6 km -ROSPA0110 Accumulations Rogojești-Bucecea

3.1.7 Motorway facilities

For the motorway Suceava-DN2H and the Express Road DN2H-Siret border, the following facilities were proposed:

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

These facilities will be carried out in accordance with the provisions of the Normative 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 optimal location with respect to the existing networks (water supply and sewerage networks, electrical networks, telephone networks, common road networks, etc.) was followed.

The table below shows the positions of these facilities.

Table no.3-10 The locations of the proposed facilities

No. crt.	Section	Name	Location	Position km	Distance to the nearest protected natural area (km)
1.	Suceava Siret border	Short-term parking	Left /Right	5+100-5+450	ROSCI0075 Pătrăuți Forest (approx. 2.7 km)
2.		Service Space Type S1	Left	20+730-21+170	ROSCI0075 Pătrăuți Forest (approx. 3.2 km)
3.		Service Space Type S1	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)

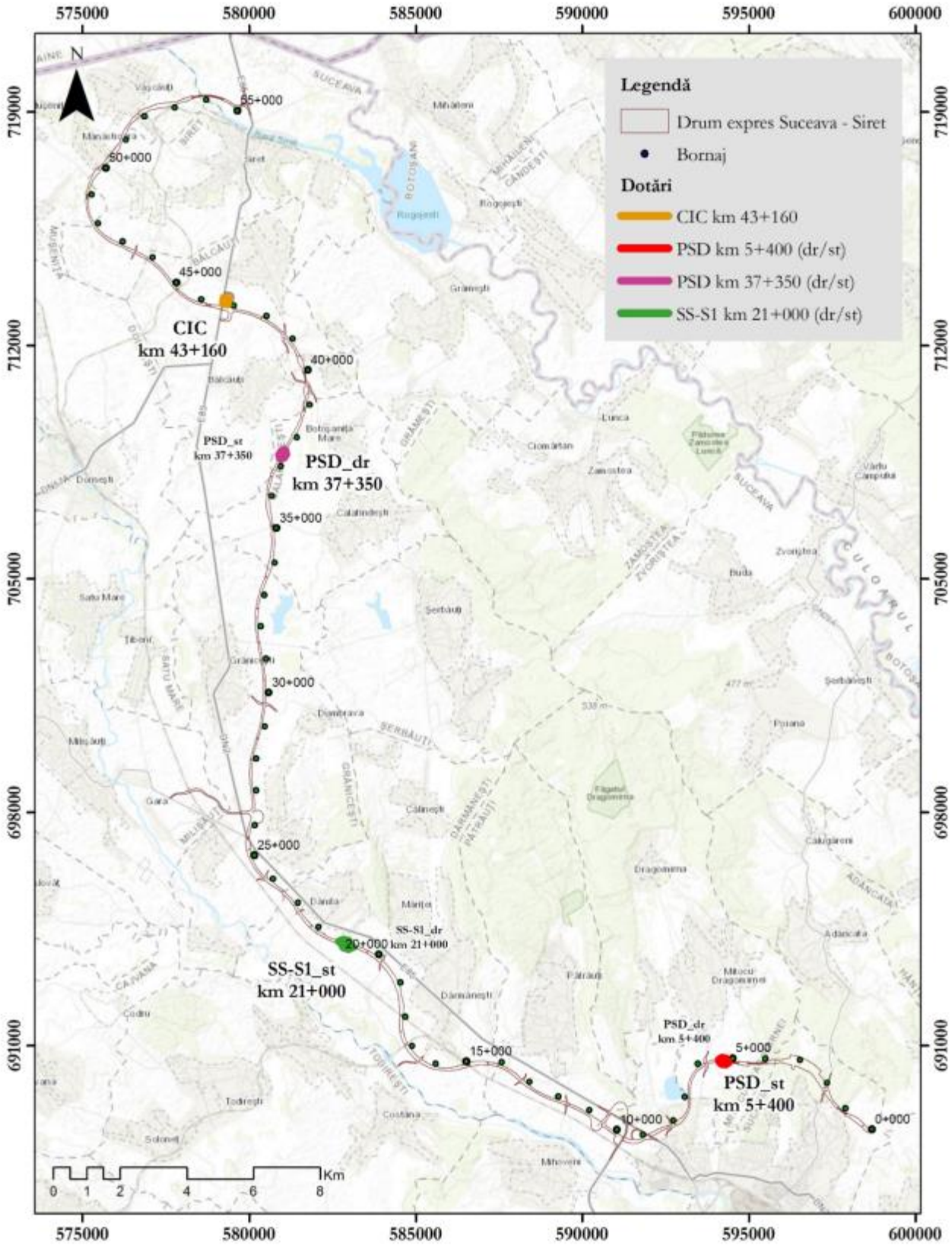

Figure no.3-4 CIC and short-term parking (PSD) locations

3.1.7.1 *Maintenance and Coordination Center (CIC)*

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 the functions of coordinating the activity of the support points and of permanent supervision of the inclusion of the motorway in the performance criteria according to the "Regulation for the maintenance of motorway 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, the influence of meteorological factors on traffic;
- providing first aid in case of accidents;
- maintenance of the motorway on the related section, 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;
- Water connection pipe to the network in the area/drilled well;
- Washing ramp;
- Cabin gate;
- Drainable sealed basin;
- Purified water collection tank;
- Sludge and hydrocarbon separators;
- 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 can be connected simultaneously. electric cars.

3.1.7.2 *Short-term parking*

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 viewpoints.

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 entry 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 purified in the hydrocarbon separator 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 toilet;
- Water connection pipe to the network in the area/drilled well;
- Drainable sealed basin;
- Rainwater pumping station and buffer tank;
- Platform scale;

- 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 can be connected simultaneously. electric cars.
- Bus parking - 2 places;
- Heavy vehicle parking - 15 places;
- Parking for people with disabilities - 4 places.

3.1.7.3 *Service spaces of (type S1)*

The service space type S1 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 toilet;
- 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 transformer;
- Fencing drilled well;
- 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. charging equipment to which 2 electric cars can be connected simultaneously;

- Bus parking - 6 places;
- Heavy vehicle parking - 33 places;
- Parking for people with disabilities - 6 places;
- Gas station reserved space;
- Space reserved for trade + catering;
- Alveola equipment maintenance.

3.1.8 Areas of forest required to be deforested

A category of preparatory works for the achievement of the investment objective that can lead to a potential significant impact on the environment, it is represented by the deforestation (trees, shrubs, grasses).

According to preliminary calculations, the areas estimated to be deforested total 36.7 ha. The location of the areas that need to be cleared for the purpose of the project will be presented and analyzed within the studies developed for the project.

3.1.9 Hydrotechnical works

In order to ensure an optimal 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 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 national roads 3. According to point 5.1 of STAS 4273-83, according to the duration of exploitation - definitive and according to the functional role - main, hydrotechnical construction 3 corresponds 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 corresponds to the annual probability of exceeding 2%.

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

For intersected watercourses (with flows below 1000m3/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

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

Hydrotechnical work Type - 2- wall made of cast-in-place concrete slabs and wall made of gabions: The work is applied to the areas where the route 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.

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

Also, in the areas where the water course bed is meandering and with 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.

3.1.10 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 emissary:
  - trenches with a walled section at the edge of the embankment;
  - culverts (with opening of 2 m and 5 m);
  - approach ditches from prefabricated elements;
  - water discharge boxes from the motorway surface in the case of high embankments, ramps; bridges and passages;
  - walled ditches in the median area of the motorway in the case of landscaped curves.
- works for the depollution of water before discharge into the emissary or on natural valleys:
  - decanter/separator chambers for hydrocarbons 200 pcs., these devices are placed before the discharge of trenches to floors or in natural water courses;
  - hydrocarbon decanter/separator chambers 32 pcs. associated with water dispersion basins are provided in the areas where the water collected in the ditches will be discharged on the natural land, in depressed areas and aims for the laminar drainage of the water to avoid soil erosion;
  - retention basins 16 pcs.

In order to drain and evacuate the water from the road system, 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 ditch.

3.1.11 Consolidation works

3.1.11.1 *Earthworks*

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

The materials that will be used to make the embankment must correspond to 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.

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

- angle of internal friction of the materialϕ= 15°;
- cohesion c=25 Kpa;
- volumetric weightγ= 19 KN/m3.

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

For the embankment areas, provided with slopes of the batters 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 land with infill piles made of granular material or wick drains;
- reinforced concrete support structures with indirect foundation on large diameter drilled piles.

In accordance with the specifications of AND 515/93, the fillings adjacent to reinforced concrete bridges, passages and walkways 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 floors. 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 adjacent batter 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 materialϕ= 33°;
- cohesion c=2 Kpa;
- volumetric weight γ= 19 KN/m3.

The slopes of the cut batters 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 batters 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 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 corresponding 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 transverse profile accentuated, limitations of the expropriation corridor, etc.), support structures made of columns were provided large diameter holes.

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

3.1.12 Protection of slopes

3.1.12.1 *Protection of embankment batters*

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

For non-cohesive filling material and slopes of batters 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 batter slopes of 1:2 or 1:3, the protection of the batters 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 batters 1:1 or 2:3, the protection of the batters 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 batters will be done with grassy topsoil.

3.1.12.2 *Protection of embankment batters*

The protection of the cut batters was adopted depending on the stratification and the slope of the cut batters as follows:

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

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

For cohesive type stratification (clay dust, dusty clays, sandy clays) and slopes of the batters 1:1 or 2:3, the protection of the batters 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 batters 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 batters 1:2, 1:3 or 1:4, the protection of the batters will be done with grassy vegetable soil and biodegradable georetes to maintain humidity after sprinkling the batters 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 batters smoother than 1:4, the protection of the batters will be done with grassy topsoil.

3.1.13 Drainage works

3.1.13.1 *Drains in open excavation*

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

The drains in 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 anti-pollution geotextile, and on the upper part the drain cover is made by the waterproof surface water drainage system (gutter, ditches, cassius) or 30 cm thick clay plug .

At the base of the drain is placed the perforated corrugated tube d=110 mm-160 mm, for capturing and directing water to the outfalls or collection points.

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

3.1.13.2 *Drains drilled horizontally*

Horizontally drilled drains are used to avoid the execution of deep ditches that lead to technological, support, labor and consumption of draining material problems. The procedure consists in making horizontal boreholes that have a 5-10% slope towards the outlet, over a length of 10.00-20.00m with the help of special installations. These boreholes are lined with perforated corrugated pipes (except for the lower third, which has the role of evacuating the collected water) with a diameter of 90 – 120 mm. The tubes are covered with geotextile as a reverse filter.

3.1.14 Surface improvement of the foundation land

3.1.14.1 *Compaction of the foundation land with the compactor cylinder*

By compaction we mean filling by mechanical means, resulting in the reduction of void volume. In non-cohesive soils, this compaction is achieved by the reorientation of the particles, 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 were saturated and worked as a closed system, without the possibility of water removal, compaction would not be possible. The state of saturation therefore represents the theoretical limit for the compaction of a soil, regardless of its natural humidity.

3.1.14.2 *Mattress made of granular material, reinforced and protected with geotextile*

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

The thickness of the mattress is between 30 cm - 1.20 m depending on the characteristics of the ground and the number of embankment geogrids.

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, a block of broken stone sort 90 - 120 mm is made which is laid in a layer of max. 20 cm and is compacted with the compactor cylinder until the refusal is reached.

3.1.14.3 *Cushion made of cohesive material compacted and stabilized with hydraulic binders*

This type of work aims to remove the highly compressible layer or the layer sensitive to wetting, with a limited thickness of no more than 1-2 m, and replace it with a cushion of compacted soil or stabilized with hydraulic binders where appropriate.

3.1.14.4 *Verification of the improved foundation land*

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

3.1.15 Improving the depth of the foundation land

It is applied in the areas of high embankments, bridge ramps and passages.

The improvement in depth of weak lands is realized by the execution of drainage columns without granular material or wick drains made of geosynthetic material.

3.1.15.1 *Depth improvement with granular material columns*

The depth improvement of the foundation land with infill columns made of granular material is applied to the connection areas of the embankments with the works of art and has a double role: a role of removing excess pressure from the pores of the compressible layer and speeding up the ground consolidation process foundation and the second role of improving the physico-mechanical parameters of the compressible layer through lateral compaction.

The improvement solution with infill columns made of granular material is recommended in areas where the foundation ground is compressible and the general stability of the embankment is not ensured.

3.1.15.2 *Depth improvement with wick drains*

The depth improvement of the foundation land with wick 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 pressure from the pores of the compressible layer and speeding up the consolidation process of the foundation land.

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.

3.1.16 Support structures

3.1.16.1 *Reinforced concrete support structures*

Reinforced concrete support 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 support structure;
- Geocomposite drainage drain at the soffit of the supporting work;
- Waterproofing with bitumen emulsion of the concrete that comes into contact with the ground;
- The support structure is executed on sections 4.00 – 16.00 m, 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.

3.1.16.2 *Reinforced earth support structures*

Geogrid-reinforced earth support structures are provided at embankments to ensure their local stability, the maximum height of the structures being 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 support walls will be made of prefabricated concrete elements of the panel or block type. The reinforcement elements interconnect with the prefabricated elements of the visible face.

3.1.16.3 *Support structures with indirect foundation*

The support structures with indirect foundation 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 foundation ground and the inclination in the transverse profile of the natural ground, the support structures with indirect foundations are provided on one row of piles or two rows of piles. The distance, diameter and length of the piles result from the general stability calculation.

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 support structure;
- Geocomposite drainage drain at the soffit of the supporting work;
- Waterproofing with bitumen emulsion of the concrete that comes into contact with the ground;
- The support structure is executed on sections 4.00 – 16.00 m, 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.

3.1.16.4 *Support structures from drilled piles*

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

The support solution of drilled piles leads to minimal excavation volume and minimal changes in the state of efforts in the excavated slope.

The constructive system is made up of:

- The platform for drilling the piles at the height of the crown of the retaining wall;
- Drilled piles;
- The solidarity beam of the piles on their upper part;
- Anchors at the top of the retaining wall (if applicable);
- Excavation in front of the support 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 prefabricated elements made of reinforced concrete.

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

Horizontally drilled drains are provided between the drilled piles for the elimination of seepage water.

3.1.17 Works of relocation and protection of utility networks, relocation of transport routes and demolitions

3.1.17.1 *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 relocation of utilities that will be carried out along the route of the express road are presented in the following tables.

Table no.3-11 Relocation/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
1.	Public water supply - sewerage service - Com. Patrauti	11+750 – 11+850	ROSCI0075 Pătrăuți Forest (7.6 km)
2.	Approval City Hall Darmanesti Commune	16+600 – 16+700, 17+750 – 17+850, 19+930 – 20+030	ROSCI0075 Pătrăuți Forest (10.2 km)
3.	Acet Suceava	54+000-55+000, 55+000-55+825, 5+725-6+000, 5+775-6+000	ROSPA0110 Accumulations Rogojesti – Bucecea (1.6 km)

Table no.3-12 Relocation/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
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.3-13 Relocation works of telephone networks

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area
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.	Underground Tc network	1+812 – 1+012	ROSPA0110 Accumulations Rogojesti – Bucecea (5.5 km)
3.	Tc aerial network	5+741 – 5+841	ROSCI0075 Pătrăuți Forest (3.9 km)

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area
4.	Underground and aerial Tc network	8+841 – 8+941	ROSCI0075 Pătrăuți Forest (6.6 km)
5.	Aerial Tc network	16+678 – 16+778	ROSCI0075 Pătrăuți Forest (8.7 km)
6.	Tc aerial network	22+883 – 22+983	ROSCI0075 Pătrăuți Forest (12.2 km)
7.	Underground and aerial Tc network	24+663 – 25+763	ROSCI0379 Suceava River (5.4 km)
8.	Tc aerial network	29+754 – 29+854	ROSCI0379 Suceava River (4.8 km)
9.	Tc aerial network	31+618 – 31+718	ROSCI0379 Suceava River (4.3 km)
10.	Underground and aerial Tc network	39+515 – 39+615	ROSCI0075 Pătrăuți Forest (3.7 km)
11.	Underground and aerial Tc network	40+624 - 41+264	ROSCI0075 Pătrăuți Forest (4.3 km)

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

Table no.3-14 Electrical network relocation/diversion works

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area
1.	LEA 110 KV Dorohoi connections	0+289 – 0+589	ROSCI0380 Suceava Liţeni River (4.5 km)
2.	LEA 110 KV - ST connections- ST Itcani C1+C2	0+932 - 1+270	ROSCI0380 Suceava Liţeni River (4.8 km)
3.	LES 20 KV, LEA 0.4 KV, LES 0.4 KV - Interchange DN 29A - Suceava North	1+812 – 1+912	ROSCI0075 Pătrăuți Forest (4.1 km)
4.	LEA 20 KV Itcani-Adancata	5+200 – 5+300	ROSCI0075 Pătrăuți Forest (3.5 km)
5.	LEA 20 KV PTAV 13 M. Dragomirnei	5+450 – 5+550	ROSCI0075 Pătrăuți Forest (3.5 km)
6.	LEA 20 KV Branch PT 214	7+300 - 7+660	ROSCI0075 Pătrăuți Forest (5.3 km)
7.	LEA 20 KV, LEA 20 KV Itcani-Adancata- Derivation PT71	7+923 – 7+973	ROSCI0075 Pătrăuți Forest (5.8 km)
8.	LEA 20 KV Avicola	8+340 – 8+350	ROSCI0380 Suceava Liteni River (5.7 km)
9.	LEA 20 KV Avicola, LEA 20 KV Derivation	9+225 - 9+325	ROSCI0380 Suceava Liteni River (6.2 km)
10.	LEA 20 KV Itcani	Interchange DN2 – DN2P (km 9+400 – km 11+000)	ROSCI00075 Pătrăuți Forest (2.3 km)
11.	LEA 20 Itcani - Darmanesti	11+850 – 11+950	ROSCI0075 Pătrăuți Forest (7.8 km)
12.	LEA 20 Itcani - Darmanesti	16+550 – 16+650	ROSCI0075 Pătrăuți Forest (8.4 km)
13.	LEA 20 KV	26+575 – 26+675	ROSCI0379 Suceava River (5 km)
14.	LEA 20 KV	27+328 – 27+428	ROSCI0379 Suceava River (4.6 km)
15.	LEA 20 KV Decommissioned	28+650 – 28+750	ROSCI0379 Suceava River (4.5 km)
16.	LEA 20 KV	29+700 – 29+800	ROSCI0379 Suceava River (4.7 km)
17.	LEA 20 KV	21+350 – 31+450	ROSCI0379 Suceava River (4 km)
18.	LEA 20 KV Siret – Balcauti	39+515 – 39+615	ROSCI0075 Pătrăuți Forest (3.7 km)
19.	LEA 20 KV – Derivation PT A1 - Rudești	40+50 – 40+150	ROSCI0075 Pătrăuți Forest (3.9 km)
20.	LEA 20 KV - Siret - Balcauti	41+214 – 41+314	ROSCI0075 Pătrăuți Forest (4.9 km)
21.	LEA 110 Siret – Rădăuti	40+050 – 40+150	ROSCI0075 Pătrăuți Forest (3.9 km)
22.	LEA 20 KV Siret – Balcauti	43+880 – 43+980	ROSCI0379 Suceava River (4.9 km)
23.	LEA 0.4	50+400 – 50+500	ROSPA0110 Accumulations Rogojești – Bucecea (4 km)

No. crt.	Utility networks to be relocated/protected	Kilometer range	The distance from the nearest protected natural area
24.	LEA 20 KV Siret - Tatarcina	51+911 – 52+011	ROSPA0110 Accumulations Rogojesti – Bucecea (3.2 km)
25.	LEA 0.4 KV	52+000 – 52+100	ROSPA0110 Accumulations Rogojești – Bucecea (3.1 km)
26.	LEA 20 KV	55+000 – 55+100	ROSPA0110 Accumulations Rogojești – Bucecea (0.7 km)
27.	LEA 0.4 KV	Parallelism DN2 – Km 55+450 – 56 +200	ROSPA0110 Accumulations Rogojești – Bucecea (1 km)
28.	LEA 20 KV Siret – Mihăileni - Derivation PTA 8	Parallelism DN2 – Km 55+450 – 56 +200	ROSPA0110 Accumulations Rogojești – Bucecea (1 km)

3.1.17.2 *Relocating and restoring road connections*

The route of the Suceava-DN2H motorway and the DN2H - Siret Border Express Road intersects a series of exploitation roads, interrupting their continuity.

Depending on their importance, bumpy intersections without access to the motorway (of the type of passage over/under the motorway) or their deviation along the motorway and their grouping in order to create a common passage over the motorway 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.3-15 County roads that require relocation

No. No.	Name	Position km	The distance from the nearest protected natural area	
			[km]	name
1.	DJ208T (relocation at km 1+000) through an opening of the viaduct	1+150 - 1+190	3.3 km	ROSCI0380 Suceava River – Liteni
2.	DJ208D (Str. Lipoveni) across the motorway	5+770 - 5+810	1 km	ROSCI0075 Pătrăuți Forest
3.	DJ209D on the motorway	16+620 - 16+660	1 km	ROSCI0075 Pătrăuți Forest
4.	DJ178B Express Road overpass	31+648 - 31+688	1 km	ROSCI0075 Pătrăuți Forest
5.	DJ209D (relocation to km 39+800) through an opening of the viaduct	39+540 - 39+580	1 km	ROSCI0075 Pătrăuți Forest
6.	DJ209D Express Road crossing	41+245 - 41+285	2 km	ROSCI0075 Pătrăuți Forest
7.	DJ291A Express Road crossing	49+925 - 49+965	961 m	ROSPA0110 Accumulations Rogojesti - Bucecea

Table no.3-16Communal and local exploitation roads that require relocation

No. No.	Name	Position km	The distance from the nearest protected natural area	
			[km]	name
1	Local road (Fetesti-Suceava) over the motorway	0+240 - 0+260	4.5	ROSCI0380 Suceava River - Liţeni
2	DE local underpass	11+440 - 11+460	1.8	ROSCI0075 Pătrăuți Forest
3	DE local (relocation at km 11+750) underpass	11+540 - 11+560	1.9	ROSCI0075 Pătrăuți Forest
4	Local road (Patrauti-Mihoveni) passage over the motorway	11+690 - 11+710	2	ROSCI0075 Pătrăuți Forest
5	DE local (relocation at km 12+450) underpass	12+190 - 12+210	1.9	ROSCI0075 Pătrăuți Forest
6	Local road (Patrauti-Mihoveni) passage over the motorway	13+367 - 13+387	2.1	ROSCI0075 Pătrăuți Forest
7	DE relocation parallel to the motorway and crossing through the passage on the motorway at km 15+080	14+807 - 14+827	3.3	ROSCI0075 Pătrăuți Forest
8	DL relocation parallel to the motorway and crossing through the passage on the motorway at km 15+080	15+390 - 15+410	3.4	ROSCI0075 Pătrăuți Forest
9	DE relocation parallel to the motorway and crossing through the passage on the motorway at km 17+295	17+490 - 17+510	3.4	ROSCI0075 Pătrăuți Forest
10	DE relocation parallel to the motorway and crossing through the passage on the motorway at km 18+170	17+685 - 17+705	3.2	ROSCI0075 Pătrăuți Forest
11	Local road over the motorway	19+967 - 19+987	2.5	ROSCI0075 Pătrăuți Forest
12	Local relocation road parallel to the motorway and crossing through the passage on the motorway at km 22+335	21+847 - 21+867	3.9	ROSCI0075 Pătrăuți Forest
13	Local road (Danila-Halta Danila) - passage on the motorway	22+923 - 22+943	4.5	ROSCI0075 Pătrăuți Forest
14	DE relocation parallel to the motorway and crossing through the passage on the motorway at km 23+700	23+365 - 23+385	4.7	ROSCI0075 Pătrăuți Forest
15	Local road - freeway crossing	24+435 - 24+455	5.5	ROSCI0075 Pătrăuți Forest
16	DE relocation parallel to the motorway 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 Express Road	29+794 - 29+814	4.8	ROSCI0379 Suceava River
18	DE 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	DE 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

No. No.	Name	Position km	The distance from the nearest protected natural area	
			[km]	name
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	DE 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-Calafindești) Express Road passage	35+203 - 35+223	3.9	ROSCI0379 Suceava River
2. 3	DE 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 Pătrăuți Forest
24	DC35 (Balăuti-Gropeni) Express Road passage	40+614 - 40+634	4.1	ROSPA0110 Accumulations Rogojesti - Bucecea
25	DE 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	DE 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	DE relocation parallel to the Express Road and crossing through the viaduct opening at km 48+940	48+045 - 48+065	2.5	ROSCI0379 Suceava River
28	DE 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 Express Road	50+443 - 50+463	3.8	ROSCI0379 Suceava River
30	DC52 (Siret-Văscăuti) passage over express road	51+996 - 52+016	3.2	ROSPA0110 Accumulations Rogojesti - Bucecea
31	DE 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
32	DC52 (Siret-Văscăuti) crossing by opening the bridge over Siret	53+665 - 53+685	1.2	ROSPA0110 Accumulations Rogojesti - Bucecea

3.1.17.3 *Demolition*

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

3.1.17.4 *Elements 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 conducting 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 routes and even blockages.

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 the pre-signaling of interchanges and service areas.

Considering the way in which traffic is carried out on the motorway (travel speed, traffic intensity), it is necessary to transmit to drivers a series of information related to road 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 route, as well as on the roads intended for international traffic, very large signs have been provided, very large format traffic interchnages, large format national roads, current size signs have been provided for the other roads.

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

To protect pedestrian traffic (including personnel from support in case of road accidents), the pedestrian parapet will be placed on both sides of the workof art at the edge of the sidewalk.

Very large format signs will be provided on the shoulder straps of the 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 signaling - indicators

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

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

Horizontal signage – markings

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

- longitudinal markings;
- delimitation markings of the carriageway;
- transverse 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 at 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 routes and even blockages.

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 signage and information to ensure its continuity, uniformity and cognizability.

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

3.1.17.5 *The motorway communication system and the intelligent traffic control system*

System for monitoring 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 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 Road Infrastructure Administration Company implements Intelligent Transport Systems (ITS) as a major option for increasing efficiency, fluency, safety and limiting the impact on the environment regarding the road transport process.

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

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 panning system - Pan Tilt and Zoom) - located at the entrances to the motorway segment, in the parking area, in 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 house the equipment needed for the different subsystems. Concentration points will be made approximately every 2 km. Powering the concentration points, for all ITS equipment, will be done both from the national electricity grid 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 network national electricity company.

Monitoring

The traffic monitoring subsystem allows remote data collection, their evaluation and transmission in a 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.

3.1.17.6 *Motorway lighting system*

The lighting is done fundamentally for all works of art with lengths over 100 m and the support point. 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 greater than 100 m, the parking lots of short duration, but also the Maintenance Centers. The lighting fixtures were also provided to an appropriate standard with the approval of the Beneficiary's Representative.

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

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

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 roadway 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 the time interval and energy efficiency of the system lighting.

All interchanges, intersections and structures with a length greater than 100m will be illuminated. It is mandatory to present the calculation briefs 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 with a parapet, and when they are placed in the field, 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 rules and regulations in force, will be located in the following areas as follows:

The lighting systems will be located in the following areas:

- In the areas of interchanges in the project;
- In the CIC and short-term parking areas;

- In the bridge areas.

3.1.18 Works for environmental protection

3.1.18.1 *Sound-absorbing panels*

To reduce the level of noise generated by 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 locations of the sound-absorbing panels will be finalized following the analysis of the noise modeling results, which must be carried out within the environmental studies developed in the impact assessment procedure.

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).

3.1.18.2 *Anti-collision panels*

In order to avoid the collision of fauna with car traffic during the operating period, the project will provide anti-collision panels in sensitive locations from the point of view of biodiversity. The main targeted locations are those adjacent to Special Bird Protection Areas or Sites of Community Importance. The locations of the anti-collision panels will be finalized following the analysis of the mortality risk of the species, carried out in the framework of the environmental studies developed in the impact assessment procedure.

3.1.18.3 *Landscaping works*

The landscaping project will include the following operations:

- removal and storage of the vegetal layer;
- covering all unexposed slopes of all embankments and embankments 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 correspond to the height of the embankment of the adjacent road;
- in the upper part of all clearings, suitable shrubs must be planted to prevent the penetration of snow;
- all plant species used for landscaping will be characteristic of the area;
- the stripped soil will be stored in order to be reused in covering the cuts and embankments and for the redevelopment of the areas affected by the works.

The basic fund of the landscape design is the vegetation and forest protection curtains. Covering the green spaces near the roadway, 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.

3.1.18.4 *Constructions for water pretreatment*

To protect the quality of soil and water, the following constructions were designed for water purification:

- Sedimentation basins;
- Oil and fat separators;
- Retention basins.

The number of these constructions was made taking into account the hydrographic basins of the area.

The project provides for the construction of: 16 retention basins, 232 hydrocarbon separators and 232 sedimentary basins.

3.1.18.5 *Fencing the motorway / Express Road*

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 route. Fencing will play a role in preventing wildlife from entering the roadway area.

3.1.18.6 *Animal crossings*

In order to ensure permeability for fauna species, undercrossing structures (undercrossings for fauna) and overcrossing will be included in the project. Their location, type and number will be analyzed and finalized within the environmental studies developed within the impact assessment procedure.

3.1.19 Works necessary for site organization

Within the Suceava-DN2H motorway and DN2H - Siret Border Express Road project, two locations were provided for the location of construction sites, one for the motorway sector and one for the Express Road sector, the total length of the route being approximately 56 km.

The site organizations will be located in approximately equidistant areas along the motorway and the Express Road, in order to cover the largest possible access areas and to allow the easy execution of the execution works, as follows:

- Interchange Suceava West - km 9+500 right - direct access from DN2P;
- Interchange Siret Sud/CIC - km 43+300 right - direct access from DN2.

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

Table no.3-21 Location of the proposed site organizations

No. crt.	Kilometer interval provided for the completion of the work	Part	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.	11+000 – 11+200	right	1.5 km ROSCI0075 Pătrăuţi Forest	0.5 km Suceava municipality, UAT Suceava county	0.9 km Patrăuteanca river
2.	43+200 – 43+450	right	4.8 km ROSPA0110 Rogojesti- Bucecea Accumulations	0.5 km Balcăuti, UAT Suceava county	0.5 km Siret river

The locations of the borrow pits are not known at the time of drafting this Memorandum.

3.2 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 state 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 minimal negative effects at the level environment 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 positive and important socio-economic effects including by "reducing distances" and regional development by increasing the area of "gravitational" economic influence of the big ones on their smaller "satellites" 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 with the A7 motorway (Buzău – Focşani – Bacău – Paşcani).

3.3 THE VALUE OF THE INVESTMENT

The value of the investment is estimated at 594,017,123 euros.

3.4 PROPOSED IMPLEMENTATION PERIOD

The execution duration of the proposed objective is estimated at around 30 months.

Grafic orientativ de realizare a investiţiei																														
Nr.Crt	Activitatea	Durata (luni)	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21	L22	L23	L24	L25	L26	L27	L28	L29	L30
1	Organizarea de santier	1																														
2	Amenajari pentru protectia mediului	18																														
3	Terasamente	23																														
4	Suprastructura drum	22																														
5	Noduri rutiere	15																														
6	Dotari	15																														
7	Dispozitive de scurgere a apelor	21																														
8	Lucrari hidrotehnice	12																														
8	Parapete	10																														
9	Poduri si pasaje	21																														
10	Podete	21																														
11	Semnalizare si marcaje	6																														
12	Lucrari provizorii	23																														

3.5 PLANS REPRESENTING THE BOUNDARIES OF THE PROJECT SITE, INCLUDING ANY LAND AREA REQUESTED FOR TEMPORARY USE (SITUATION PLANS AND SITES)

The plans for the area and the situation plans of the project are presented in Annex B.

