APPROPRIATE ASSESSMENT STUDY

DEVELOPMENT PROGRAM OF THE NATIONAL GAS TRANSPORT SYSTEM FOR THE PERIOD 2021 – 2030

Provider: SC NaturalNet SRL in collaboration with Fundatia Pronatura

through NTU International A/S and EQO-NIXUS

Beneficiary: European Investment Bank (EIB)

Plan holder: SNTGN Transgaz SA MEDIAS

25 IANUARIE, 2021

Document control sheet

Code: TA2019037 R0 HUB:

Contract title: "SEA for TYNDP of TransGaz"

Beneficiary: European Investment Bank (EIB)

Provider: SC NaturalNet SRL, in collaboration with Fundatia Pronatura, through NTU International A/S and EQO-NIXUS

Document title: APPROPRIATE ASSESSMENT STUDY for the DEVELOPMENT PLAN FOR THE NATIONAL NATURAL GAS TRANSMISSION SYSTEM 2021-2030

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Rev.	Comments	Verified by	Date
02	Revision according to the observations of the Working Group on 03.12., 2020	CMG	25.01.2021

**MINISTRY OF ENVIRONMENT,
WATERS AND FORESTS**

**REGISTRATION CERTIFICATE
No. 315 from 04.08.2020**

In accordance with the provisions of the Government Emergency Ordinance no. 195/2005 on environmental protection, approved with amendments and completions by Law no. 265/2006, with subsequent amendments and completions, and of the Order of the Minister of Environment, Waters and Forests no. 1134/2020 regarding the approval of the conditions for elaboration of environmental studies, of the attestation criteria of natural and legal persons and of the composition and Regulation of organization and functioning of the Attestation Commission, following the analysis of the documents submitted by:

S.C. NATURALNET S.R.L.

headquartered in: Capusu Mare commune, Dumbrava village, no. 46, Cluj county,
Tax code RO 22872175, registered in the Trade Register at no. J12/1910/2010

the legal person is entered in the List of experts conducting environmental studies under heading 315 for:

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**MINISTRY OF ENVIRONMENT,
WATERS AND FORESTS**

**REGISTRATION CERTIFICATE
No. 244 from 21.07.2020**

In accordance with the provisions of the Government Emergency Ordinance no. 195/2005 on environmental protection, approved with amendments and completions by Law no. 265/2006, with subsequent amendments and completions, and of the Order of the Minister of Environment, Waters and Forests no. 1134/2020 regarding the approval of the conditions for elaboration of environmental studies, of the attestation criteria of natural and legal persons and of the composition and Regulation of organization and functioning of the Attestation Commission, following the analysis of the documents submitted by:

FUNDATIA PRONATURA

headquartered in: Ozun, str. Kossuth Lajos, no. 353, Covasna county,
Tax code RO 8950472

the legal person is entered in the List of experts conducting environmental studies under heading 244 for:

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Valid until 21.07.2021

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I. General Information

This paper is the Appropriate Assessment Study for the Strategic Environmental Assessment of the DEVELOPMENT PROGRAM OF THE NATIONAL GAS TRANSPORT SYSTEM FOR THE PERIOD **2021-2030**, hereinafter referred to as TYNDP. The plan has been conceived for the observance of the requirements of the European Directive CE/73/2009 art. 22, on the requirement to annually submit a 10-year Development Plan for all the natural gas transportation systems' operators in the European Union.

According to the address of the Ministry of Environment no. 35520 / 02.10.2019 and no. 43114 / 29.11.2019 the plan was submitted to the environmental assessment procedure, the appropriate assessment procedure and the assessment procedure in a crossborder context, based on the provisions of GD no. 1076/2004, GEO no. 57/2017 and OM no. 19/2010, and in accordance with the provisions of Directive 2001/42/EC (SEA Directive) and those of the SEA Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Crossborder Context (Kiev, 2003).

The Appropriate Assessment Study was prepared in accordance with the requirements of Order no. 262/2020 on the amendment of the Methodological Guide on the appropriate assessment of the potential effects of plans or projects on protected natural areas of community interest, approved by Order of Ministry of Environment and Forests no. 19/2010.

The study took into account the European Union Directives 2001/42/EC, 92/43/EEC, 2009/147/EC, transposed into national legislation by GEO 57/2007 on the regime of protected natural areas, conservation of natural habitats, wild flora and fauna , with subsequent amendments and completions, approved by Law no. 49/2011, as well as other relevant documents on the interpretation of directives and the application of a correct methodology, including the *Manual for the implementation of the Guide on the proper assessment of the impact of plans/ projects on conservation objectives of Natura 2000 sites*, developed by the Ministry of Environment and Forests - Biodiversity Directorate, Bucharest 2011, as well as the documents *Managing Natura 2000 sites The provisions of Article 6 of the Habitats Directive 92/43/EEC*, made by the European Commission, 2019, respectively *Assessment of plans and projects significantly affecting Natura 2000 sites - Methodological guidance on the provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC*, developed by the European Commission, DG Environment, 2001. The methodology applied in drafting the study was proposed in the special working group set up on 20 November.

The owner of the plan is SNTGN Transgaz S.A.

SNTGN Transgaz SA Mediaș is the technical operator of the National Transport System (NTS) for natural gas and ensures the efficient, transparent, safe, non-discriminatory and competitive fulfilment of the national strategy regarding national and international transportation of natural gas, dispatching of natural gas, as well as research and plan in its specific field of expertise, with the observance of the European and national laws, as well as of the quality, performance, environmental and durable development standards.

NTGN "TRANSGAZ" SA (Transgaz) performs its activity in the following locations:

- Transgaz headquarters: Mediaș, Piața C.I. Motaș str., no. 1, Sibiu County, postal code 551130;
- Usage and Maintenance Department: Mediaș, George Enescu str. , no. 11, Sibiu County, cod 551018;
- Planning and Research Department: Municipiul Mediaș, str. Unirii nr. 6, Sibiu County, postal code 550173;
- PVT Operation Directorate: Bucharest, Calea Dorobanți no. 30, District 1, postal code 010573;
- Transgaz–Romania agency: Bucharest, Bld. Primăverii, no. 55;
- Transgaz Brussels – Belgium agency: Brussels, 23 Luxembourg St.
- European Funds Accessing and International Relations Department: Bucharest, Calea Victoriei, no. 155, District 1, postal code 010073;
- Planning and Research Workshop in Brasov, Nicolae Titulescu str., no. 2;
- "EUROTRANSGAZ" Limited Liability Company MD–2004, Bd. Ștefan cel Mare și Sfânt, 180, of. 506, Chișinău, Republic of Moldavia;
- Transgaz secondary headquarters: Mediaș, I.C. Brătianu str., no. 3, bl. 3, app. 75, Sibiu County; company's website: https://www.transgaz.ro

Transgaz also includes 9 territorial usage units and a branch:

- Territorial usage unit in Arad, Poetului str., no. 56, Arad city, Arad county, postal code 310369;
- Territorial usage unit in Bacău, George Bacovia str., no. 63, Bacău city, Arad county, postal code 600238;
- Territorial usage unit in Brăila, Ion Ghica str., no. 5, Brăila city, Arad county, postal code 810089;
- Territorial usage unit in Brașov, Grigore Ureche str., no. 12A, Braşov city, Arad county, postal code 500449;
- Territorial usage unit in Bucharest, Lacul Ursului str., no. 24, 6th district, Bucharest, postal code 060594;
- Territorial usage unit in Cluj, Crişului str., no. 12, Cluj-Napoca city, Arad county, postal code 400597;
- Territorial usage unit in Craiova, Arhitect Ioan Mincu str., no. 33, Craiova city, Arad county, postal code 200011;
- Territorial usage unit in Mediaş, Ion Ghica str., no. 29, Brăila city, Sibiu county, postal code 551027;
- Territorial usage unit in Constanţa, Albastră str., no. 1, Constanţa city, Sibiu county, postal code 900117;
- Branch in Mediaş, Şoseaua Sibiului no. 59, Mediaş town, Sibiu county.

The author of the Appropriate Assessment Study is SC NATURALNET SRL with its registered office in Dumbrava, Căpușu Mare commune, Cluj county, a company registered according to MMAP Order no. 1134/2020 in the List of experts elaborating environmental studies at position no. 315 for environmental report (RM), report on environmental impact (RIM) and

appropriate assessment study (EA), in collaboration with FUNDATIA PRONATURA, headquartered in Ozun, str. Kossuth Lajos, no. 353, company registered according to MMAP Order no. 1134/2020 in the List of experts elaborating environmental studies at position no. 244 for environmental report (RM), environmental impact report (RIM), environmental balance (WB), site report and baseline report (RSR), appropriate assessment study (EA).

The following elements were taken into account in the elaboration of this Appropriate Assessment Study:

- Draft plan on the DEVELOPMENT FOR THE NATIONAL NATURAL GAS TRANSPORT SYSTEM 2021-2030
- Description of the specific technical elements in the planning and execution of natural gas transmission pipelines, provided by Transgaz
- Geospatial coordinates (routes) of the projects for which the environmental assessment was not completed, provided to the consultant by Transgaz SA
- Route maps within the 7.12 Eastring project, the three options whose location is confidential
- Calculations and overlaps with protected areas and Corine Land Cover habitats made for the 7.12 Eastring project by Transgaz SA (these could not be performed by the consultant in the absence of coordinates)
- Conclusions formulated within the Working Group
- Other information discussed during meetings with Transgaz representatives
- The database with the official limits of the Natura 2000 network and the network of protected areas in Romania, as available on the website of the Ministry of Environment
- Land use categories, from the Copernicus Land Monitoring Service database, downloaded from the European Environment Agency service
- Environmental documentation (reports, appropriate assessment studies, environmental impact reports and environmental agreements) for the projects that make up the Minimum Do scenario
- Other official sources, specialized literature
- Expert opinion

II. Information on the plan subject to approval

2.1. Information on the Plan, according to the level of information existing in TYNDP 2021-2030

The plan subject to evaluation and approval is represented by the DEVELOPMENT PROGRAM OF THE NATIONAL GAS TRANSPORT SYSTEM FOR THE PERIOD **2021-2030** (TYNDP), promoted by the National Natural Gas Transmission Company TRANSGAZ SA. (SNTGN Transgaz SA Mediaş), as technical operator of the National Natural Gas Transmission System of Romania (NGTNS).

The natural gas transportation activity is performed by SNTGN Transgaz based on the License Agreement regarding the pipelines, installations, equipment and fittings afferent to NGTNS, publicly owned by the Romanian state, concluded with the National Agency for Mineral Resources (NAMR), approved by GD 668/2002, published in the OJ 486/July 8th 2002, valid until 2032. TRANSGAZ is a member of ENTSO-G (European Network of Transmission System Operators for Gas), a body within which the company cooperates with all the natural gas transportation systems' operators in the European Union, in order to create a common regulatory framework and common development strategies and visions in the European Union, for the creation of an integrated energetic market. In this context, during the elaboration of NGNTDSP for 2020-2029, it was envisaged the coordination with the 10-year development plans of the other operators in the region.

TYNDP presents the development pathways of the Romanian natural gas transportation network and of the major projects that SNTGN Transgaz S.A. desires to implement in the next 10 years.

The plan meets the requirements of European Directive EC/73/2009 art. 22 on the obligation to prepare the annual 10-year Development Plan for all operators of natural gas transmission systems in the European Union, is developed in accordance with the provisions of Law no. 123/2012 of electricity and natural gas, respectively is correlated with the development plans of the other operators in the region, with subsequent amendments and completions.

The goal of TYNDP is to reach a maximum degree of transparency regarding the development of the Natural Gas National Transportation System, to provide the players in the market the opportunity to get timely information on the existing and planned transportation capacities so that, by public consultations, the decisions regarding the investment in the natural gas transportation network would address the market's requirements.

The plan objectives are corelated with the objectives proposed in the Energetic Strategy of Romania 2020-2030 with the perspective of year 2050, observes the requirements of the European Energetic Policy regarding:

- To ensure a safe supply of natural gas;

- To increase the degree of interconnectivity of the natural gas national transportation network to the European network;
- To increase the natural gas transportation network's flexibility;
- The liberalization of natural gas' market;
- To create an integrated natural gas market at the level of the European Union;
- To ensure the connection of third parties to the transportation system, according to specific regulations, within the transportation limits and with the observance of technological requirements;
- The expansion, , of the pipeline network, up to the entrance in the localities attested as resorts of national, respectively local interest, when these localities are located within a distance of maximum 25 km from the connection points of the transportation and system operators;
- To ensure the connection to the natural gas network to new investments, thusly creating new jobs

Through TYNDP Transgaz proposes major investment projects for the strategic and sustainable development of the natural gas transmission infrastructure in Romania, also pursuing its compliance with the requirements of European regulations in the field. The plan is subject to the approval of the National Authority for Energy Regulation (ANRE).

TYNDP **2021-2030** includes a total of 17 major projects, as follows (project codes represent the codes given in the plan):

7.1.1 The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA) – Phase I
7.1.2 The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA) – Phase II
7.2 Development on Romanian l territory of the Southern Channel for the takeover of natural gas from the Black Sea shore

7.3 Interconnection of the national transportation system with the international natural gas transportation pipelines T1 and reverse flow Isaccea.

7.4 TNS developments in North-Eastern Romania, for the improvement of the natural gas supply of the area, as well as to ensure transportation capacities to the Republic of Moldavia

7.5 Amplification of bidirectional transport channel Bulgaria-Romania-Hungary-Austria (BRHA stage 3)

7.6 New developments of NTS in order to takeover of natural gas from the Black Sea shore
7.7 Interconnection Romania-Serbia - interconnection of the Natural Gas National Transportation System with the similar Serbian natural gas transportation system
7.8 Upgrading of GMS Isaccea I and GMS Negru Vodă 1

7.9 Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret

7.10 Development / Upgrading of natural gas transportation infrastructure in North-Western Romania
7.11 Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction

7.12 Eastring–Romania
7.13 Monitoring, control and data acquisition system for cathodic protection systems afferent to the Natural Gas National Transportation System
7.14 Development of SCADA system for the Natural Gas National Transportation System
7.15 Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2
7.16 Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3
7.17 TNS interconnection to GNL Terminal, located at the Black Sea shore

In addition to these projects concerning the development of the national gas transmission system (NGTNS), the plan includes five other related strategic projects regarding the development of the natural gas storage system, operated by DEPOGAZ Ploiești and DEPO Mureș:

8.1 Upgrading of the natural gas storage system's infrastructure in Bilciurești
8.2 Increase of the natural gas underground storage capacity of the storage facility in Ghercești
8.3 New natural gas underground storage facility in Fălticeni
8.4 Increase of the natural gas underground storage capacity of the storage facility in Sărmășel (Transilvania)

8.5. Storing unit - Depomureș - reengineering and development of natural gas underground storage facility in Târgu Mureș

TYNDP projects are grouped into two scenarios: "Do-minimum" and "Do maximum", according to the status regarding the allocation of financial resources: projects with FID[1] and A non FID[2] status are part of the "Do-minimum" scenario, and those with LA non FID[3] status, together with all that constitutes the first scenario, forms the "Do maximum" scenario.

Table 1. List of major projects - Reference scenario for the period *2021 - 2030* ("Do-minimum")

Project no.	Project Name	Status
Natural gas transmission		

[1] Final Investment Decizion
[2] Advanced non Final Investment Decision
[3] Less Advanced non Final Investment Decizion

Project no.	Project Name	Status
7.1.1	Development on the Romanian territory of the National Natural Gas Transmission System on the Bulgaria – Romania – Hungary – Austria Corridor - **Phase I**	FINALIZED
7.1.2	Development on the Romanian territory of the National Natural Gas Transmission System on the Bulgaria – Romania – Hungary – Austria Corridor - **Phase II**	A non FID
7.2	Development on the Romanian territory of the Southern Transport Corridor for taking over the natural gas from the Black Sea coast	FID
7.3	Interconnection of the national natural gas transmission system with the international natural gas transmission pipeline T1 and Isaccea reverse flow	FINALIZED
7.4	Developments of NGTNS in the North-East area of Romania in order to improve the natural gas supply of the area as well as to ensure the transport capacities to the Republic of Moldova	FID
7.6	New developments of NGTNS in order to take over the gas from the Black Sea coast	FID
7.7	Romania-Serbia interconnection - interconnection of the National Natural Gas Transmission System with the similar natural gas transmission system in Serbia	A non FID
7.8	1. Upgrading SMG Isaccea 1	FINALIZED
	2. Upgrading Negru Vodă 1	FID
Storage		
8.1	Modernization of the gas storage system infrastructure - Bilciurești	FID
8.4	Increasing the underground natural gas storage capacity at the Sărmășel landfill (Transylvania)	A non FID
8.5	Refurbishment and development of the Târgu Mureș underground natural gas storage depot	A non FID

Table 2. List of major projects - Development scenario for the period *2021 - 2030* (”do maxim”)

No. of project	Name of TYNDP project	Projects stage
Natural gas international transport		
7.1.1	The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA)	FINALIZED
7.1.2	The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA)	A non-FID
7.2	Development on Romanian soil of the Southern Channel for the takeover of natural gas from the Black Sea shore	FID
7.3	Interconnection of the national transportation system with the international natural gas transportation pipelines T1 and reverse flow Isaccea	FINALIZED
7.4	TNS developments in North-Eastern Romania, for the improvement of the natural gas supply of the area, as well as to ensure transportation capacities to the Republic of Moldavia	FID
7.5	Amplification of bidirectional transport channel Bulgaria-Romania-Hungary-Austria (BRHA stage 3)	LA non-FID

No. of project	Name of TYNDP project	Projects stage
7.6	New developments of NTS in order to takeover of natural gas from the Black Sea shore.	FID
7.7	Interconnection Romania-Serbia	A non-FID
7.8	1. Upgrading of GMS Isaccea I	FINALIZED
	2.Modernizare Negru Vodă 1	FID
7.9	Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret	LA non-FID
7.10	Development / Upgrading of natural gas transportation infrastructure in North-Western Romania	LA non-FID
7.11	Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction	LA non-FID
7.12	Eastring–Romania	LA non-FID
7.13	Monitoring, control and data acquisition system for cathodic protection systems afferent to the Natural Gas National Transportation System	LA non-FID
7.14	Development of SCADA system for the Natural Gas National Transportation System	LA non-FID
7.15.	Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2	LA non-FID
7.16.	Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3	LA non-FID
7.17.	TNS interconnection to GNL Terminal, located at the Black Sea shore	LA non-FID
Natural gas storage		
8.1	Upgrading of the natural gas storage system's infrastructure in Bilciurești	FID
8.2	Increase of the natural gas underground storage capacity of the storage facility in Ghercești	LA non-FID
8.3	New natural gas underground storage facility in Fălticeni	LA non-FID
8.4	Increase of the natural gas underground storage capacity of the storage facility in Sărmășel (Transilvania)	A non-FID
8.5.	Storing unit - Depomureș - reengineering and development of natural gas underground storage facility in Târgu Mureș	A non-FID

The plan also refers to 75 projects included in the Modernization and Investment Development Plan (IMDP) for NGTNS, period 2020-2023 (listed in Chapter 13 of TYNDP 2021-2030) of which:

-
- 69 are running
- 6 are in different phases of preparation for the start of execution.

58 (approximately 80%) of the projects included in the IMDP (except for the projects in point 2.2 which refer to strategic projects) are works carried out on existing installations which, in their majority, mainly aim at repairs or punctual interventions on small areas on some existing objectives, with insignificant impact on the environment. These interventions either do not require regulatory acts from the point of view of environmental protection, or the environmental decisions issued specific "Classification of notifications". For this reason, the proposed development scenarios analyze the implementation of projects classified as strategic / major projects.

2.2. Geographical and administrative location of major projects and elements of TYNDP whose location is known, at the existing level of accuracy

The DEVELOPMENT PROGRAM OF THE NATIONAL GAS TRANSPORT SYSTEM FOR THE PERIOD 2021– 2030 is a national plan, with international aspects through the interconnections with the international natural gas transmission system. The plan targets the entire National Gas Transmission System, which was designed as an interconnected radial-annular system, being developed around and having as starting points the large natural gas fields in the Transylvanian Basin (centre of the country), Olteanu and later Eastern Monteria (southern country). As a destination were the big consumers from the Ploiesti – Bucharest, Moldova, Olteanu area, as well as those from the central area (Transylvania) and the north of the country.

The National Transport System is represented by the set of main pipelines, as well as by their installations, equipment and endowments, which ensure the taking over of the natural gas extracted from the production perimeters or those coming from import and their transport for delivery to the participants on the domestic market of natural gas, export, international transport, etc.

The main components of the Natural Gas National Transmission System on 31.12.2020 were the following**:**

Table 3. The main components of the Natural Gas National Transmission System

Objective name / NGTNS component	**M.U.**	**Value**
Transportation mains and natural gas supply connections, out of which - international transportation pipelines (Transit II, Transit III)	km	13925 369 479

Objective name / NGTNS component	M.U.	Value
- BRUA		
Measurement Regulation Systems (MAS) in use	pcs	1,128 (1,233 measuring directions)
Valve control station (VCS, NT)	pcs	58
Imported gas measurement systems (GMS) (Giurgiu, Horia, Isaccea import, Negru Vodă IV, Medieșu Aurit, Isaccea Transit I, Negru Vodă I)	pcs	7
Measurement systems located on gas transit pipelines (GMS) (Isaccea Transit II, Isaccea Transit III, Negru Vodă II, Negru Vodă III)	pcs	4
Gas compression stations(GCS) (Șinca, Onești, Siliștea, Jupa , Podișor)	pcs	6
Cathodic Protection Systems (CPS)	pcs	1,041
Gas Odorization Systems	pcs	982

The main existing elements of the National Natural Gas Transmission System projected on the map of the country are presented in the following image:

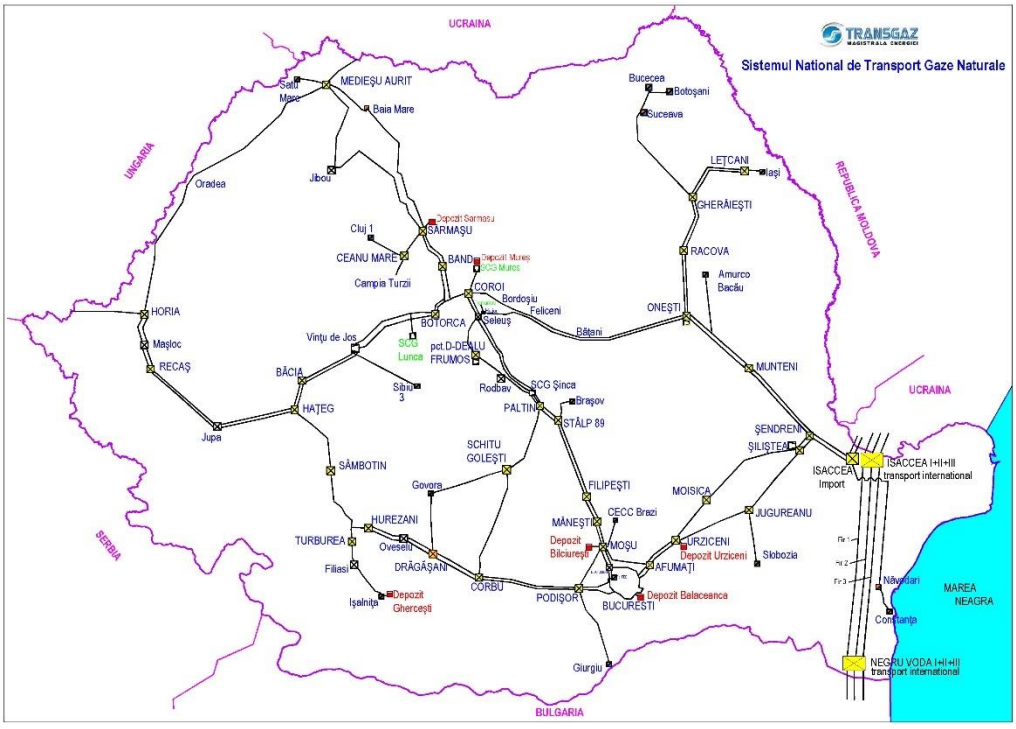

Image 1. Map of the National Natural Gas Transmission System (source: TYNDP 2021-2030)

Currently, the import/export of natural gas in/from Romania is carried out through 7 crossborder interconnection points:

Table 4. Existing crossborder interconnection points

Orlovka (UA)–Isaccea (RO)	UKRAINE
Tekovo (UA)–Medieşu Aurit (RO)	
Isaccea 1/Orlovka 1	

Szeged (HU)–Arad(RO)–Csanadpalota	HUNGARY
Ungheni (MO) – Iași (RO)	REPUBLIC OF MOLDOVA
Ruse (BG)–Giurgiu (RO)	BULGARIA
Negru Vodă 1/Kardam	

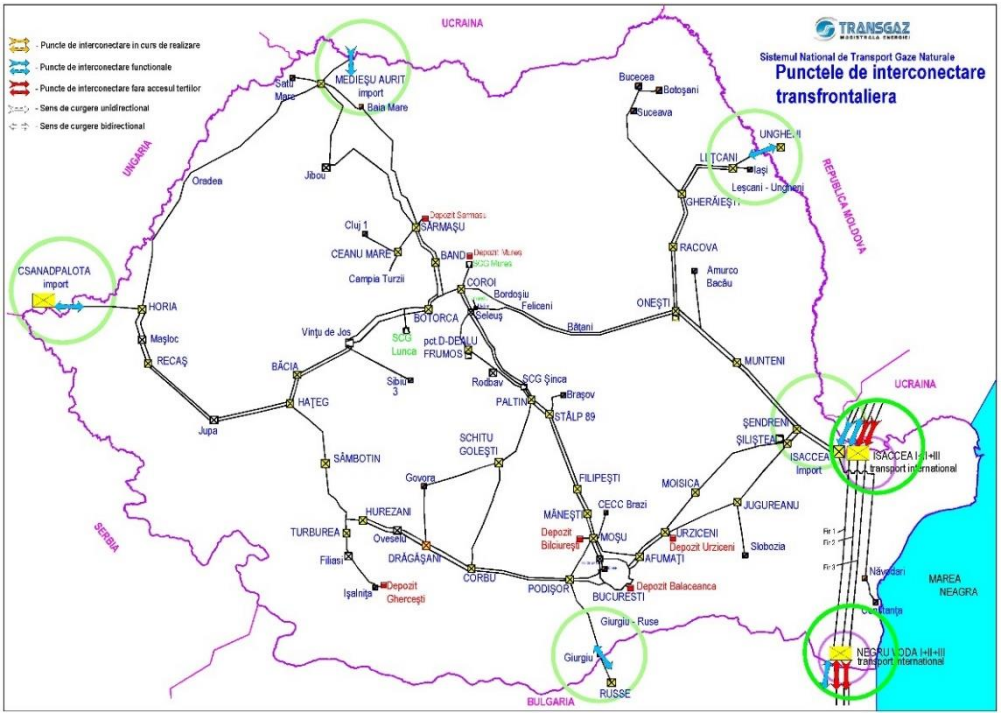

Image 2. NGTNS crossborder interconnection points (source: TYNDP 2021-2030)

The development plan of the National Natural Gas Transmission System includes large-scale projects aimed at reconfiguring the natural gas transmission network which, although extensive and complex, was conceived at a time when the emphasis was on the supply of natural gas to large industrial consumers and creating their access to resources concentrated in the centre of the country and in Oltenia, as well as to the only source of imports.

Given the latest developments and trends in the field of natural gas transmission routes at European level, it is clear the profiling of two new important sources of natural gas supply: natural gas from the Caspian Sea region and the Black Sea.

Thus, the projects planned by the company take into account:

▪ ensuring an appropriate degree of interconnectivity with neighbouring countries;

▪ creation of natural gas transmission routes at regional level to ensure the transport of natural gas from new sources of supply;

▪ creating the necessary infrastructure for taking over and transporting natural gas from off-shore perimeters in order to capitalize on the Romanian market and other markets in the region;

▪ expanding natural gas transmission infrastructure to improve the supply of natural gas to deficient areas;

▪ creating an integrated single market at EU level.

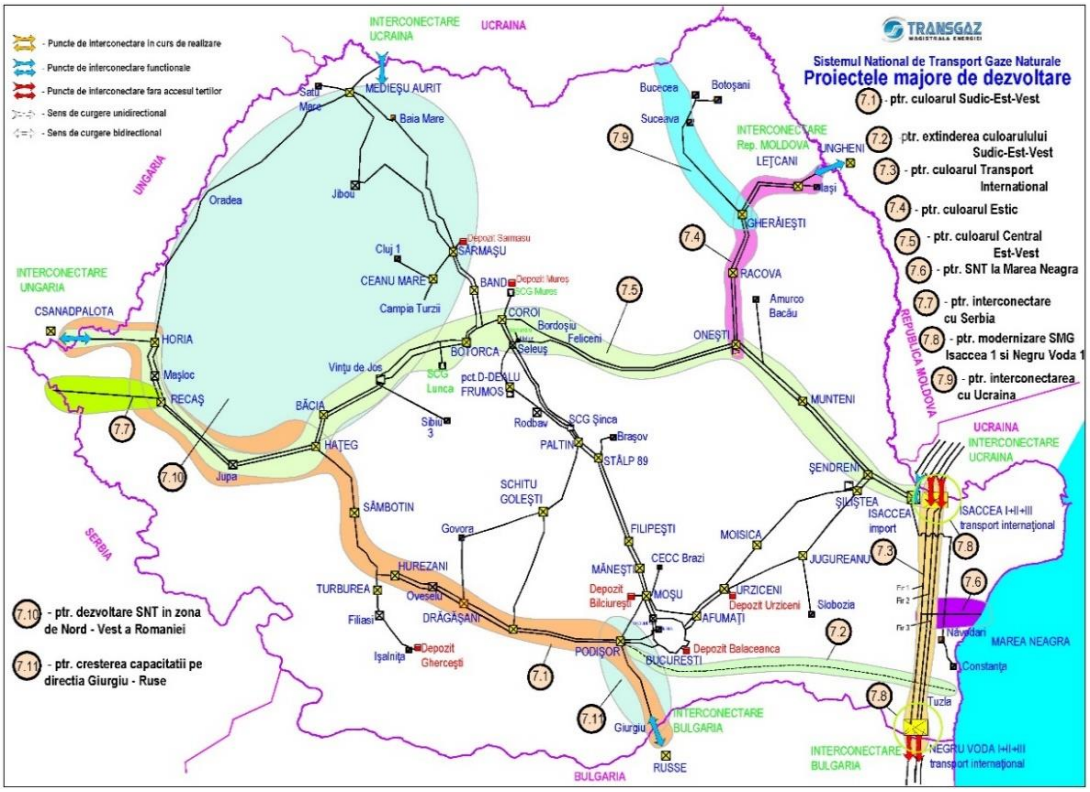

Image 3. Map of major projects in the NGTNS (source: TYNDP 2021-2030)

Next, the geographical and administrative location for each project included in the TYNDP will be presented.