3.6 PHYSICAL FORMS OF THE PROJECT

3.6.1 Profile and production capacities

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

3.6.2 Description of the installation and technological flows existing on the site

In the current situation, on the site proposed for the implementation of the project, there are no installations in which certain technological flows can be carried out.

3.6.3 Description of the production processes of the proposed project, depending on the specifics of the investment, products and by-products obtained

The project does not involve production processes, but the construction of a road section within the motorway between Suceava and Siret Border. During the operation period, no products or by-products will be obtained, the road being intended for road traffic.

3.6.4 The raw materials, energy and fuels used, with the way to ensure them

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

Table no.3-17The 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	366,362
2.	Natural aggregates stabilized with cement	mc	424,671
3.	Ballast	mc	682,969
4.	Asphalt concrete	MP	1,844,679
5.	Form layer of stabilized soil	mc	443,488
6.	Vegetable soil	mc	293,680
7.	Concrete	mc	965,000
8.	Cement	tons	362,000
9.	The water	mc	169,000
10.	Armature	tons	121,000
11.	Diesel fuel	tons	16,648,730
12.	Lubricant	tons	66,100

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.

3.6.5 Connection to existing utility networks in the area

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;
- Providing the heating agent is necessary exclusively for the site organizations and will be done through the thermal power plants.

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

- The water supply will be provided inCIC and short-term parking by making authorized drilled wells or by connecting to the water supply network in the area (if it will be available);
- Waste water disposal: domestic waste water resulting in CIC, short-term parking lots and service areaswill 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 heating agent is required in CIC and in short-term parking lots will be ensured by means of thermal plants and electric radiators.

3.6.6 Description of site restoration works in the area affected by the execution of the investment

Upon completion of the works, the temporarily occupied land surfaces (site organizations, storage platforms, etc.) will be rehabilitated. In this sense, the following works will be carried out to restore the affected areas:

- Dismantling existing buildings and installations, evacuating them from the site and arranging the temporarily occupied land in order to return it to previous uses;
- Withdrawal of construction and transport equipment from the sites;
- The collection and evacuation from the site of the resulting waste;
- Scarification of the land to a depth of 40-50 cm;
- Cleaning the land of foreign bodies, after scarification;
- Covering the respective surface with a layer of topsoil, 10 cm thick, spread and leveled;
- Seeding the motorway safety zone after the land has been prepared and watered beforehand. For the seeding of the safety zone, as well as for any other seeding of the green spaces, strictly native plant species, characteristic of the project implementation area, will be used. The planting of non-native plant species or species characteristic of other areas of the country will be avoided.

3.6.7 New access ways or changes to existing ones

As specified in the section 3.1.17.2, in the case of roads of communal or county importance, passages were provided in the area of intersection with the road. Access to the motorway will be achieved through interchanges. The proposed interchanges provide connections between all traffic directions in the intersection. Details regarding interchanges and their connections with national, county and communal roads are presented in section 3.1.

3.6.8 Natural resources used in construction and operation

The main natural resources used for the construction of the motorway 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.

3.6.9 Methods used in construction/demolition

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

- Location of site organizations;
- Development of the land, which also includes demolition works;
- 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.

At the same time, for the realization of the project, demolition works of some existing objectives located on the motorway route will be necessary. The locations of these existing objectives have been described in the section 3.1.17.3 and the methods of carrying out the demolition works were described in the section4.4.

3.6.9.1 *Earthworks*

For the actual execution of the motorway, earthworks are initially required. The earthworks 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.

3.6.9.1.1 Preparatory work

These works are carried out before the basic works and have the purpose of bringing the natural terrain (on the width of the motorway and Express Road area) to the state where it can be dug 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 motorway, more specifically on its edge.

3.6.9.1.2 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 embankment;
- 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.

3.6.9.1.3 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.

3.6.9.2 *Foundations and road dressings*

The foundation represents the part between the bed of the motorway and the Express Road and the pavement and has the role of receiving, distributing and transmitting to the embankments or the natural terrain the loads of the vehicles that act on the road pavement.

The road surface represents the part of the motorway 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 motorway 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.

3.6.9.3 *Works on the motorway and Express Road 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.

3.6.9.4 *Works of art*

3.6.9.4.1 Bridges

The superstructure of the bridges on motorway and express road 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 beams monoliths with variable height pre-compressed concrete, cast in console, for openings between 90.00 – 150.00 mm.

The adoption of the continuity system at the level of the over-concreting slab at the decks of the motorway 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 bigger speed of construction;
- Greater control over the element performance.

For an effective response of the superstructure to seismic events, are predicted reinforced concrete monolithic mezzanines are placed at both ends of the deck and anti-seismic devices are installed on the infrastructure benches.

Freeway/Express Road bridge abutments are massive reinforced concrete abutments with turned walls and guard fence. They are founded indirectly, through 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 motorways earthworks is done with the help of connecting 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 motorway/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 files of the structures have the lamellar elevations, provided at the top with a reinforced concrete ruler. They are founded indirectly through drilled piles of large diameter, made of reinforced concrete monolith. The drilled pilots are solidarized on the upper part with monolithic reinforced concrete screeds.

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

3.6.9.4.2 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 motorway/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 motorway/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 motorway embankment will be done with the help of connection plates, to avoid different settlements between the soil filling behind the piles and the motorway earthwork.

3.6.9.4.3 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 motorway route and on other adjacent routes (interchanges). 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 motorway), 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.

3.6.9.5 *Water collection and evacuation works*

The drainage of the water from the precipitation was achieved by the design of trenches, ditches that are discharged into the outfalls, after appropriate pre-purification. 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.

3.6.9.6 *Consolidation works*

Several types of consolidation works were planned for the realization of the project. Details regarding these works are presented in the section3.1.11.

3.6.9.7 *Hydrotechnical works*

The motorway project crosses a series of watercourses, located in the Siret hydrographic space. Their list is presented in the section14.1.2.

The hydrotechnical works proposed within the project and their location are presented in the section 3.1.9 of this Memorandum.

3.6.9.8 *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;
- For 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.

3.6.9.9 *Signs and markings*

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

- cleaning surfaces;
- pre-marking;
- 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 motorway/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 lateral 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 interchanges, 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 ramps of the interchnages, the lateral delimitation marking of the carriageway will be executed profiled to ensure the resonator effect.

3.6.9.10 *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, by sort, into the compartments of the station's predosing bunker, from where, by means of 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, which uses hot oil as a thermal 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.

3.6.9.11 *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.

3.6.9.12 *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.

3.6.10 The execution plan including the construction phase, commissioning, operation, restoration and subsequent use

The execution period of the works is estimated at 30 months.

3.6.11 The relationship with other existing or planned projects

The construction and operation of the motorway and the Express Road can generate a cumulative impact with the existing road and railway infrastructure. In the analyzed area there are several national, county and communal roads, as well as railways. Considering the fact that the Suceava - Siret motorway and Express Road is part of a larger road network, it can be considered that there is a risk of a cumulative impact with the other sections of the A7 motorway.

The implementation of the project can also generate a cumulative impact with the existing industrial objectives in the area of Suceava, especially the companies that own IPPC and incineration facilities, which thus fall under the scope of the Industrial Emissions Directive.

The detailed analysis of the potential impact will be presented in the Environmental Impact Report, prepared for this project.

3.6.12 Details of the alternatives that have been considered

Several alternatives were analyzed in the phase of the Multicriteria Analysis (MCA) developed in 2021, the optimal option being chosen based on an analysis from a technical, financial, socio-economic and environmental point of view. Within the AMC, 7 route options were analyzed in the first stage, later in the 2nd stage of analysis there were two main options for establishing the investment corridor, Option V3.1 and option 8.

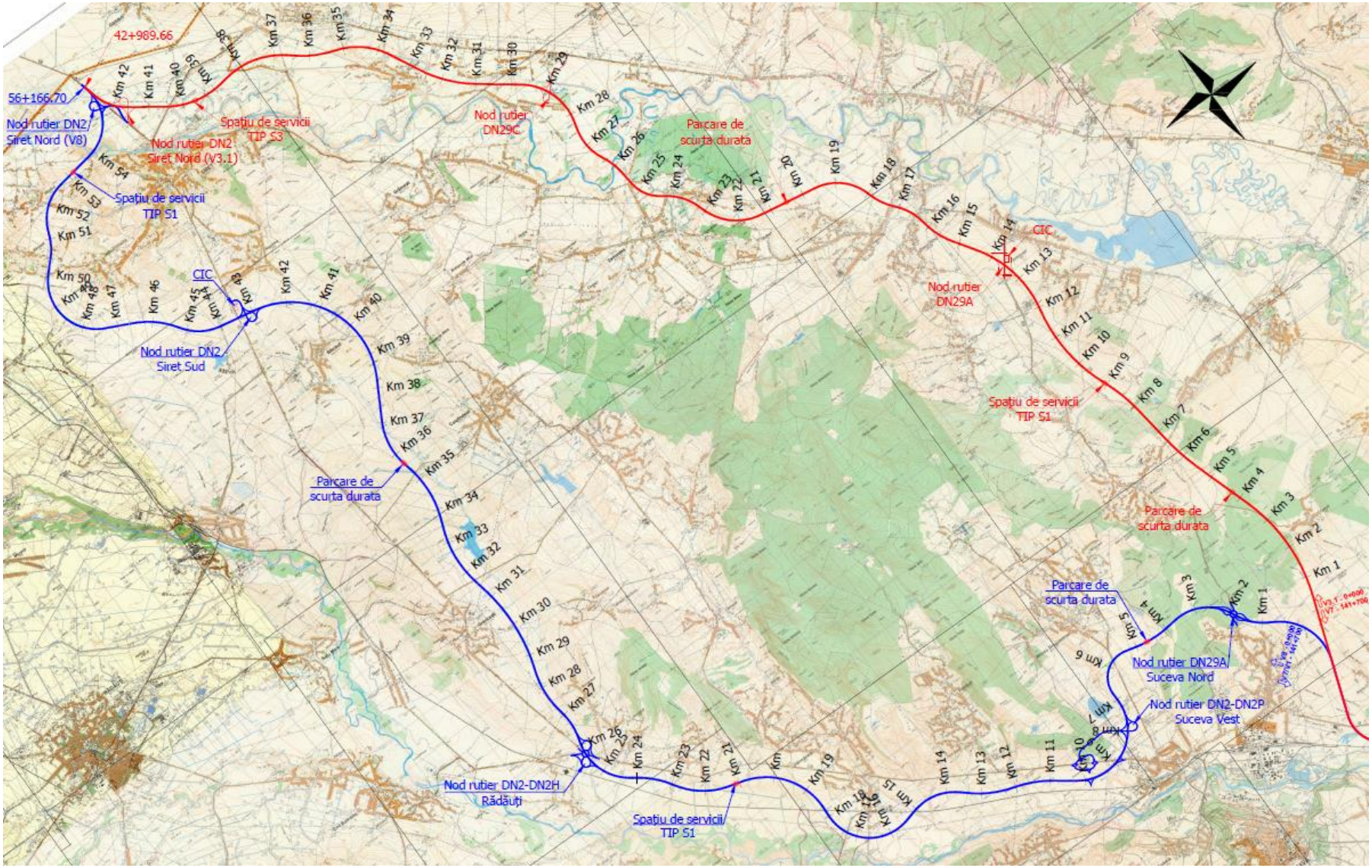

Figure no.3-5Route variants analyzed in AMC 2 on the Suceava-Siret section

The route of variant V3.1 Suceava-Siret section has Km 0 near the Municipality of Suceava, to the east of it, near the Suceava International Airport (ASCV). At the same time, for this route variant, km 0+000 (project start/Suceava-Siret section) coincides with km 141+700 (end of V7 project - Paşcani-Suceava section). The route is 43 km long, up to the border between Romania and Ukraine, where KM 42+989.66 (end of the project) is found near the Siret-Porubne Customs.

The route of this studied route variant, V8, has km 0+000 in the same area as the start of variant V3.1 Suceava-Siret section, near Suceava Municipality, to the east of it, in the vicinity of Suceava International Airport (ASCV). At the same time, for this route variant km 0+000 (project start/Suceava-Siret section) coincides with km 139+248.35 (end of V1 project - Paşcani-Suceava section) respectively km 141+700 (end of V7 project - Paşcani- Suceava). The route runs for a length of 56.17km, up to the border between Romania and Ukraine, where Km 56+166.70 (end of the project) is found near the Siret-Porubne Customs.

The variant with the best score was Variant 8.1.

The criteria that were taken into account for the comparative analysis of the impact on the environment for the Suceava – Siret sector were the following:

- Air quality,
- Water quality,
- Biodiversity – the permeability of the road infrastructure,
- Ecological corridors,
- Noise,
- Landscape,
- Land use.

None of the route variants analyzed intersects any site of community interest. Also, both options would cross an equal number of water bodies.

The results of the environmental subcriteria analyzed within AMC2 are the following:

Subcriteriu		Unitate de măsură	Ponderi individuale	Ponderi agregate	Min/ max	Punctaj maxim posibil	Alternative analizate				
							V1-V8.1	V1-V8.2	V7.1-V3.1	V7.1-V8.1	V7.1-V8.2
Calitatea aerului	Zone locuite - suprafaţa afectată din intravilanele intersectate (ha)	ha	10%		Min	3.00	44.10	44.10	85.20	49.60	49.60
	Zone naturale - suprafaţa afectată din ariile protejate (ha)	ha	5%	15%	Min	1.50	0.00	0.00	1.90	0.00	0.00
				Punctaj subcriteriu			*3.00*	*3.00*	*1.55*	*2.67*	2.67
				Punctaj subcriteriu			*1.50*	*1.50*	*0.00*	*1.50*	1.50
				Punctaj			**4.50**	**4.50**	**1.55**	**4.17**	**4.17**
Corpuri de apă	Afectarea zonelor ripariene aferente corpurilor de apa	ha	5%	5%	Min	1.50	7.00	7.00	10.70	10.00	10.00
	Lungimea lucrărilor hidrotehnice	m	5%	5%	Min	1.50	2.20	2.20	2.70	2.50	2.50
				Punctaj subcriteriu			*1.50*	*1.50*	*0.98*	*1.05*	1.05
				Punctaj subcriteriu			*1.50*	*1.50*	*1.22*	*1.32*	1.32
				Punctaj			**3.00**	**3.00**	**2.20**	**2.37**	**2.37**
Biodiversitate	Suprafaţa afectată din ariile naturale protejate	ha	10%		Min	3.00	0.00	0.00	0.20	0.00	0.00
	Permeabilitatea infrastructurii de transport	km	10%	20%	Min	3.00	70.60	70.60	67.60	73.50	73.50
				Punctaj subcriteriu			*3.00*	*3.00*	*0.00*	*3.00*	3.00
				Punctaj subcriteriu			*2.87*	*2.87*	*3.00*	*2.76*	2.76
				Punctaj			**5.87**	**5.87**	**3.00**	**5.76**	**5.76**
Zgomot	Creşterea nivelului de zgomot în zonele locuite - suprafaţa afectata	ha	10%		Min	3.00	532.50	532.50	709.70	542.30	542.30
	Creşterea nivelului de zgomot în zonele naturale	ha	5%	15%	Min	1.50	693.60	693.60	1055.40	632.90	632.90
				Punctaj subcriteriu			*3.00*	*3.00*	*2.25*	*2.95*	2.95
				Punctaj subcriteriu			*1.37*	*1.37*	*0.90*	*1.50*	1.50
				Punctaj			**4.37**	**4.37**	**3.15**	**4.45**	**4.45**
Peisaj	Lungimea totală a structurilor	km	5%	5%	Min	1.50	11.93	11.93	11.59	12.22	12.22
				Punctaj			**1.46**	**1.46**	**1.50**	**1.42**	**1.42**
Utilizarea terenului	Defrişări	ha	10%		Min	3.00	24.00	24.00	30.10	26.40	26.40
	Scoaterea din folosinţă a pajiştilor	ha	5%	15%	Min	1.50	27.60	27.60	60.60	43.60	43.60
				Punctaj subcriteriu			*3.00*	*3.00*	*2.39*	*2.73*	2.73
				Punctaj subcriteriu			*1.50*	*1.50*	*0.68*	*0.95*	0.95
				Punctaj			**4.50**	**4.50**	**3.08**	**3.68**	**3.68**
Impactul asupra populaţiei	Clădiri posibil a fi afectate	nr. clădiri	10%	10%	Min	3.00	2.00	2.00	7.00	3.00	3.00
	Proiecte, PUZ-uri dezvoltări afectate de investiţie	intersecţii	5%	5%	Min	1.50	0.00	0.00	1.00	1.00	1.00
				Punctaj subcriteriu			*3.00*	*3.00*	*0.86*	*2.00*	2.00
				Punctaj subcriteriu			*1.50*	*1.50*	*0.00*	*0.00*	0.00
				Punctaj			**4.50**	**4.50**	**0.86**	**2.00**	**2.00**
Moştenire culturală	Intersecţia cu siturile arheologice	nr. intersecţii	5%	5%	Min	1.50	5.00	5.00	7.00	5.00	5.00
				Punctaj			**1.50**	**1.50**	**1.07**	**1.50**	**1.50**
Punctaj total			100%	100%			**29.70**	**29.70**	**16.41**	**25.34**	**25.34**

Considering that the analysis was based on the environmental criterion and the following criteria: economic, technical and social, the optimal option turned out to be Variant 8.1.

Criteriu	Sub criteriu	Indicator	Ponderi individuale	Ponderi agregate	Min/ max	Alternative analizate				
						V1-V8.1	V1-V8.2	V7.1-V3.1	V7.1-V8.1	V7.1-V8.2
Criterii tehnice	*Riscuri geotehnice*		*2.0%*		Min	*1.96*	*1.96*	*1.99*	*2.00*	*2.00*
		Existenta pamanturilor dificile de fundare Vecinatati Val. Coef. Ag Val. coef. Tc Val. Adancimii de inghet Val. Caracteristice ale incarcarii din zapada pe sol Val. De referinta ale presiunii dinamice a vantului								
5%	*Riscri geologice*		*1.8%*		Min	*1.68*	*1.68*	*1.75*	*1.69*	*1.69*
		Zone de instabilitate Energie de relief								
	Riscri hidrogeologice		*1.3%*		Min	*1.25*	*1.13*	*1.22*	*1.25*	*1.25*
		Existenta nivelului freatic aproape de suprafata terenului natural Existenta zone mlastinoase Existenta zone cu exces de umiditate Existenta cursuri de apa cu maluri erodabile, vai torentiale Existenta acvifere in zonele traversate de tuneluri - deblee deschise								
		Punctaj				**4.88**	**4.77**	**4.96**	**4.93**	**4.93**

Criteriu	Sub criteriu	Indicator	Ponderi individuale	Ponderi agregate	Min/max	Alternative analizate				
						V1-V8.1	V1-V8.2	V7.1-V3.1	V7.1-V8.1	V7.1-V8.2
Criterii economice 50%	*RIR*		50%		Min	50.00	46.25	49.56	48.09	48.24
			Punctaj			**50.00**	**46.25**	**49.56**	**48.09**	**48.24**
Criterii mediu 30%	*Calitatea aerului*			*15%*		*4.50*	*4.50*	*1.55*	*4.17*	*4.17*
		Zone locuite - suprafaţa afectată din intravilanele intersectate (ha)	10.00%		Min	3.00	3.00	1.55	2.67	2.67
		Zone naturale - suprafaţa afectată din ariile protejate (ha)	5.00%		Min	1.50	1.50	0.00	1.50	1.50
	Corpuri de apă			*5%*		*3.00*	*3.00*	*2.20*	*2.37*	*2.37*
		Intersecţii ale proiectului cu corpurile de apă de suprafaţă	5.00%		Min	1.50	1.50	0.98	1.05	1.05
		Lungimea lucrărilor hidrotehnice	5.00%		Min	1.50	1.50	1.22	1.32	1.32
	Biodiversitate			*20%*		*5.87*	*5.87*	*3.00*	*5.76*	*5.76*
		Suprafaţa afectată din ariile naturale protejate	10.00%		Min	3.00	3.00	0.00	3.00	3.00
		Permeabilitatea infrastructurii de transport	10.00%		Min	2.87	2.87	3.00	2.76	2.76
	Zgomot			*15%*		*4.37*	*4.37*	*3.15*	*4.45*	*4.45*
		Creşterea nivelului de zgomot în zonele locuite - suprafaţa afectata	10.00%		Min	3.00	3.00	2.25	2.95	2.95
		Creşterea nivelului de zgomot în interiorul siturilor Natura 2000 - suprafaţa afectată	5.00%		Min	1.37	1.37	0.90	1.50	1.50
	Peisaj	Lungimea totală a structurilor	5.00%	5%	Min	*1.46*	*1.46*	*1.50*	*1.42*	*1.42*
	Utilizarea terenului			*15%*		*4.50*	*4.50*	*3.08*	*3.68*	*3.68*
		Defrişări	10.00%		Min	3.00	3.00	2.39	2.73	2.73
		Scoaterea din folosinţă a pajiştilor	5.00%		Min	1.50	1.50	0.68	0.95	0.95
	Impact asupra populatiei					*4.50*	*4.50*	*0.86*	*2.00*	*2.00*
		Clădiri posibil a fi afectate	10.00%	10%	Min	3.00	3.00	0.86	2.00	2.00
		Proiecte, PUZ-uri dezvoltări afectate de investiţie	5.00%	5%	Min	1.50	1.50	0.00	0.00	0.00
	Mostenire culturala					*1.50*	*1.50*	*1.07*	*1.50*	*1.50*
		Posibile intersectii situri	5.00%	5%	Min	1.50	1.50	1.07	1.50	1.50
			Punctaj			**29.70**	**29.70**	**16.41**	**25.34**	**25.34**
Criteriu social 15%	*Grad de acceptabilitate al autoritatilor locale*		100.00%		Max	15.00	7.50	0.00	15.00	7.50
Punctaj						**15.00**	**7.50**	**0.00**	**15.00**	**7.50**
Punctaj total						**99.58**	**88.21**	**70.93**	**93.36**	**86.01**

Note: V1 is variant 1 on the Pascani - Suceava section.

3.6.13 Other activities that may arise as a result of the project

Following the completion of the project, road transport conditions between the North-East region will be improved. The project will have a significant effect in reducing the time lost in traffic, reducing the number of road accidents, streamlining road traffic, especially that of goods, reducing traffic in densely populated areas. Reducing traffic in densely populated areas will also have a beneficial effect on air quality and noise reduction. From an economic point of view, the existence of the motorway will lead to the attraction of investment flows in the counties belonging to the region of Moldova.

As a result of the completion of the project, there will be activities for the sale of fuel, other services and goods in the service areas associated with the motorway.

Also, as a result of the completion of the project, new jobs will be created both during the execution period and later during the operation period of the motorway.

3.6.14 Other authorizations required for the project

The approvals and authorizations requested for the project can be found in Annex A - Documents of this Memorandum.

4 DESCRIPTION OF REQUIRED DEMOLITION WORKS

4.1 THE EXECUTION PLAN OF THE DEMOLITION, RESTORATION AND SUBSEQUENT USE WORKS

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

4.2 DESCRIPTION OF SITE RESTORATION WORKS

Restoring the site (in the case of decommissioning the project) will involve demolition of the structures built during the construction phase. The works include the demolition of the roadway, the built structures and the other components of the project. After the demolition of all components of the motorway, the resulting waste will be evacuated from the site, and the land will be prepared for works to restore the natural component.

4.3 NEW ACCESS WAYS OR CHANGES TO EXISTING ONES

It will not be necessary to create new access ways or to change the existing access ways.

4.4 METHODS USED IN DEMOLITION

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

4.5 DETAILS OF THE ALTERNATIVES THAT HAVE BEEN CONSIDERED

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

4.6 OTHER ACTIVITIES THAT MAY OCCUR AS A RESULT OF THE DEMOLITION

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

5 PROJECT LOCATION DESCRIPTION

The motorway project is proposed to be implemented on the territory of Suceava county. The expropriation limit of the targeted project crosses the extravillage and intravillage of the following localities: Suceava Municipality, Mitocu Dragomirnei, Pătrăuți, Dărmănești, Grănicești, Milișăuti, Calafindești, Bălcăuti, Siret, Mușenița.

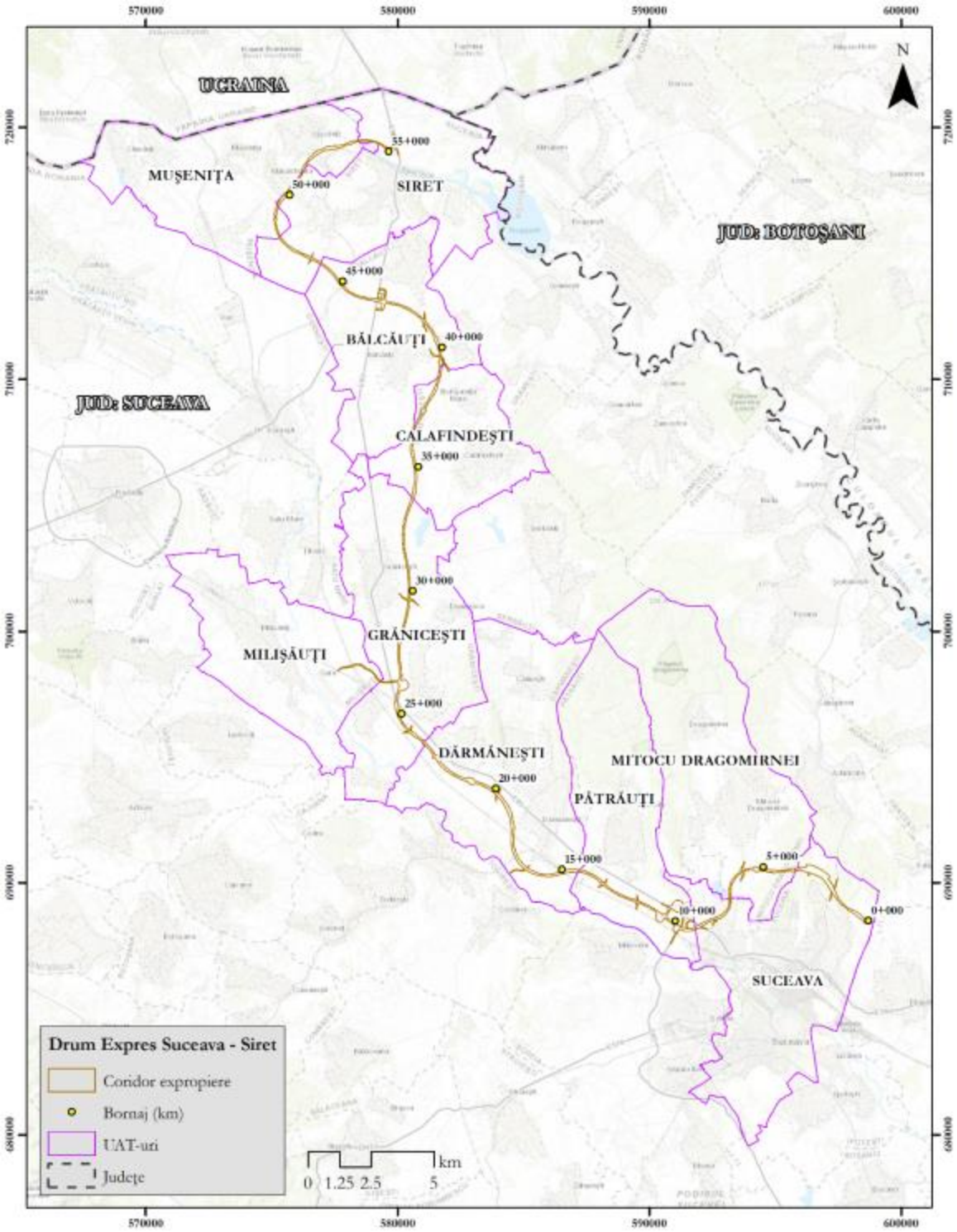

Figure no.5-1 The intersection of the project on the Suceava - Siret section related to the territorial administrative units

The motorway route crosses the following roads within the national network:

- DN 2 (E 85), DN 2 H, DN 29 A;
- DJ 178 B, DJ 208 D, DJ 208 T, DJ 209 D, DJ291 A;
- DC 241, DC 717, DC 1092.

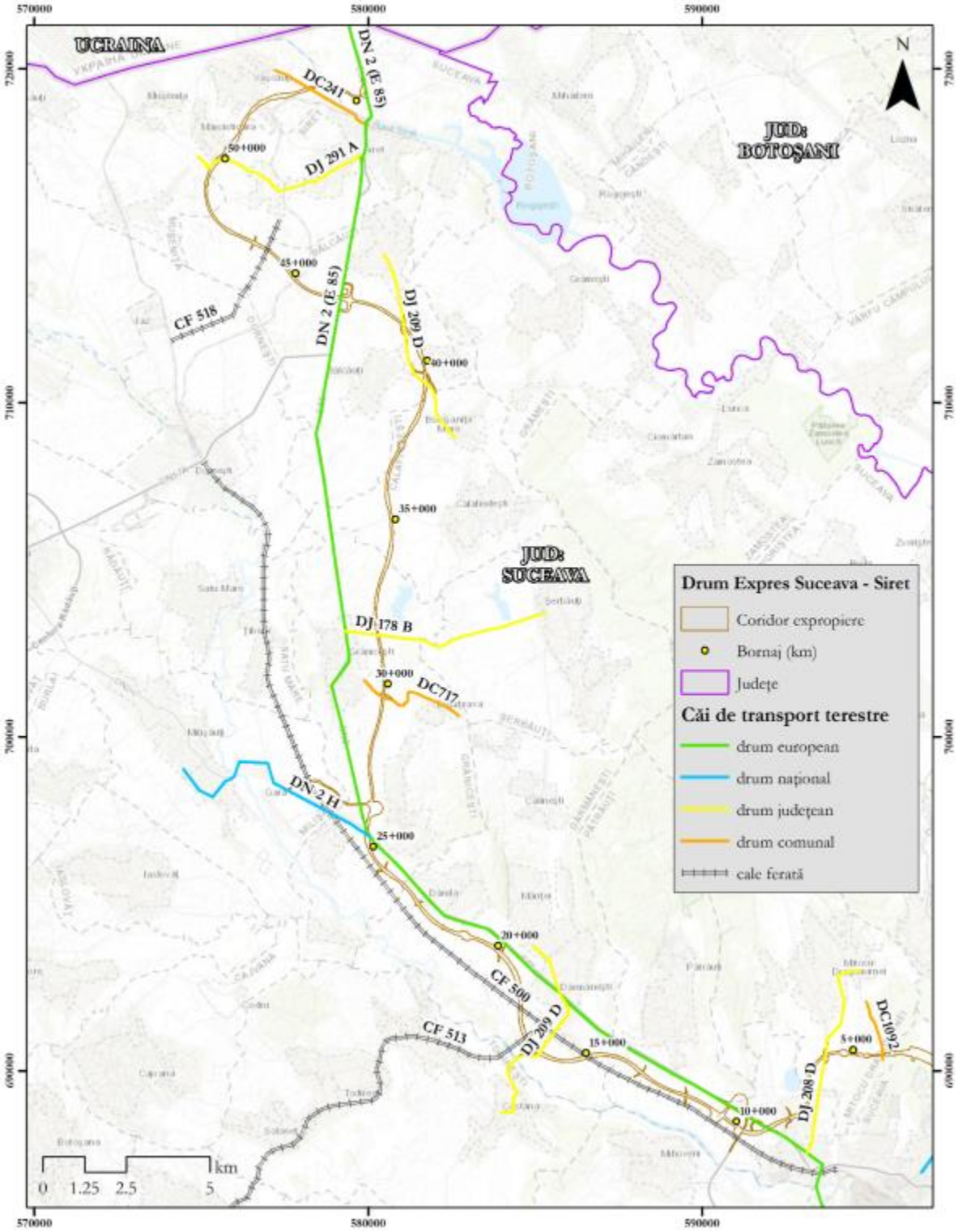

Figure no.5-2 The intersection of the Suceava - Siret motorway in relation to the transport routes

5.1 DISTANCE FROM BORDERS FOR PROJECTS COVERED BY THE 1991 ESPOO CONVENTION

The project limit is approx. 0.8 km from the border with Ukraine. The project represents a section of the DX5 road "Drumul Siretului" that will connect directly with the E85 road in Ukraine.