Project 7.1.1. The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA) – Phase I

Project location: Giurgiu, Teleorman, Dambovița, Olt, Vâlcea, Argeș, Gorj, Hunedoara, Caraș Severin, Timiș and Arad counties.

This project achieves the following objectives:

- Podişor – Recaş pipeline 479 km long:
- LOT 1 from km 0 (in the area of Podișor locality, Giurgiu County) to km 180 (in the area of Văleni Locality, Zătreni Commune, Vâlcea County);
- LOT 2 is executed from km 180 (in the area of Văleni Locality, Zătreni Commune, Vâlcea County) to km 320 (in the area of Pui locality, Hunedoara County);
- LOT 3 is executed from km 320 (in the area of Pui locality, Hunedoara County) to km 479 (in the area of Recaș locality, Timiș County).

- Three gas compression stations (GCS Podișor, Bibești and Jupa) each system fitted with two compression aggregates (one functioning and one reserve), with the possibility to ensure the bidirectional gas flow.

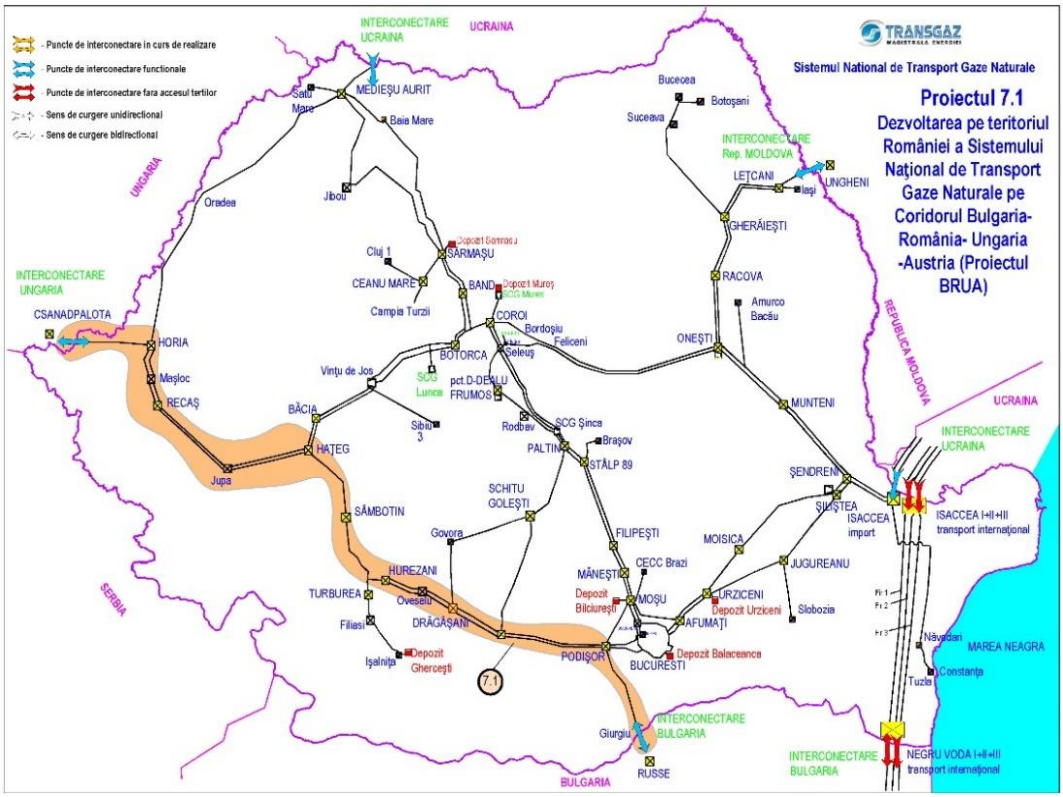

Image 4. Map of the major development project of the Bulgaria-Romania-Hungary-Austria corridor - Phase I (source: TYNDP 2021-2030)

Project 7.1.2 The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA) – Phase II

Project location: Giurgiu, Teleorman, Dambovița, Olt, Vâlcea, Argeș, Gorj, Hunedoara, Caraș Severin, Timiș and Arad counties.

This project achieves the following objectives:

- Recaș–Horia pipeline, 50 km in length;

- The increase of the three compression stations(Podișor, Bibești and Jupa) by mounting on each system an additional compression aggregate;
- Increase of the gas measurement system existing in GMS Horia.

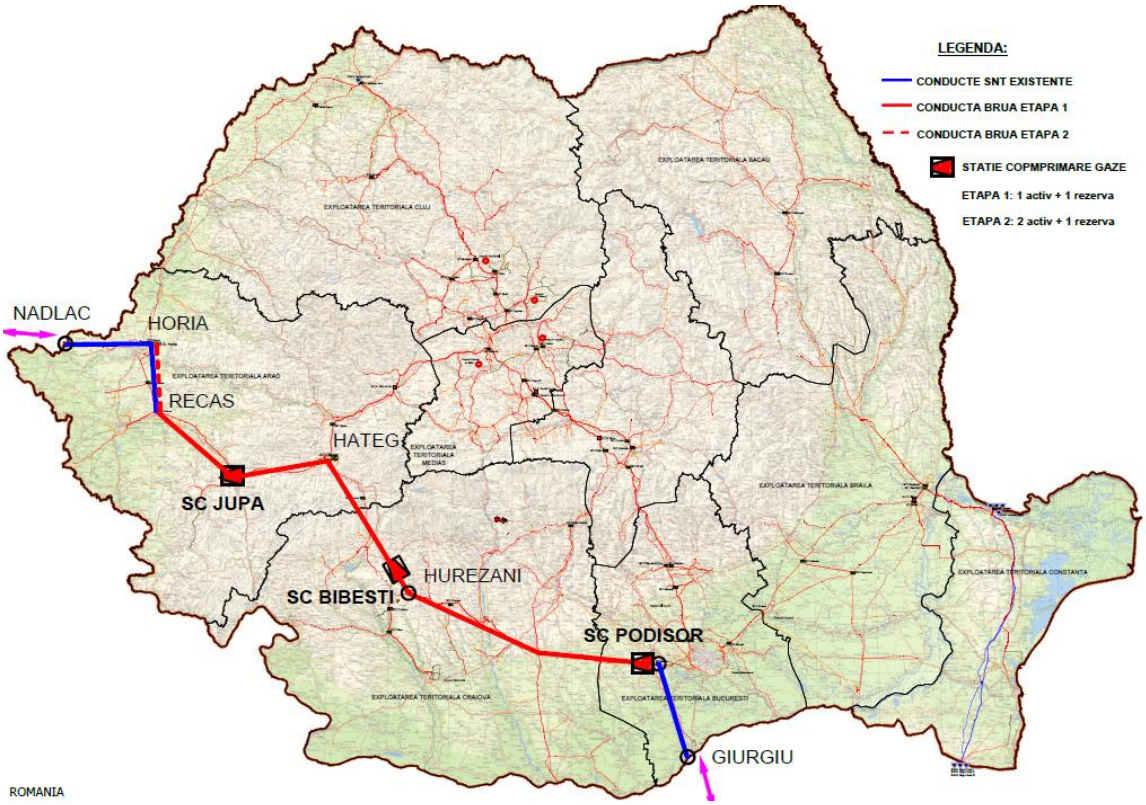

Image 5. Map of the major development project of the Bulgaria-Romania-Hungary-Austria corridor - Phase II (source: TYNDP 2021-2030)

Project 7.2. Development on Romanian l territory of the Southern Channel for the takeover of natural gas from the Black Sea shore

Project location: Constanta, Călărași and Giurgiu counties.

The main objective of this investment is the building of a natural gas transportation telescopic pipeline between Tuzla and Podisor, 308.3 km long, connecting the natural gas resources available on the Black Sea shore with the BULGARIA-ROMANIA-HUNGARY-AUSTRIA channel, thusly ensuring the possibility of natural gas transport towards Bulgaria and Hungary using the existing Giurgiu-Ruse (with Bulgaria) and Nădlac–Szeged (with Hungary) connections.

The pipeline consists in:

- Section I, Black Sea shore - Amzacea, 32.4 km long, will have a Ø 48” (DN1200) diameter and technical capacity of 12 bil mc/year;
- Section II, Amzacea - Podișor, 275.9 km long, will have a Ø 48” (DN1000) diameter and technical capacity of 6 bil mc/year;.

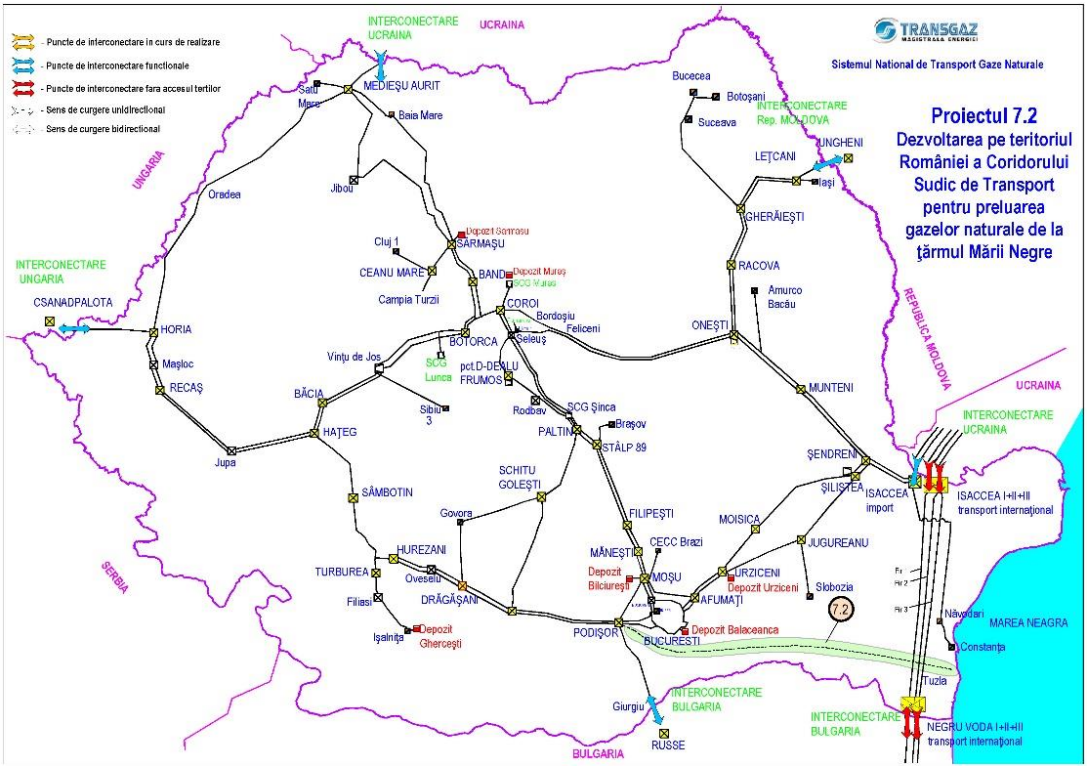

*Image 6. M*ap of the major development project for taking over the gas from the Black Sea coast by extending the South East-West corridor (source: TYNDP 2021-2030)

Project 7.3. Interconnection of the national transportation system with the international natural gas transportation pipelines T1 and reverse flow Isaccea

Project location: Tulcea, Brăila, Bacău, Vrancea and Galați counties.

The project takes place on the territory of the city of Isaccea, Tulcea County, and does not provide for the construction of new pipelines being an interconnection project. Through its implementation, a transport corridor is created between the markets in Bulgaria, Romania and Ukraine, given that the new interconnection between Greece and Bulgaria is being created, respectively the possibility of taking over the natural gas transmission system discovered in the Black Sea is created, for their capitalization on the Romanian market and on the regional markets.

The project will consist of the following:

Stage 1 - energy infrastructure category "Gas and biogas transmission pipelines that are part of a network comprising mainly high pressure pipelines, except for high pressure pipelines used for upstream or local gas distribution", with the following investment objectives:

- Isaccea interconnection, location A.T.U. Isaccea;
- Restoration of DN 800 Onești-Cosmești pipeline.

Stage 2 - energy infrastructure category "Any equipment or installation essential for the safe, efficient and safe operation of the system or for ensuring bidirectional capacity, including compression stations", with the following investment objectives:

- Upgrading of the existing Siliștea Gas Compression Station, including the Technological Junction (TJ) Siliștea, located in the Administrative and Territorial Unit (A.T.U.) Siliștea, Brăila county;
- Works at the existing Șendreni Technological Junction, located in A.T.U. Vădeni, Brăila county;
- Upgrading of the existing Onești Gas Compression Station, including the Technological Junction (TJ) Onești, located in the Administrative and Territorial Unit (A.T.U.) Onești, Bacău county.

The project does not develop additional capacities on the entry/exit point in the NGTNS at Negru Vodă

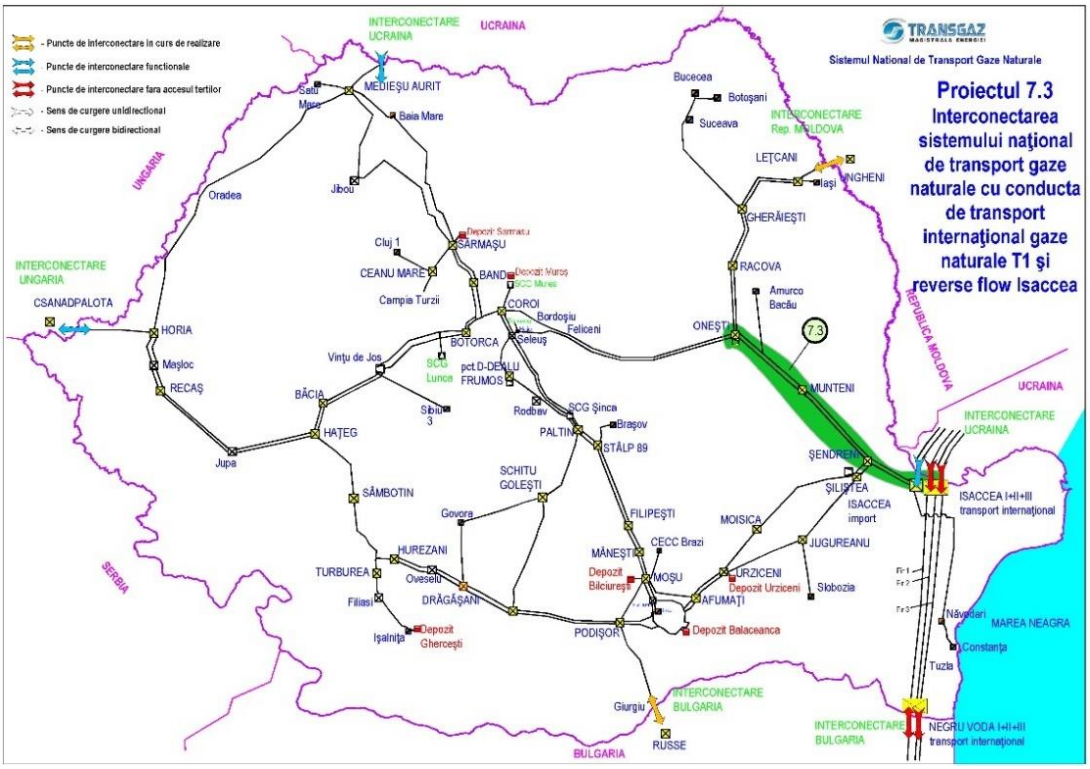

Image 7. Map of the major development project for the interconnection of NGTNS with the international transport pipeline Transit 1 and reverse flow Isaccea (source: TYNDP 2021-2030)

Project 7.4. TNS developments in North-Eastern Romania, for the improvement of the natural gas supply of the area, as well as to ensure transportation capacities to the Republic of Moldavia

Project location: Bacău, Neamț and Iași counties.

The project takes place in the northeast of the country, on the territory of Bacău, Neamț and Iași counties and provides for the construction of 165.15 km of new pipelines and two

compression stations. In order to streamline both the implementation process and to obtain funding under the programs made available from European regional development funds, the project was divided into sub-projects:

- The building of a new natural gas transportation pipeline DN 700, Pn 55 bar, in the direction Onești–Gherăești, 104.1 km long; the layout of this pipeline will be largely parallel to the existing pipelines DN 500 Onești–Gherăești
- The building of a new natural gas transportation pipeline DN 700, Pn 55 bar, in the direction Gherăești–Lețcani, 61.05 km long; this pipeline will replace the existing pipelines DN 400 Gherăești–Iași in the Gherăești–Lețcani section;
- The building of a new Gas Compression System in Onești, with an installed power of 9.14 MW, 2 compressors of 4.57 MW each, one active and one reserve;
- The building of a new Gas Compression System in Gherăești, with an installed power of 9.14 MW, 2 compressors of 4.57 MW each, one active and one reserve.

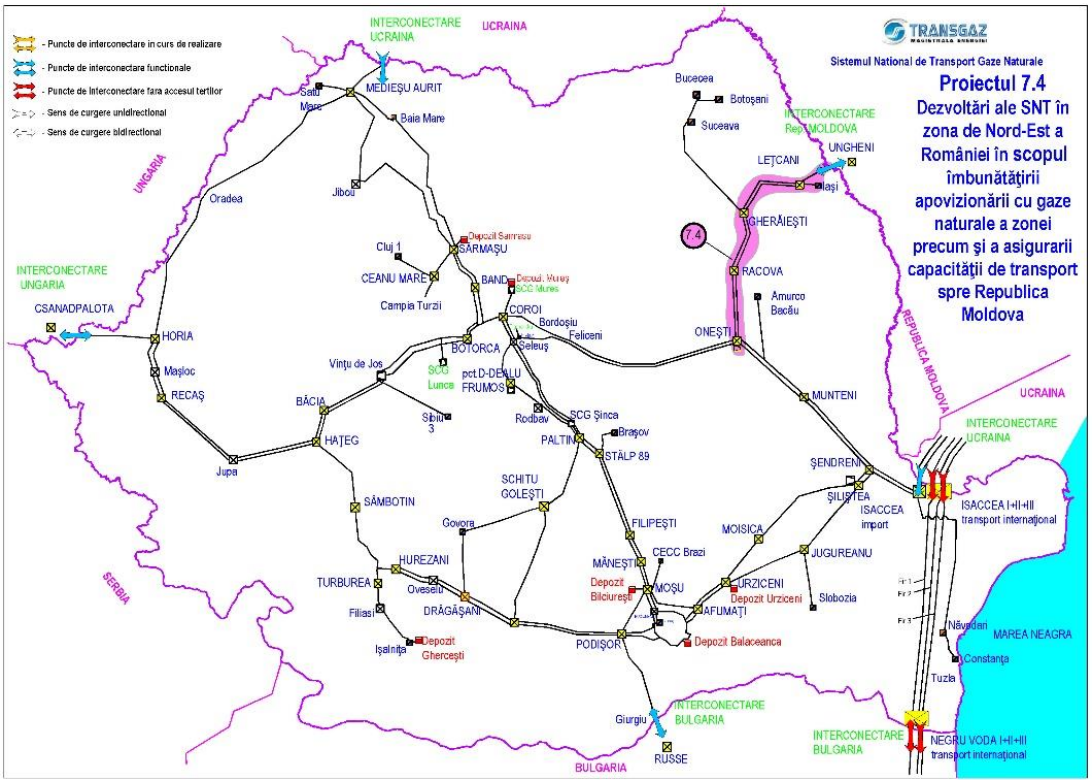

Image 8. NGTNS developments in the North-East area of Romania (source: TYNDP 2021-2030)

Project 7.5. Amplification of bidirectional transport channel Bulgaria-Romania-Hungary-Austria (BRHA stage 3)

Project location: Bacău, Harghita, Mureș, Alba, Hunedoara and Arad counties.

The project envisages the development of the transport capacity on the existing Onești – Coroi – Haţeg – Nădlac corridor. This central corridor practically follows the route of some

pipes from the current system but which currently operate at the inadequate technical parameters for a main artery.

This project achieves:

Depending on the volumes of natural gas available on the Black Sea coast (which cannot be taken over by the BRUA Corridor), in the long run the development of the transport capacity on the Oneşti – Coroi – Haţeg – Nădlac corridor is considered.

The development of this natural gas transportation channel supposes the following:

- Restoration of existing pipelines belonging to NTS;
- Replacement of existing pipelines belonging to TNS with new pipes or building new pipelines, installed in parallel to the existing ones;
- The development of 4 or 5 new compression systems, with a total installed power of about 66-82,5MW;
- Increase of natural gas transportation capacities towards Hungary by 4.4 bil mc/year.

For optimization and efficacy purposes, the channel has been divided in two projects:

1. The provision of reversible flow on the Romania-Hungary interconnection, which states:

- New natural gas transportation pipeline Băcia–Haţeg–Horia–Nădlac, of about 280 km in length
- Two new natural gas compression systems, located along the pathway.

2. TNS development between Onești and Băcia:

- Rehabilitation of pipeline sections;
- Replacement of existing pipelines with new ones, with greater diameters and operating pressure;
- Two or three new natural gas compression systems.

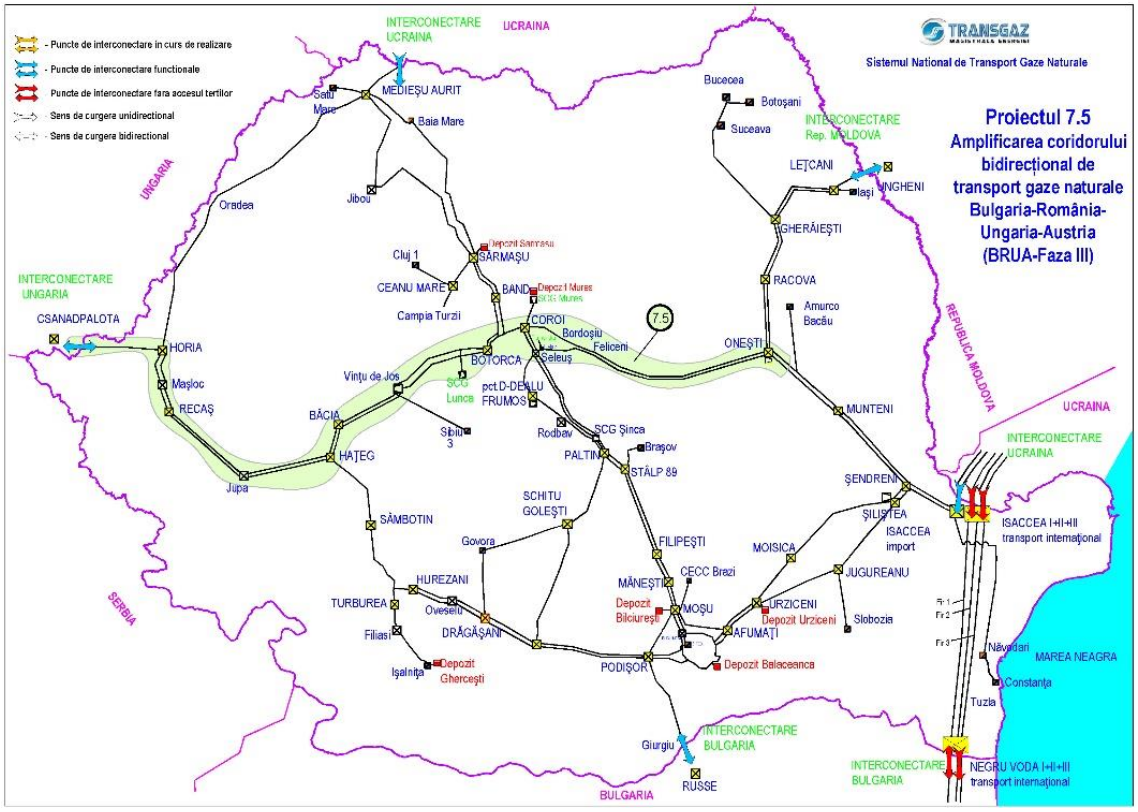

Image 9. BRUA 3 Development (source: TYNDP 2021-2030)

Project 7.6. New developments of NTS in order to takeover of natural gas from the Black Sea shore

Project location: Constanța county. The goal of the project is the creation of an additional point to takeover the natural gas supplied by the submarine exploitation perimeters in the Black Sea. The project provides a new Natural gas transportation pipeline, of about 25 km in length and DN 500 in diameter, from the Black Sea shore and up to the existing international natural gas transportation pipeline T1.

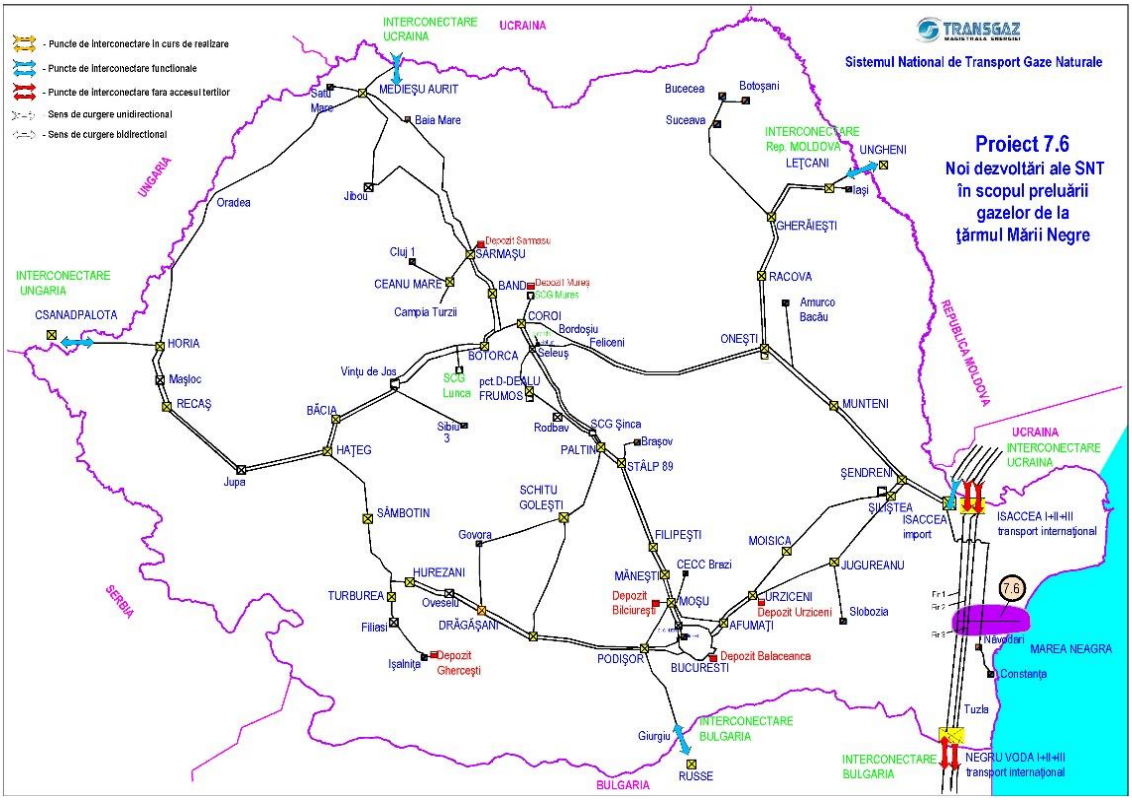

Image 10. Development of NTS in the Black Sea (source: TYNDP 2021-2030)

Project 7.7. Interconnection Romania-Serbia - interconnection of the Natural Gas National Transportation System with the similar Serbian natural gas transportation system

Project location: Timiș County.

The project presumes to build a new natural gas transportation pipeline, which will ensure the connection between the main natural gas transportation pipeline 'BRHA' and the Mokrin Technological Junction in Serbia of about 97 km in length, out of which about 85 km on Romanian territory and 12 km on Serbian soil. On the Romanian territory, the natural gas transmission pipeline will be connected to the BRUA Phase 1 pipeline (Petrovaselo locality, Timiș county) and will have a length of 85.56 km (the border between Romania and Serbia-Comloșu Mare locality, Timiș county).

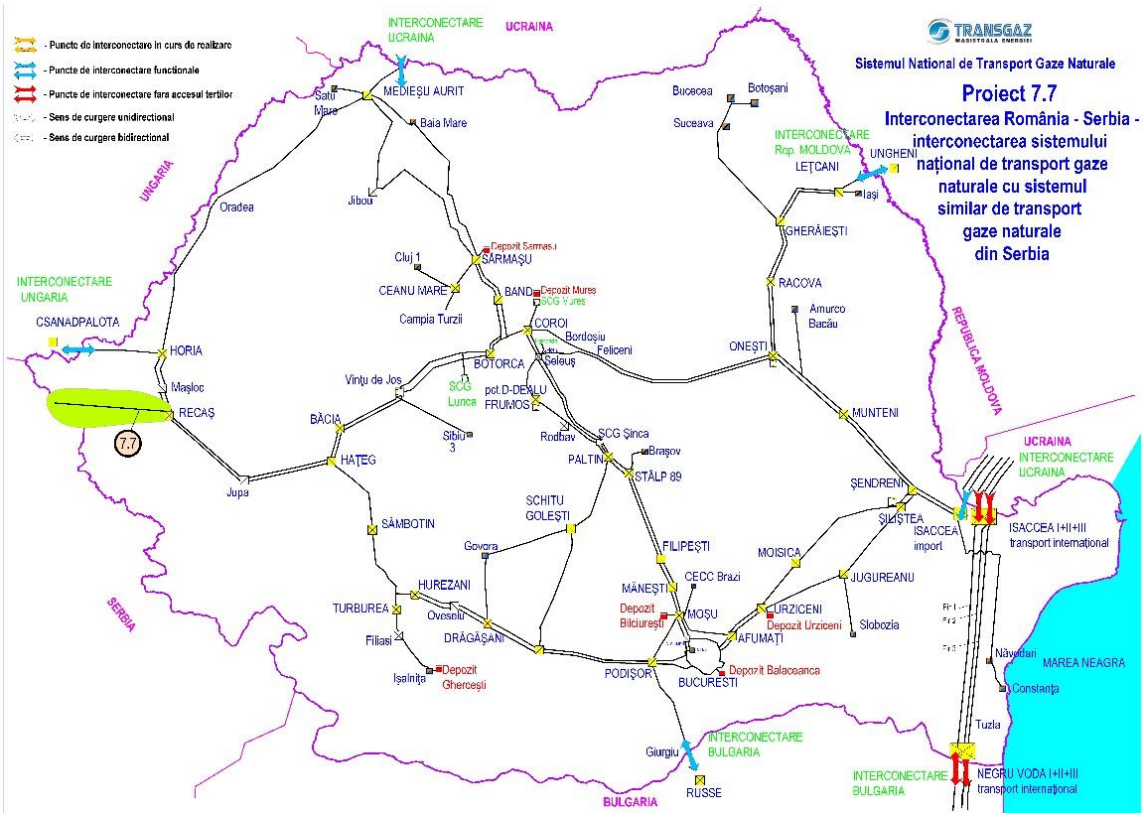

Image 11. NGTNS interconnection with Serbia in the direction of Recaș – Mokrin (source: TYNDP 2021-2030)

Project 7.8. Upgrading of GMS Isaccea I and GMS Negru Vodă 1

Project location: Tulcea and Constanța counties.

The project provides the Building of two new natural gas measurement systems replacing the existing ones. In the case of GMS Isaccea I, the system will be built within the existing system, and in the case of GMS Negru Vodă 1, in a location close to the existing system

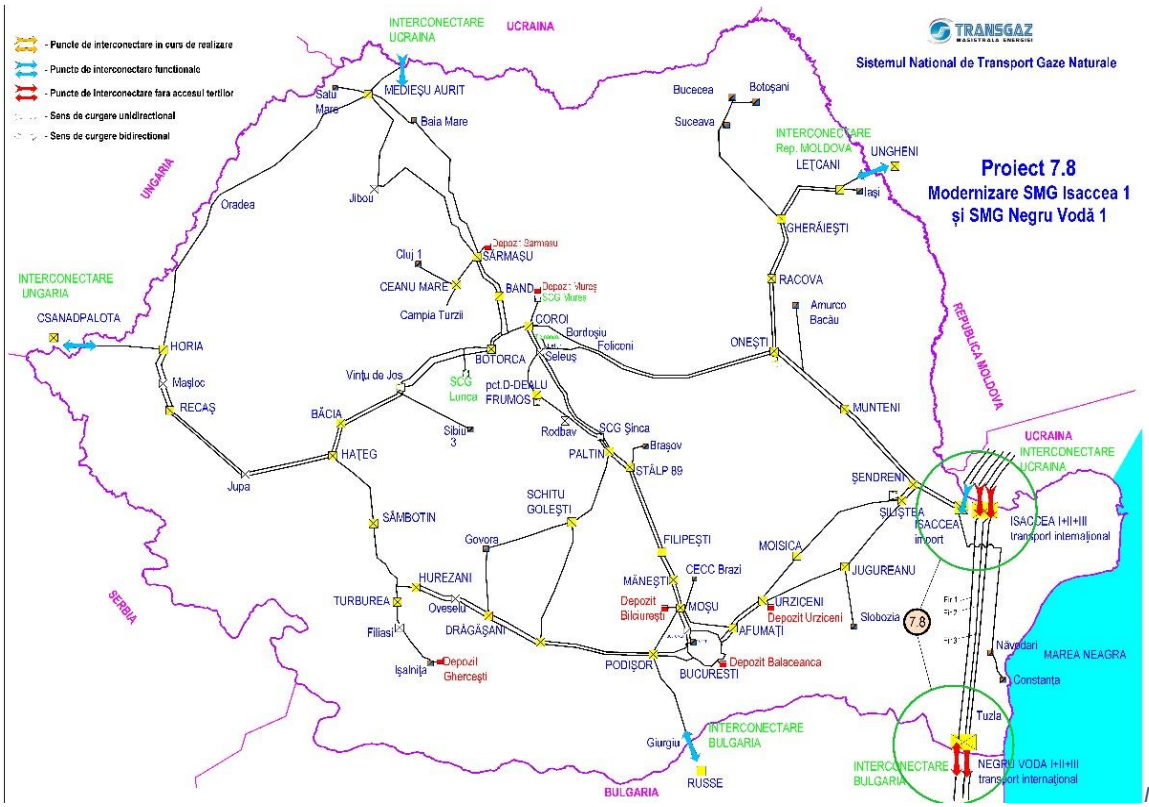

Image 12. Modernization of SMG Isaccea 1 and Negru Vodă 1 (source: TYNDP 2021-2030)

Project 7.9. Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret

Project location: Neamț and Suceava counties.

The project envisages the development of NGTNS in the North-East area of Romania in the direction of Gherăești – Siret in order to improve the natural gas supply of the area as well as to ensure the transport capacities to/from Ukraine. The project includes the construction of a new 130 km long natural gas transmission pipeline and related facilities, in the direction of Gherăești – Siret, respectively the construction of a transboundary gas measuring station and the amplification of the Onești and Gherăești compression stations.

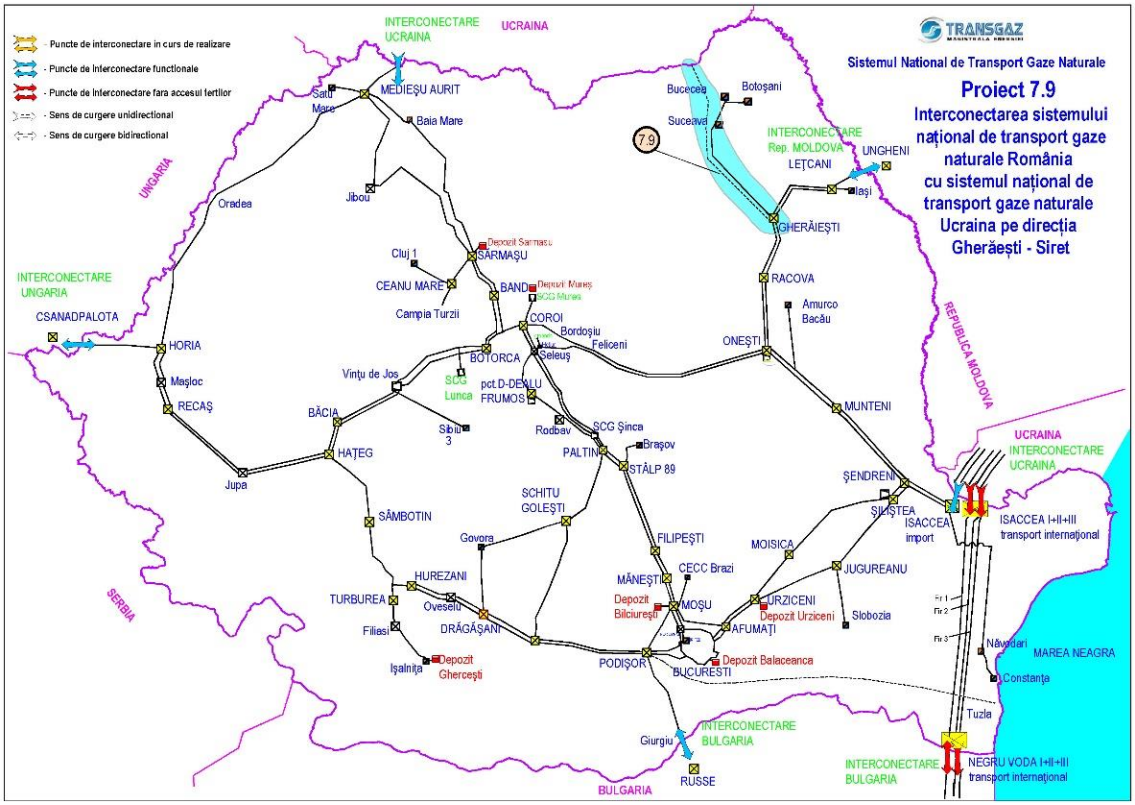

Image 13. Interconnection of the national natural gas transmission system Romania with the national natural gas transmission system Ukraine in the direction of Gherăești – Siret (source: TYNDP 2021-2030)

Project 7.10. Development / Upgrading of natural gas transportation infrastructure in North-Western Romania

Project location: Arad, Bihor, Satu Mare, Maramureș, Sălaj, Cluj, Alba, Mureș, Hunedoara, Timiș, Caraș-Severin counties.

The project involves the achievement/modernization of objectives related to the National Transport System, in the North-West of Romania. Within the project, the construction of the natural gas transmission pipeline and the related installations is carried out in stages, in the direction of Horia – Borș, Borș – Abrămuț, Huedin – Aleșd, Abrămuț – Mediașu Aurit, respectively the construction of a Natural Gas Compression Station at Mediașu Aurit.

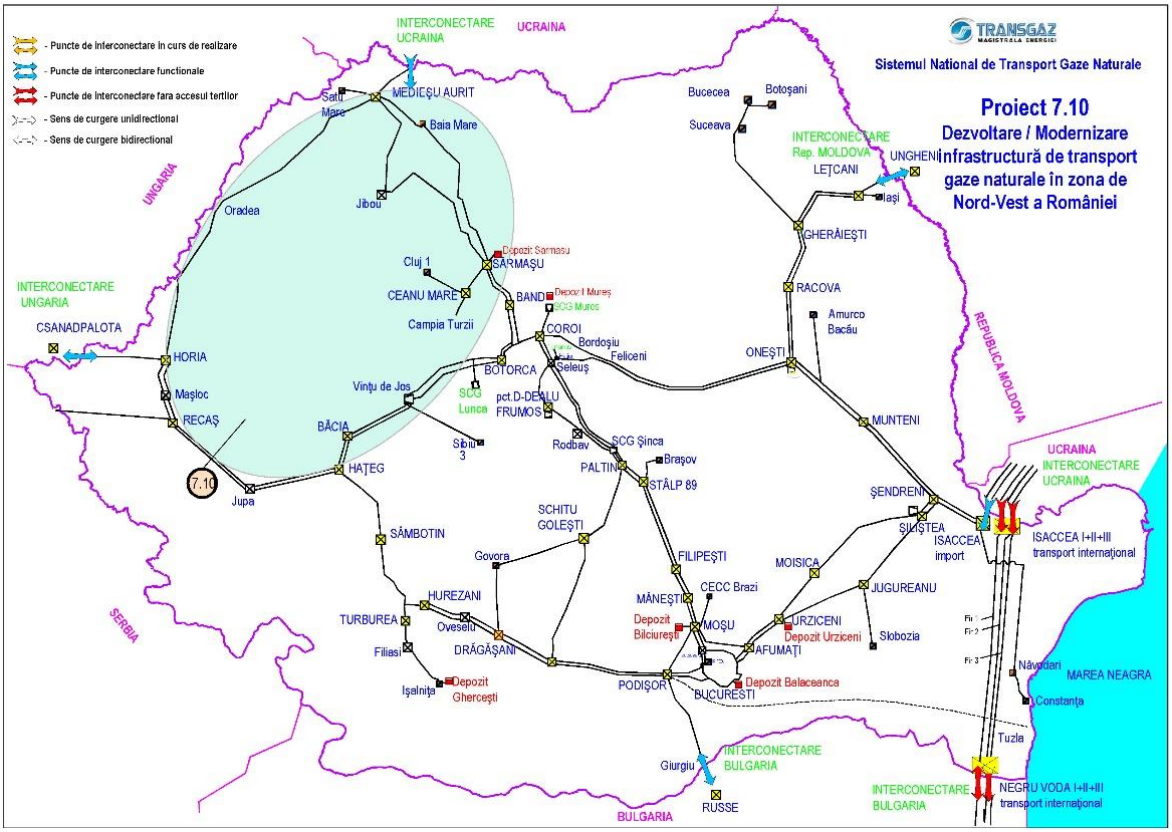

Image 14. Development / Modernization of natural gas transmission infrastructure in the North-West area of Romania (source: TYNDP 2021-2030)

Project 7.11. Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction

Project location: Giurgiu county.

This project proposes the construction of a new natural gas transmission pipeline and related installations, the construction of a new underpass on the Danube and the amplification of SMG Giurgiu. The project is in an incipient phase, the capacities to be developed within this project will be established later, on the basis of which the final technical solution will be established.

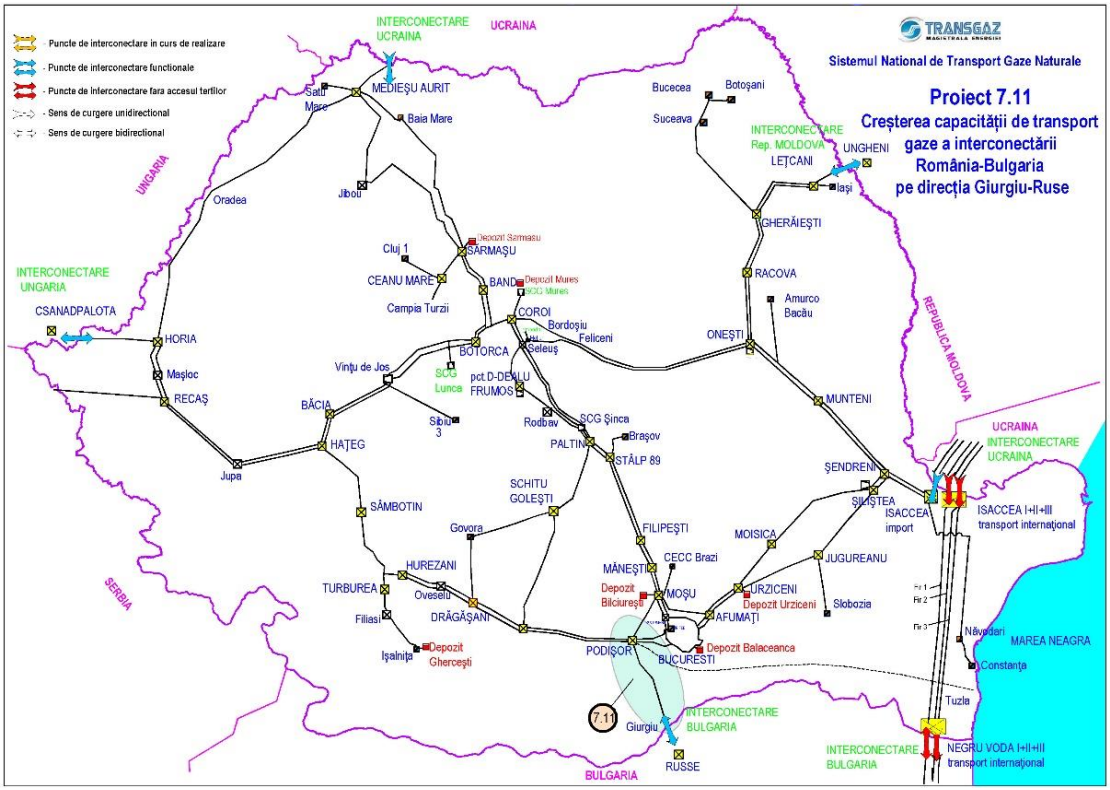

Image 15. Increasing the gas transport capacity of the Romania-Bulgaria interconnection on the Giurgiu-Ruse direction (source: TYNDP 2021-2030)

Project 7.12. Eastring–Romania

Project location:

Option 1: Satu Mare, Maramureș, Sălaj, Cluj, Mureș, Sibiu, Brașov, Argeș, Dâmbovița, Giurgiu counties.

Option 2: Arad, Timiș, Caraș-Severin, Hunedoara, Gorj, Vâlcea, Olt, Argeș, Dâmbovița, Teleorman, Giurgiu counties.

Option 3: Arad, Timiș, Caraș-Severin, Hunedoara, Gorj, Dolj, Olt counties.

The EASTRING project, promoted by EUSTREAM, is a two-way pipeline to Central and South-Eastern Europe that aims to connect transmission systems in Slovakia, Hungary, Romania and Bulgaria to gain access to natural gas reserves in the Caspian region and Middle East.

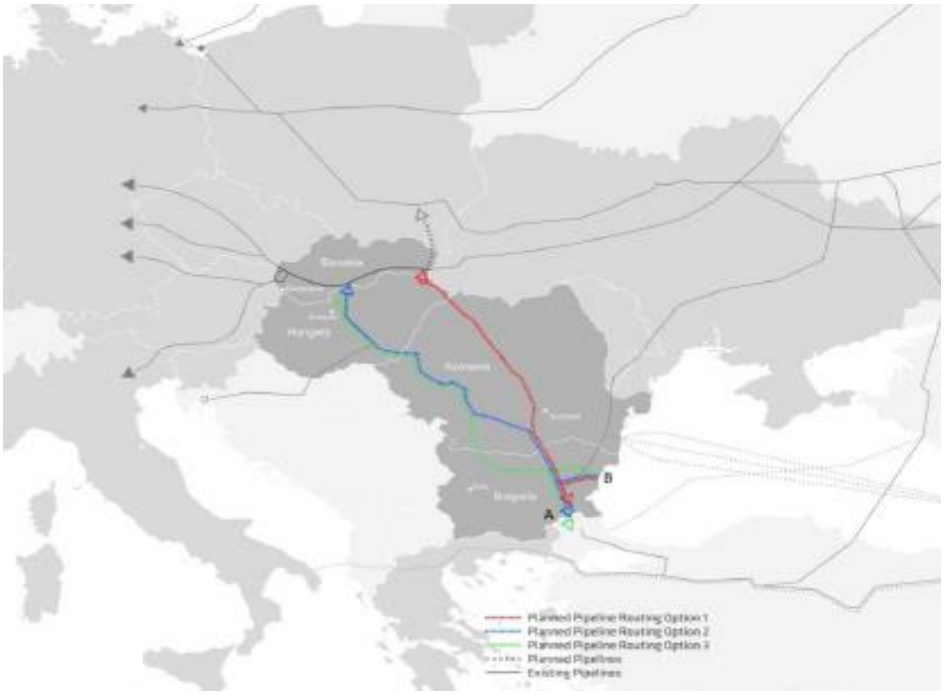

Image 16. Eastring (source: TYNDP 2021-2030)

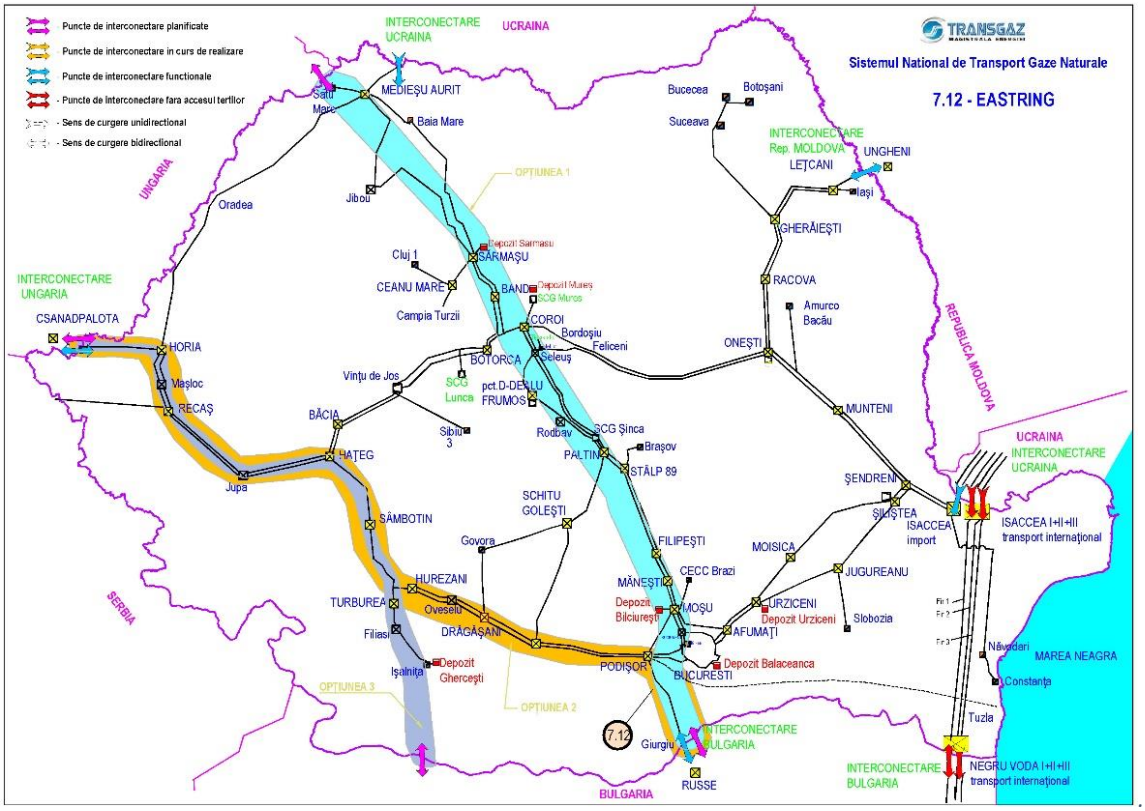

Image 17. Eastring (source: TYNDP 2021-2030)

Project 7.13. Monitoring, control and data acquisition system for cathodic protection systems afferent to the Natural Gas National Transportation System

This project does not propose the construction of new natural gas transmission pipelines and/or related installations but is a national project to modernize the entire National Natural Gas Transmission System by creating a centralized cathodic protection system (SCADA) that will provide the possibility of setting, monitoring and clear and preSCIe remote operation of system points of interest, will eliminate data reading costs, avoid situations where due to weather conditions it is not possible to read data and human errors, will allow distributed location control, will reduce costs with operation and maintenance, considerably reduces configuration time.

Project 7.14. Development of SCADA system for the Natural Gas National Transportation System

This project does not propose the construction of new natural gas transmission pipelines and/or related installations but is a national project to modernize the entire National Natural Gas Transmission System. The project aims to modernize the natural gas transmission infrastructure, which must be supported in the coming years by the development of a high-performance and flexible SCADA system, by modernizing the hardware and software architecture, by migrating to a decentralized architecture, with control distributed over organizational administrative units. structure SNTGN TRANSGAZ SA.

Project 7.15. Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2

Project location: Tulcea and Constanța counties.

The project envisages the modernization of the natural gas measuring stations SMG Isaccea 2 and SMG Negru Vodă 2 to ensure the bidirectional flow at the border with Ukraine and Bulgaria on the T2 transit pipeline. The measuring stations will be equipped with a separation/filtering installation and a measuring installation. This project does not propose the construction of new natural gas pipelines.

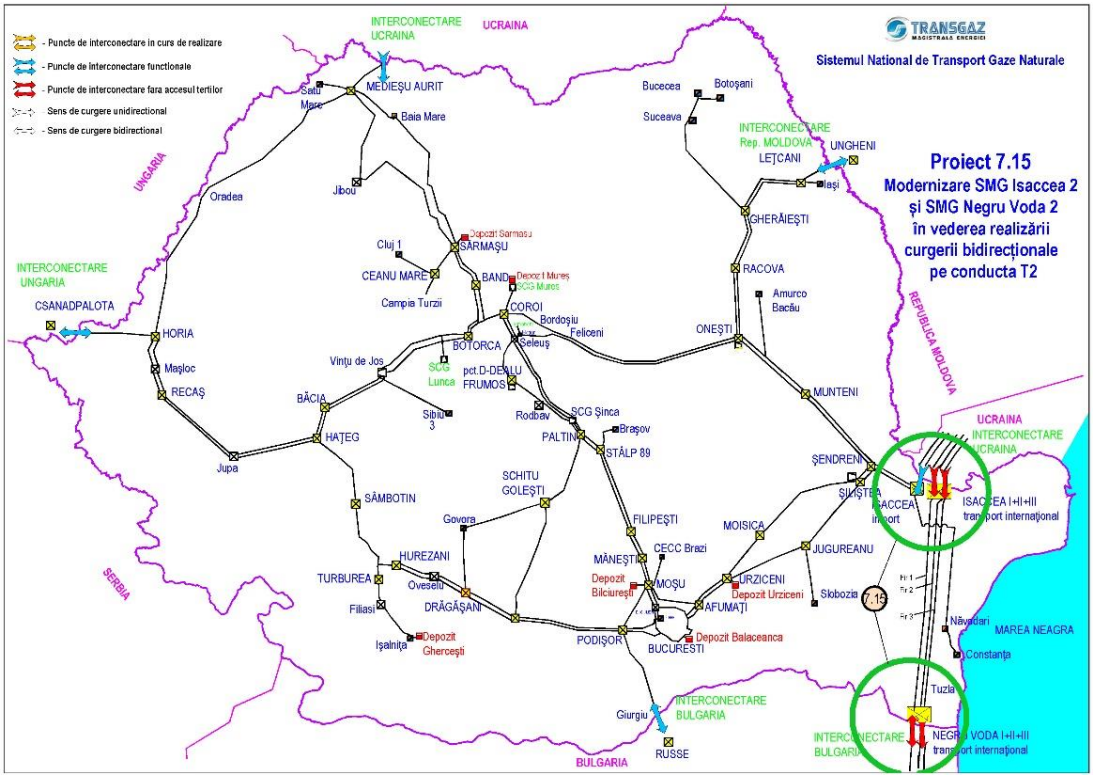

Image 18. Modernization of SMG Isaccea 2 and SMG Negru Voda 2 in order to achieve bidirectional flow on the T2 pipe (source: TYNDP 2021-2030)

Project 7.16. Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3

Project location: Tulcea and Constanța counties.

The project envisages the modernization of the natural gas measuring stations SMG Isaccea 3 and SMG Negru Vodă 3 to ensure bidirectional flow at the border with Ukraine and Bulgaria on the T3 transit pipeline. The measuring stations will be equipped with a separation/filtering installation and a measuring installation. This project does not propose the construction of new natural gas pipelines.

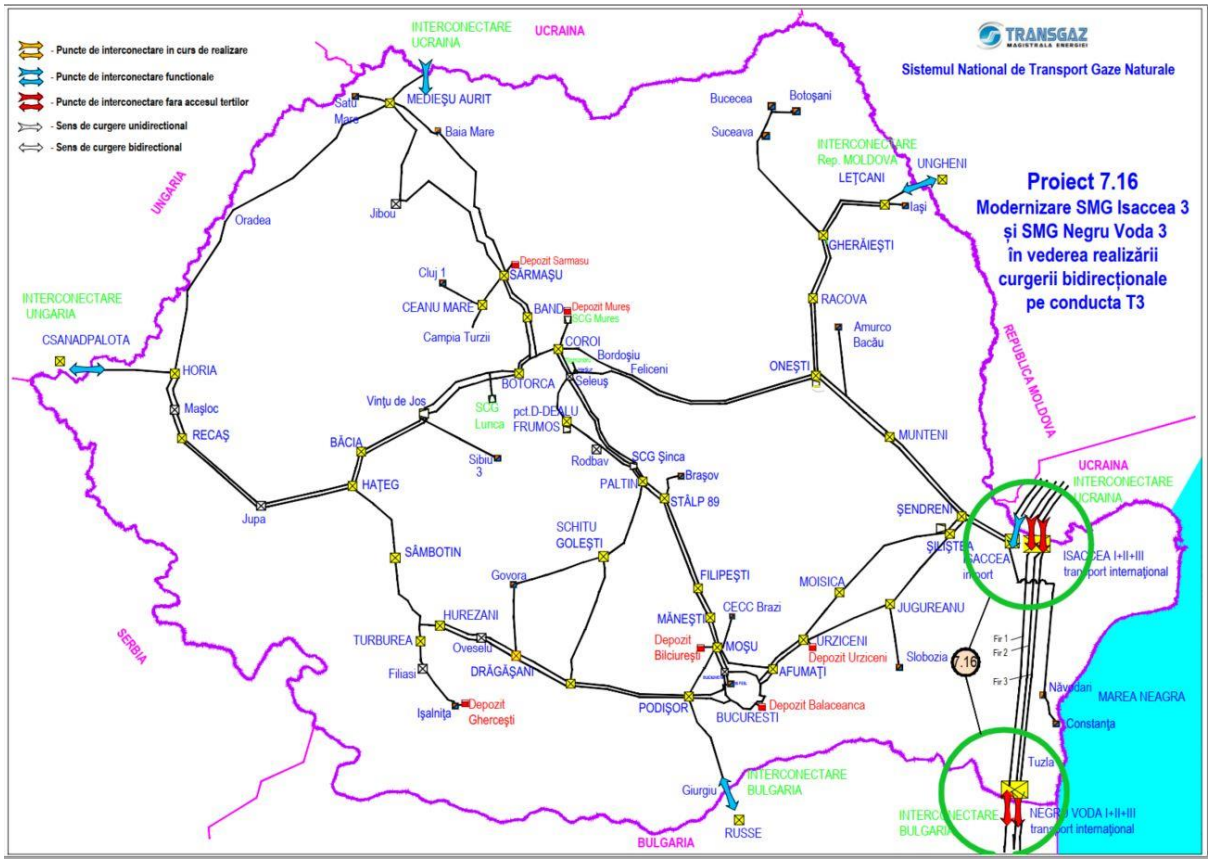

Image 19. Modernization of SMG Isaccea 3 and SMG Negru Voda 3 in order to achieve bidirectional flow on the T3 pipe (source: TYNDP 2021-2030)

Project 7.17. TNS interconnection to GNL Terminal, located at the Black Sea shore

Project location: Constanța county.

The building of a natural gas transportation pipeline, of about 25 km in length, from the Black Sea shore and up to pipelines T1 and T2.