5.2 LOCATION OF THE SITE IN RELATION TO THE CULTURAL HERITAGE

According to the List of Historical Monuments (2015) approved by Order no. 2314/2004, with subsequent amendments and additions, to the National Archaeological Repertory (cIMeC) and the National Heritage Institute - eGISpat Romania, a series of historical monuments, archaeological sites and architectural monuments were identified in the vicinity of the project development area.

In the project implementation area, there are no UNESCO sites for the protection of cultural values, but there are historical monuments that require protection, which are presented in the following table.

Table no.5-1 Heritage elements located in the vicinity of the project

No. crt.	Identification code (LMI/RAN)	Description of the heritage element	Dating	Location	Landmark	Distance from the project boundary (km)
1.	RAN 146272.16	Teodoreni - Burdujeni monastery from Suceava	Medieval era (16th century)	Burdujeni, Suceava county	Cuza Vodă str., no. 19	2
2.	RAN 146361.01	The wooden church dedicated to "Cuvioasa Parascheva" from Mitocaşi	Late medieval period (18th century)	Mitocaşi, Suceava county	The church is located in the eastern sector of the town.	2.5
3.	RAN 146334.01	The archaeological site from Mitocul Dragomirnei - La Stratulat	Neolithic	Mitocu Dragomirnei, Suceava county	The site is located on the Hranita stream, about 500 m east of the Lipoveni water treatment plant	2.2
4.	RAN 146469.01	The archaeological site from Mihoveni - Cahla Morii	La Tène (II-IV century AD)	Mihoveni, Suceava county	The site is located approx. 2 km from the village, on DJ 178A, approx. 200 m from the barracks of the gendarme unit, on the upper terrace of the right banch of the Suceava river	1.5
5.	RAN 149842.01	The archaeological site of the Church "Înălţarea Sfintei Cruci" in Patrăuţi	The Medieval Age (1487)	Patrăuţi, Suceava county	The archaeological site is located approximately 35 m north of the historical monument	1.8

No. crt.	Identification code (LMI/RAN)	Description of the heritage element	Dating	Location	Landmark	Distance from the project boundary (km)
6.	RAN 149012.01	The fortification from Iacobeşti - Dealul Ocup	Medieval era (15th century)	Iacobeşti, Suceava county	It is located approx. 3 km from Iacobeşti.	1
7.	RAN 149021.01	The archaeological site from Românești - Chetriș	Eneolithic	Românești, Suceava county	The European road E 85 (DN2) crosses the surface of the site, the LUKOIL gas station is located on the site, 100 m away is the bifurcation of the road to Rădăuți, 500 m E of the Suceava river.	0.6
8.	RAN 146986.03	The archaeological site from Milișauți - Badeuți	The Bronze Age	Milișauți, Suceava county	The site was identified on both banchs of the Bădeuți stream, the right tributary of the Sucevița, starting from the road bridge of this stream, which intersects the road segment 209A between Suceava and Rădăuți.	1.6
9.	RAN 146986.01	The ruins of the princely court from Milișauți- In the cemetery	Medieval era (15th century)	Milișauți, Suceava county	100 m SW from the ruins of the Church of Stefan cel Mare (on the border with the village of Badeuți)	3.4
10.	RAN 148952.02	The wooden church dedicated to "St. Dumitru" from Rudești	Late medieval period (18th century)	Rudești, Suceava county	The church is located in the northern part of the town, in the cemetery.	1.5
11.	RAN 146673.01	The church dedicated to "St. Onufrie" from Mănăstioara	Medieval era (17th century)	Monastery, Suceava county	The church is located in the southern part of the town.	1
12.	RAN 146664.05	The medieval center of Siret	Medieval era (14th-16th centuries)	Siret city, Suceava county	Between the center of Siret and the Siret river	1
13.	RAN 146664.01	The archaeological site from Siret - Horodiște Hill	Eneolithic	Siret city, Suceava county	The site is located in the current Jewish cemetery.	1.5
14.	RAN 146664.03	The archaeological site from Siret - Sasca Hill	The Iron Age	Siret city, Suceava county	The archaeological site is located approx. 300 m S of the city, on the E20 road	1.8
15.	RAN 146664.06	The church dedicated to "St. John the Baptist" from Siret	Medieval era (17th century)	Siret city, Suceava county	The church is located in the center of the city, in Republic Square, no. 1.	1.5
16.	RAN 146664.04	The church dedicated to "Holy Trinity" from Siret	Medieval era (14th century)	Siret city, Suceava county	The church is located in the eastern part of the town, on Victoriei Street, no. 10.	1.6

5.3 MAPS, PHOTOGRAPHS OF THE SITE THAT CAN PROVIDE INFORMATION ON THE PHYSICAL CHARACTERISTICS OF THE ENVIRONMENT, BOTH NATURAL AND ARTIFICIAL

Within the Memorandum, in different sections, maps are presented with the location of the designed elements in relation to existing elements in the area, including sensitive receptors in the implementation area (natural protected areas, inhabited areas, water bodies, etc.).

As for the inner villages of the localities located in the vicinity of the motorway and the Express Road (at a distance of less than 100 m), there are 13 of them (all from Suceava county), respectively: Suceava Municipality, Mitocu Dragomirnei, Pătrăuţi, Dărmăneşti, Danila, Iacosteşti, Gara, Grănicesti, Bălcăuti, Gropeni , Mănăstioara, Băncesti and Siret.

DX Suceava-Siret does not cross Natura 2000 sites or other types of protected natural areas. In the southern part, the road interchange near Pătrăuţi town, which separates from the express road, is at a distance of 1.3 km from ROSCI0075 Pădurea Pătrăuţi. In the central part of the project, it is located between two surfaces (distances 885/849m) of RONPA0751 Fânetele from Calafindeşti. In the northern part, the interchange near Siret is located at a distance of 450 m from ROSPA0110 Rogojeşti - Bucecea Accumulations. Details on the protected natural areas in the project area are presented in Chapter 13.

DX Suceava - Siret also intersects with 7 bodies of water, details of which are presented in chapter 14.

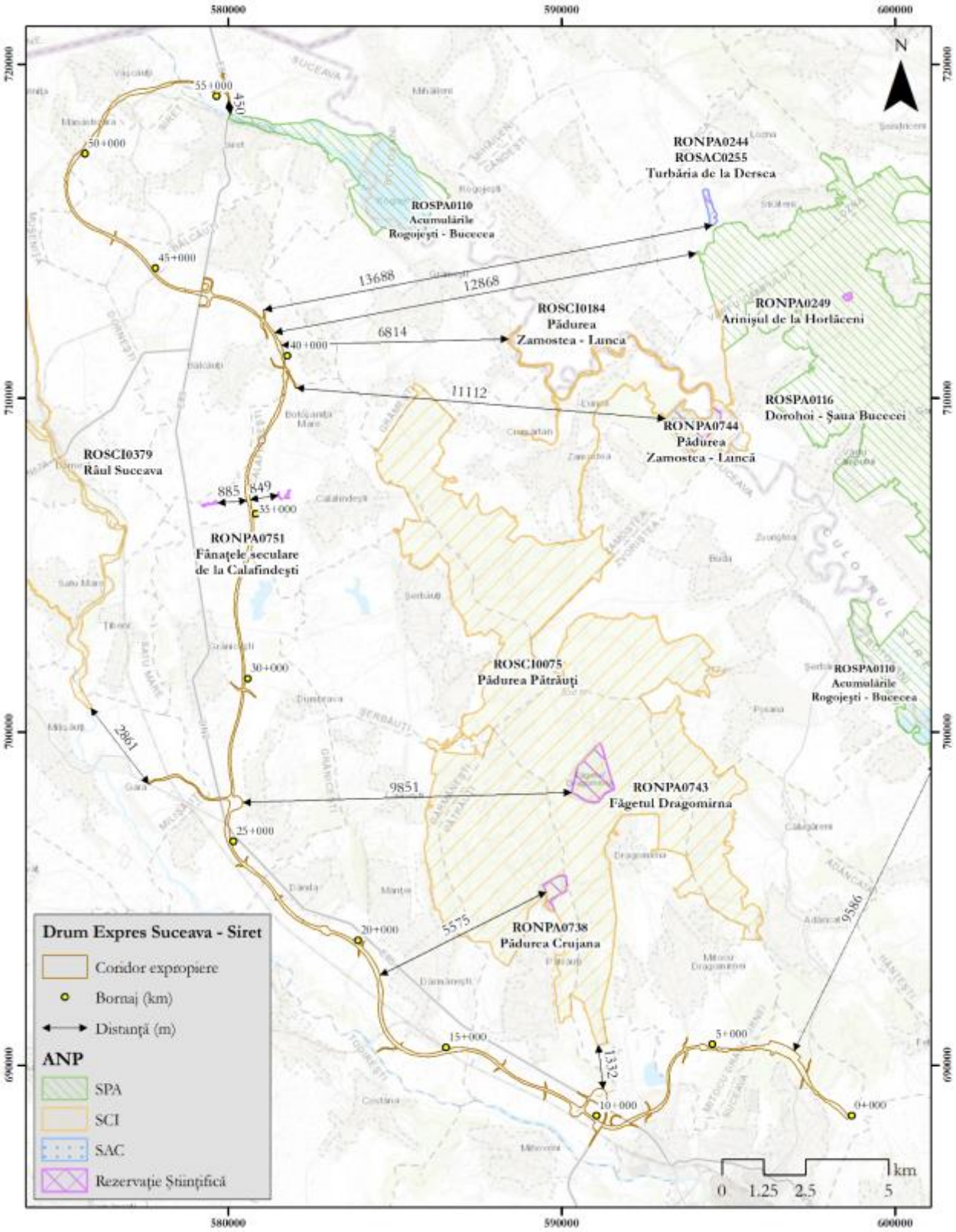

Figure no.5-3 Protected natural areas in the area of the Suceava - Siret motorway project

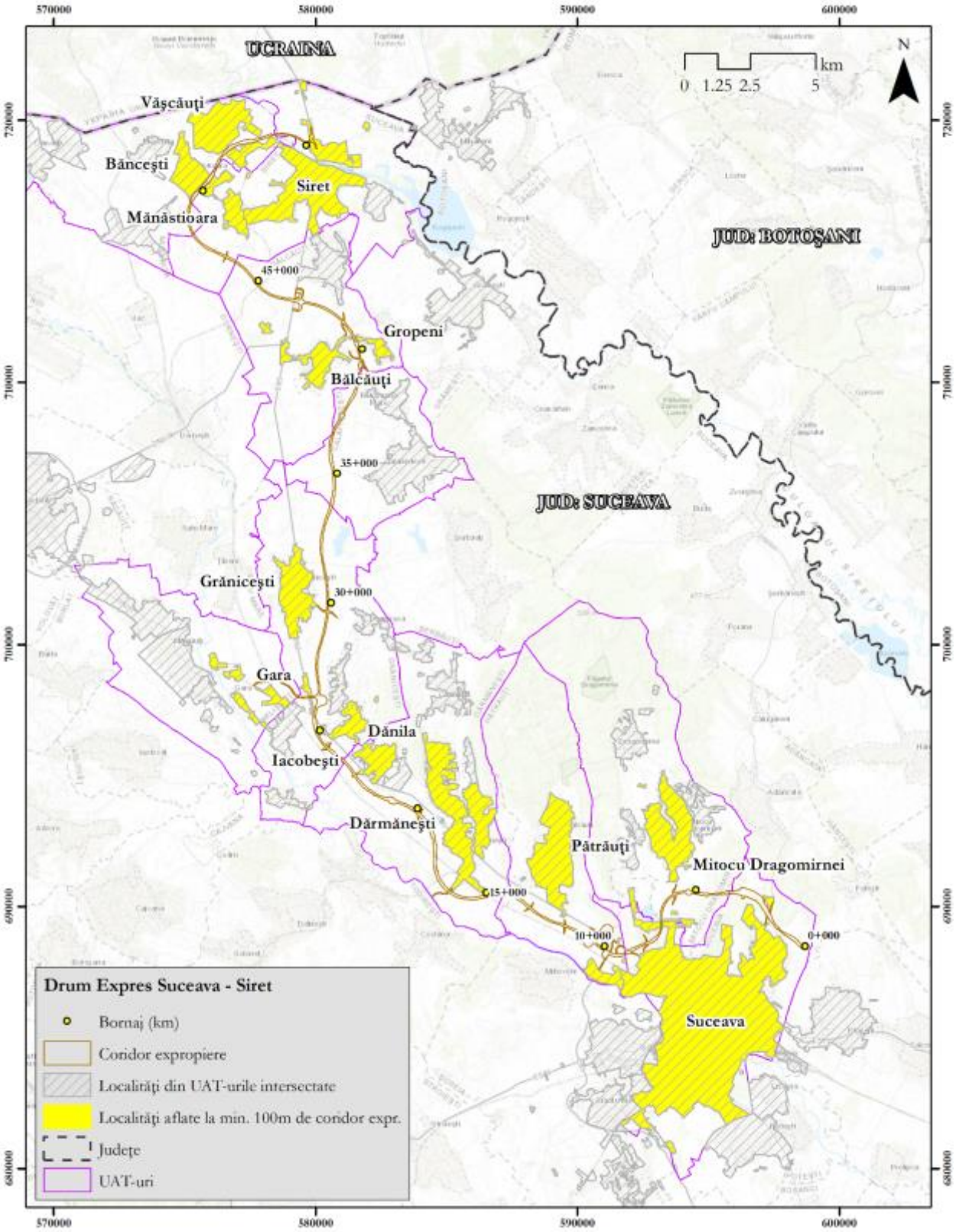

Figure no.5-4 Localities located near the Suceava - Siret motorway

5.4 CURRENT AND PLANNED LAND USE BOTH ON THE SITE AND IN ADJACENT AREAS

According to the land use information (CLC), the realization of the project involves the occupation of land with the following types of current use categories: agricultural, watercourses, forest, roads, railway, archaeological sites, communal household area (Suceava municipality), built-up areas.

The lands affected by the route of the motorway / Express Road 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.

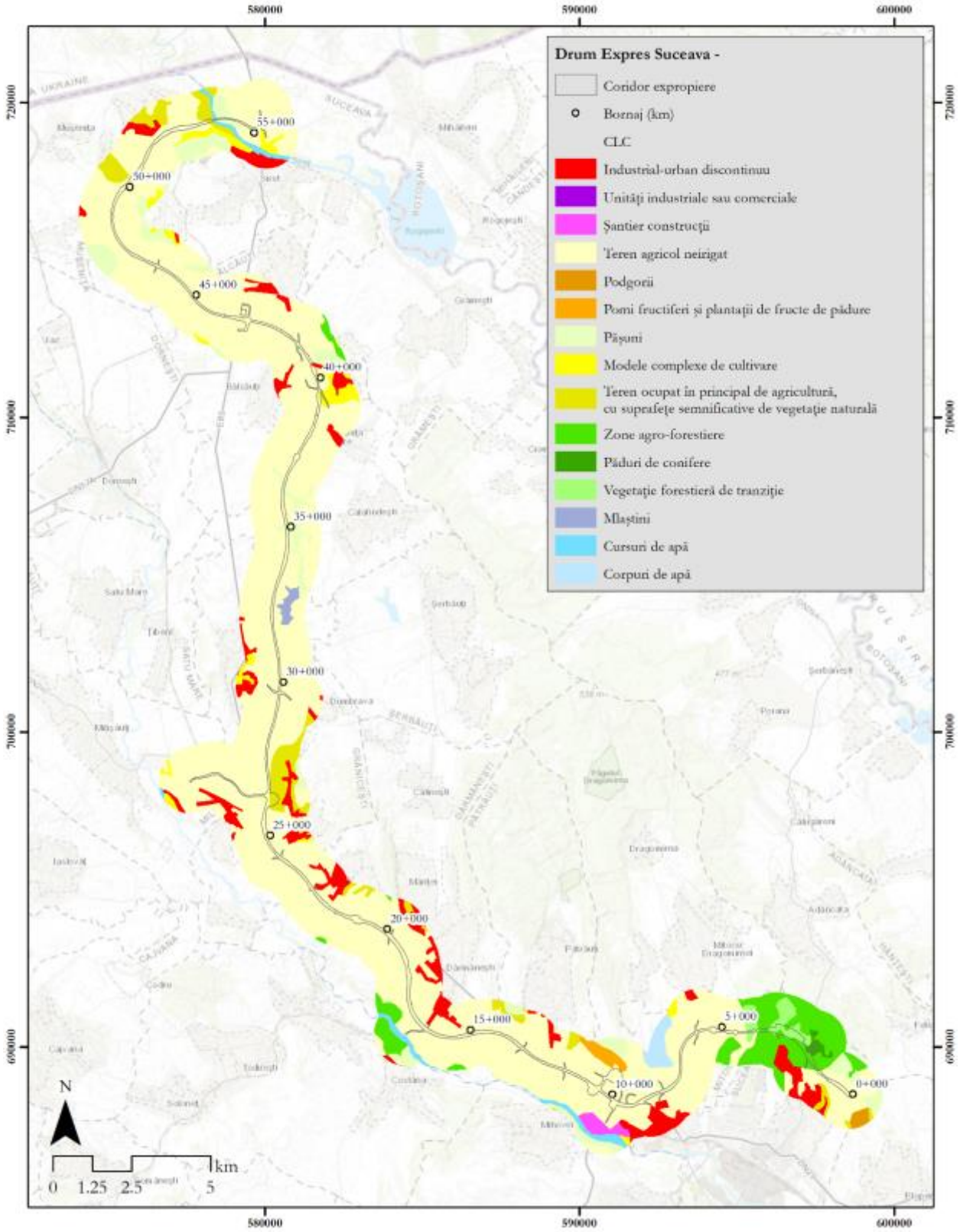

Figure no.5-5 Land use in the vicinity of the motorway / and the Suceava – Siret Express Road of the motorway, according to data extracted from CLC2018

In the vicinity (1 km) of the motorway / Express Road Suceava - Siret, 15 types of land use were identified, predominantly non-irrigated arable land, followed by agro-forestry areas.

5.5 ZONING AND LAND USE POLICIES

In order to obtain the building permit for the analyzed objective, the Urban Planning Certificate No. 192 of 15.12.2022, issued by the Suceava County Council. According to the Urban Planning Certificate issued, the project will develop mainly on landagricultural, watercourses, forests, roads, railway, archaeological sites, communal household area (Suceava municipality), and built-up areas.

From the point of view of the type of land use, the land surface definitively occupied by the investment objective after the implementation of the project, is shown in the following table.

Table no.5-2 The types and areas of land definitively occupied by the designed works

Types of land use	Suceava-Siret express road [ha]
Discontinuous urban space	0.003
Water courses	0.5
Built-up areas	0.2
Land occupied mainly by agriculture, with significant surfaces of natural vegetation	6.7
Forestry	36.7
Complex cultivation patterns	2
Medows	5.1
Transitional forest shrub	21.2
Non-irrigated arable land	535.2

5.6 SENSITIVE AREAS

The sensitive areas in the project area that require a more careful analysis regarding the potential effects that the project may have on them are represented by: protected natural areas, underground and surface water bodies.

Natural protected areas

Autostrada / DX Suceava - Siret does not cross any Natura 2000 site or protected area. However, this is adjacent to Natura 2000 sites (ROSCI0075 Pădurea Pătrăuți, RONPA0751 Secular meadows from Calafandești and ROSPA0110 Acumulările Rogojești - Bucecea). Aspects regarding the location of the analyzed objective in relation to the protected natural areas are presented in the section 6.1.6 and in the chapter13 of this Memorandum.

Underground water bodies

The site where the project is to be implemented overlaps with 2 bodies of underground water that are part of the Siret Hydrographic Basin. Information regarding the water bodies intersected by the project was dealt with in chapter 14 of the Presentation Memorandum.

Surface water bodies

The project intersects 7 bodies of surface water that are part of the Siret hydrographic basin, these being presented and analyzed in the chapter14 from this Memorandum.

Sanitary protection zones related to water catchment fronts used for water supply to the population

In the current stage of the study, the necessary data were not requested from the competent authorities to determine possible intersections with catchment fronts or the related sanitary protection zone.

Places

The project intersects several localities from 10 UATs located in Suceava county. The UAT list is presented in chapter 3 of this Memorandum, and the list of intersected localities is presented in chapter 6.

5.7 GEOGRAPHIC COORDINATES OF THE PROJECT LOCATION

The STEREO 70 coordinates of the project site are presented in shapefile format in Appendix B.

5.8 DETAILS OF ANY SITE OPTIONS THAT HAVE BEEN CONSIDERED

In order to establish route options:

- 1:25,000 scale topographic maps and updated maps were analyzed;
- the variant of bypassing the municipality of Suceava was drawn, a project carried out by CNAIR;
- protected natural areas were identified;
- based on the information received from Transgaz and Transelectrica, the major urban networks were drawn;
- an area of interest for the project, an extended corridor that included all the route variants, was sent to the local authorities (county councils, town halls, Romanian Waters, Forestry Directorate, etc.). In this way, General Urban Plans of some localities and information on ongoing or expected local projects were obtained;
- the preliminary study of resistance to climate change was drawn up, in which risks associated with floods, precipitation, temperature, wildfires, landslides and fog were identified;
- a preliminary geotechnical study was drawn up based on the synthesis of pre-existing information - from the archive and specialized literature and from geotechnical studies previously carried out in areas adjacent to the route, as well as current data regarding the particularities of the proposed route variants;
- based on a preliminary archive study, by consulting published documentary sources and supplemented with information present for the general urban planning plans (PUG) made or updated by several Territorial Administrative Units (UAT), archaeological sites were identified;
- the identified route variants were presented to the Local Authorities, both at AMC1 and at AMC2, in order to avoid obstructing the development of local programs, especially those that are included in the approved Territorial Development Plans, as well as the correlation with these programs;

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- When choosing the route alternatives, we took into account the connection of the motorway and Express Road to the major infrastructure network at the beginning and end of the route.

The Multicriteria Analysis Stage 1 was developed for a number of 8 Route Alternatives made up of the combination of the variants on the Paşcani - Suceava and Suceava - Siret sectors.

To compare the route variants, through the multi-criteria analysis - stage 1, the following general evaluation criteria were provided: technical (10%), financial (60%) and environmental (30%). These were noted in the PSV V7 – SVS V8, PSV V7 – SVS V3.1 and PSV V1 – SVS V4 documentation, in correlation with the variants on the adjacent Suceava – Siret Express Road sector.

The Multicriteria Analysis Stage 2 took into account the analysis of the technical class of the high-speed Paşcani - Suceava - Siret road, according to the Technical Norms regarding the establishment of the technical class of public roads (MT Order no. 1295/2017), runs were carried out for three variants of the motorway route for the entire Ploiesti – Bacău – Paşcani – Suceava – Siret corridor. At the level of 2040 and 2050, the results on the Paşcani - Suceava - Siret sector are presented in the preliminary traffic study.

After establishing the technical class of the road, the stand alone variant (without corridor) was run for a number of 5 variants, these being analyzed within the multicriteria analysis stage 2.

6 DESCRIPTION OF ALL POSSIBLE SIGNIFICANT EFFECTS OF THE PROJECT ON THE ENVIRONMENT

6.1 SOURCES OF POLLUTANTS AND INSTALLATIONS FOR THE RETENTION, EVACUATION AND DISPERSION OF POLLUTANTS IN THE ENVIRONMENT

6.1.1 Water quality protection

6.1.1.1 *Sources of water pollutants, the place of discharge or the emissary*

In the execution stage, 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;
- Construction site traffic to and from the work fronts or the areas from which construction materials are brought (quarries, ballasts, borrow pits);
- 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 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 from the sanitary groups within the site organizations, the management being properly ensured by means of authorized operators;
- Washing machines and means of transport at the site organization level.

In the operating stage, the main source of water pollutants is represented by the washing and entrainment by precipitation of solid particles and other soluble compounds temporarily deposited on the surface of the roadway, such as heavy metals, hydrocarbons, snow removal substances. Potential sources of pollutants can be represented by:

- Direct deposition in surface waters of pollutants generated by vehicles involved in car traffic;
- Improper operation of settling basins and hydrocarbon separators;
- Accidental release of liquid or solid pollutants (mainly due to traffic accidents).

Also, a source of water pollutants can be domestic waste water from the CIC and short-term parking lots, but these waters will be collected and purified before being discharged into the outfalls.

Depending on their nature, pollutants can be of several types:

- Fuels and residues from burning fuels;
- Residues from vehicle tire wear – macromolecular hydrocarbon substances, Zn, Cd;

- Metallic residues from vehicle corrosion - Fe, Cr, Ni, Cd, Cu and from galvanized parapets - Zn, oils and mineral fats;
- Residues from the wear and tear of the motorway surface - solid materials.

6.1.1.2 *The wastewater treatment or pre-treatment stations and installations provided*

The waste water generated during the execution stage of the project will be represented by the waste water generated at the level of the site organizations. They will be collected and discharged periodically by draining, 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.

The waste water resulting from the operation stage will be represented by the waste water resulting from the sanitary groups in the CIC premises and the service spaces / short-term parking lots. They will be treated in their own treatment facilities.

Also, the rainwater potentially contaminated with hydrocarbons, collected from the road surface and from the premises of the motorway facilities will be pre-purified by means of decanters and hydrocarbon separators provided in the project before being discharged into the outfalls.

6.1.1.3 *Measures for the protection of water quality*

In the execution stage, the main measures to reduce the impact on water bodies are:

- When carrying out the works, all the personnel involved will be trained on the need to protect the state of water bodies. The staff training program regarding any risks that could arise during the construction phase of the project will be provided in the Environmental Management Plan (EMP);
- Site organizations and production bases will be provided with sewerage, purification and drainage systems for domestic and rainwater. As the case may be, a system with drainable basins can be adopted, the connection to the nearby sewage networks or the installation of purification and discharge installations in the emissaries;
- Site organizations must be located as far as possible from surface water bodies, in no case less than 50 m from their banchs;
- 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-purified in decanters and hydrocarbon separators before discharge;
- The storage of materials, construction waste, as well as the stationing of machinery in the beds of water courses, drainage canals, irrigation or depression areas is prohibited;
- For site organizations located at distances less than 500 m from a body of water or a tributary water course of a body of water, Intervention Plans in case of accidental pollution will be

developed and rapid intervention systems will be established in case of the occurrence of accidental pollution;

- The placement of temporary access roads, if necessary, will be carried out at the greatest possible distances from the surface water bodies, without affecting the riparian vegetation, the banchs and the substrate of the bed;
- Placing bridge legs in natural surface water bodies will be avoided as much as possible;
- When placing bridge piles in surface water bodies, as well as for any other intervention on water bodies, in confluence areas, it will be considered to avoid bed changes that could lead to the interruption of longitudinal connectivity between tributaries and the main water course ;
- In all locations where it is necessary to remove the riparian vegetation (trees, shrubs on the banchs of the rivers), upon completion of the works, riparian area rehabilitation works will be carried out with the installation of shrubs of native species, corresponding to the riparian plant associations in the respective area, in the locations in which the restoration of tree vegetation is not possible;
- The execution of the designed works will not be carried out, as far as possible, during periods of high water;
- During the entire duration of the investment, data will be requested from the competent authorities regarding the forecast of flows and levels on the watercourses;
- All hydrotechnical works will be carried out with the minimum spatial extension that is able to ensure the protection of the built infrastructures in such a way as to lead to the least possible changes at the level of surface water bodies;
- It will be avoided to propose some structures that can lead to the interruption of longitudinal connectivity (e.g. bottom thresholds above the thalweg);
- The fuels will be stored in sealed tanks with retention tanks, so that no losses occur, and the used oils will be collected in specially built tanks and later handed over to specialized units;
- For the construction works, materials will not be excavated from river beds, water flows will not be taken, materials will not be stored at distances less than 50 m from the river bed limit. Exceptions are interventions in case of emergency situations;
- It will be forbidden to cross the riverbed with machines, in this sense it is necessary to provide temporary bridges, in compliance with the other measures provided in the present documentation;
- The temporary works in the beds intended for the execution of the basic works: water diversion, shore defenses, dams, earth or stone deposits, will be done without affecting the morphology of the minor and major beds, their dynamics and evolution, by changing the flow regime and increasing the risk of floodability upstream, on the watercourses where the designed works are carried out;
- The placement of the works of art will be done in such a way as to avoid blocking the bed or changing the dynamics of water flow by reducing its section;

- Measures will be taken to stabilize the bed of the bed, to avoid blocking the bed or reducing its section, to protect the existing hydrotechnical works and the undercrossings of water courses with pipes;
- Drainage of rainwater from the perimeters where works are performed will be ensured to avoid water stagnation;
- Crossing watercourses will be avoided as much as possible to ensure the access roads to the works;
- During the execution of the works, the extraction of gravel and sand from the river beds is prohibited without the approval of the Romanian National Water Administration. The extraction of ballast products will be done according to the technologies approved by the Romanian Waters National Administration, so as to avoid changing the flow speed and water depth through pits or deposits of construction materials and ballast on the bottom of the water and accidental pollution of the water with petroleum products;
- It is forbidden to wash vehicles inside or in the immediate vicinity of watercourses and irrigation-drainage channels;
- Special measures will be taken to secure the works during the execution period, against flooding caused by flood waves from the water course and leakages from the adjacent surfaces in the area as a result of precipitation;
- Special measures will be taken to protect the surface and underground waters in the protection zones, to prevent possible contamination through infiltrations or uncontrolled leaks from the construction areas;
- It is forbidden to dump any type of waste or leftover materials into permanent or non-permanent watercourses;
- Discharge of untreated wastewater, residues or waste into surface or underground water is prohibited;
- It is forbidden to degrade the bed and banchs of water courses during the execution (except for the works provided for in the Water Management Approval);
- The protection of the water supply and sewage pipes that cross the project route will be carried out (in the areas where their existence was highlighted);
- Dimensioning of the ditches, gutters and casings provided, which must take the meteoric waters and channel them to the decks and bridges, will be ensured, so as to ensure a correct drainage of the roadway and avoid its flooding;
- During the execution of the works and after their completion, the bed will be freed of any materials that would prevent the normal flow of water;
- After the completion of the hydrotechnical works, the site will be cleared of the temporary works and the remaining materials to avoid affecting water courses, canals or the water table;
- The Accidental Pollution Prevention Plan will be drawn up and those responsible for its implementation will be appointed;

- Exploitation of existing surface and underground waters in protected natural areas is prohibited;
- The water supply of the motorway equipment (short-term parking lots, service spaces and CIC) that cannot be connected to the existing networks, will be provided from its own sources. Drilling and exploitation of underground water resources will be done with the approval of the Romanian National Water Administration;
- The rules for exploiting underground water resources will be respected and measures will be provided to reduce losses and wastage. When the water supply sources are put into operation, physical-chemical and bacteriological analyzes will be carried out to establish potability;
- It will be avoided that the construction works affect the drainage of underground water;
- Liquid fuel storage tanks shall be placed in a sealed protective enclosure capable of supporting at least 110% of the total volume of the tank with an appropriate clearance height. Fill / discharge pipes will be located to ensure that the spilled substance is kept in the tank and all valves will be able to be blocked. Tanks will be checked and cleaned at regular intervals, including hatches and oil and fuel filters;
- Any large tanks / tankers with integral discharge hose and nozzle shall be provided with means of protection and with blocking of the nozzle above the maximum filling level, the nozzle being locked in position when not in use;
- A feed area shall be designated around the storage tanks and shall include a sloped concrete platform with drain into a steel pan or other watertight container;
- All 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;
- All mobile equipment such as pumps, excavators, trucks, etc., used on the site shall be in good condition and shall not leak lubricating and hydraulic oils, the steel drain trays being placed under them if they are not in use;
- All containers for chemicals and lubricants (eg solvents, hydraulic fluid, forming oil, etc.) used on site shall be stored in steel or other approved material trays of appropriate volume;
- In the event of accidental spills of fuel or chemicals on the construction site, work in the vicinity of the spill will be stopped, the source will be shut down and the contaminated soil will be excavated and removed from the construction site and transported immediately to an approved disposal location;
- The Contractor shall provide adequate and efficient sanitary facilities for his personnel and labor in suitable locations throughout the Works. All toilets will be ecological and will be emptied regularly or connected to the sewage network;
- The contractor will maintain all the toilets in an adequate working condition, for the entire duration of the execution of the works. If they are not connected to the sewage network, the toilets will be equipped with a watertight tank. The tanks will be monitored to identify the level and emptied regularly.