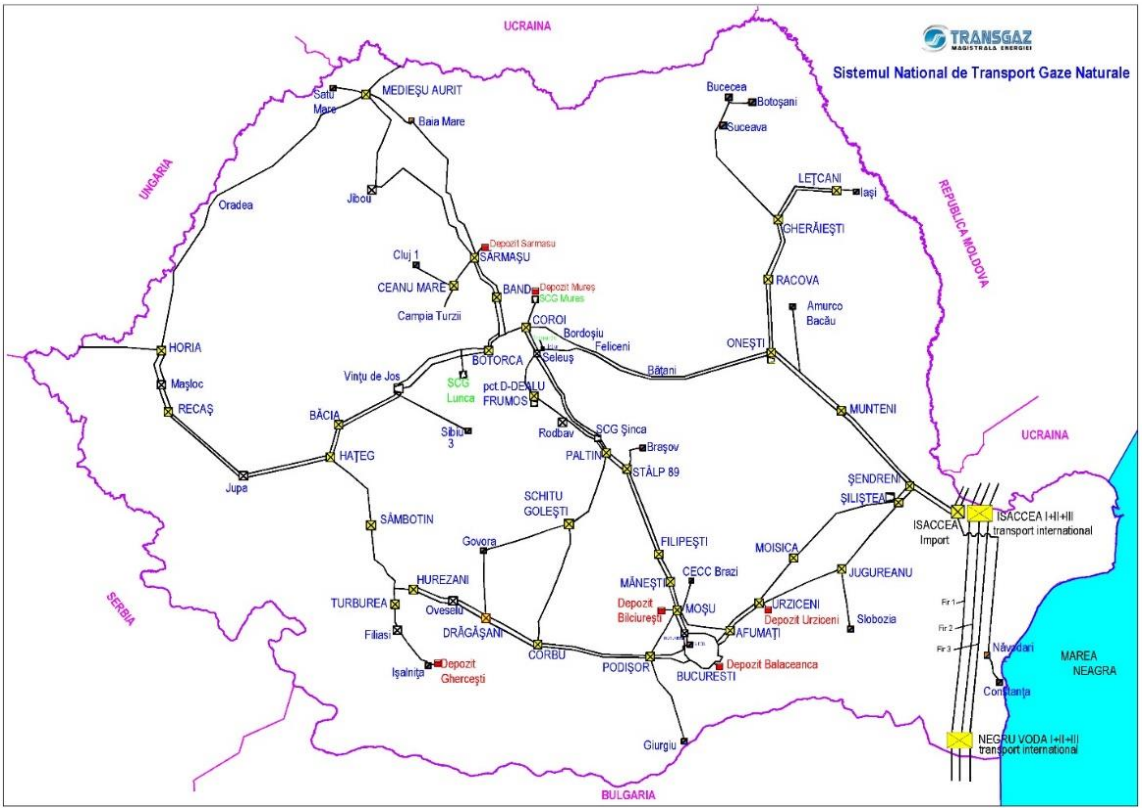

Image 20. NGTNS interconnection at the LNG Terminal located on the Black Sea coast (source: TYNDP 2021-2030)

Project 8.1. Upgrading of the natural gas storage system's infrastructure in Bilciurești

The project takes place in Bilciurești and Butimanu, Mehedinți County and will include the following:

- Upgrading of the groups separation, measurement and drying installations in Bilciurești;
- Systematization and upgrading of the natural gas aspiration / discharge pipeline system and upgrading of the cooling system in the compression system of Butimanu;
- Upgrading of 39 injection / extraction drills;
- Boring of 4 new drills;
- New natural gas transportation pipeline (11 km) between the storage in Bilciurești and the compression system in Butimanu

Project 8.2. Increase of the natural gas underground storage capacity of the storage facility in Ghercești

The project takes place in Ghercești, Dolj County and will include the following:

- Gas Compression Station;
- Expansion of gas drying and measurement installations;
- Upgrading of 20 injection / extraction drills;
- Interconnection of Ghercești storage with TNS;

- Gas inactive stock;

Project 8.3. New natural gas underground storage facility in Fălticeni

The goal of the project is to develop a new underground storage facility in North-Eastern Romania (the Moldavia region).

Conversion into an underground storage facility of one or of several depleted fields amongst the following: Pocoleni, Comănești, Todirești or Davideni..

The project will include the following:

- Natural Gas Compression System;
- gas drying and measurement installations;
- Technological installations injection / extraction drills;
- Boring of injection / extraction drills;
- Storage facility interconnection to NTS;
- Natural gas inactive stock.

Project 8.4. Increase of the natural gas underground storage capacity of the storage facility in Sărmășel (Transilvania)

The goal of the project is the development of the existing underground storage facility in Sărmășel.

The project will include the following:

- 38 drills;
- 48,6 Km of adduction pipes;
- 8 drill groups;
- 19,2 Km collecting pipes;
- 3 compression units;
- 2 gas drying units;
- Separation and measurement installation (ISM);
- Renewable energy production system;
- Connection to the National Natural Gas Transmission System (NTS)

All these developments will be made in the current perimeter of exploitation of warehouse

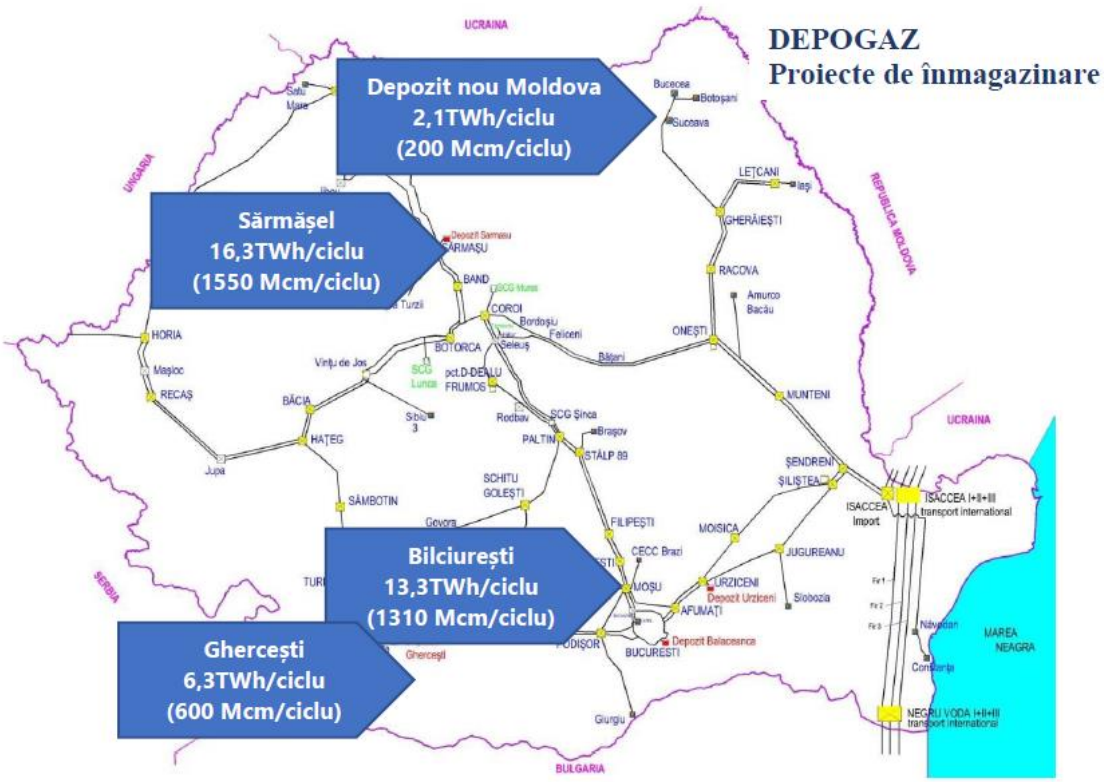

Image 21. Major natural gas storage projects - Depogaz (source: TYNDP2021-2030)

Project 8.5. Storing unit - Depomureș - reengineering and development of natural gas underground storage facility in Târgu Mureș

The goal of the project is to reengineer and develop the natural gas underground storage facility in Târgu Mureș.

The project will mainly consist in the following:

- Central gas plant (gas compression and drying units, bidirectional gas measurement commercial panel, adjacent facilities);
- New storage collector;
- upgrading.

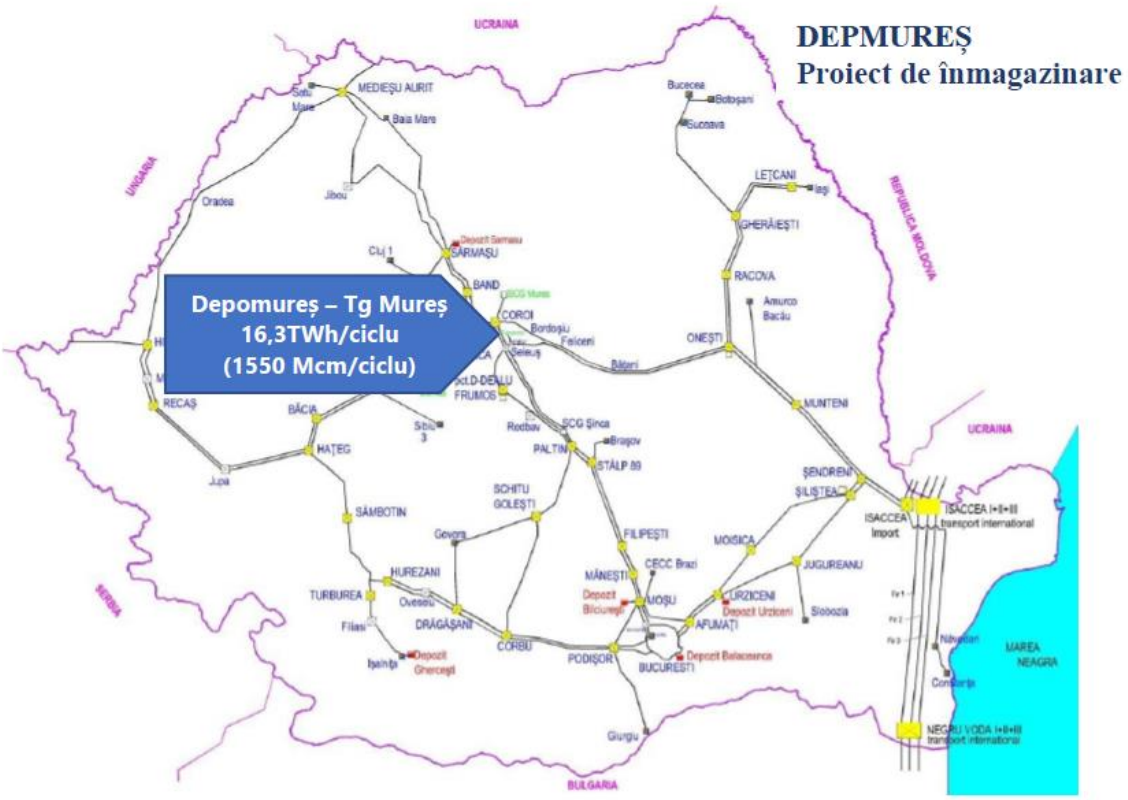

Image 22. Major natural gas storage projects - Depomureș (source: TYNDP 2021-2030)

2.3. Physical changes arising from the implementation of the Plan and which will take place during the various stages of implementation.

The physical changes resulting from the implementation of the projects included in the DEVELOPMENT PROGRAM OF THE NATIONAL GAS TRANSPORT SYSTEM FOR THE PERIOD 2021 – 2030 (TYNDP) are varied in type or size. Taking into account the diversity of the included projects, as well as their current variable level of implementation/detailing, an exact description of the physical changes that will occur as a result of the implementation of all projects cannot be made at this time, they will be detailed later at the level of evaluation of each project.

At the same time, regarding the overall TYNDP 2021-2030, it appears that the most important factor regarding the physical changes is the construction of the new natural gas transmission pipelines, being planned several hundred km of new pipelines within the strategic projects.

The planning and execution of natural gas transmission pipelines is carried out according to the Technical Norms for the planning and execution of natural gas transmission pipelines approved by ANRE Order no. 118 of 2014. Below are some relevant aspects of the specific

technical elements in the design and execution of natural gas transmission pipelines, as they were provided by Transgaz[4].

Components of natural gas transmission pipelines (COTG) are the following:

a) a) the pipe, buried or placed in the air, made up of pipes, bends, curves, reductions, tees, crosses, flanges, etc. of steel joined by welding and the elements of the corrosion, passive and active protection systems of COTG;
b) b) valves, pressure repressor/dischargers, liquid separators and siphons located on the COTG route through welded joints or flanges;
c) c) COTG cleaning and inspection installations: stations for launching and receiving inspection and/or interior cleaning devices;
d) d) crossings, underground or aerial, of natural or urban obstacles.

Work corridor when building a pipeline

The execution activities of the COTG are organized on a work corridor whose width is established according to:

- pipe diameter, measured on the outside of the anti-corrosion protection coating of the piping;
- the nature and relief peculiarities of the land in the area of the work corridor;
- the particularities of the technologies for carrying out the works and the technical characteristics of the machinery and equipment used for the execution of COTG.

In the case of applying the open ditch execution technology of COTG, the width of the working corridor is determined by the need to ensure convenient widths for its following strips/ areas/ spaces:

- the working space intended for manipulation of the bulldozer to cover the ditch;
- the earth storage space resulting from digging the ditch;
- the free safety space between the edge of the ditch and the earth resulting from the excavation, in order to avoid the collapse of the edge of the ditch and the occurrence of work accidents;
- the ditch in which the pipe is located, which must have the configuration of the cross section chosen conveniently according to the consistency of the soil in which it is executed and must be dimensioned so that the distance between its side walls and the outer surface of the pipe is at least 200 mm. to avoid the deterioration of the corrosion protection coating when launching and placing the piping in it;
- the free safety space between the edge of the ditch and the assembled piping or section of piping;

[4] from ”Technical elements of COTGN design and execution”, Transgaz 2020

- the working space occupied by the launcher with the mast inclined above the piping;
- the safety clearance between the first and the second launcher, necessary when one of these launchers moves to change its position on the COTG route;
- the space necessary for the transport of pipes and other components of the COTG and for the movement of machinery and work equipment along the COTG route;
- the storage space of the vegetal or fertile layer, as the case may be.

In order to establish the width of the working corridor, the adoption of the dimensions of the underground location ditch of the COTG and the standardization of the works regarding the excavation are used the information provided in Annex 8 of NT no. 118/2014 - The work corridor for the construction of the pipelines.

In the parts where the COTG route crosses forest, viticultures and/ or fruit-bearing areas, are provided by the project, in correlation with the conditions imposed by the owners or administrators of the lands and with the terms imposed for the execution of the COTG, all possible measures to reduce the width of the work corridor and protect the environment, such as:

a) the location of the work corridor in the free spaces between the forest, viticultures and/ or fruit-growing areas or in the non-forested areas or without forest vegetation, so as to avoid their deforestation;

b) performing manually or with light machinery and equipment the works necessary for the realization of COTG:

    - manual coverage of the COTG and reduction of the width of the working corridor with the width of the space intended for handling the bulldozer;
    - storage of the vegetal or fertile layer in the free spaces from orchards, vineyards or forests and diminishing the width of the working corridor with the width of the space with this destination;
    - tracking by launching the launchers used in the execution of the COTG and reducing by up to 30% the width of the space required for this purpose.

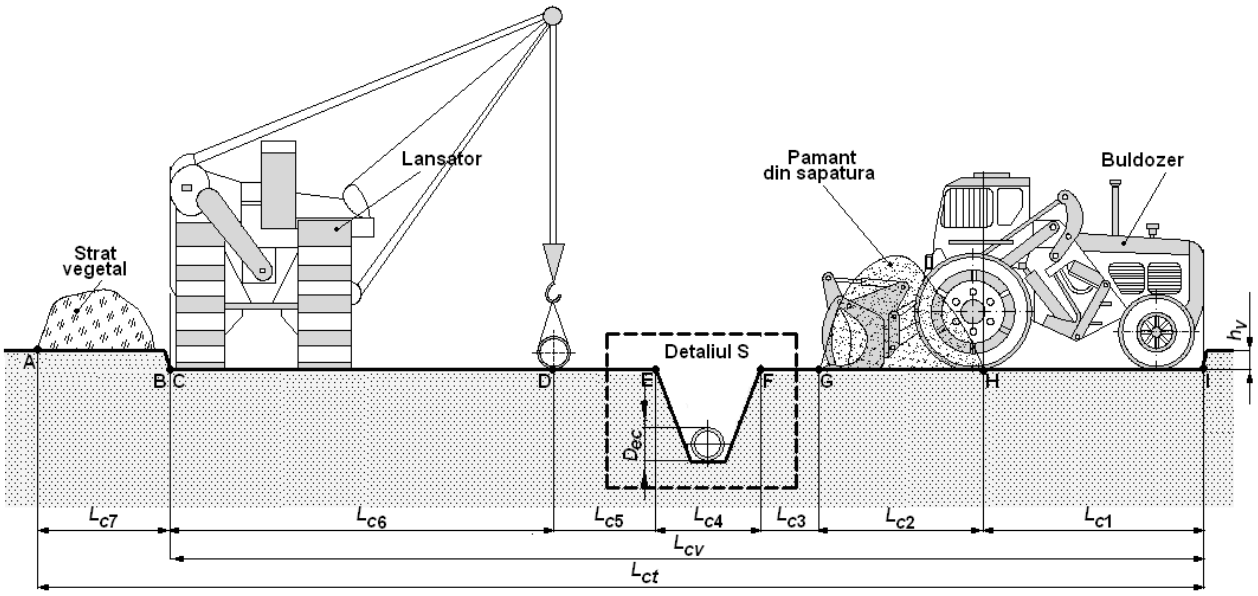

Image 23. Working corridor scheme for COTG execution with nominal diameter up to 300 (inclusive) (source: Transgaz, 2020)

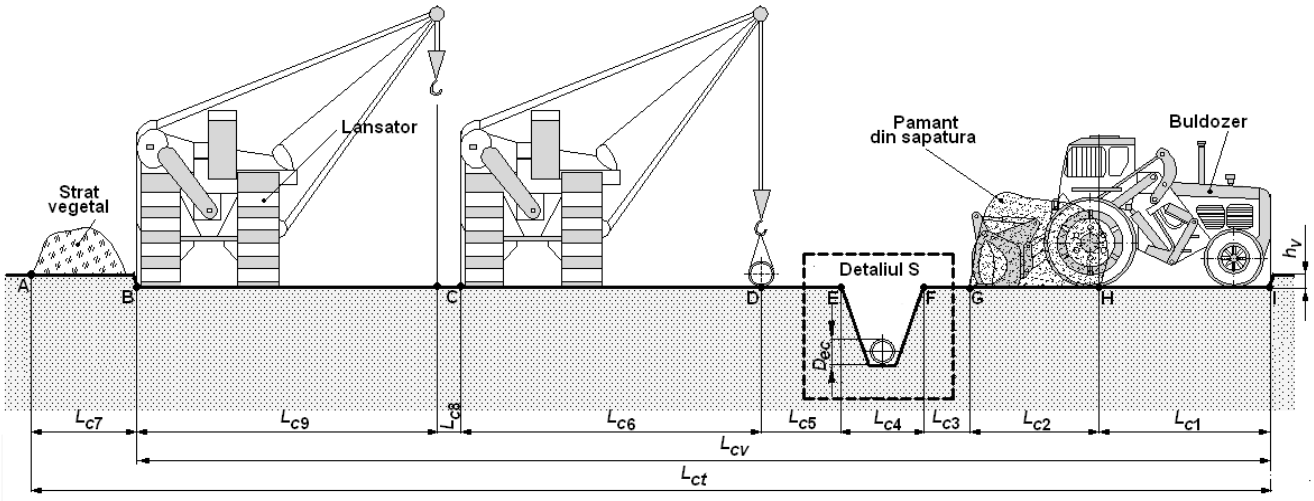

Image 24. Working corridor scheme for COTG execution with nominal diameter over 300 (source: Transgaz, 2020)

Table 5. Extract from NT no. 118/2014 - ANNEX 8 - Characteristics of the work corridor for the execution of COTG

The characteristic size for the work corridor	The characteristic size value for COTG with:							
	$D_e \leq$ 168,3 mm	219,1 $\leq D_e \leq$ 323,9 mm	355,6 $\leq D_e \leq$ 508 mm	559 mm $\leq D_e \leq$ 711 mm	762 mm $\leq D_e \leq$ 914 mm	D_e = 1016 mm	D_e = 1219 mm	D_e = 1422 mm
Working corridor dimensions								
Width of bulldozer handling space L_{c1}, m	2,0		2,4				2,9	3,0
The width of the space for the earth in the excavation L_{c2},m	1,3	1,5	2,5	3,0	3,7	4,0	5,0	5,5
The width of the safety clearance L_{c3}, m	0,5							
Ground width of the ditch for COTG L_{c4},	0,9		1,3	2,0	2,2	2,8	3,2	4,0
The width of the safety clearance L_{c5}, m	0,5			0,6		0,7	0,8	1,0
The width of the launcher handling space L_{c6}, m **d)**	3,6							6,0
The width of the space for the plant layer L_{c7},m	1,2	1,7	2,5	5,0				7,0
Width of safety space L_{c8}, m	-		0,3					
The width of the launcher travel space L_{c9}, m **d)**	-		2,4	2,7				4,7
Width of removal of the vegetal layer L_{cv}, m	8,8	9,0	13,5	15,0	16,0	17,0	19,0	25,0
The total width of the working corridor L_{ct}, m (approx.) d)	**10**	**11**	**16**	**20**	**21**	**22**	**24**	**32**
Dimensions of the COTG ditch								
Variant of the transverse profile of the ditch a)	S1			S2		S1		
Ground width of the ditch for COTG L_{c4}, m	**0,9**	**0,9**	**1,3**	**2,0**	**2,2**	**2,8**	**3,2**	**4,0**
Bottom width of the ditch for COTG L_{fs}, m	$2D_{ec}$ c)			1,2	1,4	1,8	1,9	2,3
The total depth of the ditch h_s, m	**$h_{is}+D_{ec}$ c)**			**1,45**	**1,62**	**1,80**	**2,14**	**2,40**
Depth of undeveloped area h_{fs}, m	-			0,8		-		
Excavation volume for COTG								
Depth of vegetation removal h_v, m	0,3							
Width of removal of the vegetal layer L_{cv}, m	8,8	9,0	13,5	15,0	16,0	17,0	19,0	25,0
The volume of the plant layer removed V_{sv}, m^3 b)	2,64	2,70	4,05	4,50	4,80	5,10	5,70	7,50
Excavation volume for the COTG ditch V_{ss}, m^3 b)	1,12	1,26	2,08	2,47	2,65	4,41	5,46	7,56

The characteristic size for the work corridor	The characteristic size value for COTG with:							
	$D_e \leq$ 168,3 mm	219,1 $\leq D_e \leq$ 323,9 mm	355,6 $\leq D_e \leq$ 508 mm	559 mm $\leq D_e \leq$ 711 mm	762 mm $\leq D_e \leq$ 914 mm	D_e = 1016 mm	D_e = 1219 mm	D_e = 1422 mm
Total excavation volume V_{ts}, m^3 b)	3,8	4,0	6,1	7,0	7,5	9,5	11,2	15,1

a) the transverse profile of the ditch corresponds to the details S1 or S2;
b) the volume of the removed vegetal layer, the excavation volume for the COTG ditch and the total excavation volume are calculated for 1 m from the length of the working corridor;
c) D_{ec} represents the outer diameter of the pipe, measured over the corrosion protection insulation of the piping, and h_{is} - the maximum depth of frost in the COTG location area;
d) the widths of the spaces will be dimensioned according to the types of launchers used for the execution of COTG.

OBSTACLE CROSSINGS

The main obstacles that are crossed by the COTG are: watercourses and roads, such as roads or railways. The crossing of obstacles by the COTG can be done by air or underground.

Crossing watercourses

The constructive solution of the aerial crossings of the watercourses can be:

- self-supporting, in which case COTG simultaneously fulfils the function of natural gas transmission equipment and the function of resistance structure;
- supported, in which case the COTG mainly fulfils the function of natural gas transmission equipment, and its supporting structure ensures the mechanical resistance and the stability of the crossing; the construction elements on which COTG rests can be of the type of consoles, spatial beams with lattice, suspended systems, recommended only for crossings with an opening of over 100 m, hobanate systems, piles, trestle posts, pillars.

Underground crossings of watercourses can be executed:

- by directed horizontal drilling, made under the outflow of the riverbed, by the directed drilling procedures recommended by SR EN 1594 or by other similar processes. The underground crossing through horizontal directed drilling of watercourses can be used only if the relief and the geological structure of the land in the crossing area are favourable for the accomplishment of the works specific to the directed drilling.
  by placing the COTG in an open ditch, below the discharge level, with or without ballast:
  - if the underground crossing is made by placing the COTG in an open ditch, and the weight of the COTG (with the corrosion protection coating applied on the steel pipes) is higher than the ascending, archimetrical force acting on the COTG, the crossing can be made without ballasting;
  - if the underground crossing is made by placing the COTG in an open ditch, and the weight of the COTG, with the corrosion protection coating applied on the steel pipes, is lower than the ascending force acting on the COTG, the crossing is made with the ballasted pipe.

The ballast elements can be made of reinforced concrete, reinforced concrete and pre-stressed concrete or other materials provided and justified by the PT of the COTG; when establishing the ballast material, the aggressiveness of the crossed water will be taken into account.

The laying of the COTG at the open ditches in the open ditch will usually be done at a depth of 50 ... 100 cm below the general discharge quota, considered from the upper generator of the weighted COTG.

Crossing roads, railways and roads

Depending on the importance of the crossed communication route, the length of the crossing, the technical characteristics of the COTG that crosses the communication route and the technology of accomplishing the crossing, the way of accomplishing the crossing is chosen:

- without placing the COTG in the protection tube, recommended, because the operation of the active corrosion protection system of the COTG is not affected;
- with the location of the COTG in the protection tube.

In exceptional and well-justified cases, on roads open to public traffic, other than national roads, COTGs may be located on or under the superstructure of bridges, viaducts and uneven passages, based on an appropriate solution.

The stages of the technological program of execution of a pipeline

The technological execution program to be applied for the construction of a new COTG or for the realization of the intervention works on an existing COTG includes the following stages:

- handing over the site by the designer to the executor/ builder, in the presence of the investor;
- ensuring access to the demarcated work corridor along the COTG route; includes the technological operations through which the access ways to the COTG work corridor are arranged, prepared and/ or verified;
- preparing the work corridor, making the arrangements for the organization of the site and bringing on the work corridor the machinery and equipment necessary for the realization of COTG;
- the transport and proper storage of the tubular material and of the components necessary for the realization of the COTG, as well as of the technological materials destined for the realization of the COTG;
- preparation of the tubular material and COTG components in order to assemble and make the piping; the stage includes technological operations from the following range: manufacture of curves by cold plastic deformation, machining by cutting the ends of pipes and components that are assembled by welding, making bypass pipes, if necessary;
- assembly by welding of the pipes and components that make up the COTG; the stage includes the technological welding operations, but also the welding-related operations, which affect the ends of the pipes and components that are assembled by welding: cleaning and drying, centering, preheating and post-welding heat treatment, if necessary;
- implementation of the COTG corrosion protection system; the stage includes, as the case may be, the operations of applying the corrosion protection coatings to the outside of the COTG pipes and components, the operations of completing the corrosion protection coatings in the welded joints between the pipes and / or COTG components, the operations of making the corrosion protection system elements active COTG etc.;
- carrying out excavation works; the stage comprises all the operations necessary for the construction of the underground location of the COTG and the storage of the earth resulting from the excavations;
- manual or mechanized launch of piping sectors or sections in the underground ditch of the COTG;
- assembly of components that are assembled by removable joints;
- coupling in the natural gas transmission system and filling the COTG with natural gas; In case of intervention works on an existing COTG, without decommissioning it, this stage also includes the operations of closing the section on which the intervention works are done and the installation of the bypass pipe, which ensures the transport of natural gas in the course of performing these works;

- covering the ditch where the pipe is located, restoring the land on the work corridor and putting it back into use;
- marking the COTG route.

Carrying out excavation works

The volume of excavation work required for a buried COTG is determined by considering the following requirements:

- COTG is located under the frost zone, at a minimum depth of 1 m, measured from the ground surface and up to the upper generator of the corrosion protection coating of the piping;
- configuration and dimensions of the COTG laying ditch;
- the excavations for making the pipe laying ditch are performed manually or mechanized, so as to ensure the geometry provided for the cross section of the ditch;
- Depending on the depth and the type of soil in which it is made, the walls of the laying ditch will be vertical, rectangular ditch or inclined/ sloping, ditch with triangular or trapezoidal profile and will be possibly consolidated, so as to completely eliminate the possibility of their collapse and accidents;
- in the places on the COTG route where the welded joints will be executed in position, between the segments or sections of pipes formed on the ground, spaces with sufficient width (welding holes in position) will be made in the laying ditch; SR EN 12732 recommends that the welding holes in position have: length 1.5 m, distance from bottom to COTG 0.4 m, and distance from side walls to COTG 0.6 m;
- the bottom of the laying ditch must be smooth to ensure a continuous placement/ support of the COTG; if the ditch is made in areas with stony ground, which could damage the corrosion protection coating or if the diameter of the COTG is greater than or equal to DN700, before the launch of the COTG on the bottom of the ditch a layer of sifted earth or sand, with a thickness of 10 -15 cm;
- the laying ditch must be dry, otherwise measures must be taken to remove excess water before launching the COTG.

The excavation works necessary for the underground location of the COTG and for the realization of underground crossings of communication routes, lakes or watercourses, irrigation canals, protected areas can be performed by the directed drilling procedures recommended by SR EN 1594 or by other similar procedures.

Assembling pipes and components to make the pipeline

The pipes and other components that make up the COTG can be assembled by:

a) non-removable joints: melt welded joints, pressure welded joints;

b) removable joints: flange joints, threaded joints.

The assembly and mounting of the pipeline wire in the ditch in the final position will be done depending on the conditions offered by the land, respectively on the constructions and installations encountered on the pipeline route as follows:

- on sections (maximum two doublets) joined by electric wire welding on the edge of the ditch and launching into the ditch in the final position;
- pipe by pipe (for concrete pipe) and launching into the ditch in the final position;
- the assembly of the pipe wire in the ditch in the final position will be done by welds executed "in position" in position pits.

For the assembly of pipes and other components of COTG piping, melt welded joints are mainly used, made by the following melting welding processes, named and coded according to the recommendations of SR EN ISO 4063 or by combinations thereof.

COTG welded joints are performed only on the basis of qualified welding procedures, the welding procedure representing, in accordance with the provisions of SR EN ISO 15607, the specified sequence of actions to be followed in the case of welding, including reference to materials, to preparation, preheating, if necessary, welding method and welding control, post - weld heat treatment, and welding equipment to be used.

The personnel involved in carrying out the welding works for the execution of the COTG must meet all the legal requirements regarding the qualification and authorization.

Pipeline launch

The launch of COTG in the underground ditch can be done only after:

- assembly operations by ground welding, of the pipes and components that make up the segments or sections of the COTG piping;
- operations for checking the quality of welded joints and operations for repairing any defects of these joints;
- operations for completing the corrosion protection coatings/ insulation in the areas of the welded joints between the pipes and/ or COTG components and checking the continuity of the insulation;
- excavation and ditch preparation works for COTG laying.

The installation of the pipe will be done by placing it in the previously dug ditch, using mobile launcher type cranes. Changes in direction, both horizontally and vertically, will be achieved by hot bending curves and cold bending curves.

Covering the pipe built underground

COTG launched in the underground ditch is covered with earth, manually or mechanized, complying with the following requirements:

- any hard bodies existing in the earth recovered from the ditch digging must not damage the corrosion protection coating of the piping;
- if the laying ground is stony, COTG is first covered with a layer of sifted earth, applied in successive substrates, compacted separately, which will exceed by at least 15 cm the upper generator of the anticorrosive insulated piping, after which the ditch is filled with earth from digging;
- it is forbidden to maintain or put in the ditch and to cover with earth the components of wood material used for supports.

In the case of COTG located in agricultural lands, after covering the COTG, all the works necessary to restore the vegetal layer, to bring the land to the initial profile and to fertilize the soil will be carried out. For COTGs located on sloping land, where there is a danger that the COTG laying ditch will channel rainwater, obstacles will be provided to prevent the entrainment and removal of land covering the COTG.

The quality of the welded joints of the COTG is checked during the execution of the welding operations and after the realization of the welded joints.

Tests of mechanical strength and tightness of the pipe

COTG executed and launched in the underground ditch is subjected to the pressure test to verify its mechanical strength; the pressure test is performed after the grounding of the COTG, in order to reduce the influence of temperature variations on its development and results.

The pressure test is doubled by the leak test.

The fluids used to perform the pressure and tightness tests shall be prescribed in the PT of the COTG and shall be chosen, for each section of piping to be tested, according to: the characteristics of the COTG pressure regime, the internal volume of the COTG section to be tested, the location class of the section, the ambient temperature in the season in which the test is performed, the requirements regarding work safety and environmental protection during the test, etc.

The fluid usually used to perform the pressure test is water, but if the hydraulic pressure test is not feasible, the pneumatic pressure test can be performed.

The COTG leak test is performed after the pressure test, which certifies that the mechanical strength requirements are met, based on a qualified test procedure.

Marking the route of the pipeline

The COTG route is marked with terminals provided with signposts, which are located:

- from place to place, along the COTG route - route terminals;
- at the direction changes on the COTG route - direction terminals;
- at both ends of the underpasses by COTG of the communication routes - crossing terminals;
- at the intersections of COTG with other pipes, arrangements or underground installations - intersection terminals;
- in other places specified in the PT of the COTG - special terminals.

The main techniques of execution of the COTG

The construction works of COTG will necessarily involve the usual techniques, specific to the works of clearing the land, deforestation (as appropriate), summary preparation of sites, excavations, construction-assembly of the pipeline, respectively of technological landmarks (valve stations, etc. .).

In the following we will insist on some specific general elements, as follows:

A. Excavation

The excavation works will comply with the prescriptions NT118/ 2013 by which the following requirements are foreseen to be observed:

- for the lands in the plain and hill areas, where the coarse material is missing (large stones), the horizon of vegetal soil is stripped and temporarily stored, the excavated soil will be used for backfilling, and the vegetal soil will be used for rebinding;
- for the lands where there are limestone rocky rocks in plates of 5 - 10 m, which appear locally, on the surface of some hills or in slopes bordering the hills at the border with the flat areas (fields), the horizon of vegetal soil is stripped and temporary storage , following that the excavated rocky soil, before being used for backfilling, is shredded. After backfilling, the topsoil will be used for cover.

The excavation works will be mostly mechanized. In addition to the use of regular excavators (Beaver type) of medium tonnage, in more sensitive areas (forest colour, areas with excess moisture, in the vicinity of residential areas) will be used smaller capacity excavators and backhoe loaders.

As a particular element, in this stage, the excavation of the ditch will be possible with the help of an excavator with rotating buckets that ensure significant working yields that require a high speed of advancement of the fronts, significantly reducing working times. The use of such a machine has the advantage of making a clearly delimited ditches, with stabilized walls, without affecting the proximal soil layers, and the excavated soil is crushed, being easier to

use when closing the trench, allowing easier compaction in a shorter time and with reduced mobilization of equipment and machinery. The stack of excavated soil is more precisely constructed, occupying a lower footprint. In this case, plugging the ditch can be done with a medium capacity backhoe.

Thus, even if the operating costs are higher (transport, on site, operation by specialized teams, depreciation, etc.), the impact on environmental factors is lower, this technological solution being a more advantageous alternative related to project implementation, having a significantly lower impact on environmental factors.

For excavations in hard to reach areas, the impact on the environment will be minimized and the dimensional restriction of the work strip will be reduced, using spider type excavators. With the help of these machines, the ground will be prepared for the access of the pipeline launchers, and at the end of the works they will participate in the ecological restoration.

In some places, the digging of the ditch will be done manually, in the area of intersection of some pipe networks or in their immediate vicinity. The excavation will be carried out so that the pipe can be placed below the frost limit, ensuring a distance of at least 1m between the ground surface and the upper limit of the pipe.

B. Realization of embankments

Some sectors of the route may require earthworks to be carried out, especially in areas where the pipeline route runs on a contour line, but also in perimeters with increased instability of the land.

The earthworks will involve the construction of an opening ditch, and then the geometric structure of the works will take over the elements of conformation of some quarries, with angles to ensure the stability of the slopes. Excess excavated material will be used locally as backfill material for erosion witnesses or concavities.

C. Carrying out directed horizontal drilling

In order to reduce the impact on the environment (especially in the case of crossing watercourses), but also to avoid malfunctions in the areas of intersection of transport and communications (CF, modernized roads, etc.), the solution can be adopted of directed horizontal drilling.

The directed drilling process adopted for carrying out the excavation works ensures the realization of a continuous underground channel, with controlled route, with sufficient dimensions and with the consolidated wall, which allows the introduction of COTG without damaging the corrosion protection coating and without generating mechanical stresses of inadmissible intensity. .

A pilot drilling is performed from a position pit; the airship drilling machine makes, with the help of a high-pressure jet drilling suspension, a tunnel.

The drilling rig (mixture of water, bentonite and additives) dislocates the soil, transports the dislocated material into the pits, supports the microtunnel and reduces friction. After the drilling tool reaches the target pit, successive enlargements are made, by rotating and pulling the widening head through the pilot tunnel until a suitable diameter is reached for pulling the pipe. Immediately after the last enlargement, a calibration head is mounted behind which the pipe to be drawn is fastened. The drilling suspension also acts as a lubricant between the pipe and the walls of the microtunnel. The three-dimensional location of the drilling head is based on the transmission of data by a transmitter mounted in the drilling head to a data receiver, so the depth, position in the longitudinal axis and inclination of the drilling head can be located exactly.

D. Carrying out the crossings of the watercourses with the ballasted pipe in the open ditch.

When crossing the cadastral watercourses, the mounting depth of the pipeline will be below the discharge rates established by the Hydrological Study.

For the river sectors to be crossed by an open ditch, the works will be carried out during the periods of minimum flow rate (dry periods), the works thus having a minimum of development in sensitive areas.

At this type of crossings, the level of the upper generator of the pipeline ballast is located at least 0.5 m below the level of the general outflows of the crossed watercourse.

For water crossings by digging in an open ditch, the ballast coefficient of the pipe is 1.20 ÷ 1.45 for the crossing of running waters and 1.10 for the crossing of stagnant waters. When designing the underpasses of watercourses, the value of the design factor provided in art. 70 (3) of the Technical Norms for the design and execution of natural gas transmission pipelines approved by Order of the President of ANRE no. 118, according to the location class in which the pipeline is located.

The technology for the execution of the underwater crossing is the following:

- the pipes that will form the sub-crossing wire are concreted in the prefabricated polygon (concreting station), according to the concreting detail (ballasting);
- the concrete pipes are transported to the crossing section;
- it is joined by welding, on the shore, the pipe sections that form the crossing wire, isolated and concreted in the station;
- the filler welds are concreted on the shore, after they have been insulated;
- the return curves of the crossing (those in the vertical plane) are mounted by welding; the curves are also insulated and the welds complete;

- simultaneously with the previous operations, the excavation of the pipeline ditch is carried out up to the level provided in the project;
- the pipe is launched into the ditch by firing, from the opposite bank, and with the help of launchers.

After the execution of the crossing works, the configuration of the banks will be brought back to its initial shape and condition.

At the end of the works, most of the lands will be returned to the natural / economic circuits, in charge of the contractors responsible for execution, including the stages of environmental restoration and ecological reconstruction, until they are brought to their initial state.

An exception in this case is the surfaces that cross forest surfaces, at the level of which, from the work corridor, a COTG monitoring strip will be kept. For each project, the possibility of planting shrub species with shallow roots is analyzed, thus contributing to the reduction (cancellation) of the technological corridor and the restoration of the bio-eco-cenotic functionality of the forest massifs, thus cancelling the fragmentation phenomena.

In order to restore the location on the COTG route, levelling, compaction, fertilization operations are performed and the fertile layer stripped uncovered at the beginning of the works on the pipeline alignment and stored separately is performed.

After finishing the pipe assembly works, the ditch will be covered with the soil resulting from the excavation, the fillings being made manually, in successive layers of 10-15 cm until the upper generator of the pipe is covered with 30 cm. Each layer is compacted separately. The rest of the filling will be mechanized in layers of 20-30 cm, well compacted. The compaction of the fillings will be done with the hand and with the mechanical hammer at the optimum compaction humidity through a variable number of superimposed passages over each layer.

The resulting excess land will be spread in the area of the work corridor or will be transported and stored in places established with the authorities in the area for reuse. (backfilling of neighbouring areas and covering unevenness/ potholes in the area).

Once the morphological restoration operations of the sites are completed, the vegetal soil layer will be laid, vegetal remains (debris) processed primarily, with the role of germination propagation of the initial phases (pre-project). Sowing, overseeding and re-planting of wood species will be carried out, as appropriate. Items temporarily relocated or removed will be returned to the site or rebuilt.

2.4. Natural resources necessary for the implementation of the Plan (water sampling, renewable resources, non-renewable resources, etc.);

Construction projects for new natural gas transmission pipelines will have direct effects on the consumption of *natural resources*: on water resources used for spraying work fronts and conducting technological tests, aggregates for concrete production and ballast piping, wood, energy (including electricity and fuels), organic matter (plant debris, organic fertilizer and chemical amendments) and biological material (seeds, seedlings, etc.) needed in the stage of ecological reconstruction of the affected perimeters, others. The natural resources needed to implement each project will be detailed in the EIA/ AA procedures, as they differ from project to project.

2.5. The natural resources that will be exploited within the protected natural area of community interest to be used in the implementation of the Plan;

Natural resources exploited within the protected natural areas crossed by these objectives will not be used, these resources being provided by the executor with the assurance of all technological norms and respecting the legislation in force. The need to exploit resources can be identified and evaluated at the project level.

2.6. Emissions and waste generated by the projects in the Plan (in water, in air, in soil, on the surface where the waste is stored) and the way of their elimination;

During operation, the transport of gases is carried out in a closed, airtight system (under pressure) and can generate an insignificant impact only in accidental situations, due to improper handling/ storage of substances used or due to poor waste management.

During construction, **air quality** may be affected by emissions of atmospheric pollutants such as nitrogen oxides, sulphur oxides, carbon oxides, and volatile organic compounds, heavy metals from means of transport and construction machinery. The main pollutant emitted into the atmosphere during the execution phase will be solid particles (total suspended particles - TSP with a wide dimensional spectrum, including particles with equivalent aerodynamic diameters below 10 µm - PM10), emitted during the earthworks, results from excavations, loading-unloading activities of construction materials, etc.

During operation, the objectives achieved will not be a source of pressure on air quality.

The **water quality** can be affected during the execution of the construction works by: the excavation works that are carried out for the laying of the pipes, the accomplishment of aerial crossings works or sub-crossings of watercourses or potential accidental pollution.

Under normal operating conditions, the transit of natural gas through the pipeline shows no sources of pollution for the body of water crossed. Natural gas, even in the event of technical damage or accidents, will rise into the atmosphere, not polluting the watercourse. The measures taken to weld the pipe sections do not create conditions that allow gas losses. For emergency

situations, the pipeline is provided with alarm systems and sectioning valves that allow the natural gas circulation in the pipeline to be stopped and implicitly in the underpass area until the defect is remedied.

During the operation of the installations that form the natural gas NGTNS, only domestic wastewater will result as a result of the current activities carried out by the personnel involved in its operation.

Significant quantities of waste will result during the construction period and will consist mainly of construction material waste, respectively excavation earth, construction material waste, metal waste, wood. Most of the resulting waste is non-hazardous.

During the operation period, relatively small quantities of waste are generally estimated, taking into account the specificity of the activities. The proposed works will be made with new materials, resistant to time, which will not require frequent replacements.

2.7. Land use requirements necessary for the execution of major projects in the Plan

The strategic projects in the DEVELOPMENT PROGRAM OF THE NATIONAL GAS TRANSPORT SYSTEM FOR THE PERIOD 2021 – 2030 (TYNDP), among others, aim at the design and execution of new natural gas transmission pipelines, these being considered the elements with the greatest impact potential. on protected natural areas of Community interest, taking into account their conservation objectives. Next we will present the main technical and environmental protection criteria related to the design and execution of new pipelines.

Technical and environmental protection criteria used to select the pipeline route

At least the following criteria are used when choosing the route of natural gas transmission pipelines (COTG):

- the size and importance of areas and objectives with significant human agglomerations (housing, offices and production halls, hospitals, schools or kindergartens, cultural and leisure areas, railway stations, bus stations and airports and the estimated volume of expenditure involved in ensuring the along the COTG route);
- the size and importance of the areas and objectives on the COTG route that impose protection measures and the estimated volume of expenditures involved in protecting them or diverting the COTG route to avoid them;
  the size and importance of the areas on the COTG route with natural conditions or protection status that impose special technical conditions on the execution, operation, inspection and maintenance of the COTG and the estimated volume of

expenses involved in meeting these conditions or deviating from the COTG route to avoid them :

- natural obstacles and areas with rugged relief;
- obstacles represented by the components of the hydrographic system: watercourses, waterfalls, irrigation canals, ponds and lakes;
- areas at high risk of: floods, landslides, seismic movements;
- areas with corrosive soil, unstable soil or high frequency of freeze-thaw cycles, which require ballasting or anchoring works of COTG or land consolidation;

- the size of the areas or obstacles to be crossed by the COTG and the estimated volume of expenditure related to the construction, use, inspection and maintenance of the crossings or involved in the diversion of the COTG route;
- the size of the areas on which the COTG route is parallel to the route of other pipelines, power lines, roads or railways and the volume of expenditure involved in such parallels;
- the category of land use on the COTG route, the urban or outside the city borders location of this land, the number of landowners affected by the route and the estimated volume of expenses related to obtaining the owners' agreement and temporary or permanent occupation of the land on which COTG is located;
- the length of the COTG route and the maximum level difference on its route;
- the access routes available on the COTG route and/ or the extent of the construction or extension of access roads for the execution, operation, inspection and maintenance of the COTG and the estimated volume of costs involved in providing access routes to the COTG during its normal use;
- the possibilities to provide the necessary utilities for the execution, operation, inspection and maintenance of the COTG and the estimated volume of expenses related to the provision of these utilities.

Technical and environmental protection criteria used when crossing watercourses

The design of the crossing of a watercourse by the COTG is based on the following studies:

- topographic studies in the crossing area;
- hydrological studies of the watercourse in the crossing area;
- geotechnical studies in the riverbed and on its banks, as the case may be;
- information on the hydrotechnical works in progress and which are provided in perspective in the crossing area.

Also, the choice of the crossing variant must be based on a comparative technical-economic study of the technically possible solutions for the crossing, which should take into account, for each of the considered solutions, the following:

- technical difficulties and costs related to the execution of the crossing;
- the necessity, difficulty and costs related to the accomplishment of the works of stabilization of the banks, of crossing the protection dams, of the diversion of the watercourse, of the protection of the environment or other hydrotechnical works that the accomplishment of the crossing implies;
- durability of the crossing, difficulty and costs involved in carrying out inspection and maintenance works during the normal use of the crossing.

The following categories of data are taken into account when designing watercourse crossings:

- the characteristics of the crossed watercourse: the flow regime and the degree of stability of the riverbed, the configuration of the banks and the flood limits, the free height to be ensured under COTG during the periods when the water level is high (to allow navigation, movement of possible objects floating etc.);
- COTG characteristics crossing the watercourse: outer diameter De, the steel from which the pipes are made;
- actions to be taken into account when designing the crossing: maximum operating pressure of COTG MOP, mass loads (weight of pipes and corrosion protection coatings) and those produced by wind, snow, frost, etc., loads caused by the effect of temperature, seismic action accidental; the action exerted by performing pressure and tightness tests.
- environmental conditions in which the crossing is made: the nature of the land where the underground COTG is laid in the crossing area, the existence of shore protection works or other hydrotechnical constructions, the need to protect the COTG against destructive mechanical actions: anchoring ships, accidental fall of heavy objects from ships, the existence of other crossings in the vicinity, the existence of adequate storage places for the excavated material, the action of restrictions related to the protection of the fishbed, underwater flora and fauna, the forecast for the bottom of the riverbed during COTG operation , the existence of ballast pits in operation upstream or downstream of the crossing.

Technical criteria used to cross roads, railways and roads

Crossing of communication routes, railways and roads is made taking into account the conditions imposed by the administrator or owner of the respective communication route, in compliance with all legal provisions.

When designing the underpasses of communication routes, the value of the design factor provided in Annex 21 of the Technical Norms for the design and execution of natural gas transmission pipelines approved by the Order of the President of ANRE no. 118/2013, according to the place where the crossing is located and the importance of the

communication route being crossed. The provisions of STAS 9312 - Underpasses of railways and pipelines are also observed.

2.8. The additional services required by the implementation of the Plan, respectively the way in which accessing these additional services may affect the integrity of the natural areas of community interest

No details are known at this time regarding the additional services required. These will be detailed at the technical project level. Based on the information presented, the implementation of projects in TYNDP does not involve the provision of additional services to increase the impact on protected natural areas.

2.9. Duration of construction, operation, decommissioning of Plan projects and staggering the implementation period of Plan projects

The known elements of the strategic projects are presented in the following Table:

Table 6. *List of the main projects proposed by Transgaz SA by TYNDP 2021-2030*

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
7.1.	**The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA)**	• Provides the adequate natural gas transportation capacity between the crossborder interconnection points RO-BG and RO-HU, to increase the interconnection degree to an European level; • Provides natural gas transportation capacities for the capitalization of natural gas from the Black Sea on the Central-European markets. • The project has been included in the updated list of common interest projects, published in November 2017 as appendix to Regulation 347/2013.	• Envisages developments of the natural gas transportation capacities between the Romanian natural gas transportation system and the similar Bulgarian and Hungarian systems, consisting in building new natural gas transportation pipelines, connecting the Podișor Technologic Junction and GMS Horia.	
7.1.1	**Stage I**	The result of the implementation of BRHA Project - Stage I is the assurance of the physical capacity of a permanent, bidirectional flow between the interconnections with Bulgaria and Hungary, ensuring the following natural gas transportation capacities - transportation capacity to Hungary of 1.75 bil. mc/year, respectively 1.5 bil. mc/year to Bulgaria. Project BRHA Stage I is a Supply Safety project. Project's classification in international plans • PCI project (first list): 7.1.5; • PCI project (second list): Stage I: 6.24.2;	BRHA project phase I includes the following objectives: • 32” x 63 bar Podișor–Recaș pipeline, 479 km in length; • Three gas compression stations (GCS Podișor, Bibești and Jupa) each system fitted with two compression aggregates (one functioning and one reserve), with the possibility to ensure the bidirectional gas flow	FINALIZED

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
		• PCI project (third list): Stage I: 6.24.1–2; • PCI project (fourth list): Stage I: 6.24.1 - 1 part of the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second stage". • TYNDP ENTSOG 2020: TRA-F-358		
7.1.2.	**Stage II**	The result of the implementation of BRHA Project - Stage II is the assurance of the physical capacity of a permanent, bidirectional flow between the interconnections with Bulgaria and Hungary, ensuring the following natural gas transportation capacities - transportation capacity to Hungary of 4.4 bil. mc/year, respectively 1.5 bil. mc/year to Bulgaria. Project BRHA Stage II is a commercial project. Project's classification in international plans: • PCI project (first list): 7.1.5; • PCI project (second list): Stage II: 6.24.7; • PCI project (third list): Stage II: 6.24.4-4; • PCI project (fourth list): Stage II: 6.24.4 - 2 part of the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage". • TYNDP ENTSOG 2020: TRA-A-1322	Stage II consists in the achievement of the following objectives: • 32" x 63 bar Recaș–Horia pipeline, 50 km in length; • The increase of the three compression stations(Podișor, Bibești and Jupa) by mounting on each system an additional compression aggregate; • Increase of the gas measurement system existing in GMS Horia.	The final implementation decision will be made only if the project is commercially viable.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
7.2.	**Development on Romanian l territory of the Southern Channel for the takeover of natural gas from the Black Sea shore**	The project proposes the development on Romanian territory of a natural gas transportation infrastructure, from the Black Sea shore up to the Romanian-Hungarian border. Project's classification in international plans • PCI project (second list): 6.24.8: • PCI project (third list): 6.24.-5: • PCI project (fourth list): 6.24.4 - 3 "Pipeline Black Sea shore - Podișor (RO) to takeover the natural gas in the Black Sea", part of the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage". • The list of conditioned priority projects, elaborated as part of CESEC; • TYNDP ENTSOG 2020: TRA-A-362	The main objective of this investment is the building of a natural gas transportation telescopic pipeline between Tuzla and Podisor, 308.3 km long, connecting the natural gas resources available on the Black Sea shore with the BULGARIA-ROMANIA-HUNGARY-AUSTRIA channel, thusly ensuring the possibility of natural gas transport towards Bulgaria and Hungary using the existing Giurgiu-Ruse (with Bulgaria) and Nădlac–Szeged (with Hungary) connections. The pipeline consists in: • Section I, Black Sea shore - Amzacea, 32.4 km long, will have a Ø 48" (DN1200) diameter and technical capacity of 12 bil mc/year; • Section II, Amzacea - Podișor, 275.9 km long, will have a Ø 48" (DN1000) diameter and technical capacity of 6 bil mc/year;	The building permit was obtained. The final investment decision is expected. TRANSGAZ has taken the Decision for the investment. Starting the execution depends on the Final Investment Decision taken by the Concesionaires of the perimeter of Neptun Apa Adanca (Neptun Deep Waters) from the Black Sea.
7.3.	**Interconnection of the national transportation system with the international natural gas transportation**	• Creates a natural gas transportation channel between the markets in Bulgaria, Romania and Ukraine, in the situation where the new interconnection between Greece and Bulgaria is performed;	***Stage I*** • Isaccea interconnection, location A.T.U. Isaccea; • Restoration of DN 800 Onești-Cosmești pipeline	• FINALIZED

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
	pipelines T1 and reverse flow Isaccea	• The transportation agreement afferent to the capacity of Transit I pipeline has expired on October 1st 2016; as of gas year 2016-2017, the transportation capacity of Transit 1 pipeline is sold by public sale, according to the European code on allocation mechanisms of capacities in the crossborder interconnection points and on NAER Order 34/2016; • Physical reversible flows will be able to be supplied in Negru Vodă 1 point, according to the requirements of Regulation (EU) 1938/2017; • Creates the possibility to takeover in the Romanian transportation system of natural gas found in the Black Sea, to capitalize them on the Romanian and on regional markets. Project's classification in international plans • PCI project (second list): 6.15; • PCI project (third list): 6.24.10 - 1 the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage". • TYNDP ENTSOG 2020: TRA-F-139.	***Stage II*** • Upgrading of the existing Siliștea Gas Compression Station, including the Technological Junction (TJ) Siliștea, located in the Administrative and Territorial Unit (A.T.U.) Siliștea, Brăila county; • Works at the existing Șendreni Technological Junction, located in A.T.U. Vădeni, Brăila county; • Upgrading of the existing Onești Gas Compression Station, including the Technological Junction (TJ) Onești, located in the Administrative and Territorial Unit (A.T.U.) Onești, Bacău county	•
7.4.	**TNS developments in North-Eastern Romania, for the improvement of the natural gas supply of the area, as well as to ensure transportation capacities to the Republic of Moldavia**	The performance of this project will improve the supply with natural gas in North-Eastern Romania, the necessary pressure and the natural gas transportation capacity of 1.5 bil mc/year will be ensured in the interconnection point between the natural gas transportation systems of Romania and of Republic of Moldavia. Project's classification in international plans • TYNDP ENTSOG 2020: TRA-F-357	• The building of a new natural gas transportation pipeline DN 700, Pn 55 bar, in the direction Onești–Gherăești, 104.1 km long; the layout of this pipeline will be largely parallel to the existing pipelines DN 500 Onești–Gherăești • The building of a new natural gas transportation pipeline DN 700, Pn 55 bar, in the direction Gherăești–Lețcani, 61.05 km long; this pipeline will replace the existing pipelines DN 400 Gherăești–Iași in the Gherăești–Lețcani section; • The building of a new Gas Compression System in Onești, with an installed power of 9.14 MW, 2	For the construction, the foreseen completion deadline is the year 2021.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
			compressors of 4.57 MW each, one active and one reserve; • The building of a new Gas Compression System in Gherăești, with an installed power of 9.14 MW, 2 compressors of 4.57 MW each, one active and one reserve;	
7.5.	**Amplification of bidirectional transport channel Bulgaria-Romania-Hungary-Austria (BRHA stage 3)**	In the hypothesis where the transportation capacities necessary for the capitalization of the natural gas from the Black Sea on the Central-Western European markets exceed the transportation potential of the BRHA Phase II channel, TRANSGAZ has planned the development of the central channel, which practically follows the layout of some pipes from the actual system, but which presently function at inadequate technical parameters for a main pipeline. The projects are collected on the updated list (List 3/2017) of the common interest projects, as an Appendix to Regulation 347/2013, included in position 6.24. 10.-2 under the name "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage".	The development of this natural gas transportation channel supposes the following: • Restoration of existing pipelines belonging to NTS; • Replacement of existing pipelines belonging to TNS with new pipes or building new pipelines, installed in parallel to the existing ones; • The development of 4 or 5 new compression systems, with a total installed power of about 66-82,5MW; • Increase of natural gas transportation capacities towards Hungary by 4.4 bil mc/year. For optimization and efficacy purposes, the channel has been divided in two projects: *1. The provision of reversible flow on the Romania-Hungary interconnection*, which states: • New natural gas transportation pipeline Băcia–Hațeg–Horia–Nădlac, of about 280 km in length • Two new natural gas compression systems, located along the pathway. *2. TNS development between Onești and Băcia:* • Rehabilitation of pipeline sections; • Replacement of existing pipelines with new ones, with greater diameters and operating pressure; • Two or three new natural gas compression systems	The accomplishment of this project depends on the evolution of the capacity requirement, respectively on the results of the exploration processes / exploitation of the natural gas deposits in the Black Sea or in other on-shore perimeters, and a final investment decision will only be made when the additional capacities requirement is confirmed by reservation agreements and contracts.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
7.6.	**New developments of NTS in order to takeover of natural gas from the Black Sea shore.**	The goal of the project is the creation of an additional point to takeover the natural gas supplied by the submarine exploitation perimeters in the Black Sea. Project's classification in international plans • PCI project (third list): 6.24.10 - 3 part of the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage". • TYNDP ENTSOG 2020: TRA-F-964	• Natural gas transportation pipeline, of about 25 km in length and DN 500 in diameter, from the Black Sea shore and up to the existing international natural gas transportation pipeline T1. • Transportation capacity - 1.23 bil mc/year	The building permit was obtained. The execution works are in progress. Estimated term of completion - year 2021.
7.7	**Interconnection Romania-Serbia - interconnection of the Natural Gas National Transportation System with the similar Serbian natural gas transportation system**	Reinforcement of the degree of interconnectivity between the natural gas transportation systems in the EU member states and the increase of the energetic security in the region. Project's classification in international plans • TYNDP ENTSOG 2020: TRA-N-1268	The analyzed option to export natural gas to Serbia is to take the natural gas from the future BRHA pipeline (Stage I). The project presumes to build a new natural gas transportation pipeline, which will ensure the connection between the main natural gas transportation pipelines 'BRHA' and the Mokrin Technological Junction in Serbia. The project will include the following: • Building a new interconnection pipeline on the direction Recaș–Mokrin, of about 97 km in length, out of which about 85 km on Romanian territory and 12 km on Serbian soil, with the following features: o Pressure in BRHA pipeline Recaș area: 50-54 bar (PN BRHA–63 bar);	Building Permit pending issuance. Foreseen commissioning deadline – year 2023.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
			○ Diameter of the interconnection pipeline DN 600; ○ Transportation capacity: max. 1 bil. Smc/an (115 000 Smc/h), press. in Mokrin: 48,4- 52,5 bar; ○ Transportation capacity: max. 1.6 bil. Smc/an (183 000 Smc/h), press. in Mokrin: 45,4- 49,9 bar; • Erection of a natural gas measurement system (located in Romania).	
7.8	**Upgrading of GMS Isaccea I and GMS Negru Vodă 1**	• The project is undertaken to fulfil the requirements of the Interconnection Convention for Isaccea I Interconnection Point, concluded with PJSC Ukrtransgaz, Ukraine, on 19.07.2016 and the Interconnection Convention for Negru Vodă 1 Interconnection Point, concluded with Bulgartransgaz, Bulgaria, on 19.05.2016 Project's classification in international plans • TYNDP ENTSOG 2020: TRA-N-1277	Building of two new natural gas measurement systems replacing the existing ones. In the case of GMS Isaccea I, the system will be built within the existing system, and in the case of GMS Negru Vodă 1, in a location close to the existing system.	GMS Isaccea 1 - finalised Foreseen commissioning deadline - 2021 for GMS Negru Vodă 1
7.9	**Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret**	• The project offers the increase of the degree of interconnectivity of the natural gas national transportation network to the natural gas European network, by the interconnection of the TNS with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret. Project's classification in international plans • TYNDP ENTSOG 2020: TRA-N-596	• The building of a natural gas transportation pipeline, 146 km in length, and its afferent installations, on the direction Gherăești – Siret; • The building of a crossborder gas measurement system; • The amplification of the Onești and Gherăești compression systems, if necessary	Transgaz has elaborated the Prefeasibility Study. The project is subjected to the performance of the strategic project 7.4. The foreseen completion deadline - year 2026, but is subject to the establishment of the parameters for the interconnection point and on the implementation diagram of the project on Ukrainian territory.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
7.10	**Development / Upgrading of natural gas transportation infrastructure in North-Western Romania**	The goal of the project is to create new natural gas transportation capacities or to increase the existing ones	• The building of a natural gas transportation pipeline and its afferent installations, on the Horia–Mediești Aurit direction; • The building of a natural gas transportation pipeline and its afferent installations, on the Sărmășel–Mediești Aurit direction; • The building of a natural gas transportation pipeline and its afferent installations, on the Huedin–Aleșd direction; • The building of a natural gas compression system in Mediești Aurit	The project is in an incipient stage, only the Feasibility Study being completed. The project will be developed considering the major importance projects already running, which will be performed on Romanian territory (BRHA gasoduct (7.1.), Marea Neagră– Podișor pipeline (7.2), the Romanian interconnection pipeline with the Republic of Moldavia (7.4.).
7.11	**Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction**	The project is performed in order to fulfil the obligations undertaken by the Memorandum on the cooperation for the performance of the Vertical Corridor, concluded between SNTGN Transgaz SA, Bulgartransgaz, DESFA SA, FGSZ Ltd. and ICGB AD.	• The building of a natural gas transportation pipeline and its afferent installations; • The building of a new undercrossing of the Danube; • Amplification of GMS Giurgiu.	The project is in an incipient stage, only the Feasibility Study being completed, the capacities to be developed part of this project will be set out subsequently, based on which the final technical solution being elaborated.
7.12	**Eastring–Romania**	The EASTRING project, promoted by EUSTREAM, is a bidirectional flow pipeline for Central and South-Eastern Europe, with the purpose of connecting the natural gas transportation systems in Slovakia, Hungary, Romania and Bulgaria, to gain access to the natural gas deposits in the Caspian region and in the Middle East. EASTRING will offer the most profitable, direct transportation route between the gas platforms in the West of the European Union and the Balkan Region / Eastern Turkey - an area with a very high potential to provide gas from various sources.	Interconnection bidirectional flow gasoduct, with an annual capacity between 225.500 GWh and 451.000 GWh (about 20 bil mc and up to 40 bil mc), which connects Slovakia to the external EU border by Bulgaria, Hungary and Romania. • Stage I - will ensure a maximum capacity of 20 bil mc/year; • Stage II- will ensure a maximum capacity of 40 bil mc/year.	Feasibility study elaborated. Foreseen completion deadline: year 2027 for Stage 1 year 2030 for Stage 2.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
		With this possibility to diversify the transportation routes, as well as the supply sources, the safe supply of the entire region will be ensured, mainly to the South-East European countries. Project's classification in international plans • PCI project (third list): 6.25.1: • TYNDP ENTSOG 2020 (Eastring–Romania): TRA-N-655		
7.13	**Monitoring, control and data acquisition system for cathodic protection systems afferent to the Natural Gas National Transportation System**	The implementation of the acquisition, command and monitoring system for the cathodic protection system will provide an increase durability and safety in the exploitation of transport pipelines, a simple operation of a complex protection system of the pipelines, with reduced maintenance expenses. The system will provide information on the pipeline's electrical safety, as well as for the intrinsic cathodic protection (without external cathodic current source), providing information in certain points or sections, for a restrictive rectification of the dispersion currents to alternative current induced in the pipeline.	The centralized cathodic protection system will provide the opportunity to setup, monitor and clear and precise remote operation of the system's interest points, will eliminate data reading costs, will avoid situations where, due to adverse weather, data reading is impossible and human errors, will allow assigned control of locations, will reduce operating and maintenance costs and will considerably reduce the configuring times.	Transgaz has elaborated and endorsed the Feasibility Study. Foreseen commissioning deadline: year 2023.
7.14	**Development of SCADA system for the Natural Gas National Transportation System**	The upgrading of the natural gas transportation infrastructure must be supported, in the following years, by the development of a top of the range, flexible SCADA system, by the upgrading of the hardware and software architecture, migrating towards a decentralized architecture, with the control distributed on organizational administrative units, according to the SNTGN TRASGAZ S.A. structure.	The project will include the following: • Analysis of the possibilities to optimize the SCADA system's architecture; • Upgrading/replacing, at national/territorial SCADA control rooms of morally and physically obsolete hardware equipment; • The provision of a hardware / software capacity reserve, at the level of national/territorial SCADA control rooms; • The additional integration of about 170 MAS (Measurement Adjustment Systems), functional at TNS level; • The provision of a continuous transmission and monitoring in real time to the national and territorial SCADA dispatch rooms of the relevant and necessary technological parameters as part of	Feasibility study - pending development Foreseen commissioning deadline: year 2023.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
			TNS objectives, for the monitoring and operation of TNS under safety, efficiency and environmental protection conditions; • The integration of new local automations, which will be commissioned by 2022; • The installation of systems of the SCADA Intrusion Detection System LAN SCADA type; • The installation of a simulation and PMS (Pipeline Monitoring Software) system or a NSM (Network Software Management) system; • The identification and provision of technical solutions regarding the security of industrial data network where the data acquisition and control systems are installed; • The analysis of technical opportunities regarding the designing and creation of an emergency dispatch room.	
7.15	**Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2**	To provide the bidirectional flow at the border with Ukraine and Bulgaria on the transit pipeline T2, the upgrading of natural gas measurement systems GMS Isaccea 2 and GMS Negru Vodă 2 is a must.	The GMS Isaccea 2 will be fitted with a separation/filtration installation and with a measurement installation. The GMS Isaccea Negru Vodă 2 will be fitted with a separation/filtration installation and with a measurement installation.	The projects will be developed depending on the market demand assessment results for the interconnection points located on T2 and T3 pipelines, on transportation direction Bulgaria-Romania-Ukraine (the trans-Balkan channel)
7.16.	**Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3**	To provide the bidirectional flow at the border with Ukraine and Bulgaria on the transit pipeline T3, the upgrading of natural gas measurement systems GMS Isaccea 3 and GMS Negru Vodă 3 is a must.	The GMS Isaccea 3 will be fitted with a separation/filtration installation and with a measurement installation. The GMS Isaccea Negru Vodă 3 will be fitted with a separation/filtration installation and with a measurement installation.	
7.17.	**TNS interconnection to GNL Terminal, located at the Black Sea shore**	Will provide the takeover of natural gas from the Black Sea shore, using a GNL terminal.	The building of a natural gas transportation pipeline, of about 25 km in length, from the Black Sea shore and up to pipelines T1 and T2.	The project is in its incipient stage.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
			The capacity and design pressure of this pipeline will be established depending on the natural gas quantities available at the Black Sea shore.	