In the operation stage, the main measures to reduce the impact on water bodies are:

- Identification of alternative solutions/substances, with lower effects on the environment (water and soil), for the total or partial replacement of sodium chloride and calcium chloride used for snow removal during the winter period;
- The rules of sanitary protection of underground or surface water supply sources will be respected;
- The water supply of the motorway equipment that cannot be connected to the existing networks will be provided from its own sources. The exploitation of underground water resources will be based on the Water Management Authorization issued by the Romanian National Water Administration;
- The rules for exploiting underground water resources will be respected and measures will be provided to reduce losses and wastage. When the water supply sources are put into operation, physical-chemical and bacteriological analyzes will be carried out to establish potability;
- The quality indicators of the pre-purified wastewater that will be discharged into the sewerage networks of the localities will fall within the provisions of NTPA 002/2002 (HG no. 188/2002 Annex no. 2, with subsequent amendments and additions), and those of the pre-purified waste discharged in natural emissions will comply with the maximum admissible concentrations provided by NTPA 001/2002 (HG no. 188/2002 Annex no. 3, with subsequent amendments and additions);
- Commissioning and exploitation of works built on the waters and related to the waters, including any water supply boreholes, will be done only on the basis of the Water Management Authorization;
- It is forbidden to dump any type of waste or leftover materials into permanent or non-permanent watercourses;
- Discharge of untreated waste water into surface or underground water is prohibited.

6.1.2 Air quality protection

6.1.2.1 *Sources of air pollutants, pollutants*

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

- The activities of handling earth masses (excavation of fertile soil, excavations, fillings, leveling, loading, unloading, transport), some construction materials (sand, gravel, ballast) and waste from demolitions - undirected stationary sources. Pollutants: suspended dust and sedimentable dust;
- Temporary storage of powdery materials (sand, soil) 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, suspended dust;
- Diesel storage. Pollutants: volatile organic compounds (VOC);
- 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 powders, 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 filling works, the construction of the motorway embankment and the construction of artworks. 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, the vehicles that will ensure the transport of the construction materials, as well as the supply of materials necessary for the construction works, as well as the vehicles necessary for the evacuation of 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, drilling rig, 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 by the vehicles that will transit the motorway. According to the EMEP/EEA Corine Air 2019 guide, 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.

6.1.2.2 *Installations for the retention and dispersion of pollutants in the atmosphere*

In the execution stage, installations for the retention and dispersion of pollutants in the atmosphere will be provided for the asphalt mixture manufacturing stations, concrete stations, stabilized ballast manufacturing stations and crushers.

In the **operating stage** the only measures that can influence the dispersion in the atmosphere of pollutants emitted by car traffic on the motorway are represented by sound-absorbing panels (with a role in reducing the horizontal dispersion of pollutants and favoring vertical dispersion) and the plantations that are the object of landscaping.

6.1.2.3 *Proposed measures for air quality protection*

To reduce the impact on air quality, it is recommended to take the following measures during the execution of the works:

- The limitation of particle emissions generated by the activities of handling earth masses will be achieved by:
  - surface wetting activities;
  - covering transport vehicles loaded with powdery materials;
  - limiting the speed of movement of heavy vehicles for the transport of materials.
- Limitation of atmospheric pollutant emissions at concrete and asphalt preparation plants by equipping them with pollutant and dust retention systems (capture-purification);
- The use of equipment and machinery technically compliant with the best existing technologies;
- During the periods without precipitation, wetting of access roads and areas with active works will be ensured in order to reduce particle emissions and bring the concentrations (PM10/ PM2.5) within the limit values provided by the legislation in force;
- The transport of earth, waste and any materials that release dust will be carried out at the level of the entire project exclusively with trucks covered with tarpaulins (tarpaulins for pits) in order to reduce particle emissions;
- Cleaning vehicle wheels before leaving the site on public roads;
- During the demolition/decommissioning works, wetting of the materials will be ensured to minimize particle emissions;
- Periodic technical checks of vehicles and equipment used to carry out the works;
- Avoiding the execution of works that involve the handling of soil quantities (excavation/filling) during periods with strong winds;
- Ensuring a correct management of the materials used during the construction period;
- Stopping the machines' engines during the periods when they are not involved in the activity;
- Proper disposal of the resulting waste;

- Stabilization of the areas where construction materials were obtained, respectively of the areas where slope works were carried out and where surplus excavated material deposits were set up;
- Landscaping of all areas affected by the execution works.

During the operation period, it is necessary to implement the following measures:

- Based on air quality monitoring in the localities adjacent to the motorway, traffic adaptation measures will be implemented so as to avoid exceeding the maximum concentrations of air pollutants at the level of the closest sensitive receptors;
- The most important measure to reduce air pollution at the motorway level will be to comply with the European norms regarding the quality of fuels and vehicles in terms of the imposed pollution norms.

6.1.3 Protection against noise and vibrations

6.1.3.1 *Noise and vibration sources*

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:

- Car traffic from the area of site organizations, work fronts, from access roads, to and from areas for obtaining construction materials (borrowing pits, quarries, ballast yards, storage areas);
- The activities in the work fronts, excavation, handling of ballast materials, respectively their loading and unloading;
- Operation of asphalt and concrete stations, asphalt/concrete pouring;
- The operation of the machines involved in the construction process (transporters, heavy-duty trucks, concrete mixers, excavators, cranes, bulldozers, compressors) - the operation of engines, the handling and transport of loads.

During the operation stage, the main sources of noise and vibrations will be generated by traffic on the motorway (traffic and maintenance activity), which will be permanent, carried out during the entire operation period.

6.1.3.2 *Arrangements and equipment for protection against noise and vibrations*

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

The measures required to avoid and reduce the noise and vibrations generated during the execution stage will consist of:

- Limiting the operation of machinery and vehicles (including asphalt and concrete stations) to the established work schedule;
- Avoiding carrying out construction works during sensitive periods for protected species of fauna (depositing of bridges and nesting: April-May);
- Establishing access routes/roads outside inhabited areas (bypassing localities, as far as possible) and areas with high sensitivity for fauna species and their strict compliance;
- Limiting the speed of movement of machines and vehicles (about 40 km/h), especially in areas where access through localities cannot be avoided;
- Construction works will be carried out at distances of less than 200 meters from inhabited areas/objectives only during the day between 06:00 - 22:00;
- The location of the site organizations will be done in such a way as to ensure the protection of inhabited areas.

In the operating stage, the noise level values must not exceed the maximum admissible limits, established by the legislation in force, respectively Order no. 119/2014 for the approval of the Hygiene and Public Health Norms regarding the living environment of the population, with subsequent amendments and additions. In this sense, in addition to the installation of sound-absorbing panels, additional traffic management measures can be taken, such as limiting the maximum speed of vehicles.

A preliminary analysis on the noise generated during the operating period was carried out in order to propose the installation locations of the sound-absorbing panels.In this sense, sound-absorbing panels are included in the project in the areas where the route of the motorway and the Express Road approach the sensitive receivers.

6.1.4 Protection against radiation

6.1.4.1 *Radiation sources*

During the activities carried out during the execution of the project, as well as during the operating period, no radioactive substances will be used or transported.

The project will not generate radioactive pollution. The existing sources of radiation at the level of the objectives proposed by the project do not exceed the radiation found in homes equipped with household appliances.

6.1.4.2 *Light pollution*

Suceava Motorway - DN2H and DN2H - Siret Border Express Road 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 motorway, including interchanges and other structures.

To analyze the current level of light pollution in the areamotorways Suceava - DN2H and DN2H - Siret Border Express Road publicly available resources were used. Light pollution map[1]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[2]and based on the quantification of the level of light pollution 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 motorway area is the one near Suceava, near the motorway. Other areas where an average level of light pollution can be observed are the localities of Siret, Pătrăuţi, Dărmăneşti. The following map shows Suceava motorway - DN2H and DN2H - Siret Border Express Road and the level of light pollution near it (based on the data set associated with the work of Falchi et al. from 2016). In the following table, the scale of the range of light pollution values is highlighted.

Table6-1 The scale of the range of light pollution values for the Suceava-Siret Express Road

No. Crt.	Range of values (mcd/m2)[3]	Name
1.	0.001 - 0.30	Insignificant
2.	0.03 - 0.05	Very weak
3.	0.05 - 0.06	Weak
4.	0.06 - 0.08	Weak
5.	0.08 - 0.10	Moderate
6.	0.10 - 0.15	Moderate
7.	0.15 - 0.24	Moderate
8.	0.24 - 0.38	Moderate
9.	0.38 - 0.61	Moderate
10.	0.61 - 1.02	High
11.	1.02 - 1.70	High
12.	1.70 - 2.85	Very high
13.	2.85 - 4.79	Very high
14.	4.79 - 8.09	Very high

[1]The map is available at the following addresshttps://www.lightpollutionmap.info/#zoom=8.67&lat=46.4735&lon=25.6189&layers=B0FFFFFFFTFFFFFFFFFF

[2]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.

[3]1 000 Millicandela [mcd]= 1 Candela [cd]; Candela is the luminous intensity, in a given direction, of a source emitting monochromatic radiation

Credit: Falchi et al., Sci. Adv., Jakob Grothe/NPS contractor, Matthew Price/CIRES.

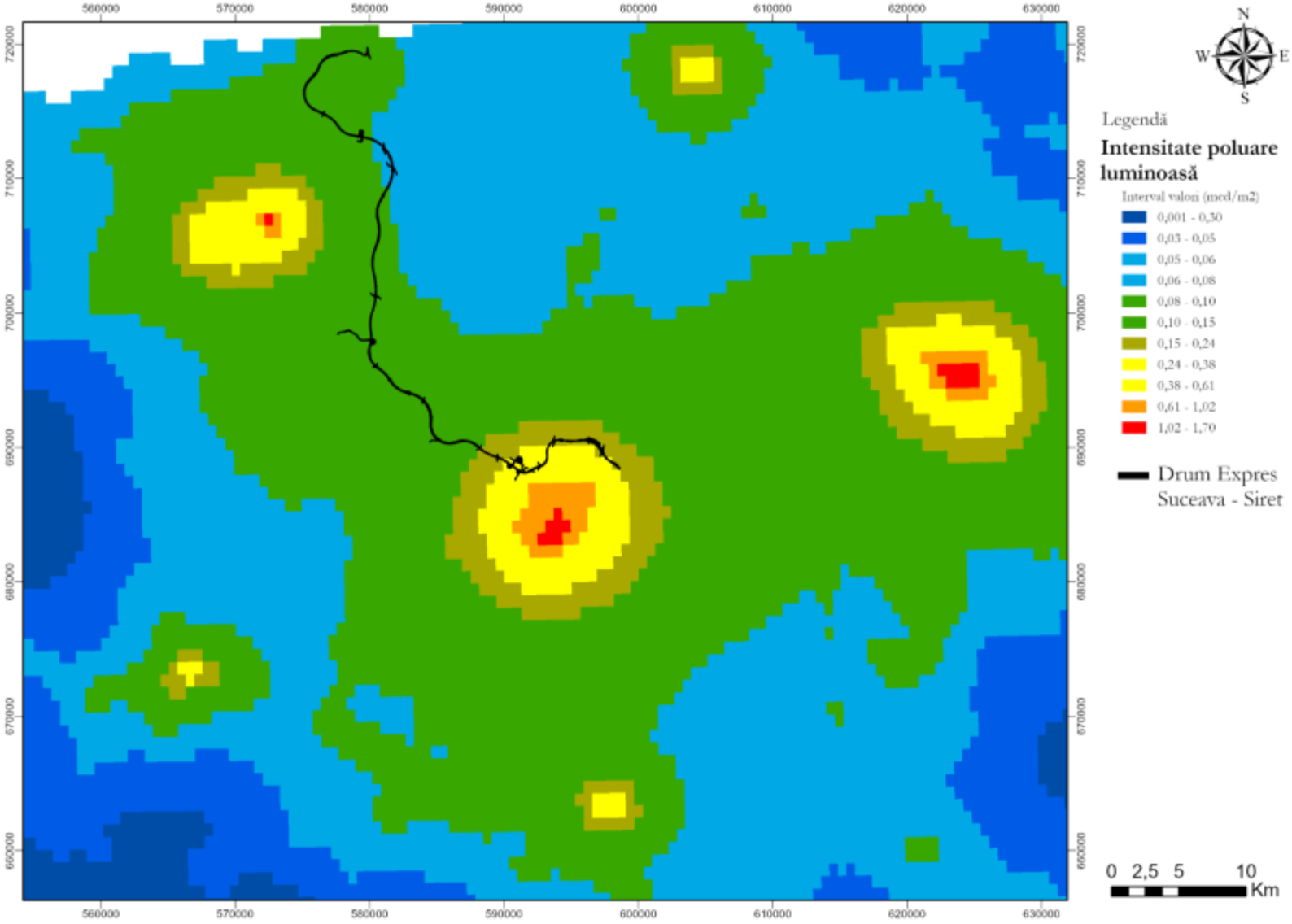

Figure no.6-1 The existing level of light pollution in the area of the Suceava - DN2H motorway and the DN2H – Siret Border Express Road

6.1.4.3 *Arrangements and facilities for protection against radiation*

At the time of drafting this Memorandum, no details are provided regarding the lighting solutions proposed for the motorway. These will be finalized and analyzed in the Environmental Impact Report.

6.1.5 Soil and subsoil protection

6.1.5.1 *Sources of pollutants for soil, subsoil and groundwater*

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;
- Soil quality degradation 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 CO, 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 motorway maintenance activities, which causes an input of chlorides into the soil and surface waters by entrainment of particles by rainwater, as well as damage to the vegetation on the side of the motorway.

The project may generate a potential impact on the geology during the construction period, as a result of the construction of the piles, the bridge abutments.

6.1.5.2 *Works and facilities for soil and subsoil protection*

In the framework of the project, the following works and facilities are provided for the protection of the soil and the basement:

- The lands temporarily occupied for the placement of roads and temporary platforms will be limited only to the surfaces necessary for the work front, and the occupied space will be fenced;
- The removed layer of topsoil will be stored in separate piles and will be reinstalled after the completion of the works, to make possible the natural re-installation of the vegetation;
- In case of soil contamination, the affected portion will be removed and treated/eliminated depending on the type of contamination; site organizations will be properly equipped with specific absorbent materials for interventions in case of accidental pollution;
- Upon completion of the construction works, the temporarily affected lands will be rehabilitated; it is recommended to use the vegetal soil uncovered at the beginning of the works, in order to preserve the same structural qualities of it, respectively the maintenance of the seed banch;
- The areas that were affected by the vegetation clearing works will be properly stabilized, and in the areas left free after the completion of the constructions, the initial vegetation will be restored;
- In the areas where special works will be carried out: embankments, deblees, storage areas for surplus excavated materials, consolidation works will be carried out to prevent the effects of sliding and erosion.

6.1.5.3 *Proposed measures for soil protection*

To avoid and reduce the impact on the soil during the construction phase, the following measures are recommended:

- As part of the site organization, priority will be given to solutions that ensure the reduction of the areas at which it is necessary to remove the natural vegetation, as well as the construction of foundations and definitive platforms;
- The topsoil layer will be gradually removed, as the earthworks progress. The fertile soil will be stored in separate piles for reuse during the rehabilitation works, both in the areas with temporary works and on the surface of the rehabilitated areas in the permanent works;

- When choosing storage areas for uncovered fertile soil and/or other excavated soil, valuable surfaces from the point of view of the productive capacity of the soil (surfaces with natural vegetation and agricultural lands) will be avoided;
- Coordinating construction activities (within the same section as well as between project sections) in such a way as to achieve a maximum utilization of the excavated earth with the minimization of the areas and durations of temporary storage as well as the areas of permanent storage of the earth/rocks that cannot be reused as construction materials;
- Soil pollution with oils and petroleum products will be avoided by ensuring the proper operation of equipment and performing maintenance operations in specially designated spaces;
- 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 in appropriate containers, in specially designed spaces;
- A soil erosion prevention and landscape management plan must be developed in the technical design stage to ensure consideration of the erosion issues generated by stormwater runoff and to identify appropriate solutions for the collection and evacuation of these waters;
- The storage areas for the excavated material will be designed and managed in such a way as to ensure the control of sediment entrainment in meteoric waters by minimizing the length and angle of the slopes;
- Installation of local control measures such as sediment retention fences or decanters;
- Collecting and discharging meteoric waters to avoid their mixing with waters containing sediments;
- The use of technically appropriate vehicles for the execution of the works, as well as for the transport of materials and for the collection and transport of waste resulting from the construction works;
- Maintenance, refueling or cleaning of vehicles and equipment will be carried out in specially arranged places, located away from sensitive areas or inside the site organizations;
- 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 from accidental leaks and infiltrations;
- Strict compliance with the rules of waste management, fuel distribution and supply, disposal of waste water and emptying of ecological toilets;
- Occupancy of land areas in addition to those provided by the project will be avoided;
- The lands temporarily occupied for the placement of roads and temporary platforms will be limited only to the surfaces necessary for the work front, and the occupied space will be fenced;

- The removed layer of topsoil will be stored in separate piles and will be reinstalled after the completion of the works, to make possible the natural re-installation of the vegetation;
- Works will be carried out to combat soil erosion in the receiving basin of the watercourses on which the designed works are carried out, so as to reduce the risk of floods and landslides during the execution period;
- In case of soil contamination, the affected portion will be removed and treated/disposed of depending on the type of contamination; site organizations will be properly equipped with specific absorbent materials for each type of material / substance that can cause pollution following improper management;
- Upon completion of the construction works, the temporarily affected lands will be restored to their original state; it is recommended to use the topsoil uncovered at the beginning of the works, in order to preserve the same structural qualities of it, respectively the maintenance of the seed banch;
- The areas that were affected by the removal of vegetation will be properly stabilized, and in the areas left free after the completion of the constructions, the initial vegetation will be restored;
- In the areas where special works have been carried out: embankments, deblees, storage areas for surplus excavated materials, consolidation works will be carried out to prevent the effects of sliding and erosion.

The following are recommended for the operating stage:

- Land consolidation works will be permanently checked and maintained;
- Maintenance, refueling or cleaning of vehicles and maintenance equipment will be carried out in specially arranged places, located away from sensitive areas;
- Strict compliance with the rules of waste management, fuel distribution and supply, disposal of waste water and emptying of ecological toilets;
- Monitoring the concentrations of pollutants in the soil on the agricultural lands in the immediate vicinity of the motorway, with the information of the competent environmental authorities and the town halls in case the concentrations exceed the alert thresholds provided by the legislation in force. The information must contain details regarding the crops that may present a risk to human health as a result of the accumulation of pollutants in the body of the plants, depending on the concentrations of pollutants identified.

6.1.5.4 *Proposed measures for the protection of the basement*

During the execution of the construction works, it is recommended to implement the following measures:

- Measures will be taken to support and strengthen areas susceptible to collapse or sliding;
- The construction methodology will include techniques that incorporate excavation risk assessment and slope stability requirements, both inside and outside the project boundary

(including in the area of site organizations, borrow pits and storage areas of the excavated earth);

- High-performance machines and equipment will be used for the execution of excavation works to reduce the excavated volume and to ensure the stability of the areas in the vicinity of the excavated areas;
- In the event that the water table is intercepted, appropriate drainage and correction measures will be taken;
- The slopes will be arranged to ensure stability and will be grassed;
- It is necessary to provide longitudinal drains, horizontally drilled drains and drains on the slope for the collection and evacuation of infiltration and seepage waters, so as to ensure the conditions of general and local stability.

6.1.6 Protection of terrestrial and aquatic ecosystems

6.1.6.1 *Identification of sensitive areas that may be affected by the project*

The main sensitive areas from the point of view of terrestrial and aquatic ecosystems, which may be affected by the project, are represented by:

- Natural areas protected by community interest and national interest;
- Ecological corridor areas;
- Important transit areas for large fauna outside the ecological corridors;
- Crossing areas of some aquatic ecosystems.

a. Natural areas protected by community interest

Suceava Motorway - DN2H and DN2H - Siret Border Express Road the Natura 2000 site ROSPA0110 Rogojești-Bucecea Acumulations is located nearby. This road also borders several protected natural areas of community interest (described in detail in chapter 13 of this Memorandum).

The following map shows Suceava Motorway - DN2H and DN2H - Siret Border Express Road in relation to the Natura 2000 sites located near the project.

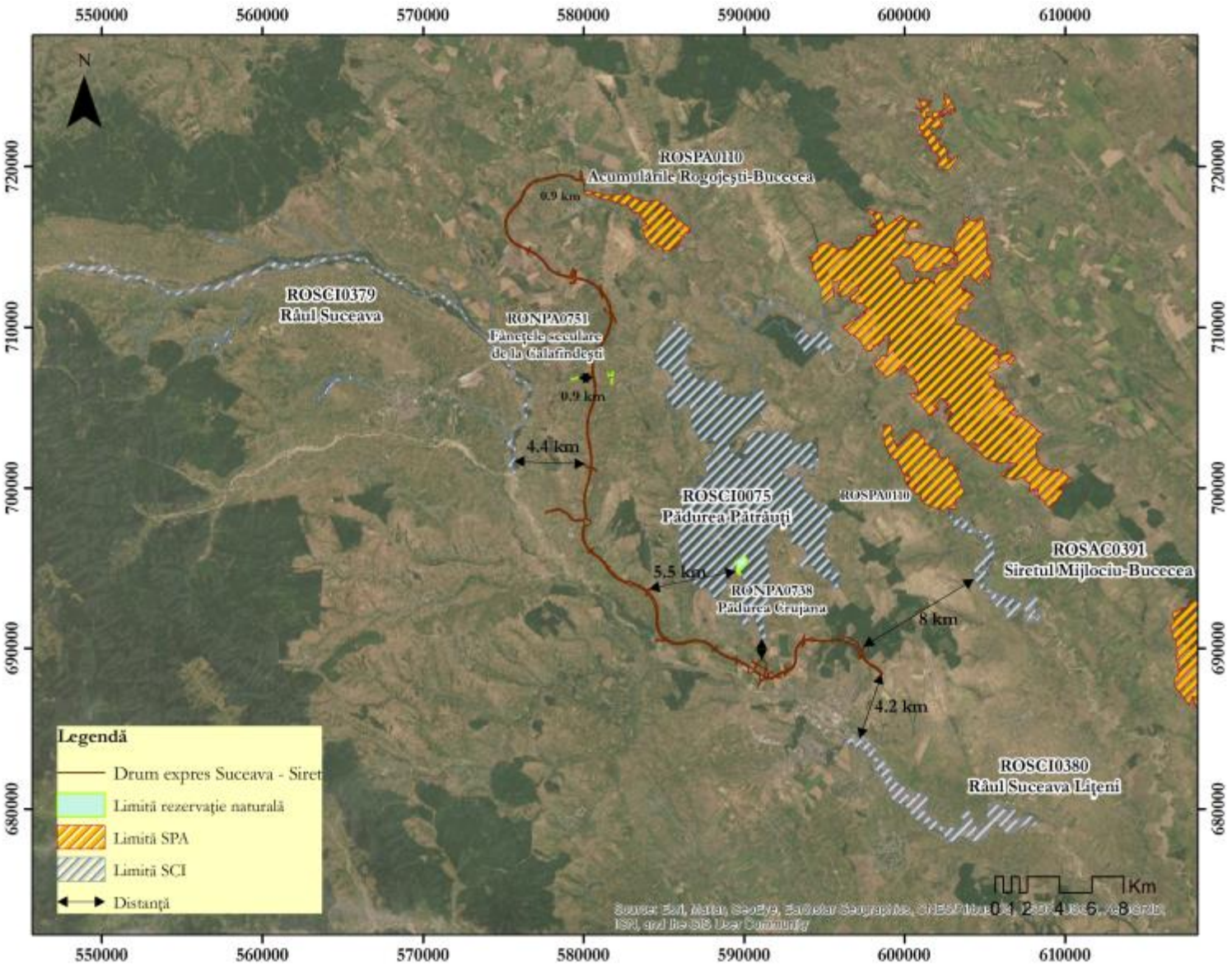

Figure no.6-2 Natura 2000 sites in the project area

b. Ecological corridor areas and other wildlife transit areas

For the motorway and the Express Road, 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"[4]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 on 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.

[4]The large mammal report resulting from this project is available at http://corehabs.ro/images/rapoarte/1.%20METODOLOGIE%20CARNIVORE.pdf

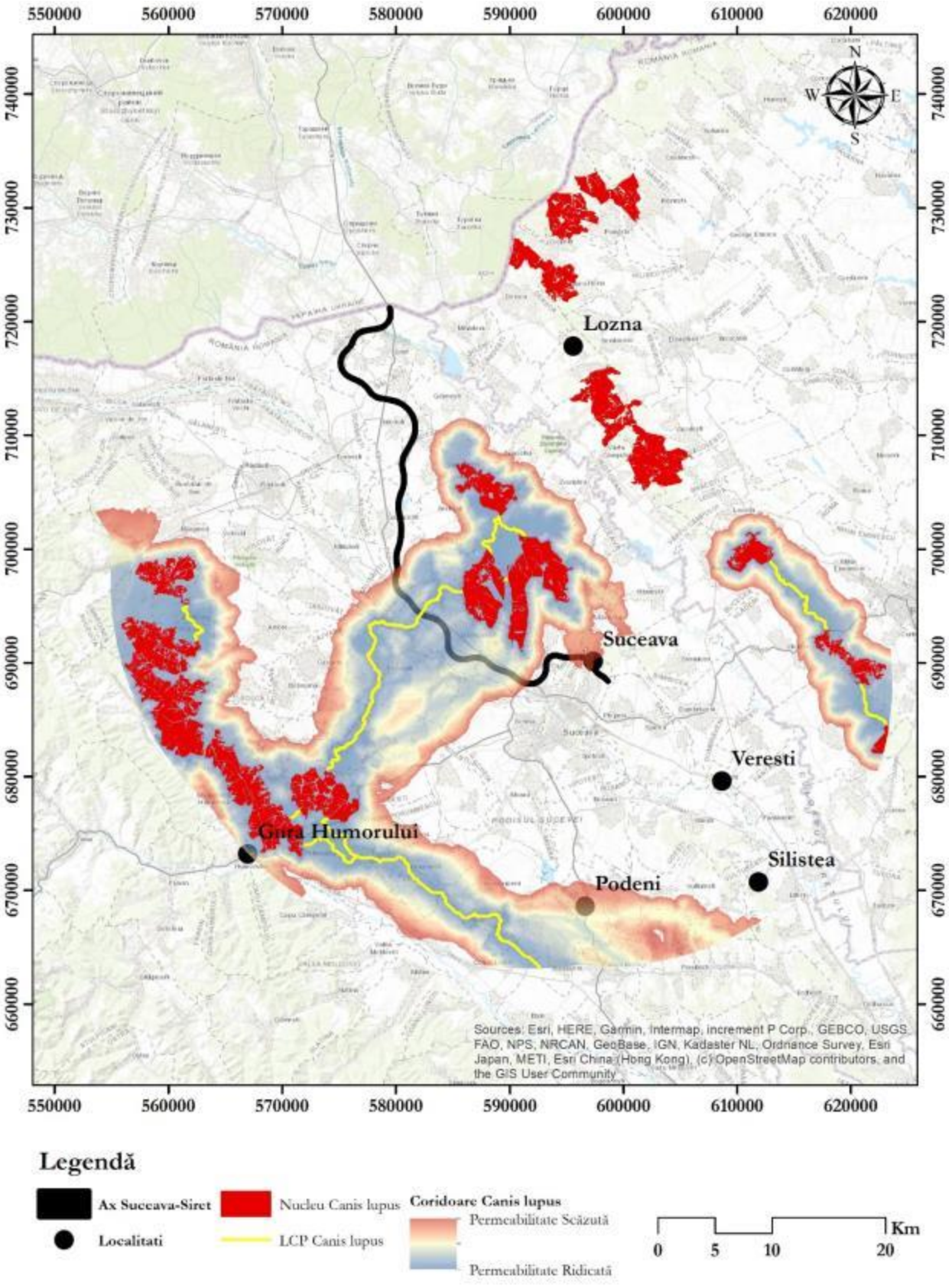

Figure no.6-3 The main area considered important for the movement of the Canis lupus species (marked in yellow). The areas were determined based on ecological connectivity modeling and observations from the specialized literature

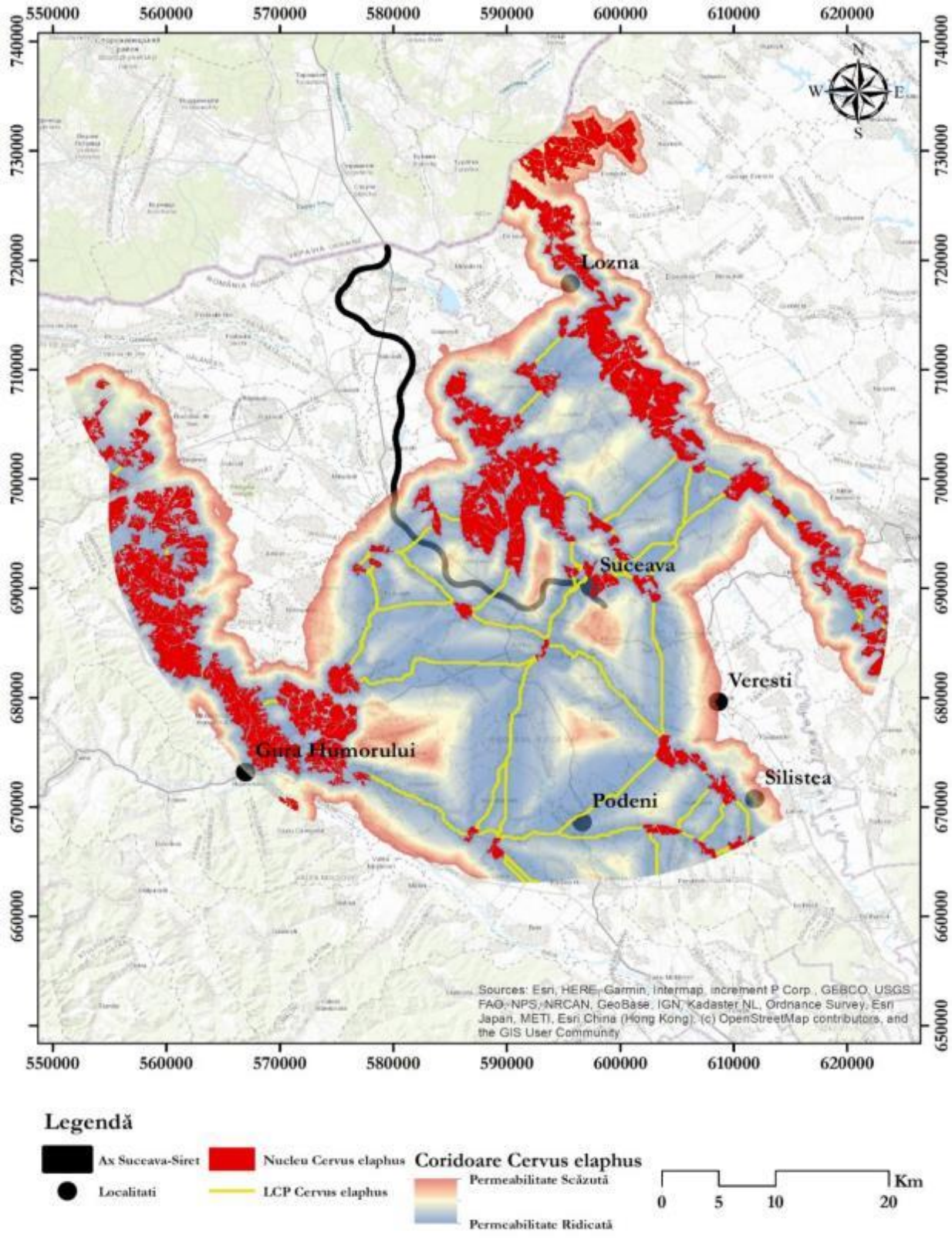

Figure no.6-4 The main area considered important for the movement of the Cervus elaphus species (marked in yellow). The areas were determined based on ecological connectivity modeling and observations from the specialized literature

c. Crossing areas of some aquatic ecosystems

The proposed route of the motorway and Express Road crosses several aquatic ecosystems. The rivers and bodies of water crossed by the motorway are presented in detail in chapter 14 of this Memorandum. There are bodies of water crossed by the motorway / Express Road that are connected to SCI. The main tributaries springing from the ROSCI0075 Pădurea Pătrăuți site are intersected by the analyzed project and then flow downstream into the Suceava river. It is located inside the site ROSCI0380 Suceava Liteni River, which may be affected by potential water pollution.