Table 7. *List of the natural gas storage projects, proposed by TYNDP 2021-2030* cu detailing the known technical elements

Project code	Name of project / Operator	Project goal	Proposed upgrading actions	Development stage
Operated by N.G.N.S. ROMGAZ SA - natural gas storage branch DEPOGAZ Ploiești SRL				
8.1.	**Upgrading of the natural gas storage system's infrastructure in Bilciurești**	The goal of the project is to increase the daily supply capacity of natural gas from the storage in Bilciurești up to a yield of 18 million mc/day and to provide an increased degree of exploitation safety	The project will include the following: • Upgrading of the groups separation, measurement and drying installations in Bilciurești; • Systematization and upgrading of the natural gas aspiration / discharge pipeline system and upgrading of the cooling system in the compression system of Butimanu; • Upgrading of 39 injection / extraction drills; • Boring of 4 new drills; • New natural gas transportation pipeline (11 km) between the storage in Bilciurești and the compression system in Butimanu.	The project is during its designing phase. Foreseen completion deadline: 2025
8.2.	**Increase of the natural gas underground storage capacity of the storage facility in Ghercești**	The goal of the project is the addition to the natural gas storage system's infrastructure in Ghercești, to provide operating conditions at the capacity of 600 million m3/cycle	The project will include the following: • Gas Compression Station; • Expansion of gas drying and measurement installations; • Upgrading of 20 injection / extraction drills; • Interconnection of Ghercești storage with TNS; • Gas inactive stock;	The project is in its incipient stage. Foreseen completion deadline: 2026
8.3	**New natural gas underground storage facility in Fălticeni (Moldavia)**	The goal of the project is to develop a new underground storage facility in North-Eastern Romania (the Moldavia region). Conversion into an underground storage facility of one or of several depleted fields amongst the following: Pocoleni, Comănești, Todirești or Davideni.	• Capacity of about 200 million m3/cycle; • Injection capacity of about 1.4 million m3/day; • Extraction capacity of about 2 million m3/day. The project will include the following: • Natural Gas Compression System; • gas drying and measurement installations;	The project is in its incipient stage. Foreseen completion deadline: 2029

Project code	Name of project / Operator	Project goal	Proposed upgrading actions	Development stage
			• Technological installations injection / extraction drills; • Boring of injection / extraction drills; • Storage facility interconnection to NTS; • Natural gas inactive stock;	
8.4	**Increase of the natural gas underground storage capacity of the storage facility in Sărmășel (Transilvania)**	The goal of the project is the development of the existing underground storage facility in Sărmășel, by increasing its capacity from 900 million m3/cycle to 1550 million m3/cycle (a 650 million m3/cycle increase), the increase of the injection capacity by 4 million m3/day, to a total of 10 million m3/day, the increase of the extraction capacity by 4 million m3/day, to a total of 12 million m3/day, by increasing the compression capacity, a new surface infrastructure for 59 injection/extraction drills, boring of new drills, etc. From a technical point of view, the project consists in drilling new wells, creating a modern surface infrastructure compliant with the requirements of European safety and control standards, expanding gas compression installations and modernizing and optimizing existing separation and fiscal measurement facilities.	The project will include the following: • 38 drills; • 48,6 Km of adduction pipes; • 8 drill groups; • 19,2 Km of collecting pipes; • 3 compression units; • 2 gas drying units; • Separation and measurement installation (**ISM**); • Renewable energy reproduction system; • Connection to the National Natural Gas Transmission System (NTS). • Development and modernization of the storage will be made in the current perimeter of exploitation.	The project is in its incipient stage. Foreseen completion deadline: 2026.
Operated by SC Depomureș SA				
8.5	**Storing unit - Depomureș - reengineer and development of natural gas underground storage facility in Târgu Mureș**	The goal of the project is to reengineer and develop the natural gas underground storage facility in Târgu Mureș, to improve the storing technical conditions and to increase the performance of the supplied services, especially in the context of the actual dynamics of the natural gas market. The development project of Depomureș was declared in 2013 a Common Interest Project (CIP) by the European Committee. The project is included on the Common Interest Projects' list in	This project's main objectives are: • To increase the storage facility's flexibility by increasing its daily injection and extraction capacity from the present average of about 1.7 million mc/day to about 3.5 million mc/day after the implementation of stage 1 of the project, respectively to about 5 million mc/day after the implementation of stage II of development, • The increase of the useful volume to 400 million during a first stage (Stage 1), respectively to 600 million mc during a subsequent stage (Stage 2). The project will mainly consist in the following:	The project is pending the granting of the Building Permit. Foreseen completion deadline for Stage I - year 2023. Stage 2 will start only after the completion

Project code	Name of project / Operator	Project goal	Proposed upgrading actions	Development stage
		force, in the NSI Gas corridor (Central and Eastern Europe region), bearing the reference no. 6.20.4.	• Central gas plant (gas compression and drying units, bidirectional gas measurement commercial panel, adjacent facilities); • New storage collector; • upgrading;	of Stage 1 implementation.

2.10. Activities that will be generated as a result of the implementation of the Plan

The technical details, execution schedules and staff involved will be detailed at project level. As presented above, the execution of gas transmission projects primarily involves the construction and installation of existing or new corridors natural gas transmission pipelines, construction of natural gas compression stations, repair and refurbishment of existing infrastructure, maintenance work.

Potential developments subsequent to the implementation of the Plan include, but are not limited to, the following:

- extending the connection of distributors to the NGTNS and extending the gas distribution networks
- increasing the number of localities connected to the national network
- attracting new development projects/ investors

2.11. Existing characteristics of the Plans/ Programs, proposed or approved, which may generate a cumulative impact with the Plan which is in the evaluation procedure and which may affect the protected natural area of Community interest

Regarding the cumulative impact of the plan, it is necessary to examine the plans and strategies that can create the premises for investments and impact-generating interventions at the level of Natura 2000 sites intersected by the elements of TYNDP, as well as other plans and strategies at national level, such as transport, energy, mineral resource extraction, etc., which may have a cumulative impact by affecting Natura 2000 sites that are designated for the conservation of species and habitats of Community interest that could also be significantly affected by the TYNDP.

As the present study shows, the TYNDP is not able to produce a significant impact at the level of biogeographically area on some species or habitats of community interest, so the analysis is limited to the elements in the plans that intersect the community sites that will be intersected and the infrastructure created through the analyzed plan.

Plans and projects that can generate cumulative impact with the analyzed TYNDP plan are:

- General master plan for transport in Romania
- Large Infrastructure Operational Plan (LIOP) 2014-2020
- Electricity transmission network development plan for 2018 – 2027

- Romania's Energy Strategy for the Period 2020-2030 with the Perspective of the Year 2050

The analysis of the intersection of some sites by TYNDP and by other projects within these plans is presented in the chapter of the cumulative impact analysis. We remind you that the scope of large infrastructure projects, such as roads, highways, railways, waterways, overhead power lines, hydroelectric power plants and hydroelectric dams far exceeds the level of impact of TYNDP projects. Execution projects for gas transmission pipelines create temporary impacts, during the execution period, in some cases in the medium term, during the regeneration of the habitats affected by the work corridor. The period of operation of these pipelines does not generate a significant impact within the intersected sites, so no cumulative impact can be taken into account.

III. Information on protected natural areas of community interest affected by the implementation of the Plan

3.1. General information about the Natura 2000 network in Romania

The Natura 2000 network is a system of protected natural areas at European level, which includes two major categories of areas: Special Protection Areas (SPAs) and Sites of Community Importance (SCIs). These areas aim to conserve rare, vulnerable or endangered animal and plant species and their natural environment.

Special Protection Areas (SPA) are governed by the Birds Directive (Directive 2009/147/ EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds), which details the avifauna species for which these areas must be designated and the criteria must meet these areas.

Sites of Community Importance (SCI) are governed by the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora), which details species of animals (other than birds), plants and habitats for which these areas must be designated and the criteria that these areas must meet.

In Romania, these two legislative acts were transposed into national legislation by GEO no. 57/2007 approved with modifications by Law no. 49/2011. Sites of Community Importance were legislated by Order of the Minister of Environment and Sustainable Development no. 1,964/ 2007 and by Order no. 2,387 of September 29, 2011 (amending the Order of the Minister of Environment and Sustainable Development No. 1,964/ 2007 on the establishment of the protected natural area regime of sites of community importance, as an integral part of the European ecological network Natura 2000 in Romania). The Areas of Special Avifauna Protection were legislated on by Government Decision no. 1284 of 2007 (regarding the declaration of special avifauna protection areas, as an integral part of the European ecological network Natura 2000 in Romania) and completed by Government Decision no. 971 of 2011 (regarding the amendment and completion of GD 1284/2007, regarding the declaration of special avifauna protection areas, as an integral part of the European ecological network Natura 2000 in Romania).

Another aspect that is taken into account when designating Natura 2000 areas is the presence of biogeographical regions. These are areas with relatively homogeneous ecological conditions, with common characteristics. There are nine such regions in the European Union, of which five are also present in Romania (see map):

- Alpine - which includes mountainous areas
- Continental - which includes the centre of the country and sub-Carpathian areas
- Pannonian - which includes the plains in the west of the country
- Steppic - which includes the lowlands of the southeast
- Pontic - which includes the area adjacent to the Black Sea

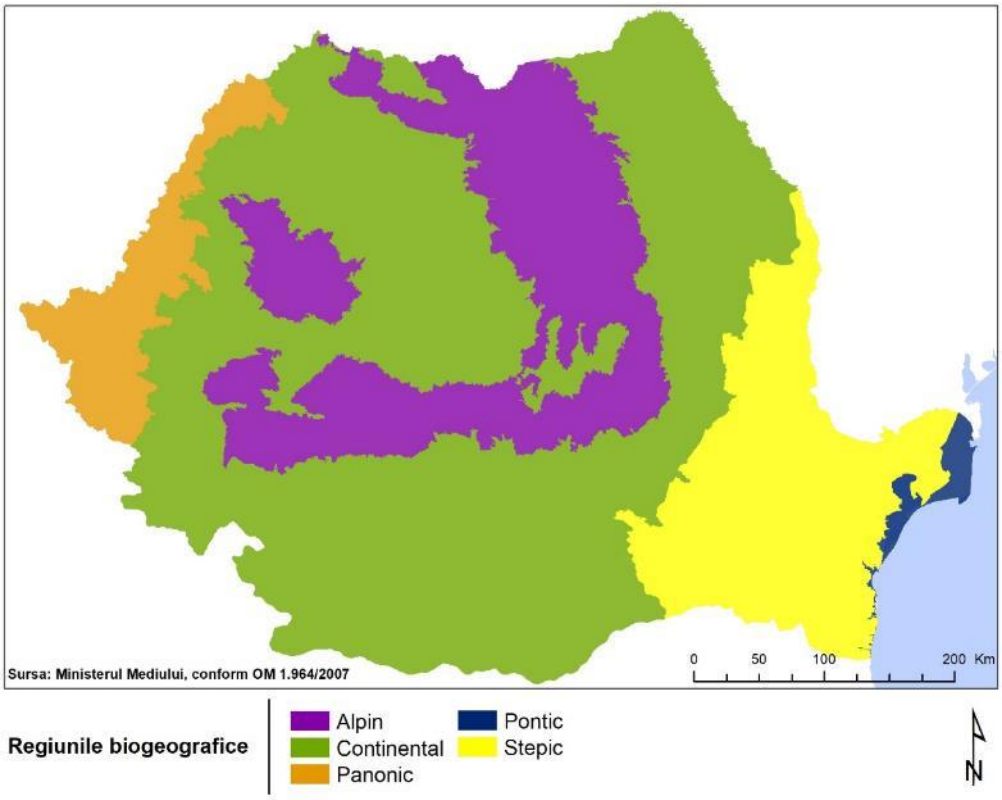

Image 25. Distribution of biogeographical regions in Romania

Each Member State acceding to the European Union is obliged to designate natural areas to be included in this network. In 2007, Romania designated 381 Natura 2000 sites, of which 108 areas of Special Avifauna Protection (11.89% of the country's surface) and 273 Sites of Community Importance (13.21% of the country's surface), the total area of the network covering 17.84% of the total area of the country.

The current situation of the Natura 2000[5] network

The Natura 2000 network subsequently underwent several stages of extensions and changes. After the latest changes (the version of existing limits in 2019 available to the Ministry of Environment), the Natura 2000 network is as follows:

Sites of Community Importance. There are currently 435 SCI designated, covering a total area of 4,650,819 hectares. Of these, a number of 426 are designated on the land area of the country (the rest are marine sites), with a total area of 4,045,192 hectares, representing 16.97% of the national territory.

Special Protection Areas. There are currently 171 designated SPAs, covering a total area of 3,875,298 hectares. Of these, a number of 170 are designated on the land area of the country (the rest are marine sites), with a total area of 3,726,153 hectares, representing 15.63% of the national territory.

[5] Based on official information available from the European Environment Agency through EIONET (European Environment Information and Observation Network) - Central Data Repository

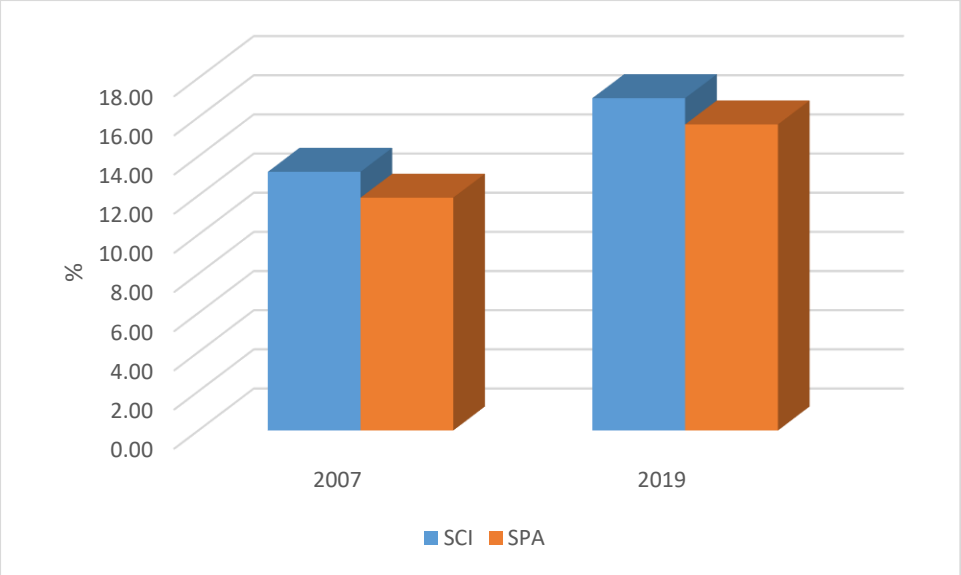

Image 26. Percentage of the area of Natura 2000 areas in the national territory at the level of 2007 and 2019 (terrestrial area)

Regarding the coverage of biogeographical regions, within the Sites of Community Importance, the region best represented as an area is the Alpine (43.6% of the designated area is located in this region), followed by the Continental (34.5%) and Steppe (13.7%).

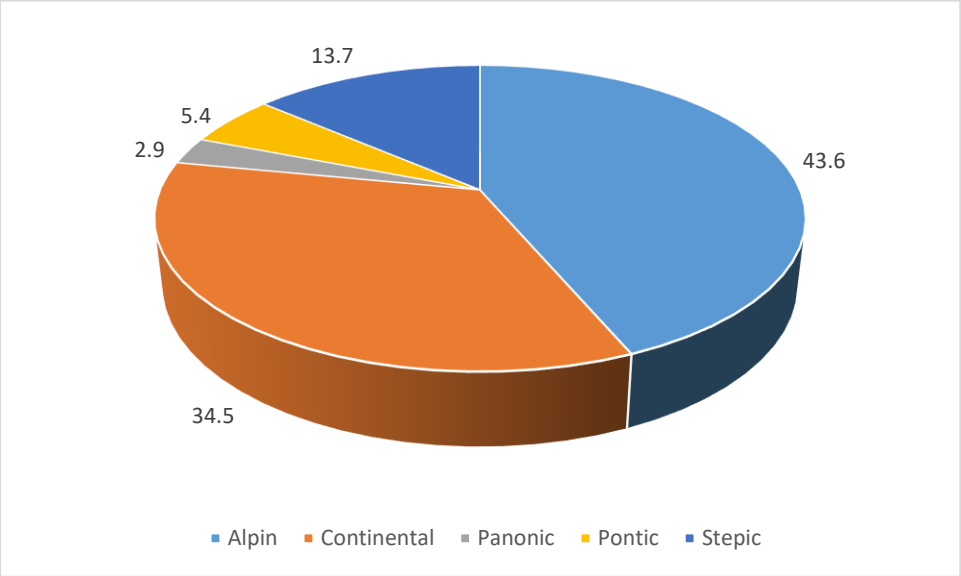

Image 27. Percentage of different biogeographical regions within Areas of Community Importance (SCI)

Regarding the coverage of biogeographical regions by the Special Protection Areas, the region best represented as an area is the Continental (37.5% of the designated area is located in this region), followed by the Alpine (30.4%) and Steppe (21.3%).

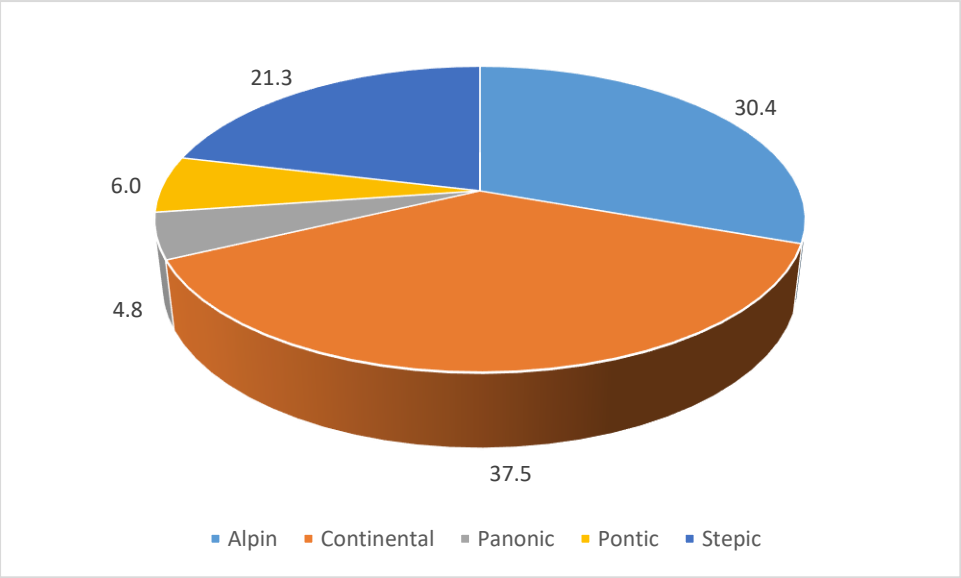

Image 28. Percentage of different biogeographical regions within Special Avifauna Protection Areas (SPA)

Regarding the use of existing land in the Natura 2000 Network, the analysis based on Corine Land Cover (2018 version), we can see that the best represented are deciduous forests, both at SCI level (34.90%) and at the level of SPAs (28.62%). The detailed situation is presented in the tables and graphs below.

Table 8. Share of different categories of habitats within Areas of Community Importance (SCI)

Land use within the SCI (based on Corine Land Cover 2018)	**Percentage**
Discontinuous urban fabric	0.43
Industrial or commercial units	0.04
Mineral extraction sites	0.07
Dump sites	0.01
Sport and leisure facilities	0.03
Non-irrigated arable land	6.11
Rice fields	0.09
Vineyards	0.12
Fruit trees and berry plantations	0.27
Pastures	8.70
Complex cultivation patterns	0.85
Land principally occupied by agriculture, with significant areas of natural vegetation	2.05
Broad-leaved forest	34.90
Coniferous forest	11.96
Mixed forest	10.24
Natural grasslands	6.03
Moors and heath land	1.60
Transitional woodland-shrub	3.65
Beaches, dunes, sands	0.25
Bare rocks	0.25

Sparsely vegetated areas	0.14
Inland marshes	6.07
Salt marshes	0.22
Water courses	2.32
Water bodies	1.93
Coastal lagoons	1.65

Table 9. Share of different categories of habitats within the Special Protection Areas for Avifauna (SPAs)

Land use within the SCI (based on Corine Land Cover 2018)	**Percentage**
Discontinuous urban fabric	0.50
Industrial or commercial units	0.06
Port areas	0.01
Mineral extraction sites	0.11
Dump sites	0.01
Sport and leisure facilities	0.01
Non-irrigated arable land	15.87
Rice fields	0.40
Vineyards	0.21
Fruit trees and berry plantations	0.24
Pastures	12.11
Complex cultivation patterns	1.09
Land principally occupied by agriculture, with significant areas of natural vegetation	2.48
Broad-leaved forest	28.62
Coniferous forest	9.44
Mixed forest	5.12
Natural grasslands	4.76
Moors and heath land	0.77
Transitional woodland-shrub	3.34
Beaches, dunes, sands	0.26
Bare rocks	0.13
Sparsely vegetated areas	0.10
Inland marshes	6.77
Salt marshes	0.24
Water courses	2.24
Water bodies	3.31
Coastal lagoons	1.79

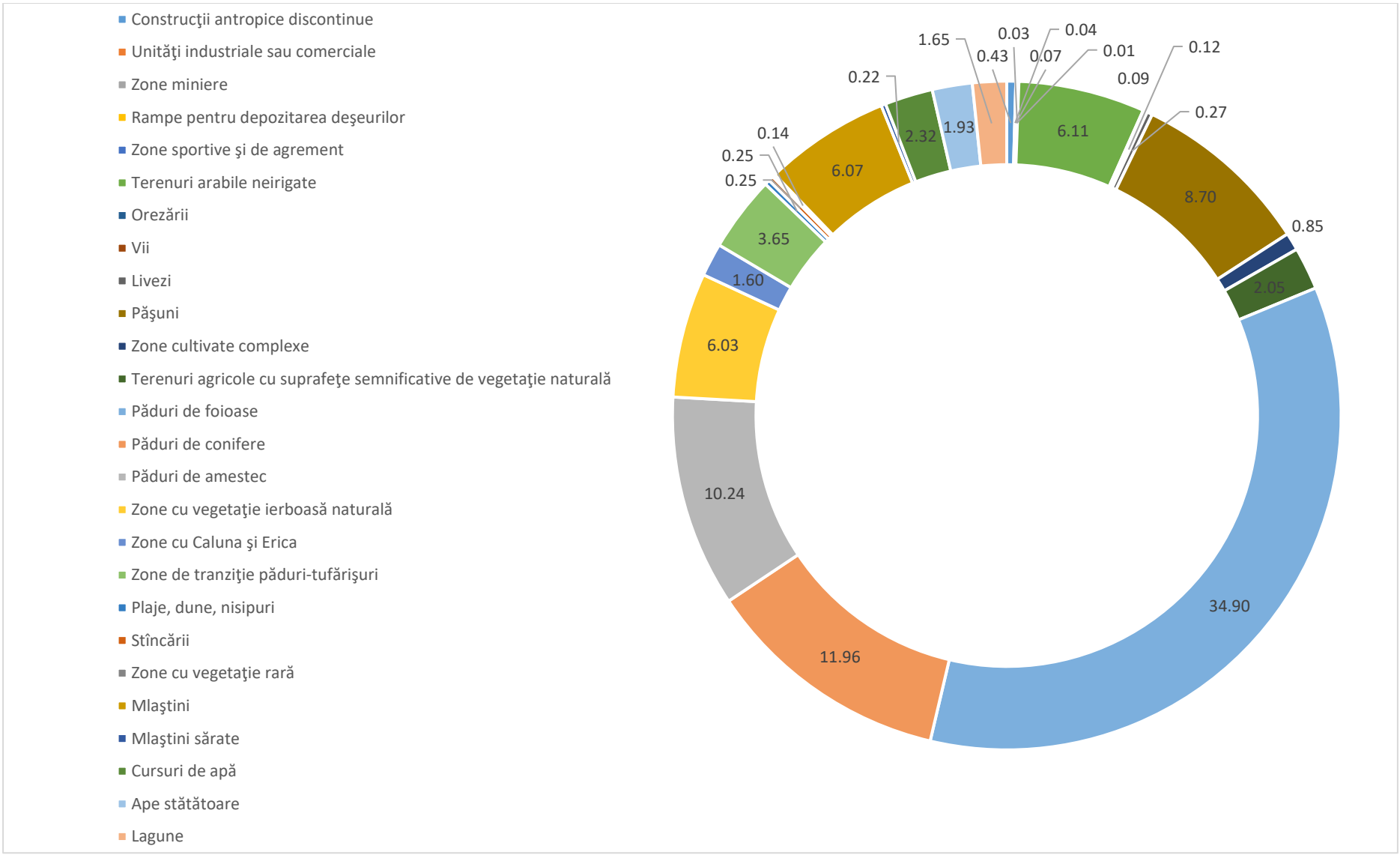

Image 29. Share of different categories of habitats within Areas of Community Importance (SCI)