6.1.6.2 *Works, facilities and measures for the protection of biodiversity, natural monuments and protected areas*

In order to protect biodiversity components, a series of measures and facilities are provided, such as:

- Undercrossings and overcrossings to maintain permeability for fauna species;
- Preventing the collision of birds with car traffic by placing anti-collision panels and sound-absorbing panels, whose role is to divert the flight of birds above the collision risk area;
- Avoiding works that may affect water bodies during sensitive periods for the populations of protected ichthyofauna species;
- The clear delimitation of the work front to minimize the unnecessary disruption of some surfaces additional to those necessary for carrying out the activities provided for in the project;
- The verification by a specialist of the woody vegetation in the work fronts where the vegetation cleaning works are to be done to identify the active nests/existing scurvy and establish the protection measures, depending on the species identified.

The bridges and viaducts provided in the project also ensure a high degree of permeability, and these structures are present along the entire route of the motorway.

6.1.7 Protection of human settlements and other objectives of public interest

6.1.7.1 *Identification of the objectives of public interest, the distance from human settlements, respectively from historical and architectural monuments, other areas on which a restriction regime exists, areas of traditional interest*

Objectives of public interest

The project implementation area intersects at certain points with a series of public utility networks (water supply pipes, electrical networks, telecommunications networks, etc.) that will require special crossing works or relocations. The relocations were previously presented in the section3.1.17.

Human settlements

The proposed route for the construction of the motorway Suceava - DN2H and DN2H - Siret Border Express Road crosses several administrative-territorial units belonging to Suceava county.

In the table below, based on the analysis of the project's distance from the localities, it appears that its expropriation limit intersects or borders the inner city of 19 localities.

Table no.6-1 The approximate distance of the project from the localities

No. crt.	Locality name	Code SIRUTA	County	UAT	Distance from the inner city of the localities (m)
1.	Suceava	146272	Suceava	The municipality of Suceava	crossed
2.	Dărmănești	147964	Suceava	Dărmănești	crossed
3.	Dănilă	147955	Suceava	Dărmănești	crossed
4.	Iacobești	149012	Suceava	Grănicești	crossed
5.	Slobozia Sucevei	149030	Suceava	Grănicești	crossed
6.	Mitocu Dragomirnei	146325	Suceava	Dărmănești	crossed
7.	Bălcăuți	147009	Suceava	Balcauți	crossed
8.	Mânăstioara	146673	Suceava	Siret town	crossed
9.	Bănceşti	149600	Suceava	Mușeniţa	crossed
10.	Văscăuți	149637	Suceava	Mușeniţa	crossed
11.	Siret	146664	Suceava	Siret town	crossed
12.	Pătrăuți	149842	Suceava	Pătrăuți	0.28 km
13.	Mărițeia Mică	147991	Suceava	Dărmănești	0.29 km
14.	Românești	149021	Suceava	Grănicești	0.17 km
15.	Grănicești	148989	Suceava	Grănicești	0.11 km
16.	Botoșaniţa Mare	147606	Suceava	Calafindești	0.51 km
17.	Negostina	147027	Suceava	Balcauți	0.28 km
18.	Gara	146959	Suceava	Milisauți town	0.07 km
19.	Grănicești	148989	Suceava	Grănicești	0.04 km

Historical monuments and archaeological sites

In the project area, possible locations of some archaeological sites or some objects of historical interest were identified, their location in relation to the project limits being previously presented in the section5.2.

6.1.7.2 *The works, facilities and measures for the protection of human settlements and protected objectives and / or of public interest*

During the execution of the construction worksrules will be established to ensure the safety of traffic inside and in the vicinity of the construction site in order to avoid accidents that could occur between construction equipment and traffic participants in the construction site area. At the same time, it will be proposed to limit the movement routes of large machines in inhabited areas.

In the execution stage, the following measures are proposed:

- Informing the citizens of the area about the work schedule;
- Daily cleaning of access roads in the vicinity of work areas and maintenance of these roads;
- Protection and signaling of work areas, with clear markings regarding the safety limit in the perimeter of the works;
- Prohibition of access to work areas for unauthorized persons;

- Arrangement of passageways;
- The use of new vehicles, equipment and machines, technically compliant with the best existing technologies;
- During the execution of the works, archaeological surveillance is recommended along the entire project route, during the uncovering and excavation works, with special attention paid to the potential archaeological areas;
- In the event that objects of archaeological importance are identified in the work fronts, following the handling of earth masses, the works will be stopped, and the competent authorities will be contacted for expertise and the establishment of the necessary solutions for archaeological unloading;
- Placement of mobile sound-absorbing panels in the area of work fronts.

In order to reduce the impact on inhabited areas during the operation stage, the following measures will be taken:

- Monitoring and control of atmospheric pollutant emissions;
- Keeping in working order the structures that ensure the collection and purification of rainwater that has an outlet point in natural emissions;
- Maintenance of sound-absorbing panels.

The implementation of the project will be carried out in such a way as to ensure the continuation of community life and economic activities. In this sense, the roads and utility networks crossed by the motorway Suceava - DN2H and crossed they will be relocated, continuing to be functional during the operation of the motorway. In this sense, by implementing the project, the economic activities in the neighboring areas can be encouraged, the project having a positive impact on the local economy. We also mention the fact that the implementation of the project is expected to generate a positive impact on the localities in the area by streamlining the existing traffic on the national, communal and local roads, which will take over the current surplus.

6.1.8 Prevention and management of waste generated on site during project implementation/operation, including disposal

6.1.8.1 *List and quantities of generated waste*

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.6-2 The 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	t/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

Waste name	Estimated amount to be generated	Place of generation	Unit	Physical condition*	Waste Code**	Management mode
						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	
Glass	0.5	Windows resulting from the demolition of intersected buildings		S	17 02 02	
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 authorized units for collection and recovery.
Concrete mixtures, bricks, tiles and ceramic materials, other than those specified in 17 01 06	3	Demolition of buildings		S	17 01 07	They will be stored in containers and later transported by authorized operators to the municipal waste depot.

Waste name	Estimated amount to be generated	Place of generation	Unit	Physical condition*	Waste Code**	Management mode
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 motorway 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	Coming from the machines used for motorway 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 concrete platform. They will be handed over to authorized units for collection and recovery.

Waste name	Estimated amount to be generated	Place of generation	Unit	Physical condition*	Waste Code**	Management mode
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.*

6.1.8.2 *The program for the prevention and reduction of the quantities of generated waste*

In order to reduce the amount of waste as a result of the realization of the project, the reuse of the excavated earth in the fillings that will be carried out for the construction of the motorway embankment is considered.

Also, in order to reduce the amount of mixed municipal waste that is disposed of at the authorized ecological landfills, facilities for separate collection of waste consisting of appropriate containers for each fraction (paper/cardboard, plastic/glass, metal, etc.).

6.1.8.3 *The waste management plan*

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 the case of hazardous waste, special measures will be taken to manage it (by separate storage only on impermeable surfaces), in order not to contaminate the rest of the waste or the soil. Within the site organization, the contractor will set up a platform 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 platform will be arranged 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,

In all stages of the project, the record of waste management will be maintained according to GD no. 856/2002 and respectively GEO 92/2021 regarding the waste regime. The manner of waste management, depending on its category, is described in the following table.

Table no.6-3 Details on how to manage the resulting waste

Waste name	Management mode - collection/evacuation	Remarks
Household waste (including selectively collected fractions)	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.	Records will be kept of the recovered quantities in accordance with the provisions of GEO 92/2021 regarding the waste regime
Metallic mixtures	They will be collected selectively in temporary storage spaces specially arranged within the site organization and in the work fronts. Periodically they will be picked up by authorized operators and transported for recovery.	
Plastic waste	They will be stored separately in specially arranged areas in the work front. These will be taken over by authorized contractors in order to capitalize.	
Glass waste resulting from demolitions	They will be stored separately in specially arranged areas in the work front. These will be taken over by authorized contractors in order to capitalize.	
Packaging waste	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).	
Packaging containing dangerous substances	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).	
Absorbent materials contaminated with oil	They will be collected in sealed bags and stored in specially arranged spaces and will be handed over to authorized operators for disposal.	
Used oils from construction machinery	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.	Records will be kept of the quantities handed over for recovery in accordance with the provisions of GEO 92/2021 regarding the waste regime.
Concrete mixes, bricks, tiles and ceramic materials	They will be collected in containers and will be recovered and disposed of by authorized companies. They can be used for: ⚙ local capitalization in the pavement of exploitation roads; ⚙ deposition in the borrow pits reached the final exploitation rate; ⚙ use as an intermediate covering material within the waste deposits used in the area.	Records will be kept with the recovered quantities in accordance with the provisions of GEO 92/2021 regarding the waste regime
Asphalt waste	They will be collected in containers and will be recovered and disposed of by authorized companies. They can be used energetically in cement production facilities or for the production of new asphalt.	
Welding waste	They will be collected in covered bins located in specially designed spaces and will be handed over to authorized operators for disposal.	
Sludges from the pretreatment of rainwater potentially contaminated with hydrocarbons	They will be collected from the retention chambers of the hydrocarbon separators and transported by authorized operators for disposal.	Records will be kept regarding the quantities transported.
Earth and stones	It will be stored in the area of the work fronts and will later be used as a filling material	Records will be kept with the recovered quantities in accordance with the provisions of GEO 92/2021 regarding the waste regime
Sludge from drainable basins	They will be periodically emptied by authorized operators and disposed of in authorized sewage treatment plants.	Records will be kept regarding the quantities transported.

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.

6.1.9 Management of dangerous chemical substances and preparations

6.1.9.1 *Hazardous chemical substances and preparations used and/or produced*

Execution of works for the construction of the motorway Suceava - DN2H 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.6-4 The main dangerous chemical substances and preparations used

No. crt.	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 (motor 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 indications on the packaging of these products, as well as from the safety data sheets that accompany the products.

6.1.9.2 *The management of dangerous chemical substances and preparations and ensuring the conditions for the protection of environmental factors and the health of the population*

During the execution period, all substances and chemical preparations necessary for carrying out the activities will be stored in the premises of the site organization, in spaces specially provided for this purpose, in the original packaging in which they are delivered from the manufacturer.

In the spaces specially provided for the storage of chemical substances and preparations, intervention kits in case of accidental spills composed of absorbent materials and special collection containers will be provided. In the event of accidental spills of substances or chemical preparations in the storage area or in the work area, appropriate measures will be taken immediately to isolate the source, remove the substances and remove them from the site under safe conditions , through authorized economic operators.

Employees who use chemical substances and preparations in their activity will be informed and trained periodically about the dangers that could be caused by them as well as how to act in the event of incidents. Also, each substance and chemical preparation stored and used in the activities will be accompanied by safety data sheets provided by the manufacturers. The use by the execution personnel of these materials will be done with appropriate protective equipment, indicated in the safety data sheets.

It will be considered to avoid the formation of stocks of chemical substances and dangerous preparations, the supply being made rhythmically depending on the works to be executed so as to eliminate the possibility of going beyond the validity period and implicitly turning them into waste.

A clear record of the waste resulting from these materials will be kept, their removal from the site being carried out exclusively on the basis of a contract concluded with an authorized company.

Fueling the machines will be carried out in specially arranged premises, the machines that will be brought to the construction site will be in perfect working order, having undergone technical inspections and lubricant changes. Lubricant changes and maintenance/repair operations of equipment/means of transport will be carried out in specialized workshops.

In order to limit the risks of accidental pollution, the Accidental Pollution Prevention Plan and emergency intervention procedures will be developed.

During the operating period, the fuel supply will be carried out in the CIC for the vehicles related to the motorway maintenance, and at the distribution stations for the vehicles using the motorway. The oil change will be done in specialized centers.

The chemical substances used in the maintenance, protection and road marking works will be stored in specially designed spaces, will be packed in appropriate packaging, and the empty packaging will be collected and temporarily stored for return to the supplier.

The way of securing the spaces where they are stored will be permanently monitored, and the staff who handle such substances will be periodically trained to comply with the conditions in the technical safety data sheet.

6.2 THE USE OF NATURAL RESOURCES, ESPECIALLY SOIL, LAND, WATER AND BIODIVERSITY

The main natural resources that will be used in the construction stage are mineral aggregates (sand, gravel, ballast), water and soil (used in filling works in areas where embankments are planned). The mineral aggregates will be purchased from quarries or ballast yards, from authorized suppliers. The estimated quantities required for the realization of the project were presented in the section 3.6.4.

In the case of the land used in the filling works, on the analyzed section, near but also inside the expropriation corridor, possible locations are analyzed in this phase for the creation of possible borrow pits / land storage areas.

The location of some possible borrow pits / soil storage areas will be presented and analyzed in the framework of the environmental studies developed for the project and the impact generated and the modification of their location will be established, taking into account the following conditions:

- Not to be located in protected natural areas or in their vicinity;
- Not to be located in the immediate vicinity of bodies of water;
- To be as close as possible to the location of the motorway and access roads;
- Not to require deforestation of forested areas;
- Not to be placed in flood zones, in wet areas or swamps;
- Not to be placed in areas with rough terrain to avoid landslides;
- Not to be located near existing SEVESO objectives.

The borrow pits / storage areas that will be built within the project will be fenced to avoid illegal storage of waste and will be provided with guard ditches all around to collect stormwater.

Another important natural resource that will be used both in the construction stage and in the operation stage is represented by land.

A detailed situation of the use of natural resources, especially soil, land, water and biodiversity, will be presented within the RIM, after the quantification of the impact on protected natural areas is completed.

During the operation period of the objective, natural resources similar to the execution stage will be used, represented mainly by mineral aggregates and water, but in much smaller quantities, these being only necessary in the framework of capital repairs or maintenance of the road infrastructure.

7 DESCRIPTION OF ENVIRONMENTAL ASPECTS LIKELY TO BE SIGNIFICANTLY AFFECTED BY THE PROJECT

7.1 FORMS OF IMPACT

A correct understanding of the effects and impacts requires the analysis of all the changes that take place in the different implementation stages of the project, as well as the interdependence between them.

The interventions proposed for the implementation of the project and identified as having the potential to generate impacts are presented in the table below.

Table no.7-1 The types of interventions and activities included in the project, identified as having the potential to generate impacts

Code	Type of intervention	Activities included
IE1.	Realization of site organizations	Offices, manufacturing/storage platforms, asphalt and concrete stations.
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 interchanges, service spaces, short-term parking lots and CIC
IE6.	Artwork (above ground)	Construction of decks, bridges and passages
IE7.	Consolidation works	Construction of defense walls and retaining walls
IE8.	Hydrotechnical works	All works related to water
IE9.	Motorway works	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.	The development of car traffic	Car traffic on the motorway 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

Legend: IE – Interventions during the execution period; IO – Interventions during the operating period

An analysis of the identification of cause-effect-impact relationships associated with the project is presented in the following table.

Table no.7-2 Identification of cause-effect-impact relationships for the construction and operation of the project

Type of intervention		CAUSE (Activities)	Environmental factors	Effects / Risks	Direct impacts	Secondary impacts
IE1	Realization of site organizations	Temporary arrangements	Soil	Soil compaction	Alteration of the productive capacity of the soil	Alteration of habitats
			Biodiversity	Reducing the degree of vegetation coverage	Alteration of habitats	Loss of habitats
		Creation of definitive platforms	Soil	Soil insulation	The loss of the productive capacity of the soil	Loss of habitats
			Biodiversity	Vegetation removal	Loss of habitats	-
		Underground water supply	Ground water	Debit charges	Quantitative alterations of groundwater	-
		Preparation of concrete and asphalt mixtures	Air quality	Emissions of atmospheric pollutants	Change in air quality	-
		Material / waste storage	Ground water	Penetration of pollutants into the water table	Alteration of underground water quality	-
			Air quality	Emissions of atmospheric pollutants	Change in air quality	-
			Biodiversity	Covering the vegetation with earth and other materials	Alteration of habitats	Loss of habitats
		Material / waste storage	Soil	Penetration of pollutants into the soil	Alteration of soil quality	Alteration of habitats
		Accidental spills of pollutants on the ground	Ground water	Penetration of pollutants into the water table	Alteration of underground water quality	-
			Soil	Penetration of pollutants into the soil	Alteration of soil quality	Alteration of habitats
			Surface water	Penetration of pollutants into surface waters	Alteration of surface water quality	-
		Drainage of rainwater from OS	Surface water	Penetration of pollutants into surface waters	Alteration of surface water quality	-
		Hiring the workforce	Population	Temporary establishments with domicile in the project area	Changes in the structure of the human population	-
			Goods	Temporary employment of local people in construction activities	Financial gains	-
			Soil	Soil compaction	Alteration of the productive capacity of the soil	Alteration of habitats
			Biodiversity	Vegetation removal	Loss of habitats	-
			Surface water	Alteration of the substrate and the banks of the bed	Deterioration of the ecological state of the water body	-
			Biodiversity	Interruption of longitudinal connectivity	Fragmentation of habitats	-
		Fertile soil storage	Biodiversity	Covering the vegetation with earth and other materials	Alteration of habitats	Loss of habitats
		Accidental spills of pollutants on the ground	Ground water	Penetration of pollutants into the water table	Alteration of underground water quality	-
			Soil	Penetration of pollutants into the soil	Alteration of soil quality	-

Type of intervention		CAUSE (Activities)	Environmental factors	Effects / Risks	Direct impacts	Secondary impacts
		Site traffic	Air quality	Emissions of atmospheric pollutants	Change in air quality	-
			Biodiversity	Increasing noise level	Disturbance of species activity	-
			Human health	Increasing noise level	Discomfort generated by noise	-
			Goods	Vibration	Immovable property damage	-
			Goods	Increasing the level of traffic on public roads	Financial losses	-
			Cultural heritage	Vibration	Affecting cultural heritage	Loss of cultural heritage
			Landscape	Heavy traffic growth	Reducing the aesthetic value of the landscape	Financial losses
IE2	Relocation of utility networks	Earthworks	Air quality	Emissions of atmospheric pollutants	Change in air quality	-
			Soil	Soil compaction	Alteration of the productive capacity of the soil	Alteration of habitats
			Biodiversity	Vegetation removal	Alteration of habitats	-
			Biodiversity	Vegetation removal	Loss of habitats	-
		Land storage	Biodiversity	Vegetation removal	Alteration of habitats	-
		Construction of foundations	Soil	Soil removal	Quantitative soil losses	-
			Biodiversity	Vegetation removal	Loss of habitats	-
		Welding and assembly operations	Air quality	Emissions of atmospheric pollutants	Change in air quality	-
		Accidental spills of pollutants on the ground	Ground water	Penetration of pollutants into the water table	Alteration of underground water quality	-
			Soil	Penetration of pollutants into the soil	Alteration of soil quality	-
IE3	Relocating roads	Earthworks	Air quality	Emissions of atmospheric pollutants	Change in air quality	-
			Soil	Soil compaction	The loss of the productive capacity of the soil	-
			Biodiversity	Vegetation removal	Loss of habitats	-
		Fertile soil storage	Biodiversity	Covering the vegetation with earth and other materials	Alteration of habitats	Loss of habitats
		Accidental spills of pollutants on the ground	Ground water	Penetration of pollutants into the water table	Alteration of underground water quality	-
			Soil	Penetration of pollutants into the water table	Alteration of underground water quality	-
		Pouring asphalt mixtures	Air quality	Emissions of atmospheric pollutants	Change in air quality	-
		Traffic diversion				-
			Goods	Increasing the level of traffic on public roads	Financial losses	-
IE4	Earthworks	Expropriations / demolitions	Goods	Differences between the value of the compensation and the market value of real estate	Financial losses	-
			Population	Change of residence (relocation)	Changes in the size of the population in localities	Abandonment of the locality

Type of intervention		CAUSE (Activities)	Environmental factors	Effects / Risks	Direct impacts	Secondary impacts
			Population	Change of residence	Changes in the ethnic structure of localities	The disappearance of a minority at the locality level
			Biodiversity	Destruction of shelters and nests	Loss of habitats	-
			Biodiversity	Destruction of shelters and nests	Reduction of the population	The disappearance of some plant / animal populations
		Sanitation of the road area (armament only)	Human health	Extraction of weapons with a risk of explosion	Avoiding loss of human life	-
			Goods	Extraction of weapons with a risk of explosion	Avoiding economic losses	-
		Ground handling	Human health	Increasing noise level	Discomfort generated by noise	-
			Population	vibration	Financial losses	-
			Human health	Emissions of atmospheric pollutants	The increase in the incidence of diseases	-
			Air quality	Emissions of atmospheric pollutants	Change in air quality	-
			Soil	Soil removal	Quantitative soil losses	-
				Changing the topography of the land through soil storage	Alteration of soil quality	-
				Contaminated soil handling (identification of contaminated sites)	Alteration of soil quality	-
				The production of landslides	The loss of the productive capacity of the soil	-
			Geology	Structural changes due to the execution of the debles	Losses from the geological substratum	-
			Biodiversity	The production of landslides	Alteration of habitats	Loss of habitats
			Goods	The production of landslides	Financial losses	Abandonment of the locality
			Cultural heritage	The production of landslides	Affecting cultural heritage	Loss of cultural heritage
			Cultural heritage	Construction works inside some archaeological sites	Affecting cultural heritage	Loss of cultural heritage
			Landscape	The production of landslides	Reducing the aesthetic value of the landscape	Financial losses
			Biodiversity	Vegetation removal	Loss of habitats	-
				Destruction of shelters and nests	Loss of habitats	-
				The collision of fauna with construction site traffic	Reduction of the population	The disappearance of some plant / animal populations
				Increasing noise level	Disturbance of species activity	-
				Invasion of non-native species	Alteration of habitats	Loss of habitats
				The appearance of physical barriers for wildlife	Fragmentation of habitats	Loss of habitats
		Accidental spills of pollutants on the ground	Ground water	Penetration of pollutants into the water table	Alteration of underground water quality	-
			Soil	Penetration of pollutants into the soil	Alteration of soil quality	Alteration of habitats

Type of intervention		CAUSE (Activities)	Environmental factors	Effects / Risks	Direct impacts	Secondary impacts
IE5	Works of art	Building bridges	Surface water	Removal of riparian vegetation	Deterioration of the ecological state of the water body	-
			Surface water	Hydro-morphological changes due to the construction of piles in the minor bed	Deterioration of the ecological state of the water body	-
			Soil	Soil compaction	Alteration of the productive capacity of the soil	Alteration of habitats
			Soil	Soil removal	The loss of the productive capacity of the soil	-
			Geology	Structural changes due to the execution of the foundations	Alteration of the geological substrate	-
			Biodiversity	Removal of riparian vegetation	Loss of habitats	-
			Biodiversity	The appearance of physical barriers for wildlife (only during construction)	Fragmentation of habitats	-
			Human health	Increasing noise level	Discomfort generated by noise	-
			Human health	Emissions of atmospheric pollutants	The increase in the incidence of diseases	-
			Goods	vibration	Immovable property damage	-
			Cultural heritage	Construction works inside some archaeological sites	Affecting cultural heritage	Loss of cultural heritage
			Landscape	The creation of massive artificial structures	Reducing the aesthetic value of the landscape	Financial losses
IE6	Consolidation works	Construction of defense / support walls	Ground water	Interruption of groundwater connectivity	Lowering of the groundwater level	Abandonment of the locality
			Surface water	Alteration of the banks of the river	Deterioration of the ecological state of the water body	-
			Surface water	Removal of riparian vegetation	Deterioration of the ecological state of the water body	-
			Soil	Soil removal	The loss of the productive capacity of the soil	-
			Geology	Structural modifications of the substrate	Alteration of the geological substrate	-
			Biodiversity	The appearance of physical barriers for wildlife	Fragmentation of habitats	Loss of habitats
			Human health	Prevention of disasters (landslides)	Avoiding loss of human life	-
			Goods	Prevention of disasters (landslides)	Avoiding economic losses	-
			Landscape	The creation of massive artificial structures	Reducing the aesthetic value of the landscape	Financial losses
IE7	Hydrotechnical works	Bed reprofiling on the natural route	Surface water	Alteration of the banks of the river	Deterioration of the ecological state of the water body	-
			Biodiversity	Alteration of the banks of the river	Loss of habitats	-

Type of intervention		CAUSE (Activities)	Environmental factors	Effects / Risks	Direct impacts	Secondary impacts
		Buried bottom sills	Surface water	Alteration of the riverbed substrate	Deterioration of the ecological state of the water body	-
			Biodiversity	Alteration of the riverbed substrate	Loss of habitats	-
			Biodiversity	Longitudinal Connectivity interruption	Fragmentation of habitats	Loss of habitats
		Riverbed deviation	Surface water	Creation of artificial riverbed	Strong modification of the water body	-
			Biodiversity	Creation of artificial riverbed	Loss of habitats	-
			Soil	Soil removal	Loss of the productivity capacity of the soil	-
		Riverbed recalibration	Surface water	Alteration of the substrate of the riverbed	Deterioration of the ecological state of the water body	-
			Biodiversity	Alteration of the substrate of the riverbed	Loss of habitats	-
		Bridge pile protection	Surface water	Alteration of the banks of the riverbed	Deterioration of the ecological state of the water body	-
			Biodiversity	Alteration of the banks of the riverbed	Loss of habitats	-
		Protection of the slope embankment road	Surface water	Alteration of the banks of the riverbed	Deterioration of the ecological state of the water body	-
			Biodiversity	Alteration of the banks of the riverbed	Loss of habitats	-
		Discharger Qon concrete steps	Biodiversity	Change of natural conditions of water drainage on batters	Alteration of habitats	Loss of habitats
			Biodiversity	Longitudinal connectivity reduction	Fragmentation of habitats	Loss of habitats
			Biodiversity	Change of natural conditions of water drainage on batters	Alteration of habitats	Loss of habitats
			Biodiversity	Longitudinal connectivity reduction	Fragmentation of habitats	Loss of habitats
		Arrangement of torrents	Biodiversity	Modifications of some favorable amphibian habitats	Loss of habitats	-
			Biodiversity	Longitudinal connectivity reduction	Fragmentation of habitats	-
		Protection with gabion mattresses in front of the retaining wall	Surface water	Alteration of the substrate and the banks of the riverbed	Deterioration of the ecological state of the water body	-
			Biodiversity	Alteration of the banks of the riverbed	Loss of habitats	-
IE8	Motorway works	Construction of the road superstructure	Ground water	Interruption of the groundwater supply with meteoric waters	Quantitative alterations of groundwater	-
			Air quality	Emissions of atmospheric pollutants	Change in air quality	-
			Human health	Emissions of atmospheric pollutants	The increase in the incidence of diseases	-
		Installation of fences on the sides of the motorway	Biodiversity	Disruption of ecological connectivity for terrestrial wildlife	Fragmentation of habitats	Loss of habitats
			Biodiversity	Avoiding wildlife from entering the roadway	Maintaining the population	-
			Human health	Avoiding wildlife from entering the roadway	Avoiding loss of human life	-

Type of intervention		CAUSE (Activities)	Environmental factors	Effects / Risks	Direct impacts	Secondary impacts
		Making undercrossings/over crossings for fauna	Soil	Soil removal	The loss of the productive capacity of the soil	-
			Geology	Structural changes due to the execution of the foundations	Alteration of the geological substrate	-
			Biodiversity	Vegetation removal	Loss of habitats	-
			Biodiversity	Restoring ecological connectivity for terrestrial wildlife	Defragmentation of existing barriers	-
IE9	Rehabilitation works of the lands temporarily affected by the works	Winterizing and vegetation restoration works	Biodiversity	The penetration of non-native and invasive species	Alteration of habitats	-
			Landscape	Landscaping restoration of temporarily affected surfaces	Maintaining the aesthetic value of the landscape	-
IO1	The development of car traffic	Motorway traffic	Air quality	Emissions of atmospheric pollutants	Change in air quality	Alteration of habitats
			Air quality	Emissions of atmospheric pollutants	Reduction of mass flows of air pollutants emitted	-
			Soil	Deposition of atmospheric pollutants on the ground	Alteration of soil quality	-
			Biodiversity	Facilitating the spread of non-native and invasive species	Alteration of habitats	Loss of habitats
			Biodiversity	Emissions of atmospheric pollutants	Alteration of habitats	Loss of habitats
			Biodiversity	Increasing noise level	Disturbance of species activity	Loss of habitats
			Biodiversity	Wildlife collision with car traffic	Reduction of the population	The disappearance of some plant / animal populations
			Climate conditions	Reduction of greenhouse gas emissions	Reducing contributions to climate change	-
			Population	New residential establishments in the project area	Changes in the structure of the human population	-
			Goods	Economic development of the areas bordering the motorway	Financial gains	-
			Human health	Emissions of atmospheric pollutants	The increase in the incidence of diseases	-
			Human health	Increasing noise level	Discomfort generated by noise	The increase in the incidence of diseases
			Cultural heritage	Emissions of atmospheric pollutants	Affecting cultural heritage	Loss of cultural heritage
			Cultural heritage	vibration	Affecting cultural heritage	Loss of cultural heritage
			Cultural heritage	The increase in the number of tourists	Capitalizing on cultural heritage	Financial gains
			Landscape	The increase in the number of tourists	Capitalizing on natural heritage	Financial gains

Type of intervention		CAUSE (Activities)	Environmental factors	Effects / Risks	Direct impacts	Secondary impacts
			Landscape	Increase in road traffic (including at night)	Reducing the aesthetic value of the landscape	Financial losses
			Air quality	The occurrence of fires	Change in air quality	-
			Biodiversity	The occurrence of fires	Alteration of habitats	-
			Human health	The occurrence of fires	Loss of human life	-
			Goods	The occurrence of fires	Financial losses	Abandonment of the locality
			Human health	Prevention of road accidents	Avoiding loss of human life	-
			Goods	Prevention of road accidents	Avoiding economic losses	-
			Goods	Reducing traffic times	Avoiding economic losses	-
IO2	Precipitation management	Evacuation of pre-purified rainwater in outfalls	Surface water	Penetration of pollutants into surface waters	Alteration of surface water quality	-
			Biodiversity	Penetration of pollutants into surface waters	Alteration of habitats	-
		Snow removal and frost prevention activities (including snow storage)	Surface water	Penetration of pollutants into surface waters	Alteration of surface water quality	-
			Biodiversity	Penetration of pollutants into surface waters	Alteration of habitats	-
			Soil	Penetration of pollutants into the soil	Alteration of soil quality	Alteration of habitats
			Ground water	Penetration of pollutants into the water table	Alteration of underground water quality	-
IO3	Maintenance and upkeep works	Road resurfacing/repair works	Air quality	Emissions of atmospheric pollutants	Change in air quality	-
			Human health	Emissions of atmospheric pollutants	The increase in the incidence of diseases	-
IO4	The activity of service spaces and maintenance centers	Material / waste storage	Biodiversity	Attracting wildlife to household waste storage areas	Disturbance of species activity	Reduction of the population
		Underground water supply	Ground water	Debit charges	Quantitative alterations of groundwater	-

7.2 SPATIAL EXTENT OF POTENTIAL IMPACT

In the case of most of the identified forms of impact, the observed effects can occur up to distances of 700 m from the project boundaries (a distance of 1 km should be considered cautiously). The greatest distances to which the effects of the project can be felt in the execution stage are given by noise (increase in the equivalent level of noise) and air quality (increase in the level of particles in suspension), being spatially and temporally restricted effects. During the operation stage, the potential negative impact of the project will manifest itself mainly through the noise and vibrations produced by motor vehicle traffic. The project has the potential to fragment the habitats of wild fauna species, an impact that can be felt at distances of kilometers from the axis of the project, both north and south of it.

The analysis of the project's potential impact on the biodiversity component related to the Natura 2000 sites was analyzed in relation to the Specific Conservation Objectives established for the sites. In order to comply with the requirements regarding the analysis of potential cumulative impacts and to ensure the analysis of the entire project of the Express Road, the evaluation of the potential impact on biodiversity was carried out taking into account the entire project.

7.3 THE MAGNITUDE AND COMPLEXITY OF THE IMPACT

The Suceava - DN2H motorway and DN2H - Siret Border Express Road may be able to generate potentially significant forms of impact on several components of the environment. The main components on which the project can generate a significant impact are:

- Biodiversity:
  - **Potentially significant impact** on several species of fauna from the sites ROSCI0075 Pădurea Pătrăuți, ROSCI0380 Suceava Liteni River and ROSPA0110 Rogojești - Bucecea Accumulations, due to the risk of mortality of individuals as a result of the collision with car traffic. A significant potential impact may occur for the species *Myotis myotis, Myotis dascyneme, Alcedo atthis, Ardea purpurea, Aythya nyroca, Gavia stellata* as a result of the construction of the road;
  - **Potentially significant impact as a result of affecting ecological connectivity**from the area, especially in the case of the following sensitive areas in terms of connectivity: km 2+975 – km 3+550, km 12+375 – km 12+400 and km 21+750 – km 21+825;
  - **Potentially significant impact as a result of increased noise levels**. This impact can manifest itself especially on bird species located atnested;
  - **Uncertain impact** as a result of the increase in the level of light pollution in the area of the motorway /the Express Road. There is a risk of affecting biodiversity as a result of the increase in the number of artificial lighting sources.
- Abiotic components:
  - **Potentially significant impact on water bodies** as a result of the hydrotechnical works proposed in the project. At the time of the preparation of this Presentation Memorandum,

the current level of damage to the quality indicators associated with the state of water bodies is not known. There is a risk that the interventions proposed by the project, combined with the current situation of the indicators, will lead to affecting the state of water bodies. It is necessary that this uncertainty be analyzed and evaluated through an Impact Assessment Study on Water Bodies.

- Social environment:
  - **Potentially significant impact on the population** by decreasing the air quality and increasing the noise level in the area of several localities. As a result of the execution of the Suceava - DN2H motorway and DN2H - Siret Border Express Road, there is a risk of significant damage to the localities: Suceava, Dărmăneşti, Dănilă, Iacobesti, Slobozia Sucevei, Mitocul Dragomirnei, Bălcăuti, Mănăstioara, Bancesti, Văscăuti, Siret, Pătrăuti, Mărîţeia Mică, Românești, Grăniceşti, Botosanita Mare, Negostina, Gara, Grăniceşti.

The significant impacts presented above may also occur as a result of the cumulation of project interventions with existing activities and/or proposed projects.

7.4 PROBABILITY OF IMPACT

All the previously mentioned forms of impact have a high probability of occurrence. Uncertainties are strictly related to the magnitude of the impact. Only in the case of spills of polluting substances on the ground or in watercourses, the probability of the occurrence of the impact is small, these events may occur accidentally.

In order to avoid the occurrence of significant forms of impact, it is necessary to adopt an adaptable plan of measures and monitor the effectiveness of the measures:

- The design and implementation of appropriate measures to avoid/reduce the impact;
- Evaluation of the effectiveness of the implemented measures (monitoring, impact evaluation at the completion of construction and in the first years of operation);
- The implementation of additional measures in case the effectiveness of the already implemented measures does not allow to avoid the significant impact.

7.5 DURATION, FREQUENCY AND REVERSIBILITY OF THE IMPACT

The forms of impact related to the execution period have the beginning corresponding to each generating activity. The duration of manifestation of the impacts specific to the execution stage will not exceed the duration of 30 months necessary for the completion of the stage, with the exception of the impact on the soil and possible habitat loss, permanent impact. The frequency of the manifestation of the impact on human settlements and terrestrial ecosystems is related to the activities of the work fronts, being impacts mostly caused by the increase in the noise level and the presence of work teams.

For the potential impact on water quality, the impact generating events will be limited to the surfaces in the bed subjected to specific works.

In the case of the potential impact on air quality, its manifestation can be felt far from the source, depending on the meteorological conditions that dictate the direction of the wind and the dispersion capacity of the pollutants.

During the operating period, the potential impact on human settlements and biodiversity components is permanent, depending on the traffic volume.

In the case of the potential impact on water quality, it is unlikely, in view of the use of the best methods and practices regarding the maintenance of bridges and passages, but also of the pre-treatment facilities provided at the discharge points of rainwater in natural emissions .

All forms of impact can be reversible (at different time scales) with the exception of habitat loss as a result of occupation with permanent constructions.

7.6 MEASURES TO AVOID AND REDUCE THE IMPACT

Where potential significant negative impacts on the environmental components were estimated as a result of the project implementation, different sets of measures to avoid and reduce the impact were analyzed, the main ones being presented in the chapter6for each environmental component. Most of these measures are already included in the motorway project.

The need for additional measures will be analyzed in the framework of the environmental studies developed for the project.

7.7 TRANSBOUNDARY NATURE OF THE IMPACT

Considering the nature of the project, its location and its characteristics, we believe that a potential direct or indirect cross-border impact cannot be excluded.

7.8 EXPOSURE OF THE AREA TO CLIMATE CHANGE

The Suceava - DN2H motorway and DN2H - Siret Border Express Road are located in Suceava County at altitudes included between 200 and 500 mdNM.

From the point of view of the zonal climate sectors, the studied area is included in a continental climate with sub-Baltic climate influences, hilly topoclimatic floor.

- ***Rainfall***

From the point of view of atmospheric precipitation, the studied area records the following values:

- average annual values: 500 ÷ 800 mm;

- average monthly values – July (rainiest month): 50 ÷ 80 mm;

- average monthly values – January (the driest month): <30 ÷ 50 mm.

- ***Temperature***

From the point of view of temperature values, the studied area records the following values:

- average annual values: 6 ÷ 9oC;

- average monthly values – July (the warmest month): 16 ÷ 21oC;

- average monthly values – January (the coldest month): -6 ÷ -2oC;.

Winds

According to CR 1-1-1-4/2012 "Evaluation of wind action on constructions", the reference value of the dynamic wind pressure for an average recurrence interval (IMR) = 50 years, is "qb" =0.6 - 0.7 kPa.

Snows

In accordance with CR 1-1-3/2012: "Design code. Evaluation of the action of snow on constructions", the characteristic value of the snow load on the ground for variants 5 and 6 is "sk" = 2.0 KN/m2, and for the rest of the variants (variants 1, 2, 3, 4, 7), the characteristic value is of "sk" = 2.5 KN/m2.

The depth of frost

According to STAS 6054-77: "Foundation ground. Maximum frost depths. Zoning of the territory of Romania", the studied area has frost depths between: 100-110 cm.

According to STAS 1709/1-90: Frost depth in the road complex", the studied area, appear in climate type II (dry–moderately humid), with Thornthwaite humidity index Im = 0...20.

- Arithmetic mean of freezing index values of the three harshest winters in a thirty-year period is Imed3/30 = 700÷720 0C x days, for roads with non-rigid road systems, for heavy and very hard traffic classes.
- The maximum value of the freezing index in a thirty years period is Imax30 = 730÷760 (0C x days), for roads with rigid road systems, regardless of traffic class.

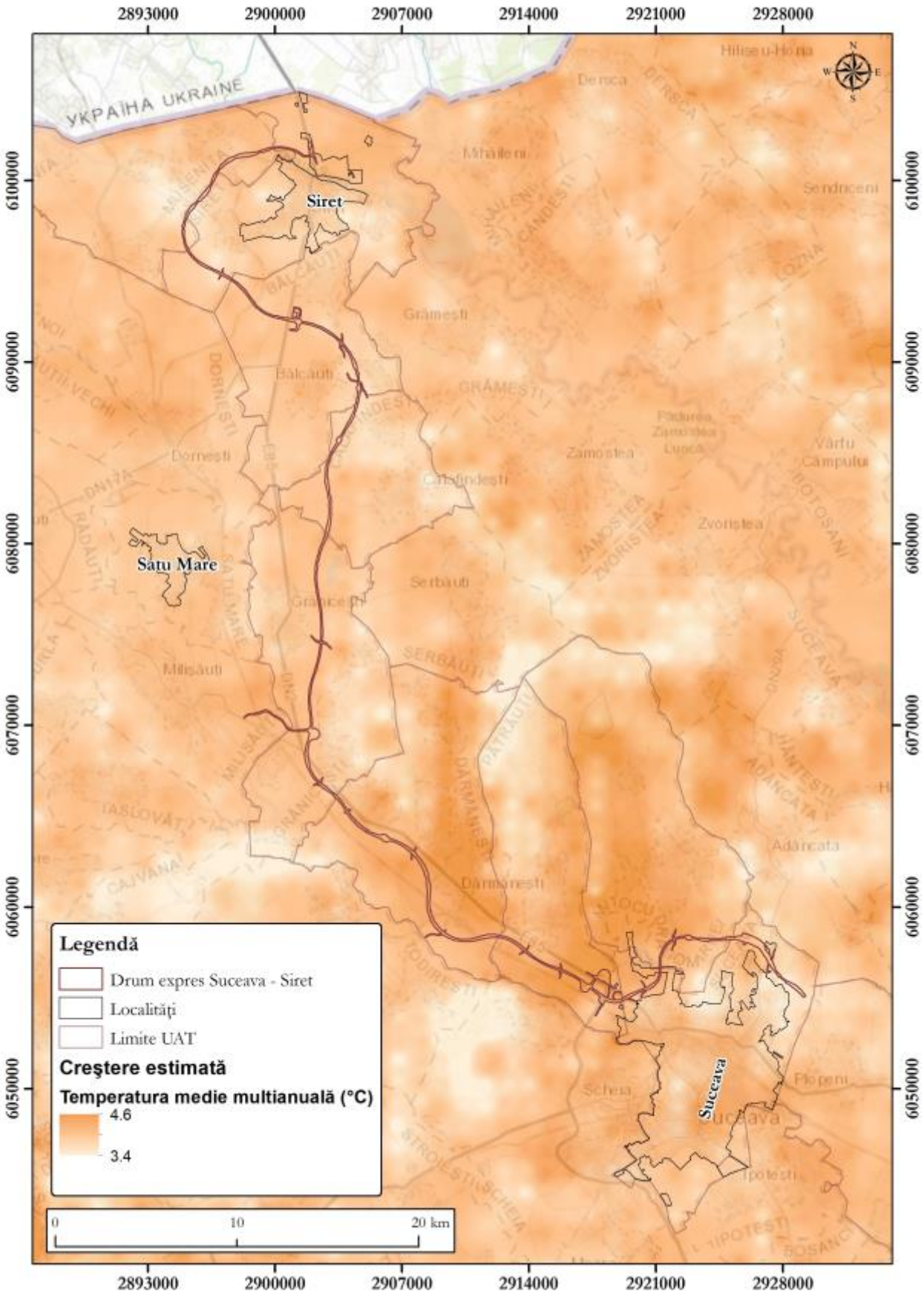

Figure no.7-1 Estimated multiannual average temperature increases until 2050, according to the HadGEM2-CC model

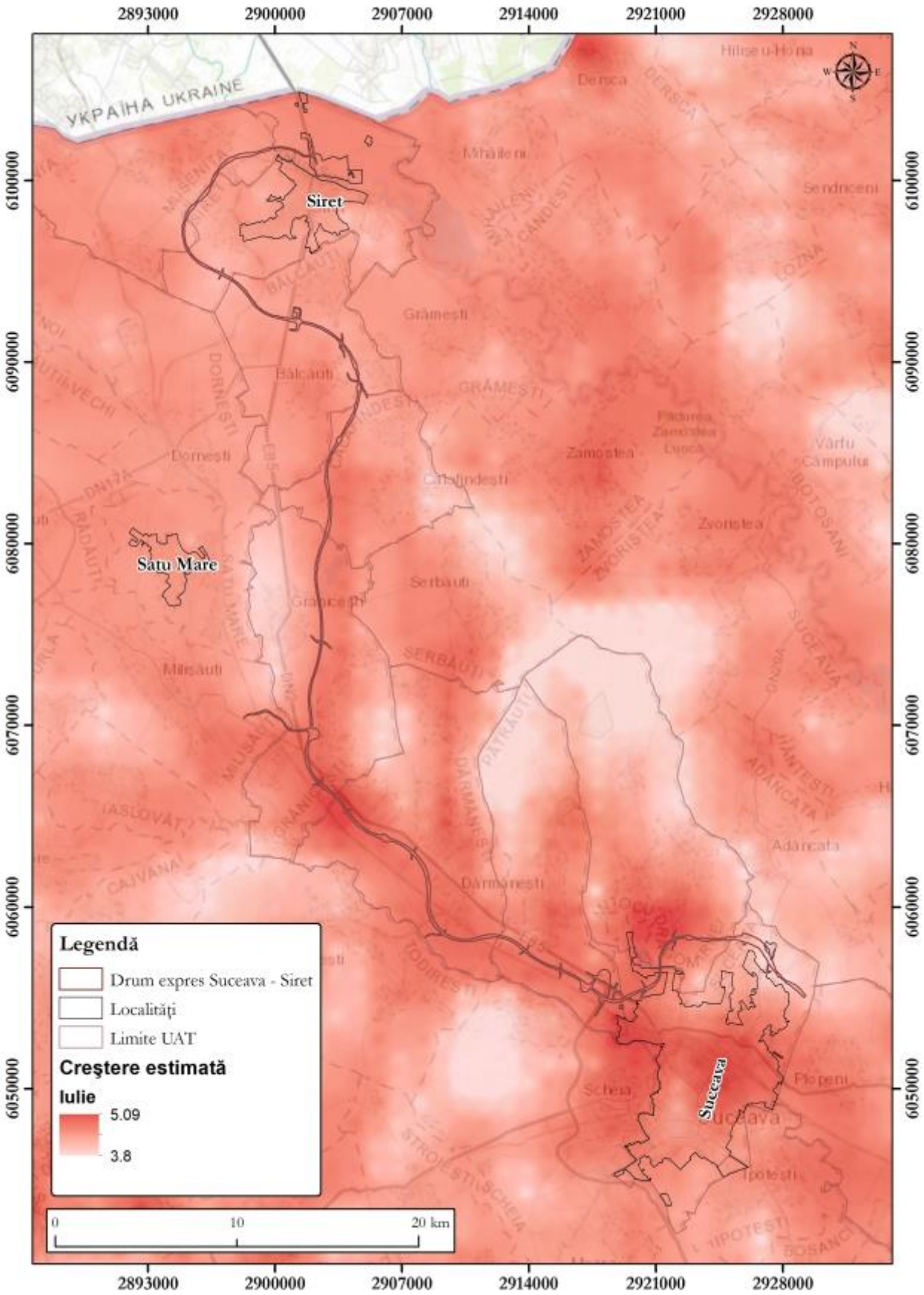

Figure no.7-2 Projected increases in July maximum temperature to 2050, according to the HadGEM2-CC model

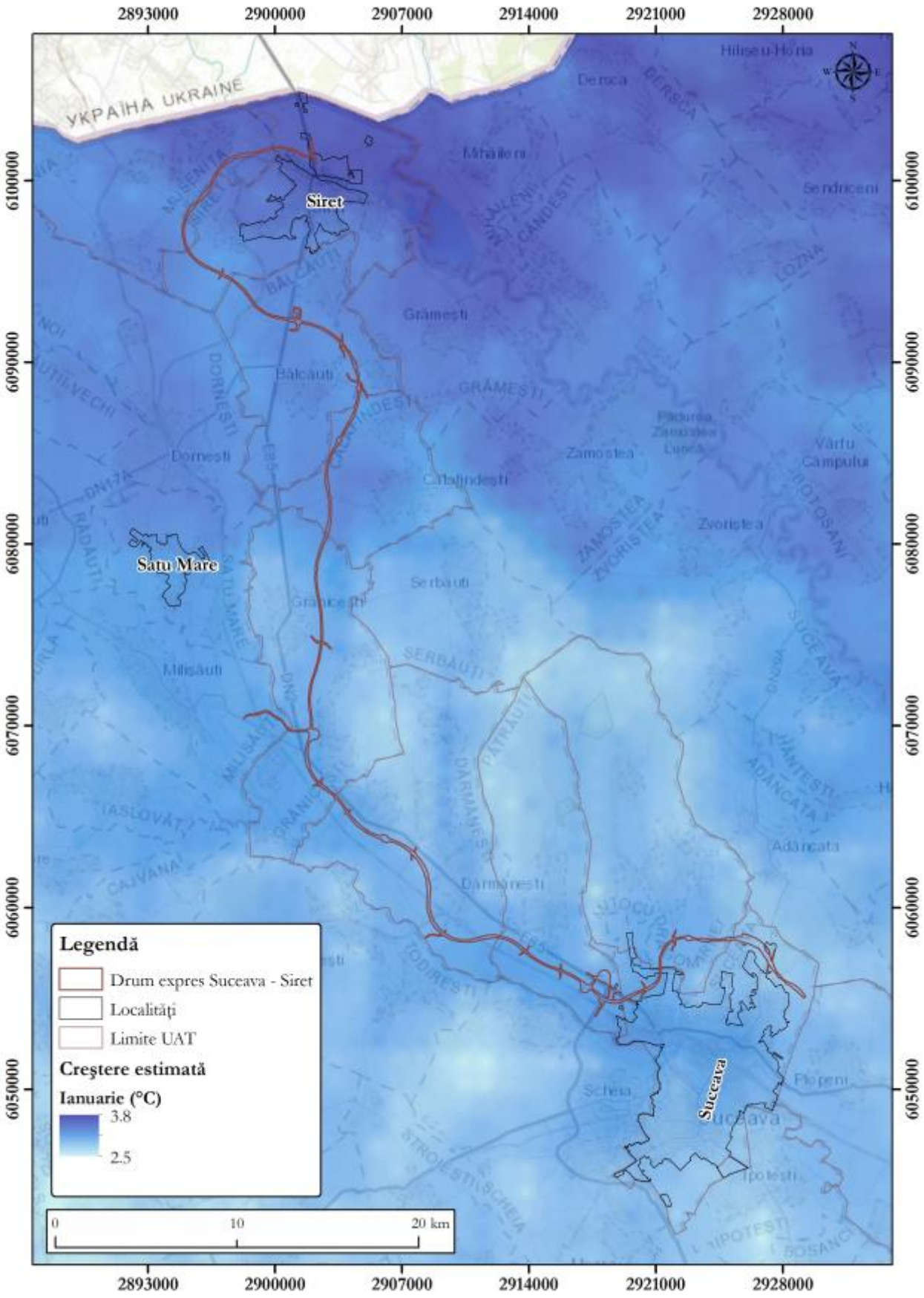

Figure no.7-3 Projected increases in January maximum temperature to 2050, according to the HadGEM2-CC model

In the analyzed area, the estimated rainfall range is between 48 - 96. The main watercourses in the area are tributaries of the Suceava River, which presents a low-moderate level of flood risk.

Susceptibility to landslides in the analyzed area on the alignment of the Suceava - Milisău settlements presents a low and very low risk, and a moderate risk is registered on the Milisău - Siret section.

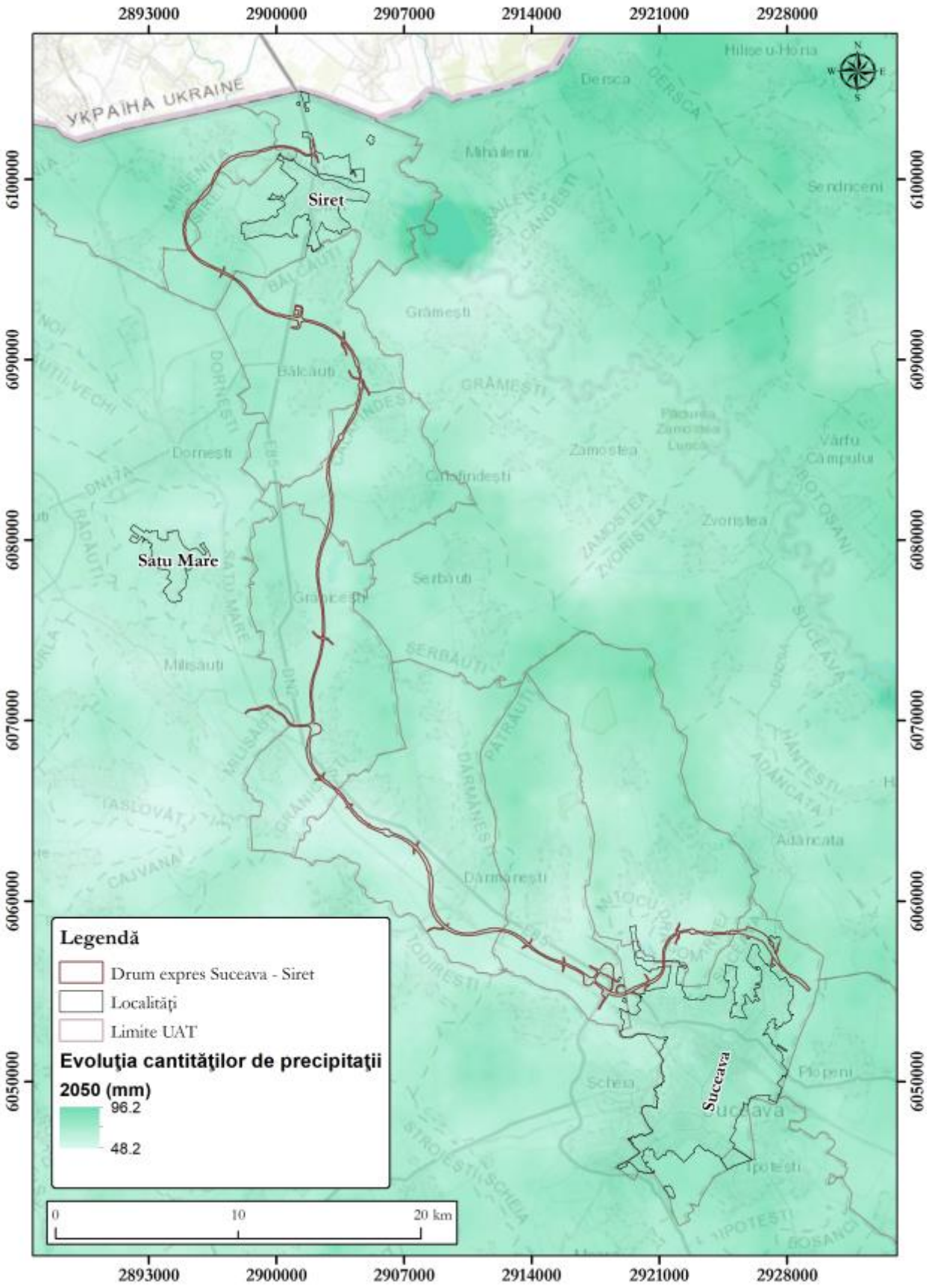

Figure no.7-4 The evolution of the annual amounts of precipitation estimated in the 2050 horizon compared to the current conditions, according to the HadGEM2-CC model

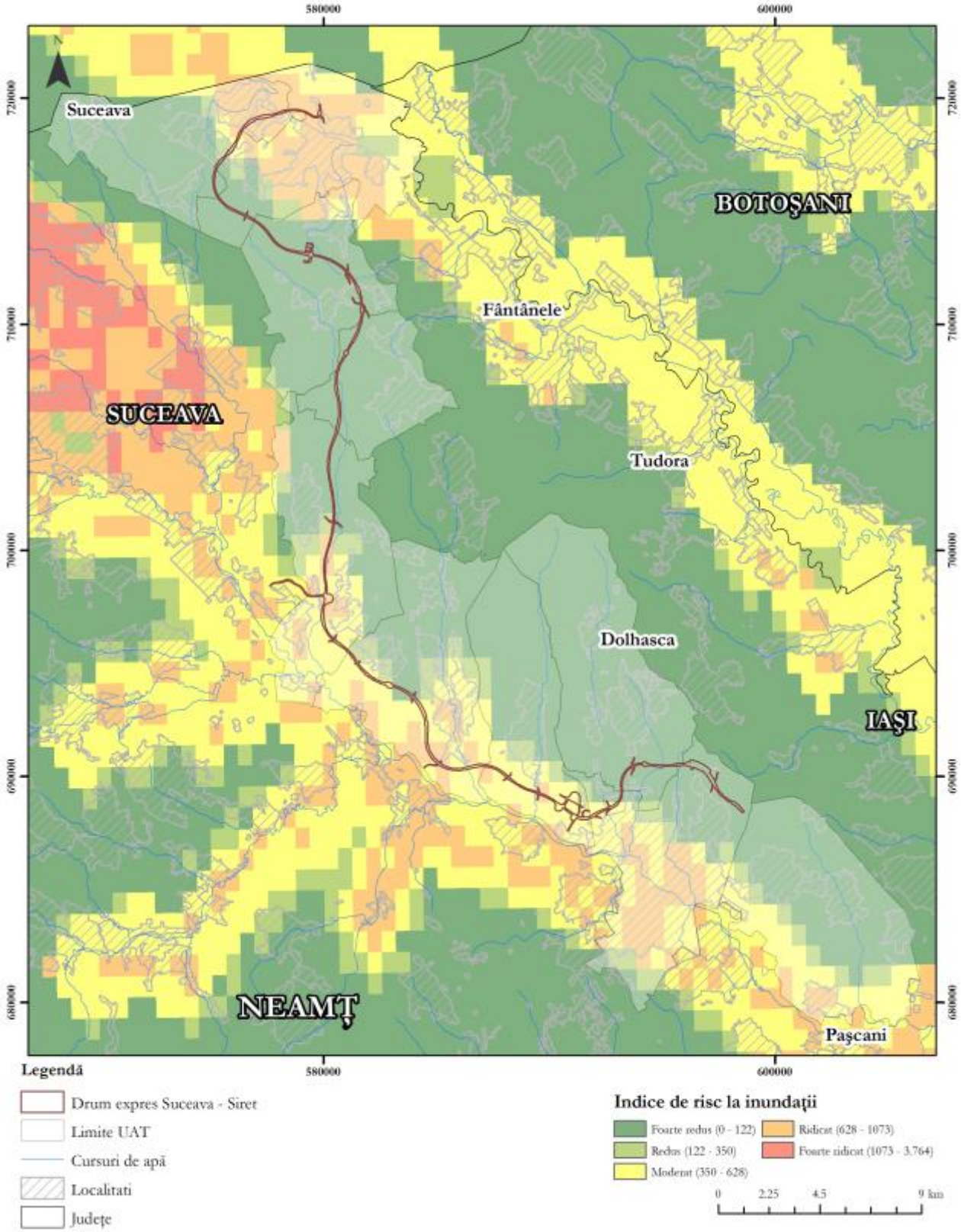

Figure no.7-5 Flood risk map in the study area, source: ANAR - Hazard and flood risk maps

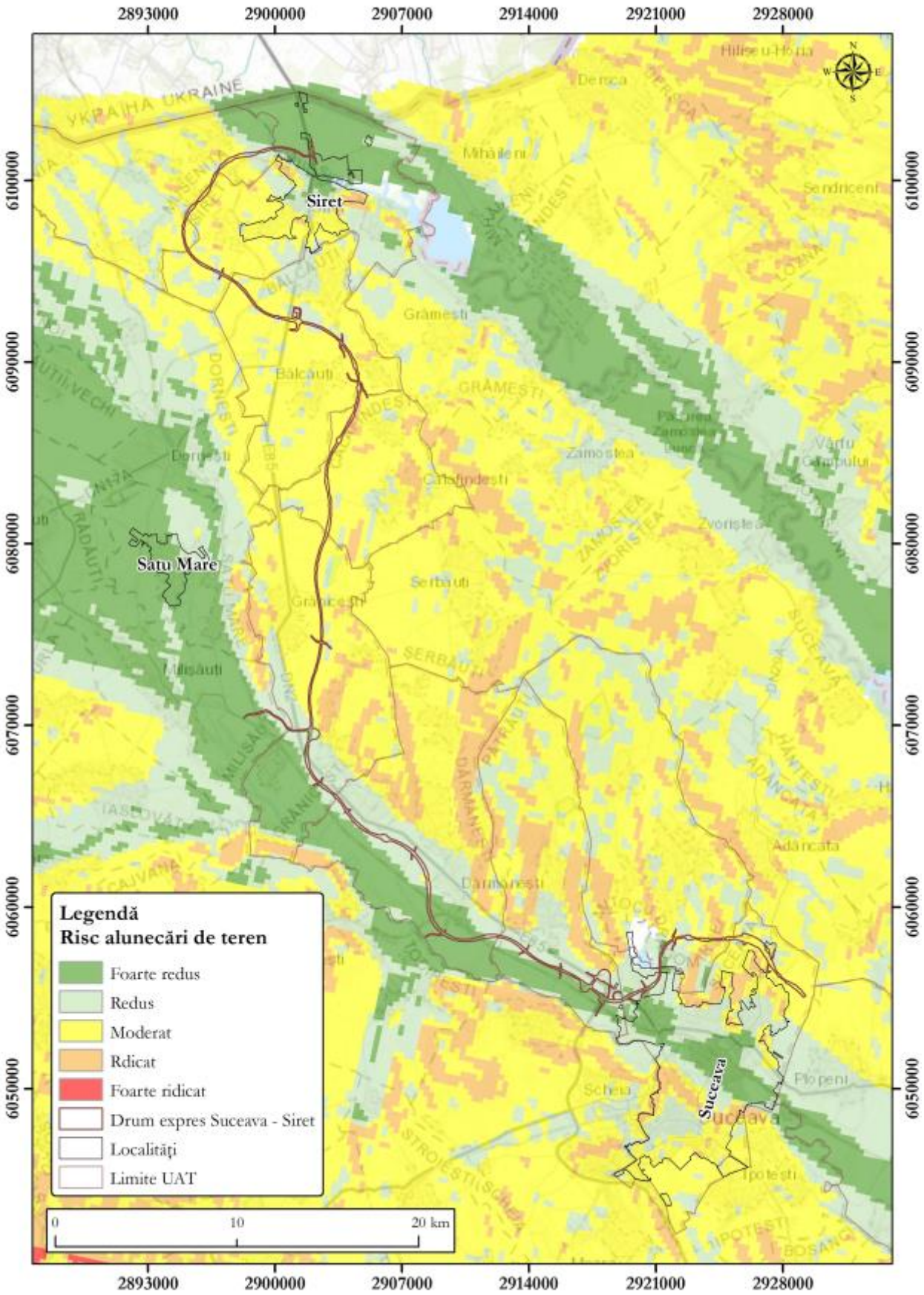

Figure no.7-6 Susceptibility of the project site to landslides

8 PROVISIONS FOR ENVIRONMENTAL MONITORING

The monitoring of the impact that the project will have on the environmental components has the role of confirming or denying the residual impact quantifications made before the implementation of the project, to quantify the effectiveness of the proposed avoidance and reduction measures and to identify new areas where it is necessary to implement some measures impact reduction.