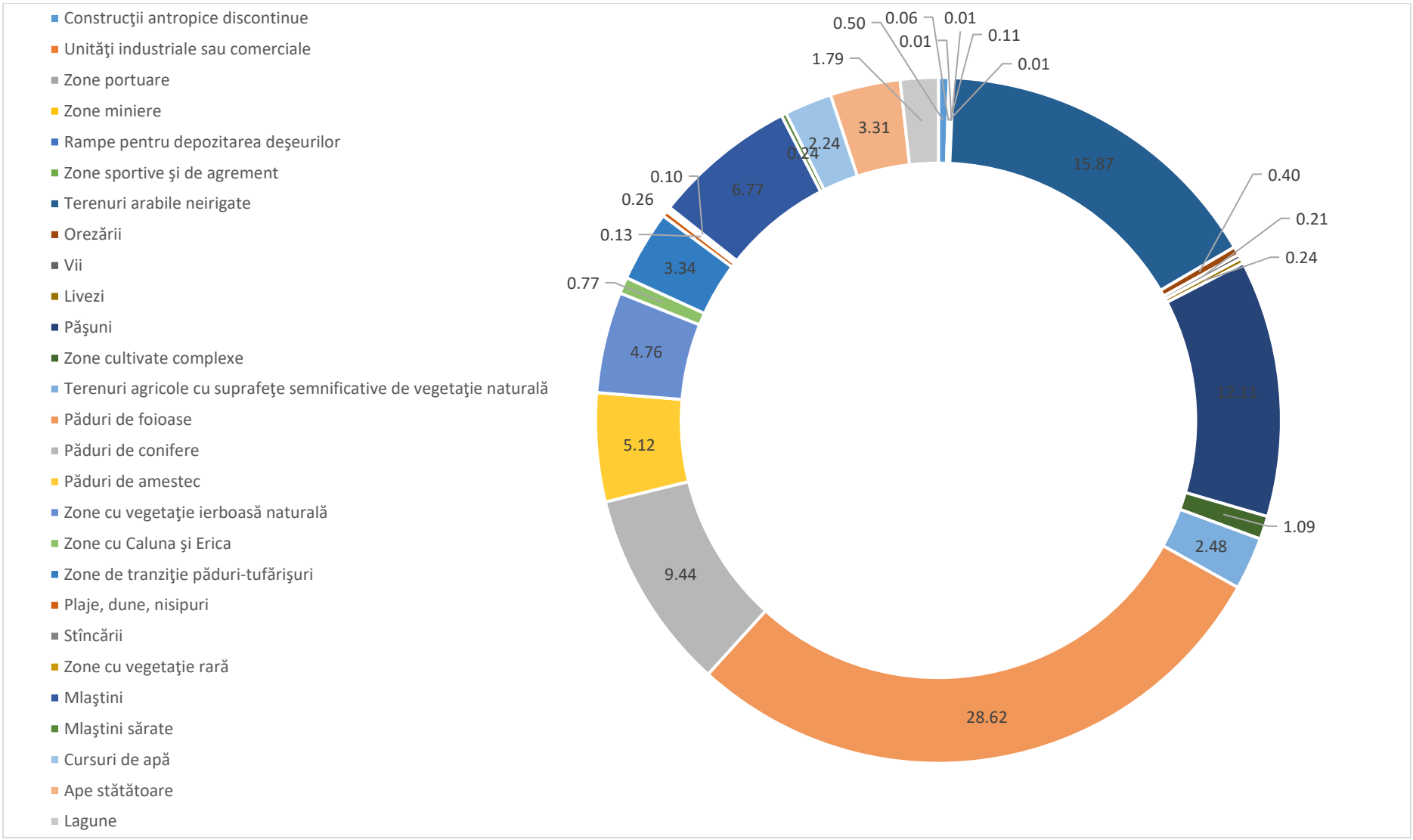

Image 30. Share of different categories of habitats within the Special Protection Areas for Avifauna (SPAs)

3.2. Data on protected sites of community interest that may be affected by the projects in the Plan

In the analyzes performed regarding the Natura2000 sites, the species and habitats of community interest potentially affected by the implementation of the Plan, we will analyze separately the 2 development scenarios proposed by TYNDP 2021-2030:

(1) (1) "Do-minimum" scenario - includes projects for which the Final Investment Decision (FID) has been taken or is in an advanced state for making the Final Investment Decision. Most of these projects have been analyzed and regulated, with information on the species and habitats affected. This information is extracted from existing environmental studies: reports and appropriate assessment studies, environmental impact assessment studies, and regulatory acts (environmental agreements). The information thus obtained is used in the analysis of this study, and in the drafting of conclusions. This scenario also includes 3 natural gas storage projects, not yet evaluated from the point of view of environmental protection.

(2) (2) "Do Maximum" scenario - all projects included in TYNDP projects for which the Final Investment Decision (FID) has been taken/ projects in an advanced state for FID taking, as well as those for which the final investment decision is not in one from these stages of development. This scenario includes the evaluated projects that are part of the "Do-minimum" scenario and projects for which the environmental impact assessment procedure has not started. Unassessed projects do have neither completed feasibility studies, nor technical projects at the start of the environmental assessment. They are located at a lower level of accuracy, and there is only prior information on the purpose and objectives of these projects. A special case between these projects is the Eastring project, with code 7.12, with 3 different route options. The location of these three pipeline routes in the project is confidential, the necessary analyzes being performed by the Owner, and the resulting data being included in the environmental analyzes.

It is important to note that the analyzes and the results of these analyzes are possible only at the level of known detail, and using the information received from the Holder, both location information, which exists at a variable accuracy, and information on execution techniques.

Regarding the impact on the Natura2000 network and on other categories of protected areas, the main source of impact is the construction of sections of gas transmission pipelines, respectively repairs and improvements on existing pipelines. Locating the work corridors for the construction of new pipes, and the intervention corridors on the existing pipes is an exercise meant to provide an overview, and by no means complete or exhaustive. These results cannot

replace the more in-depth analyzes, which will be carried out at project level, in order to obtain environmental agreements.

Using the available spatial data, the potentially affected Natura 2000 sites were identified for the "Do-minimum" and "Do Maximum" scenarios. A "Do nothing" scenario or the 0 alternative, represents the current situation of the national gas transmission system. The current situation, particularly complex and with many elements throughout the country, is not analyzed, being too broad and outside the scope of this assessment.

In identifying the affected sites, the aim was to intersect the spatial data with the official database of protected areas, downloaded from the website of the Ministry of Environment, Waters and Forests. In the previously regulated projects, the existing information at the level of evaluation studies and environmental agreements were taken into account. In the case of projects for which the procedure for obtaining the environmental agreement has not yet started (projects in the " Do Maximum" scenario, without those included in the " Do-minimum" scenario), the location information was provided by the Holder, at a variable accuracy - usually only a precision at the level of pre-feasibility study, provided in order to perform the analysis of this study.

We also mention that in the inventory of intersected areas and those in the vicinity, linear spatial data were considered, without distinguishing between routes of new pipelines, new pipelines on existing corridors and existing pipelines that will be refurbished, repaired or replaced.

We considered the intervention corridors exactly in the form received from the Owner - indicative routes, which will be adapted and completed at project level. In this way, the analyzes presented in this study represent a cautious approach, taking into account a maximum level of interventions, but at the same time unitary, in order to compare the analysis between projects, plan scenarios, planned projects and projects whose impact analysis has been completed, or are already in various stages of execution.

In order to obtain a more complete picture, the following were highlighted:

- SCI and SPAs intersected by the elements of major projects
- SCI and SPAs in the vicinity of major project elements, at distances of less than 1.5 km

National and international protected areas (nature reserves, natural and national parks, Ramsar sites), either overlapping with Community or independent protected areas, have been highlighted to obtain a complete picture.

Detailed analysis was performed only at the level of intersected Natura 2000 sites. Nearby sites were highlighted for study at the project level, or in case of changes in the design of strategic project routes.

In the next section we present the inventory of all identified protected areas, grouped according to the two scenarios, and according to the intersection or location close to the strategic projects.

Some protected areas are affected by the elements of several strategic projects. Most areas are affected by only one of the strategic projects.

There are several ways in which protected areas that intersect, or are close to, investment elements can overlap:

- SCI and SPA, in partial or total overlap, both intersected/ in close proximity to the elements of the strategic projects - both are mentioned

- SCI and SPA, in partial overlap, the intersection happens only in one of them - only the intersected site is mentioned, the one that is not intersected is mentioned in the nearby areas

- Natura 2000 site (SCI, SPA or both overlapping) which includes a national/ international protected area: - indicate the area included only if it is intersected, or at a distance of less than 1,5 km, as appropriate

- Natural/ National Park/ Geopark that includes, or is partially overlapping with Natura 2000 sites: indicate each type of protected area separately, as appropriate: intersected or at a distance of less than 1.5 km

Due to the complexity of the analyzed Plan, the presentation of the situation of the intersection and the protected areas nearby, it was decided to present the two scenarios, grouped on strategic projects, separately for the intersected areas, and separately for those nearby.

Table 10. Community and national protected areas intersected by the elements of the major projects in the “Do-minimum” Scenario:

Project code	Category	Code	Name
7.1.1, 7.1.2	SCI	ROSCI0063	Jiu Gorge
	SCI	ROSCI0129	North of the Western Gorj
	SCI	ROSCI0138	Bolintin Forest
	SCI	ROSCI0236	Strei Hațeg
	SCI	ROSCI0292	Rusca Montană-Țarcu-Retezat Corridor
	SCI	ROSCI0385	Timiș river between Rusca and Prisaca
	SPA	ROSPA0106	Oltul Inferior Valley
	Parc	RONPA0933	Jiu Gorge National Park
	Parc	RONPA0929	Țara Hațegului Dinosaur Geopark
7.2	SPA	ROSPA0039	Danube-Ostroave
	SCI	ROSCI0022	Danube Canaries
	Ramsar site	RORMS0017	Danube-Bugeac-Iortmac islands
	SPA	ROSPA0012	Borcea Horn

Project code	Category	Code	Name
	Ramsar site	RORMS0014	Borcea Horn
	SCI	ROSCI0319	Fetești Swamp
	SPA	ROSPA0105	Mostiștea Valley
	SCI	ROSCI0131	Olteniţa-Mostiştea-Chiciu
	SCI	ROSCI0043	Comana
	SPA	ROSPA0022	Comana
	Parc	RONPA0928	Comana Natural Park
	Ramsar Site	RORMS0008	Comana Natural Park
7.3	SPA	ROSPA0031	Danube Delta and Razim-Sinoe Complex
	SCI	ROSCI0162	Siretul Inferior Water Meadow
	SPA	ROSPA0071	Siretul Inferior Water Meadow
7.4	SCI	ROSCI0059	Perchiu Hill
	AP	2126/VII.1	Perchiu Wildlife Sanctuary
	SPA	ROSPA0138	Piatra Șoimului – Scorțeni – Gîrleni
	SCI	ROSCI0364	Moldova River between Tupilați and Roman
	SCI	ROSCI0378	Siret River between Pașcani and Roman
	SPA	ROSPA0072	Siretul Mijlociu Water Meadow
	SCI	ROSCI0221	Sărăturile from Valea Ilenei
	AP	2551	Sărăturile from Valea Ilenei Wildlife Sanctuary
	SPA	ROSPA0150	Sârca – Podul Iloaiei accumulations
7.6	SPA	ROSPA0031	Danube Delta and Razim Sinoe Complex
7.7	SPA	ROSPA0142	Teremia Mare -Tomnatic
7.8	SPA	ROSPA0031	Danube Delta and Razim Sinoe Complex

Table 11. Community and national protected areas that are not intersected, but are less than 1.5 km away from the elements of major projects in the “Do-minimum” Scenario:

Project code	Category	Code	Name
7.1.1, 7.1.2	SCI	ROSCI0296	Drăgășani Hills
	SCI	ROSCI0087	Grădiştea Muncelului – Cioclovina
	SCI	ROSCI0109	Timișului Water Meadow
	SPA	ROSPA0045	Grădiştea Muncelului – Cioclovina
7.2	SCI	ROSCI0353	Peștera-Deleni
	Ramsar site	RORMS0017	Danube-Bugeac-Iortmac islands
	SCI	ROSCI0343	The forests of Silvostepa Mostiștei
	SCI	ROSCI0138	Bolintin Forest
	SCI	ROSCI0273	The marine area at Capul Tuzla

Project code	Category	Code	Name
	SPA	ROSPA0076	Black Sea
7.3	UNESCO	ROMAB0003	Danube Delta Biosphere Reserve
	Ramsar site	RORMS0001	Danube Delta
	SCI	ROSCI0065	Danube Delta
	SCI	ROSCI0162	Siretul Inferior Water Meadow
	SPA	ROSPA0071	Siretul Inferior Water Meadow
7.6	UNESCO	ROMAB0003	Danube Delta Biosphere Reserve
	Ramsar site	RORMS0001	Danube Delta
	SCI	ROSCI0065	Danube Delta
	SPA	ROSPA0031	Danube Delta and Razim-Sinoe Complex
	SPA	ROSPA0019	Dobrogea Gap
	SCI	ROSCI0215	Cheia Jurassic Reefs
7.7	SCI	ROSCI0402	Sânandrei Valley
	SCI	ROSCI0115	Satchinez Swamp
	AP	2740	Satchinez Swamp Reserve
	SCI	ROSCI0287	Comloșu Mare
7.8	UNESCO	ROMAB0003	Danube Delta Biosphere Reserve
	Ramsar site	RORMS0001	Danube Delta
	SCI	ROSCI0065	Danube Delta
8.5	SCI	ROSCI0342	Târgu Mureș Forest
8.4	SCI	ROSCI0333	Sărmășel - Milaș – Urmeniș Meadows

Table 12. Community and national protected areas intersected by the elements of the major projects in the " Do Maximum" Scenario:

Project code	Category	Code	Name
7.1.1, 7.1.2	SCI	ROSCI0063	Jiu Gorge
	SCI	ROSCI0129	North of the Western Gorj
	SCI	ROSCI0138	Bolintin Forest
	SCI	ROSCI0236	Strei Hațeg
	SCI	ROSCI0292	Rusca Montană-Țarcu-Retezat Corridor
	SCI	ROSCI0385	Timiș River between Rusca and Prisaca
	SPA	ROSPA0106	Oltul Inferior Valley
	Parc	RONPA0933	Jiu Gorge National Park
	Parc	RONPA0929	Țara Hațegului Dinosaur Geopark
7.2	SPA	ROSPA0039	Danube-Ostroave
	SCI	ROSCI0022	Danube Canaries
	Ramsar site	RORMS0017	Danube-Bugeac-Iortmac islands

Project code	Category	Code	Name
	SPA	ROSPA0012	Borcea Horn
	Ramsar site	RORMS0014	Borcea Horn
	SCI	ROSCI0319	Fetești Swamp
	SPA	ROSPA0105	Mostiștea Valley
	SCI	ROSCI0131	Olteniţa-Mostiştea-Chiciu
	SCI	ROSCI0043	Comana
	SPA	ROSPA0022	Comana
	Parc	RONPA0928	Comana Natural Park
	Ramsar site	RORMS0008	Comana Natural Park
7.3	SPA	ROSPA0031	Danube Delta and Razim-Sinoe Complex
	SCI	ROSCI0162	Siretul Inferior Water Meadow
	SPA	ROSPA0071	Siretul Inferior Water Meadow
7.4	SCI	ROSCI0059	Perchiu Hill
	AP	2126/VII.1	Perchiu Wildlife Sanctuary
	SPA	ROSPA0138	Piatra Șoimului – Scorțeni – Gîrleni
	SCI	ROSCI0364	Moldova River between Tupilați and Roman
	SCI	ROSCI0378	Siret River between Pașcani and Roman
	SPA	ROSPA0072	Lunca Siretului Mijlociu
	SCI	ROSCI0221	Sărăturile from Valea Ilenei
	AP	2551	Sărăturile from Valea Ilenei Reserve
	SPA	ROSPA0150	Sârca – Podul Iloaiei Acvumulations
7.6	SPA	ROSPA0031	Danube Delta and Razim-Sinoe Complex
7.7	SPA	ROSPA0142	Teremia Mare -Tomnatic
7.8	SPA	ROSPA0031	Danube Delta and Razim-Sinoe Complex
7.5	SCI	ROSCI0130	Oituz - Ojdula
	SCI	ROSCI0037	Ciomad - Balvanyos
	SCI	ROSCI0236	Strei - Hațeg
	SCI	ROSCI0292	Rusca Montană - Țarcu - Retezat Corridor
	PARK	RONPA0929	Țara Hațegului Dinosaur Geopark
	AP	RONPA0533	Slivuț Forest
	SCI	ROSCI0329	Oltul Superior
	SCI	ROSCI0357	Porumbeni
	SCI	ROSCI0374	Negru River
	SCI	ROSCI0383	Târnava Mare River between Odorheiu Secuiesc and Vânători
	SCI	ROSCI0382	Târnava Mare river between Copșa Mică and Mihalț
	SCI	ROSCI0384	Târnava Mică River
	SCI	ROSCI0385	Timiș River between Rusca and Prisaca

Project code	Category	Code	Name
	SPA	ROSPA0027	Homoroadelor Hills
	SPA	ROSPA0028	Târnavelor Hills and Nirajului Valley
	SPA	ROSPA0082	Bodoc - Baraolt Mountains
	SPA	ROSPA0147	Râul Negru Valley
7.9	SCI	ROSCI0184	Zamostea – Lunca Forest
	SCI	ROSCI0363	Moldova River between Oniceni and Mitești
	SCI	ROSCI0365	Moldova River between Păltinoasa and Ruși
	SCI	ROSCI0371	Cumpărătura
	SCI	ROSCI0380	Suceava Liteni River
	SCI	ROSCI0391	Siretul Mijlociu - Bucecea
7.10	SCI	ROSCI0021	Ierului Flat
	SCI	ROSCI0025	Cefa
	SCI	ROSCI0048	Crișul Alb
	SCI	ROSCI0049	Crișul Negru
	SCI	ROSCI0050	Crișul Repede upstream of Oradea
	SCI	ROSCI0099	Știucilor Lake- Sic - Puini - Bonțida
	SCI	ROSCI0104	Crișul Repede Water Meadow
	SCI	ROSCI0231	Nădab - Socodor - Vărșad
	SCI	ROSCI0302	Bozânta
	SCI	ROSCI0314	Lozna
	SCI	ROSCI0322	Șes Mountain
	SCI	ROSCI0410	Sucutard Hayfields
	SCI	ROSCI0436	Someșul Inferior
	SPA	ROSPA0015	Crișul Alb and Crișul Negru Plane
	SPA	ROSPA0016	Nirului Plane- Ierului Valley
	SPA	ROSPA0097	Cefa Fishery- Rădvani Forest
	SPA	ROSPA0103	Alceului Valley
	SPA	ROSPA0104	Fizeșului Basin
	SPA	ROSPA0114	Cursul Mijlociu al Someșului
	SPA	ROSPA0115	Crișul Repede Gorge- Iadului Valley
	SPA	ROSPA0123	Accumulation lakes on Crişul Repede
7.11	SCI	ROSCI0043	Comana
	SCI	ROSCI0088	Gura Vedei - Șaica - Slobozia
	SCI	ROSCI0138	Bolintin Forest
	SCI	ROSPA0146	Câlnistei Valley
7.12.1	SCI	ROSCI0436	Someșul Inferior
	SPA	ROSPA0114	Cursul Mijlociu al Someșului
	SCI	ROSCI0314	Lozna
	SCI	ROSCI0394	Someșul Mic

Project code	Category	Code	Name
	SCI	ROSCI0099	Știucilor Lake- Sic - Puini - Bonțida
	SPA	ROSPA0104	Fizeșului Basin
	SCI	ROSCI0367	Mureș River between Moreşti and Ogra
	SCI	ROSCI0384	Târnava Mică River
	SCI	ROSCI0227	Sighișoara - Târnava Mare
	SPA	ROSPA0099	Hârtibaciului Plateau
	SPA	ROSPA0098	Făgăraș Piedmont
	SCI	ROSCI 0352	Persani
	SCI	ROSCI0122	Făgăraș Mountains
	SCI	ROSCI0013	Bucegi
	SCI	ROSCI0194	Piatra Craiului
	SPA	ROSPA0165	Piatra Craiului
	SCI	ROSCI0043	Comana
	SCI	ROSCI0088	Gura Vedei - Șaica - Slobozia
	AP	RONPA0652	Secular Oaks from Breite
	PARK	RONPA0006	Bucegi Natural Park
	PARK	RONPA0011	Piatra Craiului National Park
7.12.2	SCI	ROSCI0109	Timișului Water Meadow
	SCI	ROSCI0292	Rusca Montană - Țarcu - Retezat Corridor
	SCI	ROSCI0236	Strei – Hațeg
	SCI	ROSCI0129	North of the Western Gorj
	SCI	ROSCI0063	Jiu Gorge
	SPA	ROSPA0106	Oltul Inferior Valley
	SCI	ROSCI0043	Comana
	SCI	ROSCI0088	Gura Vedei - Șaica - Slobozia
	PARK	RONPA0929	Țara Hațegului Dinosaur Geopark
	PARK	RONPA0933	Jiu Gorge National Park
7.12.3	SCI	ROSCI0109	Timișului Water Meadow
	SCI	ROSCI0292	Rusca Montană - Țarcu - Retezat Corridor
	SCI	ROSCI0236	Strei – Hațeg
	SCI	ROSCI0129	North of the Western Gorj
	SCI	ROSCI0063	Jiu Gorge
	SCI	ROSCI0045	Jiu Corridor
	SPA	ROSPA0023	Jiu – Dunăre Confluence
	Ramsar site	RORMS0018	Jiu – Dunăre Confluence

Table 13. Community and national protected areas that are not intersected, but are less than 1.5 km away from the elements of major projects in the “Do Maximum” Scenario:

Project code	Category	Code	Name
7.1.1, 7.1.2	SCI	ROSCI0296	Drăgășaniului Hills
	SCI	ROSCI0087	Grădiştea Muncelului – Cioclovina
	SCI	ROSCI0109	TimișWater Meadow
	SPA	ROSPA0045	Grădiştea Muncelului – Cioclovina
7.2	SCI	ROSCI0353	Peştera-Deleni
	Ramsar site	RORMS0017	Dunării-Bugeac-Iortmac islands
	SCI	ROSCI0343	The forests of silvosteppe of Mostiștea
	SCI	ROSCI0138	Bolintin Forest
	SCI	ROSCI0273	Capul Tuzla Marine area
	SPA	ROSPA0076	Black Sea
7.3	PARK	ROMAB0003	Danube Delta Biosphere Reserve
	Ramsar site	RORMS0001	Danube Delta
	SCI	ROSCI0065	Danube Delta
	SCI	ROSCI0162	Siretul Inferior Water Meadow
	SPA	ROSPA0071	Siretul Inferior Water Meadow
7.6	PARK	ROMAB0003	Danube Delta Biosphere Reserve
	Ramsar site	RORMS0001	Danube Delta
	SCI	ROSCI0065	Danube Delta
	SPA	ROSPA0031	Danube Delta and Razim-Sinoe Complex
	SPA	ROSPA0019	Dobrogei Gap
	SCI	ROSCI0215	Cheia Jurassic Reefs
7.7	SCI	ROSCI0402	Sânandrei Valley
	SCI	ROSCI0115	Satchinez Swamp
	AP	2740	Satchinez Swaps Reservation
	SCI	ROSCI0287	Comloșu Mare
7.8	PARK	ROMAB0003	Danube Delta Biosphere Reserve
	Ramsar site	RORMS0001	Danube Delta
	SCI	ROSCI0065	Danube Delta
8.4	SCI	ROSCI0333	Sărmășel - Milaș - Urmeniș Meadows
8.5	SCI	ROSCI0342	Târgu Mureș Forest
7.5	SCI	ROSCI0109	Timișului Water Meadow
	SCI	ROSCI0108	Mureșul Inferior Water Meadow
	SPA	ROSPA0069	Mureșul Inferior Water Meadow
	SPA	ROSPA0139	Munților Metaliferi – Vințu Piedmont
	SCI	ROSCI0419	Mureșul Mijlociu – Cugir
	SCI	ROSCI0187	Suciu Meadows

Project code	Category	Code	Name
7.9	SPA	ROSPA0064	Fălticeni Lakes
	SCI	ROSCI0310	Fălticeni Lakes
	SPA	ROSPA0110	Rogojesti- Bucecea Accumulations
	SPA	ROSPA0116	Dorohoi - Șaua Bucecei
	AP	RONPA0744	Zamostea-Lunca Forest
7.10	SCI	ROSCI0020	Careiului Plane
	SCI	ROSCI0347	Fegernic Meadow
	SCI	ROSCI0387	Salonta
	SCI	ROSCI0394	Someșul Mic
	SCI	ROSCI0275	Bârsău - Șomcuta
	SCI	ROSCI0421	Pădurea celor Două Veverițe
	SCI	ROSCI0333	Sărmășel - Milaș - Urmeniș Meadows
	AP	VI.26	The ponds from Moftinu Mic
	AP	RONPA0114	Reservation of saline soils
	AP	RONPA0350	Legiilor Valley
7.11	SPA	ROSPA0090	Ostrovu Lung – Gostinu
	AP	RONPA0438	Teșila
7.12.1	SPA	ROSPA0068	Turului Inferior Water Meadow
	SCI	ROSCI0214	Tur River
	SCI	ROSCI0192	Măgurici Cave
	SCI	ROSCI0410	Sucutard Hayfields
	SCI	ROSCI0333	Sărmășel – Milaș - Urmeniș Meadows
	SPA	ROSPA0028	Târnavelor Hills and Nirajului Valley
	SCI	ROSCI0132	Oltul Mijlociu – Cibin - Hârtibaciu
	SCI	ROSCI0186	The Fluffy Oak Forests of Târnava
	SCI	ROSCI0102	Leaota
	SCI	ROSCI0381	Târgului Argeșului-Râușor River
	SCI	ROSCI0138	Bolintin Forest
	SPA	ROSPA0146	Câlnistei Valley
	SPA	ROSPA0090	Ostrovu Lung – Gostinu
	SCI	ROSCI0275	Bârsău – Șomcuta
	SCI	ROSCI0302	Bozânta
	AP	RONPA0118	Suslănești Fossiliferous place
	AP	RONPA0125	nr. 15 Cave
	AP	RONPA0127	Uluce Cave
	AP	RONPA0251	Bucșoiu-Mălăești-Gaura Steep
	AP	RONPA0350	Legiilor Valley
	AP	RONPA0438	Teșila
	AP	RONPA0609	Ilba stone rosette
	AP	RONPA0851	Măgurici Cave

Project code	Category	Code	Name
	AP	RONPA0121	Dâmbovița – Dâmbovicioara – Brustureț Karst area Gap
7.12.2	SCI	ROSCI0108	Mureșul Inferior Water Meadow
	SPA	ROSPA0069	Mureșul Inferior Water Meadow
	SCI	ROSCI0385	Timiș River between Rusca and Prisaca
	SCI	ROSCI0138	Bolintin Forest
	SPA	ROSPA0045	Grădiștea Muncelului - Ciclovina
	SCI	ROSCI0087	Grădiștea Muncelului-Ciclovina
	SPA	ROSPA0146	Câlnișteі Valley
	SCI	ROSCI0296	Drăgășaniului Hills
	SCI	ROSCI0341	Stolnici Forest and Lake
	SPA	ROSPA0090	Ostrovu Lung – Gostinu
	PARK	RONPA0926	Mureș Water Meadow Natural Park
	Ramsar site	RORMS0004	Mureș Water Meadow
	PARK	RONPA0015	Grădiștea Muncelului-Ciclovina Natural Park
	AP	RONPA0438	Teșila
	AP	RONPA0474	Gornăcelu Hill
	AP	RONPA0524	Pește ana Swamp
	AP	RONPA0526	Poieni Peak
	AP	RONPA0539	Crivadiei Gap
7.12.3	SCI	ROSCI0108	Mureșul Inferior Water Meadow
	SPA	ROSPA0069	Mureșul Inferior Water Meadow
	SCI	ROSCI0385	Timiș River between Rusca and Prisaca
	SPA	ROSPA0045	Grădiștea Muncelului – Ciclovina
	SCI	ROSCI0087	Grădiștea Muncelului-Ciclovina
	SPA	ROSPA0135	Dăbuleni Sands
	PARK	RONPA0926	Mures Water Meadow Natural Park
	Ramsar site	RORMS0004	Mures Water Meadow
	PARK	RONPA0015	Grădiștea Muncelului-Ciclovina Natural Park
	AP	RONPA0474	Gornăcelu Hill
	AP	RONPA0524	Pește ana Swamp
	AP	RONPA0526	Poieni Peak
	AP	RONPA0539	Crivadiei Gap
	AP	RONPA0408	Dranic Fossiliferous place

Table 14. Protected areas located in the potential area of influence of the project 7.17 "Interconnection of NGTNS to LNG Terminal located on the Black Sea coast" (project without location data at the time of evaluation):