The monitoring activities will focus on the environmental components on which some forms of impact are expected to be generated: air, water, soil, biodiversity and local communities, in all stages of the project: construction, operation and decommissioning. The points where monitoring will be carried out will be established within the environmental studies developed for the project.

Regardless of the monitoring program, the owner/contractor of the project has the obligation to report, according to the legal requirements in force, any accidental killing of any species of conservation interest (both during the construction stage and during the operation stage).

In order to monitor the impact that the construction andoperation of the motorway / and Express Road will have on the environmental components, a monitoring plan is proposed that includes a component for the construction phase and a component for the operation phase (presented in the tables below). In the decommissioning stage of the project, the monitoring plan will be similar to the one established in the construction stage.

The responsibility for monitoring biodiversity and environmental factors during the construction and operation period rests with the Contractor / beneficiary, respectively CNAIR SA

The monitoring plan presented below may undergo changes following the completion of the environmental studies developed for the project.

Table no.8-1 The plan for monitoring the environmental components during the construction phase

Component	Subcomponents	Road sign	UM	Frequency
Biodiversity	Fauna species	Lost Habitat areas	Ha	monthly
		Altered habitat surfaces	Ha	monthly
		Rehabilitated habitat areas	Ha	monthly
		Identification of habitat fragmentation situations	location	monthly
		Mortality in the area of the work fronts and list of identified species.	no. ind./surface	monthly
Abiotic factors	Air quality	Measurements in the vicinity of the nearest houses. At least the indicators: PM10 and NOx (emissions)	µg/m3	quarterly
	The water	Physico-chemical analyzes in surface water bodies. At least the indicators: TPH, pH, dissolved oxygen, turbidity	mg/l	quarterly
	ground	Physico-chemical analyzes in the area of work fronts. At least the indicators: TPH, Pb, Cu, Zn	mg/m3	quarterly
	Noise	Equivalent noise level, measurements of at least 2	dB(A)	quarterly

Component	Subcomponents	Road sign	UM	Frequency
		h/point in the vicinity of the nearest houses		

Table no.8-2 The proposed locations for monitoring campaigns during the construction phase

Component	Subcomponents	Location
Biodiversity	Habitats/plants	- outside the natural protected areas: the Motorway route and the Express Road, in the work fronts and at least 300 m from the limits of the expropriation corridor, as well as in other areas potentially affected by the project; - in the vicinity of the protected natural areas close to the project route, in the work fronts and at least 500 m from the expropriation corridor limits, as well as in other areas potentially affected by the project.
	Invertebrates	
	Fish	
	Amphibians and reptiles	
	Birds	
	Mammals	
Abiotic factors	Air quality	- at the level of neighboring sensitive receptors and in the work fronts close to inhabited areas.
	The water	- the intersected bodies of water, downstream and upstream of the works or the discharge site, as the case may be.
	Soil	- in site organizations and storage areas.
	Noise	- at the level of neighboring sensitive receptors.

Table no.8-3 Monitoring plan for the operation stage (first 3 years of operation)

Component	Subcomponents	Road sign	UM	Frequency
Biodiversity	Habitats / plants	List of invasive species, locations of presence and trends in their distribution	list, surfaces, abundances	Quarterly, over a period of three years
	Fauna species	Mortality on the route motorway and the Express Road	no. ind.	
Abiotic factors	Air	Measurements in the vicinity of the nearest houses. At least the indicators: PM10 and NOx (emissions)	µg/m3	
	The water	Measurements in intersected bodies of water, downstream and upstream of works or discharge site, as appropriate	µg/l mg/l	
	Noise	Equivalent noise level, measurements of at least 2 hours/point.	dB(A)	

Table no.8-4 The proposed locations for monitoring the environmental components in the operating stage

Component	Subcomponents	Location
Biodiversity	Habitats/plants	On the motorway and Express Road route
	Fauna species mortality	
Abiotic factors	Air	At the level of sensitive receptors in the vicinity
	The water	
	Noise	

9 THE CONNECTION WITH OTHER NORMATIVE ACTS AND/OR PLANS/ PROGRAMS/ STRATEGIES/ PLANNING DOCUMENTS

The Suceava - DN2H motorway and DN2H - Siret Border Express Road is defined within the MPGT and will constitute an integral part of the Central TEN-T Network approved in 2012 within the TTE Council of the European Commission. Through this project, the east-west connection of Romania will be realized and the motorway sectors already built or in various phases of implementation/execution will be connected: Paşcani - Suceava motorway.

Regarding the impact on the environment, the project falls under Annex no. 1 of Law no. 292/2018, at point 7, letter b) "Construction of motorways and express roads".

Based on the results of the evaluation of the potential significant impacts on the Natura 2000 sites (attached to this Memorandum), the project presents a risk of affecting the Natura 2000 sites, in the case of bird species with small populations (eg: Aythya nyroca in the ROSPA010 site), there being a risk of not reaching the targets set for the parameters required for the specific conservation objective established by ANANP. However, according to the initial evaluation Decision, it does not fall under the scope of art. 28 of the Government Emergency Ordinance no. 57/2007 regarding the regime of natural protected areas, conservation of natural habitats, flora and fauna, approved with amendments and additions by Law no. 49/2011, with subsequent amendments and additions.

The project falls under the provisions of art. 48 and art. 54 of the Water Law no. 107/1996, with subsequent amendments and additions.

10 WORKS REQUIRED FOR SITE ORGANIZATION

10.1 DESCRIPTION OF THE WORKS REQUIRED FOR SITE ORGANIZATION

The work required by the site organizations will include:

- Constructions and installations of the Contractor, equipped with means of his choice, which allow him to satisfy the obligations of execution and quality, in relation to the Beneficiary, as well as those regarding the control of the execution;
- All materials, installations and devices, control systems necessary for the execution, in accordance with the provisions of the project, the specifications, the regulations in force and environmental protection.

The following works will be required for the organization of the construction site:

- Delimitation and fencing of the premises of the construction site organization;
- Preparation of the land surface in order to place the necessary facilities;
- Plotting on the ground the location of constructions, access roads, offices, warehouses, warehouses, parking lots for means of transport and equipment necessary for the realization of the project;
- Organization of materials, raw materials and waste warehouses with the appropriate arrangement of storage spaces by making concrete platforms, perimeter trenches for the collection of possible accidental losses. Areas provided with a concrete platform, fencing and warning devices will be set up for the storage or temporary storage of raw materials, materials and waste;
- Placement of containers intended for offices, warehouses, building materials laboratories, specific workshops for machinery maintenance;
- The location of stations for the manufacture of asphalt mixtures, concrete stations, stations for the manufacture of stabilized ballast and crushers and the verification of systems for capturing and retaining pollutant emissions in the atmosphere;
- The installation of hydrocarbon separators in the areas where the parking lots and fuel and oil management areas will be arranged;
- Ensuring utilities - supplying electricity, water, ensuring the collection and purification of domestic and technological waste water;
- Procuring and placing PSI pickets and signaling according to the legal provisions in force;
- Ensuring the lighting of the objectives.

If the site organizations (including offices) of the Contractor will be carried out in spaces related to existing industrial platforms, some of the above operations will not be necessary, depending on the characteristics of each location.

10.2 LOCATION OF SITE ORGANIZATIONS

Within the project, site organizations were proposed, these being located in the following areas:

- In the area km 11+000 – km 11+200, UAT Patrauti;
- In the area km 43+200 - 43+300, UAT Bălcăuți.

The distances of the proposed site organizations from water bodies and streams, localities and protected natural areas are presented in section 3.1.19.

The facilities considered in the Site Organization are: gate cabin, infirmary, laboratory, offices, canteen, covered work platform, mechanical workshop, washing ramp, warehouse, concrete station, aggregates for the concrete station, asphalt station, aggregates for asphalt station, hydrocarbon separator, fuel station, generator for electricity supply, scale, car parking lot, equipment parking lot, material warehouses, PSI. We specify that they will be updated/adapted as needed, by the future Contractor.

10.3 DESCRIPTION OF THE ENVIRONMENTAL IMPACT OF SITE ORGANIZATION WORKS

The potential impact due to the realization of site organizations can be manifested through:

- Temporary occupation of some land surfaces. The impact is direct and temporary (during the execution of the work). The temporarily occupied surfaces will be reduced to the necessary minimum;
- The impact on the environmental factors water, air, soil can be estimated as direct/indirect, depending on the nature of the pollutant and the local manifestation. The magnitude of the impact is reduced;
- Noise pollution manifests itself directly, depending on the location of the dwellings in relation to the site and local organization;
- Affecting the flora and fauna in the vicinity of the site organization can occur as a result of the vegetation cleaning works, noise pollution, emissions generated in the atmosphere and possible improper storage of waste and materials. The impact can be estimated as low, manifested directly, in the short term, temporarily and locally, due to the proposed location;
- The use of labor in the area will have a positive, direct and local impact.

10.4 SOURCES OF POLLUTANTS AND INSTALLATIONS FOR THE RETENTION, EVACUATION AND DISPERSION OF POLLUTANTS IN THE ENVIRONMENT WITHIN THE SITE ORGANIZATION

The sources of emissions in the atmosphere related to construction site organizations consist of fixed emission sources and mobile emission sources.

The sources of fixed emissions are represented by the installation for preparing asphalt mixtures and the installation for preparing concrete, these being located at the level of the site organizations.

Also, within the site organization, fueling facilities will be provided for the vehicles and machines used to carry out the works, which generate volatile organic compounds (VOCs) in the atmosphere.

During the execution of the works, the construction site is characterized by heavy traffic that causes pollutant emissions into the atmosphere resulting either from the combustion of fuels (CO, CO2, NOx, SO2, suspended particles), or from driving dust from the roads and the wear of tires that generate dust sedimentable.

Sources of pollutant emissions into water can be insufficiently purified waste water discharges from site organizations. The construction site organizations will be equipped with appropriate systems for the collection and pretreatment/purification of domestic and technological waste water, depending on the characteristics of the sites where the construction site organizations will be built, which may allow connection to appropriate networks or may require the creation of some systems waste water collection/pretreatment/purification kits.

Potential sources of soil and water table pollutants can be improper storage of waste, raw materials and materials, as well as accidental spills of petroleum products from vehicles and machinery or wastewater leaks as a result of leaks.

10.5 FACILITIES AND MEASURES PROVIDED FOR THE CONTROL OF POLLUTANT EMISSIONS IN THE ENVIRONMENT

For the control of emissions in the environment, depending on the installations that will be placed in the site organizations and the location and characteristics of the chosen locations, the following will be ensured:

- Appropriate installations for the retention of atmospheric pollutants at the concrete and asphalt mixture preparation stations;
- Appropriate installations for the collection, pretreatment and/or treatment of household and technological wastewater;
- Appropriate installations for the collection and pretreatment of potentially impure rainwater;
- Adequate installations for the containment of accidental spills at fuel filling stations and fuel depots/tanks;
- Concrete platforms for storing materials, raw materials and waste that can lead to the appearance of pollutants for soil and groundwater.

11 WORKS TO RESTORE THE SITE UPON COMPLETION OF THE INVESTMENT

11.1 Proposed works to restore the site upon completion of the investment, in case of accidents and/or upon cessation of activity

Upon completion of the construction works, the Contractor will ensure the restoration of the natural framework of the temporarily occupied areas and those included in the construction limit, but which are not occupied by the interventions related to the motorway, including in the areas related to the relocation of utilities (e.g. the rehabilitation of the land surface in the case of underground networks). The areas affected by the construction works will be brought to a state that represents as faithfully as possible the natural state of the affected areas and ensure the landscape integration of the elements subject to the restoration works. These works will be carried out by sanitizing the area (total removal of the waste resulting from the specific activities of the work fronts, including household waste), filling it with topsoil and ensuring its stability, planting species from the vegetation specific to the area. The restoration works have both the aim of ensuring the landscape restoration of the affected areas, as well as that of reducing the risk of penetration and installation of invasive non-native plant species on the affected surfaces, which would endanger the natural areas in the vicinity of the proposed project, leading to the increase of surfaces of altered habitats. Restoration works may have different degrees of complementarity with other measures to reduce the impact on the environment, such as reducing the impact on air quality or measures to restore the ecological connectivity of the affected areas. Site restoration works can be classified into the following main categories: The restoration works have both the aim of ensuring the landscape restoration of the affected areas, as well as that of reducing the risk of penetration and installation of invasive non-native plant species on the affected surfaces, which would endanger the natural areas in the vicinity of the proposed project, leading to the increase of surfaces of altered habitats. Restoration works may have different degrees of complementarity with other measures to reduce the impact on the environment, such as reducing the impact on air quality or measures to restore the ecological connectivity of the affected areas. Site restoration works can be classified into the following main categories: The restoration works have both the aim of ensuring the landscape restoration of the affected areas, as well as that of reducing the risk of penetration and installation of invasive non-native plant species on the affected surfaces, which would endanger the natural areas in the vicinity of the proposed project, leading to the increase of surfaces of altered habitats. Restoration works may have different degrees of complementarity with other measures to reduce the impact on the environment, such as reducing the impact on air quality or measures to restore the ecological connectivity of the affected areas. Site restoration works can be classified into the following main categories: which would endanger the natural areas in the vicinity of the proposed project, leading to an increase in the areas of altered habitats. Restoration works may have different degrees of complementarity with other measures to reduce the impact on the environment, such as reducing the impact on air quality or measures to restore the ecological connectivity of the affected areas. Site restoration works can be classified into the following main categories: which would endanger the natural areas in the vicinity of the proposed project, leading to an increase in the areas

of altered habitats. Restoration works may have different degrees of complementarity with other measures to reduce the impact on the environment, such as reducing the impact on air quality or measures to restore the ecological connectivity of the affected areas. Site restoration works can be classified into the following main categories:

- Works for the restoration of the areas occupied by the site organizations - following their decommissioning, the evacuation of materials and equipment, the site will be arranged according to the category of use prior to its occupation;
- Works to restore the borrow pits and the adjacent areas affected by the execution works - the works involve the sloping and reprofiling of the slope to reduce the risk of erosion, leveling and grassing or planting trees and shrubs, using plant species specific to the vegetation in the area;
- Works for the restoration of the areas included in the construction limit, but which are not occupied by the interventions related to the motorway (e.g. embankment slopes), including in the areas related to the relocation of utilities;
- Works for the development of the CIC, parking lots, interchanges - these will be landscaped, by planting trees, shrubs and grassy species.

For any restoration work and landscaping of the areas affected by the project, only the species from the local phytocenotic composition (corresponding to the affected areas or located near the affected areas) will be used. The use of any foreign (non-native) plant species will be prohibited.

11.2 ASPECTS RELATED TO THE PREVENTION AND RESPONSE TO ACCIDENTAL POLLUTION CASES

In the event of accidental pollution, actions will be taken according to the procedures established in the Plan for the prevention and combating of accidental pollution related to the construction site. The plan to prevent and combat accidental pollution within the construction site will be drawn up by the Contractor according to Order no. 278/1997 and will inventory and specify the activities, places and installations from which accidental pollution may originate. The plan will establish a set of clear intervention measures and procedures in case of accidental pollution, as well as the duties of the responsible persons nominated in the intervention team.

The following can be mentioned as incidents on the environment during the execution of the works:

- Leaks or losses of fuels, oils or other dangerous substances from machinery or from the storage facilities provided within the construction site;
- Accidental discharge of untreated waste water from the sanitary groups within the site organizations;
- Non-compliant storage of waste containing dangerous substances;
- Road accidents involving chemicals or dangerous preparations.

In the event of such an incident in the environment, the nature and level of the incident will be identified in order to act appropriately and limit the effects on the environment. In situations of occurrence of such an incident in the environment, the works will be stopped and appropriate intervention measures will be applied in order to minimize the impact. If it is deemed necessary, the intervention team will be mobilized, the equipment provided will be used, and the competent authorities will be informed, respectively the representatives of the Romanian National Water Administration and the Inspectorate for Emergency Situations.

11.3 ASPECTS RELATED TO THE CLOSURE/DEMOLITION OF THE PROJECT

In accordance with Annex GD no. 2139/2004, amended by GD no. 1496/2008 (Catalogue regarding the classification and normal durations of operation of fixed means, chapter III, point 4, "Maintenance in operation of fixed means that can affect the protection of life, health and the environment - road, rail, air and naval, construction and communal household machines, lifting machines, etc.), after the expiry of the normal operation period, the maintenance of the motorway will be possible only "on the basis of a technical report drawn up by certification bodies or technical inspection bodies ability in the field of activity of the fixed asset".

The specific closing activities of the proposed project will include the following stages:

- Demolition/dismantling and sorting works in order to reuse the superstructure and infrastructure elements (asphalt and the components of the embankment, bridges, floors and rainwater management elements);
- Land clearance (which involves the collection, sorting, classification and management of unusable materials classified as waste);
- Environmental restoration works by rehabilitating the lands occupied by the project (return to agricultural/natural circuit) - if no alternative solutions for use are found.

The waste estimated to be produced by decommissioning the project is mainly: concrete, soil and stones, iron and steel, asphalt and household waste. Depending on the life of the project, there are chances that some of it will belong to the category of contaminated waste.

In the event that the need to decommission the motorway is established, it will be necessary to obtain an Environmental Permit. The studies that will be required by the legislation in force at the time of the decommissioning of the project will establish the impact on the environment generated by the decommissioning activities, the measures necessary to avoid the impact and those intended to restore the ecological integrity of the project area.

11.4 WAYS TO RESTORE THE INITIAL STATE/REALIZATION FOR THE FUTURE USE OF THE LAND

Once the construction works are completed, the contractor has the obligation to carry out the ecological reconstruction in order to rehabilitate all the lands that were temporarily occupied by various objectives within the site (site organizations, technological platforms, temporary access roads,

etc.). These areas affected by the construction of the motorway will be rehabilitated through greening, soil stabilization, the laying of topsoil and, as the case may be, the installation of initial vegetation, thus avoiding the penetration and installation of non-native invasive species that could change the initial structure of the habitats in the areas affected by the project.

The main works that will be carried out in order to bring the land to its original state are:

- Decommissioning the access roads by removing the ballast by loading it into means of transport and utilizing the material for other purposes;
- The site organizations and asphalt and concrete mix installations, as appropriate, will be closed, the existing constructions and installations will be dismantled and evacuated, and the site will be set up in order to restore it to its previous uses.

In the areas of service spaces, parking lots, CIC and interchanges, the surfaces will be restored by sanitizing the area, arranging the adjacent lands, carrying out landscaping by planting trees and shrubs and reforesting the slopes.

12 ANNEXES

12.1 THE PLAN FOR FRAMING THE AREA OF THE OBJECTIVE AND THE SITUATION PLAN

The plan for framing the area of the objective and the plans representing the limits of the project location are presented in Annex B.

12.2 IMPACT ASSESSMENT BASED ON SPECIFIC CONSERVATION OBJECTIVES

The evaluation table according to the Specific Conservation Objectives related to Natura 2000 habitats and species potentially affected by the project are presented in Appendix C. Also, the cumulative impact evaluation table is also presented in Appendix C.

12.3 THE FLOW CHARTS FOR THE TECHNOLOGICAL PROCESS AND THE PHASES OF THE ACTIVITY, WITH THE DEPOLLUTION INSTALLATIONS

The analyzed project does not involve technological processes in the operation stage.

12.4 FLOW CHART OF WASTE MANAGEMENT

It's not necessary.

12.5 OTHER DRAWINGS, ESTABLISHED BY THE PUBLIC AUTHORITY FOR ENVIRONMENTAL PROTECTION

It's not necessary.

13 ELEMENTS OF ADEQUATE ASSESSMENT

13.1 BRIEF DESCRIPTION OF THE PROJECT AND THE DISTANCE FROM THE PROTECTED NATURAL AREAS OF COMMUNITY INTEREST

"Suceava - DN2H motorway and DN2H - Siret Border Express Road " has its starting point near the Municipality of Suceava, to the east of it, in the vicinity of the Suceava International Airport (ASCV). This road sector will connect in the area of Suceava Municipality with the motorway sectionUmPaşcani-Suceava. By implementing the project, the motorway and the Express Road will be built in accordance with the technical parameters required by the European standards and legislation in force.

In order to identify the protected natural areas of community interest potentially affected by the project of the Suceava - DN2H motorway and DN2H - Siret Border Express Road, a GIS spatial analysis was carried out that took into account all 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 by means of 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 list of the sites necessary to be included in the impact analysis of the project of the Suceava - DN2H motorway and DN2H - Siret Border Express Road was established. It is important to mention that none of the analyzed sites is crossed by the route of the motorway or the Express Road. However, in the vicinity of the project there are protected natural areas, some of which may be affected by the project as a result of their connection with the project area through ecological corridors or through rivers (hydraulic connection), as well as taking into account the mobility of species of fauna.

The following table shows the protected natural areas in the vicinity of the project and the distances from the project limits.

Table no. 13-1. The complete list of Natura 2000 sites included in the impact assessment of the Suceava - DN2H motorway and DN2H - Siret Border Express Road.

No. crt.	Site code	Site name
1.	ROSCI0075	Patrăuți Forest
2.	ROSAC0391	Siretul Mijlociu - Bucecea
3.	ROSPA0110	Accumulations Rogojesti - Bucecea
4.	ROSCI0380	Suceava Liteni River
5.	ROSCI0379	Suceava River

For the analysis of the location of the project in relation to the protected natural areas and the potential of their impact, the limits in vector format available on the website of the Ministry of the Environment and the publicly available reports related to the ecological corridors, according to the NaturRegio and COREHABS projects, were used.

The following figure shows the location of the project in relation to the protected natural areas and the elements that can represent potential connection points with the protected natural areas in the area (ecological corridors and watercourses).

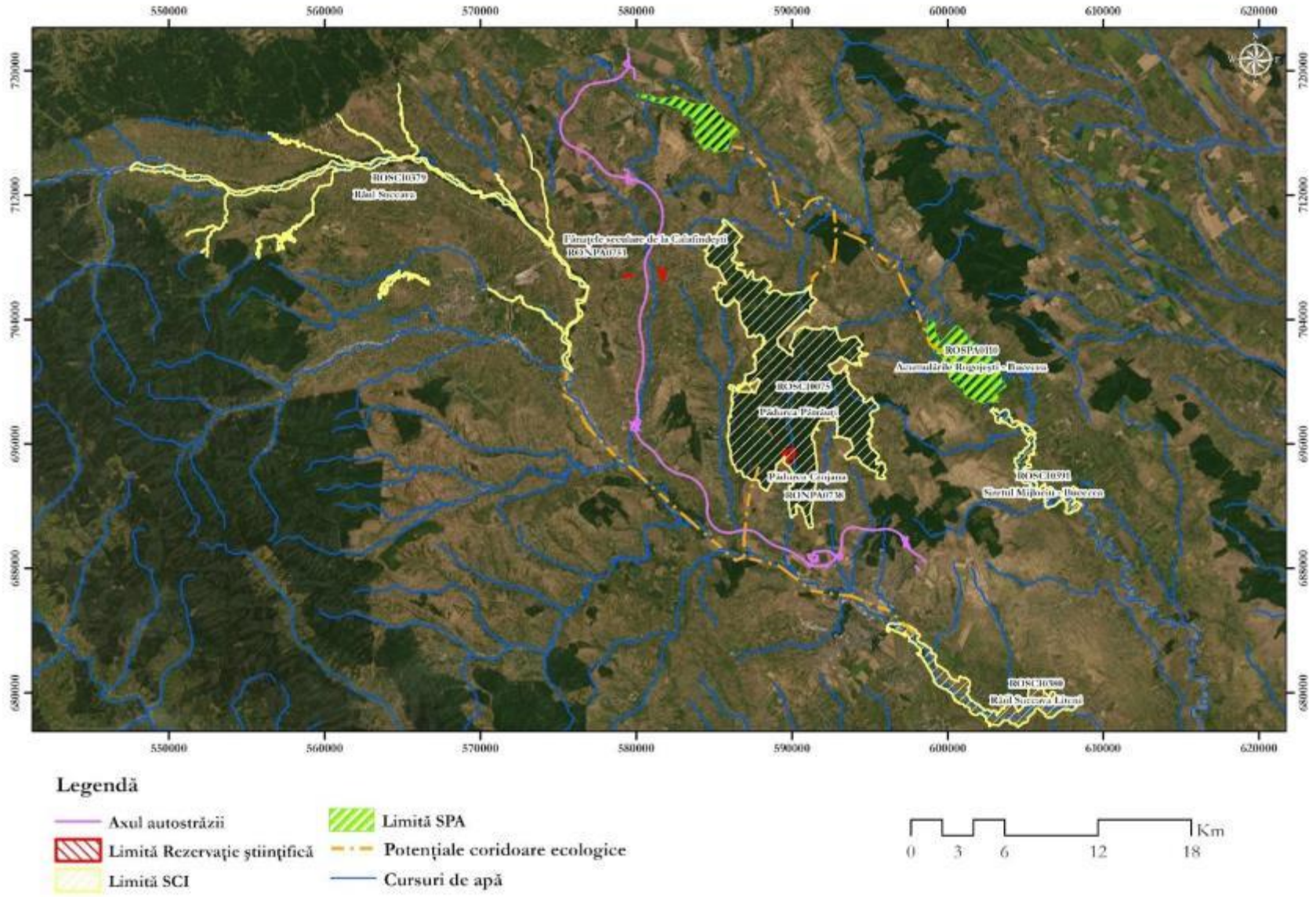

Figure no.13-1 Natura 2000 sites included in the impact assessment for Suceava - DN2H motorway and DN2H - Siret Border Express Road

The table below shows the Natura 2000 sites in the vicinity of the project, as well as their distance from the project.

Table no. 13-2. Natura 2000 sites in the vicinity of the project.

No. crt.	Natura 2000 site	SCI / SPA confirmation year	Year of PM approval	No. administrative act of approval of the PM	No. MO	Publication date MAN	Location of the project in relation to the site (km)	ANANP decisions to issue OSC	Site area (ha)
1.	ROSCI0075 Pătrăuți Forest	2009	-	-	-	-	1.65 km	4484/04.08.2022	8772.3
2.	ROSAC0391 Siretul Mijlociu - Bucecea	2013	2016	1205	120	5/2016	8.15 km	415/03.08.2022	586.7
3.	ROSPA0110 Accumulations Rogojesti - Bucecea	2011	2016	1098	-	-	1.06 km	130/28.03.2022	2106.5
4.	ROSCI0380 Suceava Liteni River	2013	-	-	-	-	4.25 km	73254/23.11.2021	1253.9

13.2 THE NAME AND CODE OF THE PROTECTED NATURAL AREAS OF COMMUNITY INTEREST

The table below shows the names and codes of the protected natural areas of community interest potentially affected by the implementation of the project.

Table no. 13-3. The list of protected natural areas of community interest potentially affected by the implementation of the project.

No. crt.	Natura 2000 site name	Site code
1.	Patrăuți Forest	ROSCI0075
2.	Siretul Mijlociu – Bucecea	ROSAC0391
3.	Accumulations Rogojesti - Bucecea	ROSPA0010
4.	Suceava Liteni River	ROSCI0380

13.3 THE PRESENCE AND NUMBERS/SURFACES COVERED BY SPECIES AND HABITATS OF COMMUNITY INTEREST IN THE PROJECT AREA

The analysis of the species of community interest, as well as the habitats of the areas of community interest, were analyzed using mainly the information from the Natura 2000 Standard Forms and from the Site Management Plans (where applicable, including those not yet approved at the time of the analysis).

13.3.1. ROSCI0075 Pătrăuţi Forest

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

From a geographical point of view, the Natura 2000 site ROSCI0075 Pătrăuţi Forest 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, Vătafului Bridge.

The Pătrăuți Forest 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%.

In the tables below, information is presented about the areas of the habitats and about the species that are the object of conservation in the site.

Table no. 13-4. The areas covered by habitats of community interest from the site ROSCI0075 Pătrăuți Forest.

No. crt.	Code Natura 2000	Habitat type	Areas covered by habitats (ha)
1.	9130	Asperulo-Fagetum type beech forests	Unknown
2.	91E0*	Dacian forests of oak and hornbeam	Unknown
3.	91Y0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior	Unknown

Table no. 13-5. Population effects of the species of community interest from the site ROSCI0075 Pătrăuți Forest.

No. crt.	Species code	Species name	Population type	Effective population (according to FS)
1.	1188	*Bombina bombina*	p	-
2.	1193	*Variegated bombina*	p	-
3.	4014	*Carabus variolosus*	p	-
4.	1324	*Myotis myotis*	c	-
5.	1324	*Myotis myotis*	w	-
6.	1324	*Myotis myotis*	p	-
7.	1324	*Myotis myotis*	R	-
8.	1087	*Rosalia alpina*	p	-
9.	1166	*Triturus cristatus*	p	-

13.3.2. 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.

In the tables below, information is presented about the areas of the habitats and about the species that are the object of conservation in the site.

Table no. 13-6. The presence and population size of species of community interest from the site ROSAC0391 Siretul Mijlociu – Bucecea.

No. crt.	Species code	Species name	Population type	Effective population (according to FS)
1.	1130	*Aspius aspius*	p	100 - 500 i
2.	5266	*Barbus petenyi*	p	-
3.	6963	*Cobitis taenia Complex*	p	1000 - 5000 i
4.	1355	*Otter otter*	p	-
5.	6143	*Romanogobio kesslerii*	p	5000 - 10000 i
6.	5329	*Romanogobio Vladykovi*	p	-
7.	5197	*Sabanejewia balcanica*	p	1000 - 5000 i
8.	1032	*Unio crassus*	p	-

Table no. 13-7. The areas covered by habitats of community interest from the site ROSAC0391 Siretul Mijlociu – Bucecea.

Code Natura 2000	Habitat type	Areas covered by habitats (ha)
6430	Border associations with tall hydrophilic grasses from plains to mountain and alpine levels	5.5

13.3.3. ROSPA0110 Accumulations Rogojesti – Bucecea

Regarding the Natura 2000 site ROSPA0110 Rogojeşti - Bucecea Accumulations, 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 Suceva, included from the point of view of geographical region in the sub-unit of the Suceva 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 banchs, 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 reed heron (Circus aeroginosus).

In the tables below, information is presented about the areas of the habitats and about the species that are the object of conservation in the site.

Table no. 13-8. The presence and effective population of species of community interest from the ROSPA0110 site.

No. crt.	Species code	Species name	Population type	Effective population at national level		
				Min.	Max.	um
1.	A229	*Alcedo atthis*	Passage	-	-	-
2.	A054	*Acute anas*	Passage	-	-	-

No. crt.	Species code	Species name	Population type	Effective population at national level		
				Min.	Max.	um
3.	A052	*Anas crecca*	Passage	200000	300000	and
4.	A050	*Anas Penelope*	Passage	-	-	-
5.	A053	*Anas platyrhynchos*	Passage	-	-	-
6.	A053	*Anas platyrhynchos*	Nesting	76662	146831	p
7.	A053	*Anas platyrhynchos*	Nesting	76662	146831	p
8.	A055	*Anas querquerdula*	Passage	-	-	-
9.	A051	*Anas barren*	Passage	-	-	-
10.	A028	*The censer was burning*	Passage	-	-	-
11.	A029	*It was burning purple*	Passage	5000	20000	and
12.	A059	*Aythya ferina*	Passage	20000	40000	and
13.	A061	*Aythya fuligula*	Passage	-	-	-
14.	A062	*Aythya marila*	Passage	-	-	-
15.	A060	*Aythya nyroca*	Nesting	2628	10464	p
16.	A021	*Botaurus stellaris*	Nesting	2500	4500	cmales
17.	A136	*Charadrius dubius*	Passage	-	-	-
18.	A196	*Chlidonias hybridus*	Passage	-	-	-
19.	A197	*Chlidonias niger*	Passage	20000	80000	and
20.	A031-B	*Stork stork*	Passage	100000	500000	and
21.	A081	*Circus aeruginosus*	Passage	-	-	-
22.	A081	*Circus aeruginosus*	Passage	-	-	-
23.	A082	*Circus cyaneus*	Passage	-	-	-
24.	A038	*Cygnus cygnus*	Passage	2000	5000	and
25.	A036	*Cygnus olor*	Passage	30000	50000	and
26.	A027	*White egret*	Nesting	-	-	-
27.	A026	*Egretta garzetta*	Passage	20000	50000	and
28.	A125	*The coot attracts*	Nesting	78773	134561	and
29.	A002	*Arctic marlin*	Passage	-	-	-
30.	A001	*Gavia starata*	Passage	-	-	-
31.	A075	*Haliaeetus albicilla*	Passage	-	-	-
32.	A131	*Hymantopus hymantopus*	Passage	10000	50000	and
33.	A022	*Ixobrychus minutus*	Passage	-	-	-
34.	A338	*Lanius collurio*	Passage	-	-	-
35.	A339	*Lanius minor*	Passage	-	-	-
36.	A459	*Larus cachinnans*	Passage	10000	50000	and
37.	A177	*Larus miutus*	Passage	-	-	-
38.	A179	*Larus ridibundus*	Passage	100000	300000	and
39.	A156	*Limosa limosa*	Passage	25000	50000	and
40.	A068	*Mergus albellus*	Passage	-	-	-
41.	A391	*Phalacrocorax carbo sinensis*	Passage	20000	50000	and
42.	A393	*Phalacrocorax pygmeus*	Passage	-	-	-
43.	A151	*Philomachus pugnax*	Passage	-	-	-
44.	A140	*Pluvialis apricaria*	Passage	5000	20000	and

No. crt.	Species code	Species name	Population type	Effective population at national level		
				Min.	Max.	um
45.	A193	*Sterna hirundo*	Passage	50000	200000	and
46.	A885	*Sternula albifrons*	Passage	2000	10000	and
47.	A161	*Tringa erythropus*	Passage	25000	50000	and
48.	A166	*Tringa glareola*	Passage	50000	300000	and
49.	A165	*Tringa ochropus*	Passage	-	-	-
50.	A162	*Tringa totanus*	Passage	10000	30000	and
51.	A142	*Vanellus vanellus*	Nesting	-	-	-

Caption: p– pairs; i – individuals

13.3.4. ROSCI0380 Suceava Liteni River

Regarding the Natura 2000 site ROSCI0380 Suceava Liteni River, 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.

The tables below show the areas of the habitats and the species that are the object of conservation in the site.

Table no. 13-9. The presence and the effective population of the species present in the ROSCI0380 site.

No. crt.	Species code	Species name	Population type	Effective population (according to FS)
1.	5266	*Barbus petenyi*	p	-
2.	1188	*Bombina bombina*	p	-
3.	1193	*Variegated bombina*	p	-
4.	1220	*Emys orbicularis*	p	-
5.	1355	*Otter otter*	p	-
6.	1323	*Myotis bechsteinii*	p	-
7.	1324	*Myotis myotis*	p	-
8.	5339	*Rhodeus bitterus*	p	-
9.	1335	*Spermophilus citellus*	p	-
10.	1166	*Triturus cristatus*	p	-

13.4 THE JUSTIFICATION OF THE DIRECT CONNECTION OF THE PROJECT AND ITS NECESSITY FOR THE MANAGEMENT OF THE CONSERVATION OF NATURAL AREAS PROTECTED BY COMMUNITY INTEREST

The project is not directly related to the conservation management of protected natural areas of community interest.

13.5 ANALYSIS OF FORMS OF CUMULATIVE IMPACT ON SPECIES AND HABITATS IN 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 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.

The construction of the analyzed project may amplify existing pressures or anticipated threats and has the potential to generate a significant cumulative impact, especially in the case of species in an unfavorable-inadequate conservation status or in the case of species for which the project may generate a significant impact. It is necessary that the detailed analysis of the potential significant cumulative impacts be carried out within the subsequent environmental studies, from the environmental impact assessment procedure.

13.6 ESTIMATION OF THE PROJECT'S POTENTIAL IMPACT ON THE SPECIES AND HABITATS OF THE PROTECTED NATURAL AREA OF COMMUNITY INTEREST

The preliminary analysis of the potential impact generated by the project on natural elements with conservation value aimed at identifying and studying those forms of impact for which there is a risk of reaching significant thresholds in the absence of measures to avoid and reduce the impact. The potential impact that the project can generate on the biodiversity components can manifest itself differently depending on the stage of the project. The impact analysis was carried out on the basis of the Specific Conservation Objectives established for the sites, in compliance with the requirements of the Circular issued by the Ministry of Environment, Water and Forests no. 4654/02.07.2020. Details regarding the identified potential impacts are presented in the annex to this Memorandum.

For the ROSCI0379 site, no potential forms of impact generated by the project on the Natura 2000 components were identified, so the analysis based on the Specific Conservation Objectives (SOC) was not carried out.

Project execution stage

At this stage, the following types of impacts are estimated to occur: the alteration of habitats and the disruption of species activity and the reduction of the population of wild fauna species as a result of the collision of individuals with construction site traffic.

- Alteration of habitats

During the execution stage, alterations within the Natura 2000 sites may occur in the areas adjacent to the works. The alteration of the habitats is generated by the possibility of pollutants to reach the inside of the site, in the habitats favorable to the bird species in ROSPA0110, by hydrological means.

As a result of the execution of the works, pollutants from machinery can enter the aquatic environment, as well as solid suspensions from activities that involve the handling of earth masses or the handling of powdery construction materials. These can lead to water contamination and increased turbidity in water bodies intersected or located near the work fronts and the alteration of aquatic habitats. During the execution period, such events could have a local character, manifesting over a moderate duration of time. The increase in turbidity in the water can have negative effects on the bird species inside the ROSPA0110 site.

This type of impact generated by the analyzed project is not significant in the construction stage.

- Disturbance of species activity

This may occur as a result of the increase in the noise level in the sensitive areas in the vicinity of the project route (favorable habitats for bird species), as a result of the possible risk of mortality for species that serve as food for birds in ROSPA0110 (due to water contamination or for other reasons), the amount of the food resource could decrease, so their activity will be affected, because they will have to spend more time searching for the necessary food. During the execution of the works, the activities and machines in the work front can create discomfort for the species in the vicinity by increasing the noise level and the human presence in the area, which will have a behavioral impact on the birds, resulting in the avoidance of the areas within the area of influence of the works.

Also at this stage, an increase in mortality can be registered mainly in the case of bird species populations from the ROSPA0110 site, fauna species that have the ability to move long distances, such as otters and bats, but also in the case of some species of invertebrates that can reach the risk area, following the collision with construction site traffic.

This type of impact generated by the analyzed project is not significant in the construction stage.

The operation stage of the project

At this stage, the following types of impacts may occur: alteration of habitats, disruption of species activity, reduction of species population numbers.

- Alteration of habitats

Regarding the alteration of aquatic habitats, there are risks of accidental pollution, as well as the risk of substances used on the Express Road entering the aquatic environment.

This type of impact generated by the analyzed project is not significant in the operation stage.

- Disturbance of species activity

During operation, the level of noise and vibrations represents a source of discomfort for some species of animals in the vicinity of the motorway and Express Road. The predictable and cadenced nature of the discomfort can lead some species to adapt to it, diminishing the negative effect over time. Another way of affecting the species due to this type of impact is through the mortality of the food species, because the amount of food is reduced, and the individuals of the affected species will have to look for more food in other areas. The magnitude of the potential impact will be analyzed within the environmental studies, and measures to avoid or reduce the impact will be proposed within it.

This type of impact generated by the analyzed project is not significant in the operation stage.

- Reduction of the population of fauna species

As a result of the development of road traffic, it is possible to increase the mortality rate, (the risk of collision increases due to the speed of travel), at the level of some species of birds, some species of bats, invertebrates and at the level of the Lutra lutra species. This risk is not constant in time and space, being variable depending on weather conditions (for example, fog prevents visibility and the propagation of sound, leading to the animal's lack of response to avoid a collision).

As part of the environmental studies, the risk of fauna mortality as a result of the collision with car traffic will be analyzed and the necessary avoidance and reduction measures will be proposed.

This type of impact generated by the analyzed project is significant in the operation stage for the following Natura 2000 species: Myotis myotis and Myotis dasycneme, from the ROSCI0075 site; Myotis myotis, from site ROSCI0380, Alcedo athis, Ardea purpurea, Aythya nyroca, Gavia stellata, from site ROSPA0110.

14 INFORMATION REGARDING THE BODIES OF WATER INTERSECTED BY THE PROJECT

14.1 LOCATION OF THE PROJECT IN RELATION TO WATER BODIES

14.1.1 The hydrographic basin

The project is located in the Siret River Basin. The Siret hydrographic basin is located in the eastern part of Romania and is bordered to the east by the Prut hydrographic area, to the west by the Olt, Mureş, Someş and Tisa hydrographic areas, to the south by the Ialomiţa and Dobrogea Litoral hydrographic basins, and to the north by the border with Ukraine. The basin is mostly located upstream from the city of Adjud, in the Moldavian Plateau, and the southern extremity is part of the Romanian Plain until it flows into the Danube near the Municipality of Galaţi.

14.1.2 Surface water courses

The registered watercourses intersected by the project are presented in the following table.

Table no.14-1 Registered surface water courses intersected by the project

Hydrographic basin	Cadastral code	Watercourse name	Confluence with:
Siret	XII_1.....	Siret	Negostina
	XII_1.3....	Negostina	Siret
	XII_1.17.24a...	Horaiţ	Soloneţ
	XII_1.17.27...	Hãtnuţa	Suceava
	XII_1.17.28...	Pătrăuţeanca	Şcheia
	XII_1.17.30...	Dragomirna	Mitoc
	XII_1.17.30.1..	Mitoc	Podul Vătafului
	XII_1.17.30b...	Podul Vătafului	Plopeni

14.1.3 Surface water bodies

The project intersects 7 bodies of surface water. Details regarding the works that will be carried out in the area of water bodies (eg: bridges, decks, consolidations, etc.) are presented in chapter 3 of this Memorandum. The following table shows the intersected water bodies.

Table no.14-2 Surface water bodies intersected by the project

No. crt.	Hydrographic space code	The hydrographic basin	Water body name	Water body code
1.	RO10	Siret	Horait	RORW12.1.17.24a_B1
2.			Hatnuţa + Bocancea	RORW12-1-17-27-1
3.			Pătrăuţeanca	RORW12-1-17-28-1
4.			Dragomira (Lac Dragomirna – CF Suceava	RORW12-1-17-30-3
5.			Mitoc	RORW12-1-17-30A-1
6.			Podul Vătafului	RORW12-1-17-30B-1
7.			Negostina	RORW12-1-3-1

The following figure shows the surface water bodies intersected by the project's catchment area. It is necessary to mention the fact that the intersections of the dam with water bodies are represented in the figure with a corresponding color for each water body. The analysis of the intersections was carried out using the data provided by the beneficiary (project scope) and the spatial data for the water bodies available on the website of the European Environment Agencyhttps://www.eea.europa.eu/).

Ecological status/ecological potential for surface water bodies is discussed in the next section.

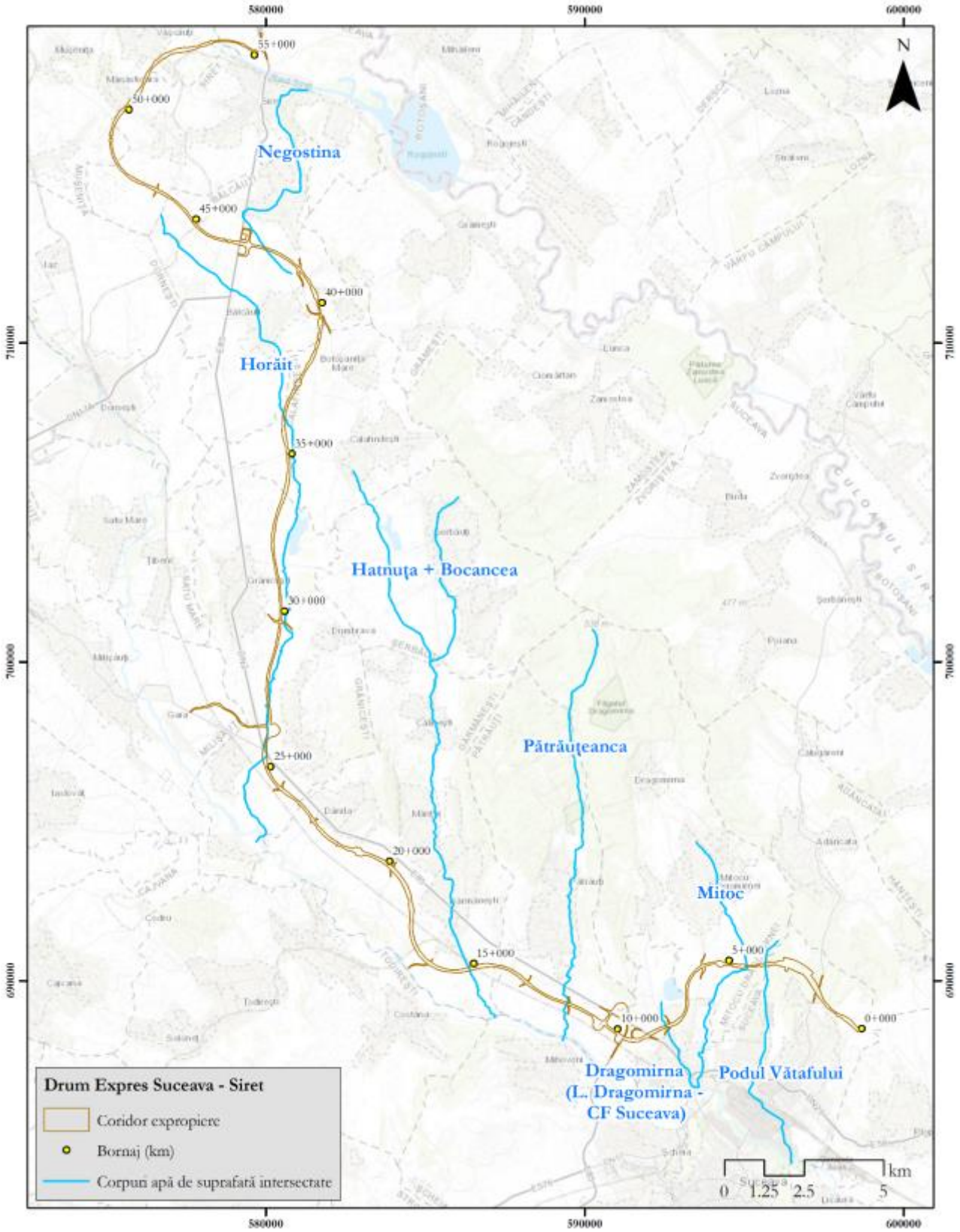

Figure no.14-1 Water bodies that intersect with the DX Suceava - Siret project

14.1.4 Underground water bodies

In the project area, 2 bodies of underground water were identified: ROSI03 Lunca Siretului and its tributaries and ROSI06 Suceava.

According to the Management Plan of the Siret Hydrographic Area, the ROSI03 and ROSI06 groundwater bodies reach good chemical status and the quantitative status is classified as good.

The following figure shows the location of the Suceava-DN2H motorway and DN2H- Siret Border Express Road in relation to underground water bodies.

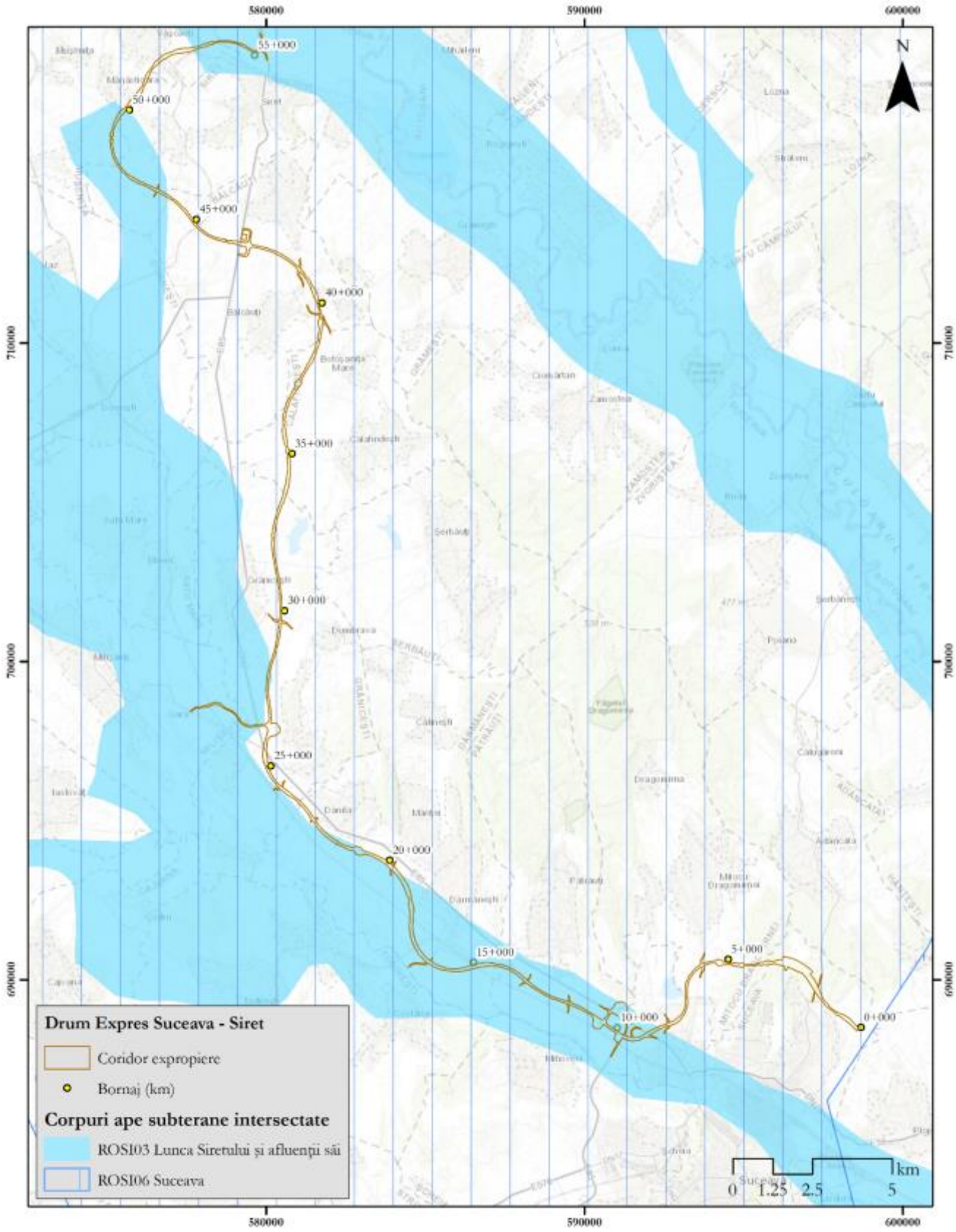

Figure no.14-2 Underground water bodies crossed by the Suceava-DN2H motorway DN2H and Siret Border Express Road project

14.2 ENVIRONMENTAL OBJECTIVES OF INTERSECTING WATER BODIES

14.2.1 Environmental objectives of surface water bodies

The environmental objectives established within the Basin Management Plans, cycle III, for the water bodies influenced or potentially influenced by the project are shown in the following table.

Table no.14-3 Presenting the current status and environmental objectives for the surface water bodies intersected by the project and the deadlines for achieving them

No. crt.	Code and name of the water body	Protected areas	Assessed status of the water body		Environmental objective		The deadline for achieving the objective	
			Ecological status	Chemical state	Ecological status	Chemical state	Ecological status	Chemical state
1.	RORW12.1.17.24a_B1	SCI/SPA	Good	Good	Good	Good	2016	2016
2.	RORW12.1.17.27_B1	SCI/SPA	Good	Good	Good	Good	2016	2016
3.	RORW12.1.17.28_B1	SCI/SPA	Good	Good	Good	Good	2016	2016
4.	RORW12-1-17-30-B3	SCI/SPA	Good	Good	Good	Good	2021	2021
5.	RORW12.1.17.30a_B1	SCI/SPA	Good	Good	Good	Good	2016	2016
6.	RORW12.1.17.30b_B1	SCI/SPA	Moderate	Good	Good	Good	2027	2016
7.	RORW12.1.3_B1	SCI/SPA	Good	Good	Good	Good	2016	2016

14.2.2 Environmental objectives of groundwater bodies

In the case of underground water bodies in the project area, the qualitative and quantitative status was determined to be good according to the Management Plan of the Siret Hydrographic Area. The following table shows the bodies of underground water, their condition and environmental objectives.

Table no.14-4 The status and environmental objectives for the underground water bodies intersected by the project and the deadlines for achieving them

Name of underground water body	Code	Condition		Environmental Objective - Status		The deadline for achieving the objective	
		Quantitative	Cleaning	Quantitative	Qualitative	Quantitative	Qualitative
The meadow of Siret and its tributaries	RED03	Good	Good	Good	Good	2020	2020
Suceava	RED06	Good	Good	Good	Good	2020	2020

15 CRITERIA REGARDING THE ASSESSMENT OF THE IMPACT OF CERTAIN PUBLIC AND PRIVATE PROJECTS ON THE ENVIRONMENT APPLIED TO THE PROJECT

15.1 PROJECT CHARACTERISTICS

a) The size and concept of the entire project

The project consists in making Suceava-DN2H motorway and DN2H- Siret Border Express Road with a total length of 56 km. The route is located on the territory of Suceava county.

b) Cumulation with other existing and/or approved projects

Construction and exploitation of the motorway and express road generates a cumulative impact together with the Pașcani - Suceava motorway.Also, the project cangenerate cumulative impact with road infrastructure and existing railway. In the analyzed area there are several national, county and communal roads, and railways too.

These roads are in operation, so no cumulative impact can be recorded during the execution period of the construction works. Also, not during the exploitation period of the motorwaya and the Express Road, the cumulative impact will not be significant. The motorway and the express road will attract traffic from the existing roads, so that at the locality level crossed currently the level of atmospheric.pollutant emissions will be reduced.

c) Use of natural resources, especially soil, land, water and biodiversity

The natural resources used in construction and operation are: natural aggregates, various types of gravel and sand, water and soil.

Categories of use of the lands occupied by the motorway and roadexpress project are: discontinuous urban space, watercourses, built-up areas, land occupied mainly by agriculture, with significant areas of natural vegetation, coniferous forests, complex cultivation patterns, pastures, transitional forest shrubs, non-irrigated arbail land, deciduous

From the point of view of biodiversity, the project does not intersect natural areas protected by community and national interest.

d) The amount and types of waste generated/managed

The main types of waste produced and managed, as well as the estimated quantities generated both in the execution stage and in the operation stage, are presented in the following table.

Table no.15-1 Types and amounts of waste generated/managed within the project

Waste name	Estimated amount to be generated	Unit	Physical condition*	Waste Code**
Execution stage				
Mixed municipal waste	36	y/y	S	20 03 01
Paper and cardboard	3		S	20 01 01
Plastic	2		S	20 01 39
Metals	1		S	20 01 40
Metallic mixtures	22		S	17 04 07

Waste name	Estimated amount to be generated	Unit	Physical condition*	Waste Code**
Plastic waste	9	t/ execution period	S	17 02 03
Glass	0.5		S	17 02 02
Paper and cardboard packaging	4		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*
Absorbents, filter materials (including oil filters not otherwise specified), polishing materials, protective clothing contaminated with hazardous substances	1		S	15 02 02*
Other engine, transmission and lubricating oils	34		S	13 02 08*
Used tires	10		S	16 01 03
Concrete mixtures, bricks, tiles and ceramic materials, other than those specified in 17 01 06	3		S	17 01 07
Welding waste	0.9		S	12 01 13
Earth and stones other than those specified in 17 05 03*	9		S	17 05 04
Sludge from drainable basins	9		SS	20 03 04
Operation stage				
Mixed municipal waste	225	y/y	S	20 03 01
Paper and cardboard	44		S	20 01 01
Metallic mixtures	56		S	17 04 07
Plastic materials	9		S	17 02 03
Paper and cardboard packaging	2		S	15 01 01
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*
Used tires	4		S	16 01 03
Absorbents, filter materials (including oil filters not otherwise specified), polishing materials, protective clothing contaminated with hazardous substances	0.9		S	15 02 02*
Other engine, transmission and lubricating oils	4		S	13 02 08*
Mixtures of fats and oils from the separation of water/oil mixtures from sectors other than those specified in 19 08 09	180	m3/year	SS	19 08 10*
Sludge from drainable basins	45	m3/year	SS	20 03 04

** 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.*

e) Pollution and other negative effects

Most of the effects will manifest themselves during the construction works but they will be temporary and reversible. During this period there will be noxious emissions and noise from machinery and means of transport. During the operation period, the level of pollution will be reduced at the level of localities crossed by national and county roads, because the Suceava-DN2H motorway and DN2H-Siret Border Express Road take over much of the traffic on this road.

f) The risks of major accidents and/or disasters relevant to the project in question, including those caused by climate change, according to scientific information

As a result of putting the motorway into operation the Suceava-DN2H motorway and DN2H-Siret Border Express Road the number of road accidents will be significantly reduced, consequently the risk of accidental pollution is minor.

The level of pollutant emissions and atmospheric can increase especially during the construction period of the motorway, which can lead to affecting the air quality. During the period of operation, the motorway / Express Road can contribute to reducing the general level of air pollution, by streamlining road traffic, but this aspect must be analyzed in detail through air quality modeling, within the Environmental Impact Report.

g) Risks to human health

The only risk to human health that may arise as a result of the construction of the motorway and Express Road is related to the decrease in air quality as a result of car traffic during the construction or operation stages (the level of this change must be analyzed in detail in the RIM). There are several localities that are exposed to a significant potential impact as a result of the decrease in air quality. It is necessary that this aspect be analyzed in detail within the Environmental Impact Report, in order to clearly establish the level of potential impact on human health.

15.2 PROJECT LOCATION

The ecological sensitivity of the geographical areas likely to be affected by the projects must be taken into account, in particular with regard to:

a) Current and approved land use

The project will be carried out on the administrative territory of Suceava county.According to the Urban Planning Certificate issued, the project will develop mainly on land with various categories of use, on discontinuous industrial-urban areas, non-irrigated agricultural land, fruit trees and forest fruit plantations, pastures, complex cultivation models, land occupied in mainly agricultural, with significant areas of natural vegetation, agro-forestry areas, conifer forests, transitional forest vegetation, water courses.

b) The relative abundance, availability, quality and regenerative capacity of natural resources, including soil, land, water and biodiversity, in the area and its subsoil

The natural resources necessary for the implementation of the project will be taken over from authorized economic operators who hold regulatory documents in which conditions and measures are established regarding the exploitation of natural resources. The excavated soil will be used for fillings and for restoring the surfaces temporarily affected by the works.

c) The absorption capacity of the natural environment, paying special attention to the following areas

1. **Wetlands, riparian areas, river springs**

The project involves the construction of bridges over the watercourses crossed. Within the project, specific measures were provided so that the execution of the works, as well as the operation of the express road, do not affect the physical-chemical characteristics of these waters. It is necessary that the level of impact on water bodies on which interventions are proposed within the project be analyzed by means of a Water Body Impact Assessment Study.

2. **Coastal areas and the marine environment**

It's not necessary. The project is located at a great distance from the coastal and marine areas of Romania and is not in a position to affect them.

3. **Mountain and forest areas**

The project will not affect mountainous areas. In forest areas, it will be necessary to remove some forest areas from the national forest fund.

4. **Protected natural areas of national, community, international interest**

The protected natural areas in the Suceava-DN2H motorway and DN2H-Siret Border Express Road project area are presented in the following table.

No protected natural areas of international interest were identified in the project implementation area.

Table no.15-2Protected natural areas of community interest in the area

No. crt.	Natura 2000 Site Code	Name Natura 2000 Site
1.	ROSCI0075	Patrăuţi Forest
2.	ROSAC0391	Siretul Mijlociu - Bucecea
3.	ROSPA0110	Accumulations Rogojesti - Bucecea
4.	ROSCI0380	Suceava Liteni River

5. **Areas classified or protected according to the legislation in force: Natura 2000 sites designated in accordance with the legislation regarding the regime of natural protected areas, conservation of natural habitats, flora and fauna; the areas provided by the legislation regarding the approval of the National Land Development Plan - Section III - protected areas, the protection areas established according to the provisions of the legislation in the field of water, as well as the one regarding the nature and size of sanitary and hydrogeological protection areas**

The motorway and Express Road project is in a position to affect the Natura 2000 sites ROSCI0075 Pădurea Pătrăuţi and ROSPA0110 Accumulations Rogojeşti - Bucecea (presented in the previous table), however at the moment it is not known whether the project will affect protection zones established according to the provisions of the legislation in the field of water , but this cannot be ruled out.

6. **Areas where there have already been cases of non-compliance with the environmental quality standards provided for by national and European Union legislation and relevant to the project or where such cases are considered to exist**

It's not necessary.

7. **Areas with a high population density**

The route of the motorway and the Express Road does not cross areas with high population density, generally following areas outside the urban areas of the localities. However, there are situations in which the route of the express road will also cross localities. These are generally represented by rural areas, without a high population density.

8. **Historically, culturally or archaeologically important landscapes and sites**

In the vicinity of the project, a series of historically, culturally and archaeologically important elements that could be affected by the realization of the project were identified.

Based on archaeological investigation reports for the project Suceava-DN2H motorway and DN2H-Siret Border Express Road, the following are proposed:

- Archaeological surveillance along the entire project route, during discovery and excavation works, with special attention paid to potential archaeological areas;
- Carrying out a preventive archaeological study for the identified archaeological sites.

15.3 TYPES AND CHARACTERISTICS OF POTENTIAL IMPACT

a) The importance and spatial extent of the impact - for example, the geographical area and size of the population that may be affected

Significant impacts may occur on several species of community interest (details on this aspect are presented in the evaluation table attached to this Memorandum), on the human population in several localities near the project and on water bodies. The clear level of these impacts must be clarified in the environmental studies developed within the environmental impact assessment procedure.

b) The nature of the impact

During the execution of the construction works, as well as during the operation period, there will be both a direct impact (occupation of land surfaces, sedimentable dust emissions, increased noise level) and an indirect impact.

c) Transboundary nature of the impact

Considering the small distance from the project to the border with Ukraine, it cannot be excluded that some effects will occur on this state.

d) The intensity and complexity of the impact

The intensity of the impact can be significant in the case of several components of the environment (detailed previously).

e) Probability of impact

Very likely.

f) The expected onset, duration, frequency and reversibility of the impact

The impact will begin with the start of construction works. Most forms of impact are reversible, except for the permanent occupation of some land surfaces.

g) Accumulation of the impact with the impact of other existing and/or approved projects

The impact of the project analyzed in this Memorandum is cumulative with the Paşcani - Suceava motorway and with the existing and proposed transport infrastructures in the area.

h) The possibility of effective reduction of the impact

The impact can be reduced by proposing specific measures in the environmental studies developed for the project. These measures will be sized and established based on the identified forms of impact and the assessed level of impact.