Code	**Name**	**Type**	**Hectare**

ROMAB0003	Danube Delta Biosphere Reserve	Biosphere reserve	576421.70
ROWHS0001	Danube Delta World Heritage Site	Natural site of universal natural heritage	311915.88
RORMS0001	Danube Delta	Wetland of international importance	576517.87
RORMS0005	Techirghiol Lake	Wetland of international importance	1272.26
RORMS0017	Dunării - Bucgeac - Iortmac islands	Wetland of international importance	81407.92
RONPA0365	Corbu - Nuntași - Histria	Protected area	1804.37
RONPA0370	Credința Fossiliferous place	Protected area	10.49
RONPA0376	Valu lui Traian	Protected area	29.77
RONPA0381	Fântinița Murfatlar	Protected area	79.35
RONPA0383	Agigea Marine Dunes	Protected area	11.83
RONPA0385	Agigea Lake	Protected area	32.94
RONPA0937	Techirghiol Lake	Protected area	1272.26
ROSPA0019	Dobrogei Gap	Special avifauna protection area	10916.80
ROSPA0031	Danube Delta and Razim – Sinoie Complex	Special avifauna protection area	508302.34
ROSPA0057	Siutghiol Lake	Special avifauna protection area	1858.75
ROSPA0060	Tașaul - Corbu Lakes	Special avifauna protection area	2733.97
ROSPA0061	Techirghiol Lake	Special avifauna protection area	2950.69
ROSPA0076	Black Sea	Special avifauna protection area	149143.94
ROSPA0151	Ciobănița-Osmancea	Special avifauna protection area	211.33
ROSPA0166	Plopeni-Chirnogeni	Special avifauna protection area	137.17
ROSCI0022	Danube Canaries	Site of Community Importance	26109.89
ROSCI0065	Danube Delta	Site of Community Importance	453645.54
ROSCI0066	Danube Delta – marine area	Site of Community Importance	336200.15
ROSCI0071	Dumbrăveni - Valea Urluia - Vederoasa Lake	Site of Community Importance	18024.43
ROSCI0073	Agigea Marine Dunes	Site of Community Importance	11.83
ROSCI0083	Fântânița Murfatlar	Site of Community Importance	577.54
ROSCI0197	Eforie Nord - Eforie Sud Submerged beach	Site of Community Importance	5716.71
ROSCI0215	Cheia Jurassic reefs	Site of Community Importance	5654.46
ROSCI0273	Capul Tuzla marine area	Site of Community Importance	4946.79
ROSCI0293	Costinești - 23 August	Site of Community Importance	4883.63
ROSCI0353	Peștera - Deleni	Site of Community Importance	2549.27
ROSCI0398	Straja - Cumpăna	Site of Community Importance	1099.78

In the following section we present a summary of the situation of the protected areas potentially affected by the plan:

Table 15. Protected areas intersected in total Do-minimum scenario

Scenario	SCI no.	SPA no.	Other AP no.
Do-minimum	15	11	8

Table 16. Protected areas intersected in the total "Do maximum" scenario

Scenario	SCI no.	SPA no.	Other AP no.
"Do maximum"	52	28	13

Table 17. Proximity protected areas in total Do-minimum scenario

Scenario	SCI no.	SPA no.	Other AP no.
Do-minimum	15	5	4

Table 18. Protected areas in total proximity in the "Do maximum" scenario

Scenario	SCI no.	SPA no.	Other AP no.
"Do maximum"	35	15	24

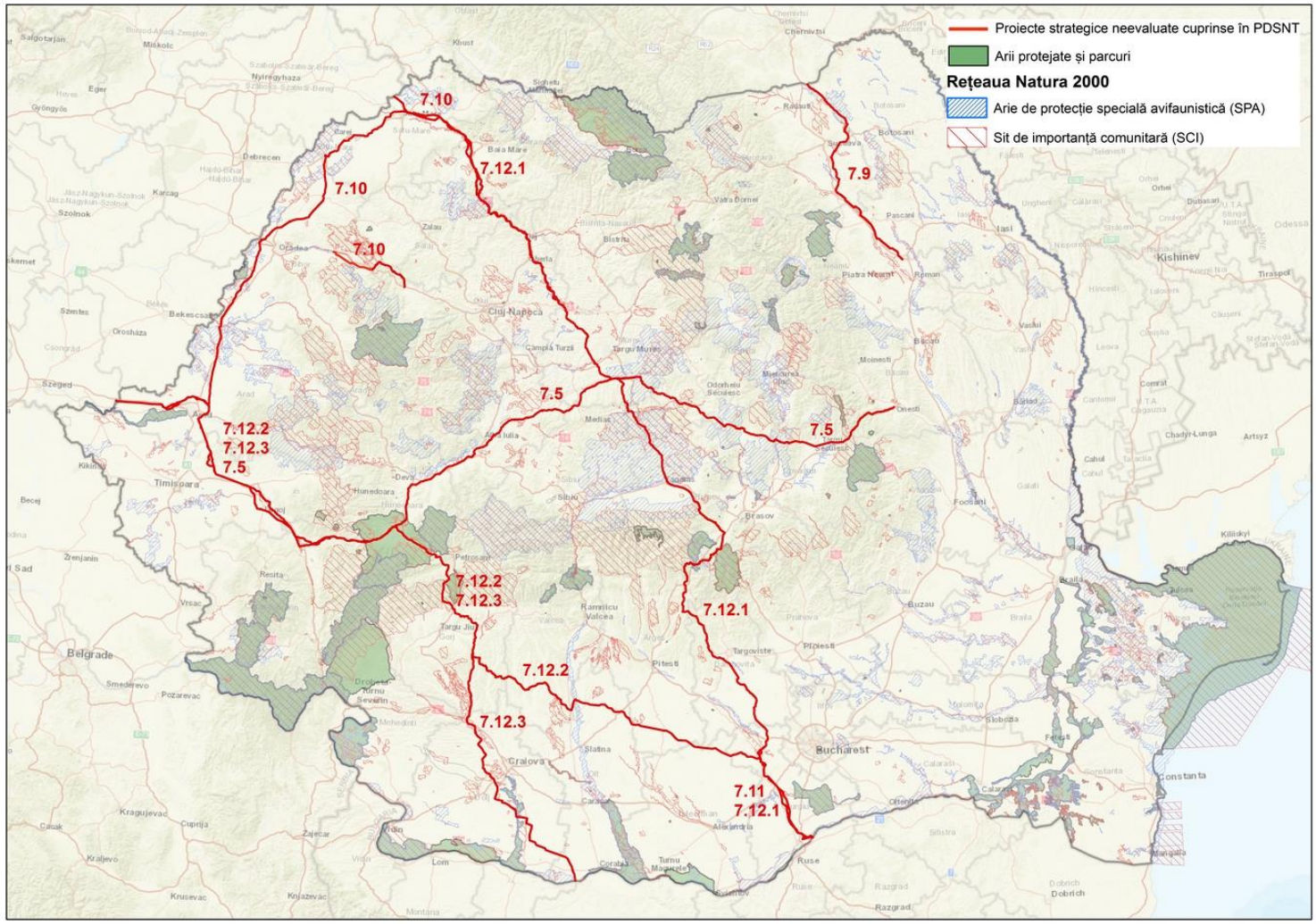

Image 31. Strategic projects without the Do-minimum scenario

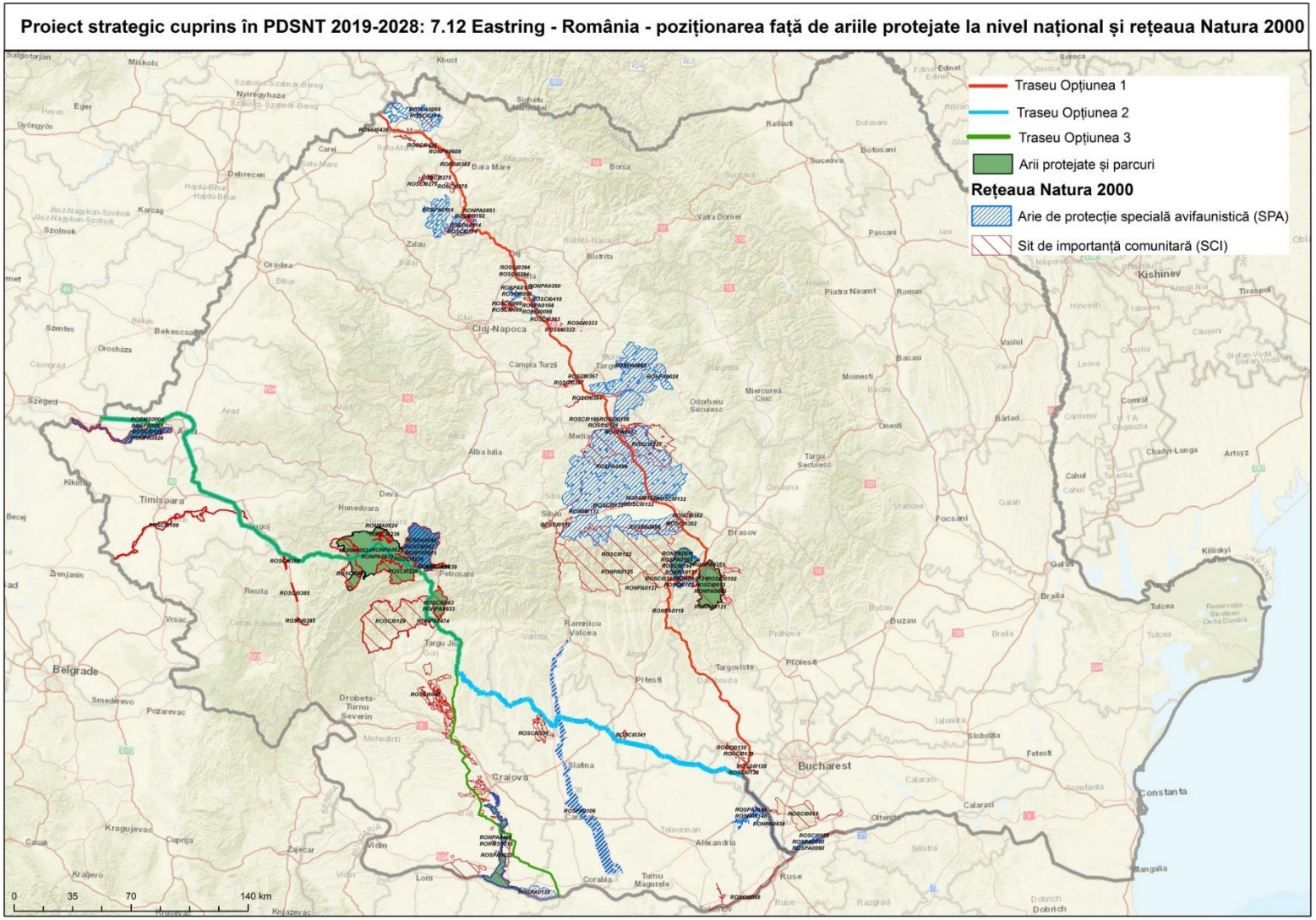

Image 32. Strategic project 7.12 Eastring–România *with the presentation of the three options*

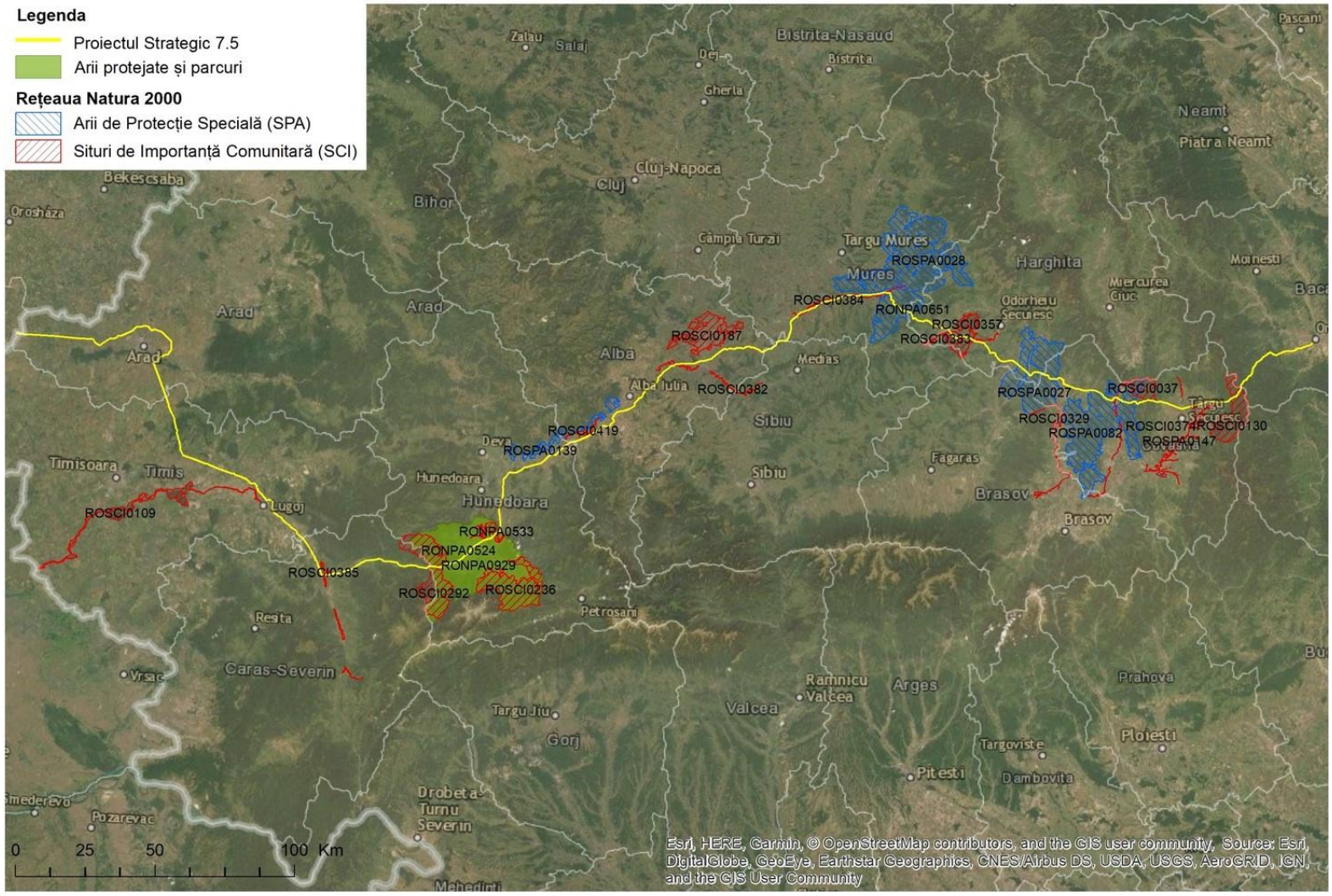

Image 33. The strategic project 7.5 Amplification of bidirectional transport channel Bulgaria-Romania-Hungary-Austria (BRHA stage 3)

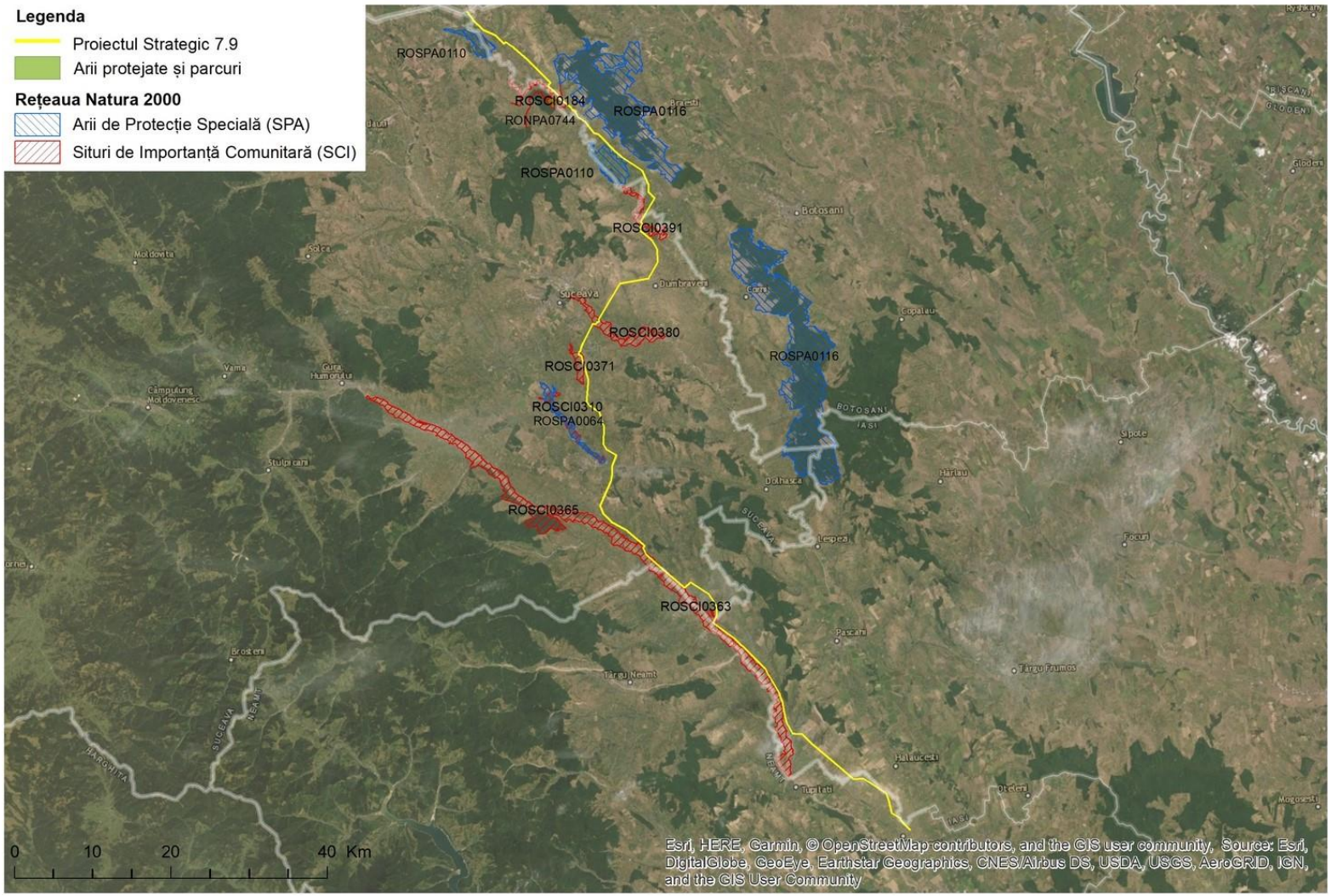

Image 34. The strategic project 7.9 Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret

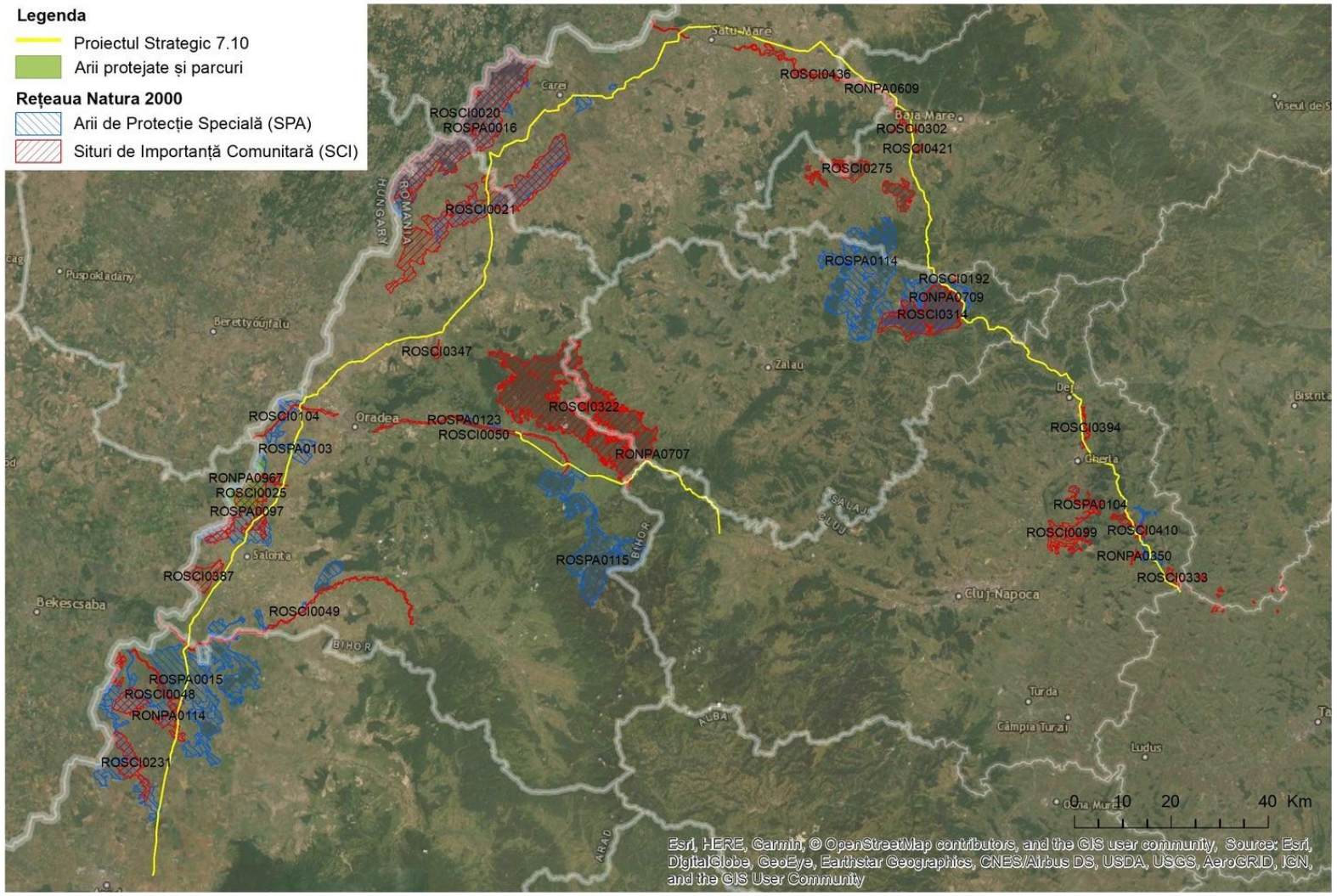

Image 35. The strategic project 7.10 Development / Upgrading of natural gas transportation infrastructure in North-Western Romania

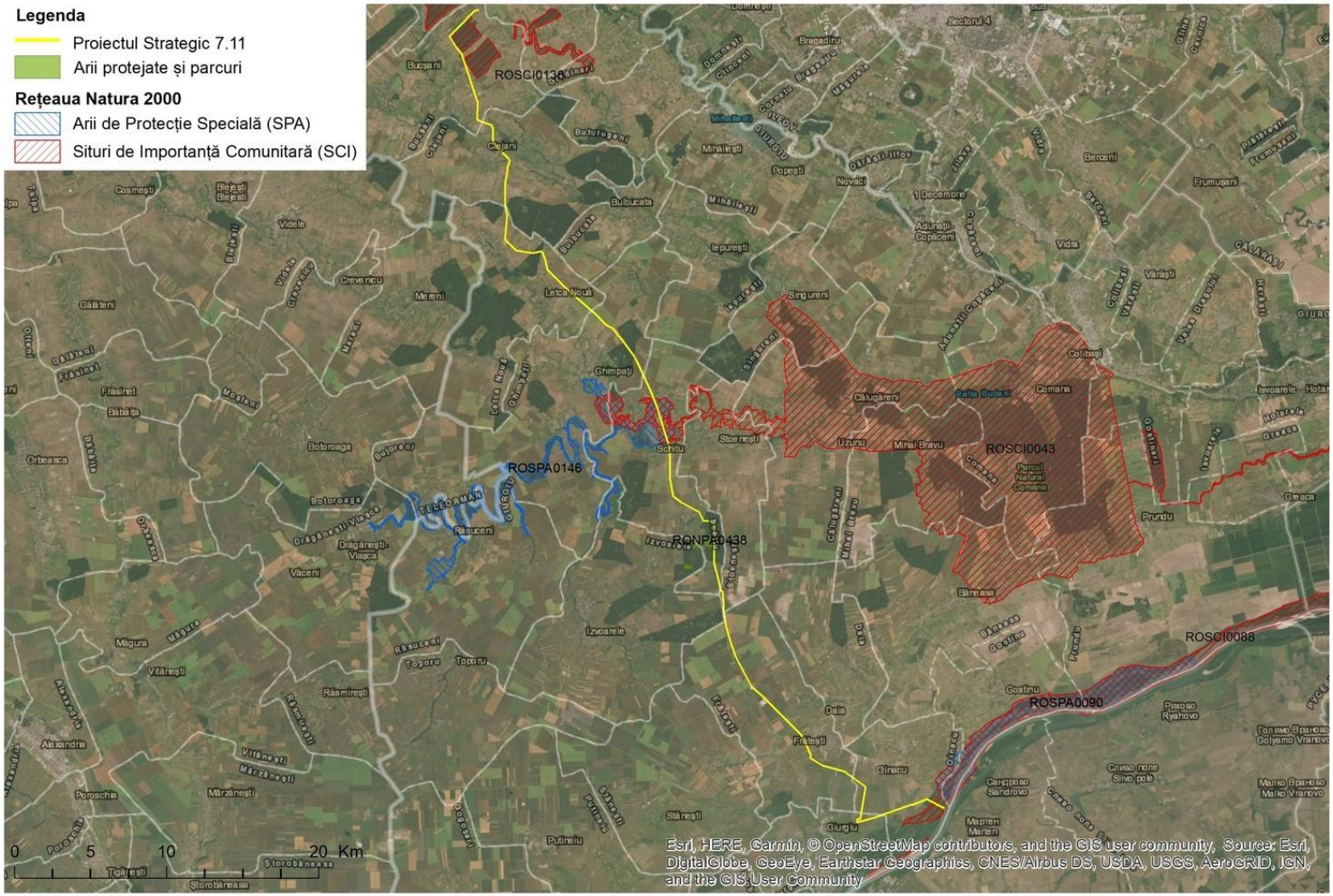

Image 36. The strategic project 7.11 Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction

Analysis of the situation of intersected community protected areas

Situation of habitats and species of potential Community interest affected by the Plan at SCI level

Table 19. Species and habitats listed in the standard forms and management plans in the SCI intersected by the elements described in the Plan

Scenario	Number of SCI intersected	Number of SCI habitats intersected	Number of SCI species intersected	No. of SCI in Romania	No. of habitats in the SCI network Romania	No. of species in the SCI network Romania
”Do-minimum”	15	49	82	436	89[6]	166
“Do maximum”	52	65	118			

Table 20. Intersecting SCI containing priority habitats

Scenario	Number of intersected SCI containing priority habitats
”Do minimum”	10
“Do maximum”	25

Table 21. Community habitats that are found only in the SCI intersected by the elements of the Plan at national level

Scenario	Habitats that exist only in the SCI intersected by the elements of the Plan in the two scenarios	
	Habitats of community interest	Habitats of priority community interest
”Do-minimum”	2130 *Coastal fixed dunes with herbaceous vegetation (gray dunes)*	-
“Do maximum”	*2130 Coastal fixed dunes with herbaceous vegetation (gray dunes)*[7]	6260* *Pannonian and western Pontic meadows on the sands* [8]

[6] 87 according to SF, two more habitats proposed according to the Management Plan of ROSCI0045
[7] Existing habitat in ROSCI0065 Danube Delta and ROSCI0073 Sea dunes from Agigea, not intersected by projects, but is introduced in the management plan of ROSCI0045 Jiu Corridor, being thus the only habitat location in the continental region of the country
[8] according to the corrections from the management plan ROSCI0045 Jiu Corridor

Table 22. Number of species of Community interest potentially affected by the intersection with the elements of the Plan

	Scenario	Plants	Invertebrates	Amphibians	Reptiles	Fish	Mammals	Total no.
No. of species of Community interest in the intersecting SCI	Do-minimum	11	26	5	3	21	16	82
	Do maximum	28	39	6	3	21	21	118
No. of species of community interest in SCI Romania		46	54	6	6	26	28	166

Table 23. Species found only in the SCI intersected nationally

Scenario	Species that exist only in the SCI intersected by the elements of the Plan in the two scenarios
Do-minimum	-
Do maximum	1927 *Stephanopachys substriatus*

Situation of species of potential Community interest affected by the Plan at SPA level

Table 24. Species listed in standard forms and SPA management plans intersected by the elements described in the Plan

Scenario	No. of intersected SPA	No. of species of birds of Community interest in intersected SPA	No. of SPA in Romania	No. of species of birds of Community interest in SPA Romania
Do-minimum	11	247	171	310
Do maximum	28	268		

Table 25. Species found only in SPA intersected nationally

Scenario	Species that exist only in the SPA intersected by the elements of the Plan in the two scenarios
Do-minimum	A025 *Bubulcus ibis*
	A037 *Cygnus columbianus bewickii*
	A095 *Falco naumanni*
	A143 *Calidris canutus*
	A159 *Numenius tenuirostris*
	A167 *Xenus cinereus*
	A169 *Arenaria interpres*
	A173 *Stercorarius parasiticus*
	A174 *Stercorarius longicaudus*
	A278 *Oenanthe hispanica*
	A335 *Certhia brachydactyla*
	A375 *Plectrophenax nivalis*
	A515 *Glareola nordmanni*
Do-maximum	A025 *Bubulcus ibis*
	A037 *Cygnus columbianus bewickii*
	A095 *Falco naumanni*
	A129 *Otis tarda*
	A143 *Calidris canutus*
	A157 *Limosa lapponica*
	A159 *Numenius tenuirostris*
	A167 *Xenus cinereus*
	A169 *Arenaria interpres*
	A173 *Stercorarius parasiticus*
	A174 *Stercorarius longicaudus*
	A278 *Oenanthe hispanica*
	A335 *Certhia brachydactyla*
	A375 *Plectrophenax nivalis*
	A515 *Glareola nordmanni*

Analysis of the situation of nearby community protected areas

In this analysis we present the situation of the sites located less than 1.5 km from the elements of the Plan

Situation of habitats and species of Community interest in the vicinity of the elements described in the Plan at SCI level

Table 26. Species and habitats listed in the standard forms and SCI management plans in the vicinity of the elements described in the Plan

Scenario	No. of SCI at < 1.5 km	No. of habitats within SCI at < 1.5 km	No. of species within SCI at < 1.5 km	No. of SCI in Romania	No. of habitats within the SCI network Romania	No. of species within the SCI network Romania
Do-minimum	15	52	81	436	89	166
Do maximum	35	60	104			

Table 27. Nearby SCI containing priority habitats

Scenario	No. of SCI at <1.5 km containing priority habitats
Do-minimum	6
Do maximum	16

Table 28. Community habitats that are found only in the SCI in the vicinity of the elements of the Plan at national level

Scenario	Habitats that exist only in the SCI at <1.5 km by the elements of the Plan from the two scenarios	
	Habitats of community interest	Priority habitats of community interest
Do-minimum	1210 Annual vegetation along the shoreline	1150* *Coastal lagoons*
	1410 Salted Mediterranean-type meadows	
	2110 *Embryonic mobile dunes*	
	2160 *Dunes with Hippophae rhamnoides*	
	6420 *Wet Mediterranean meadows with high hygrophilous grasses from plains to mountain and alpine*	
Do maximum	1210 Annual vegetation along the shoreline	1150* *Coastal lagoons*
	1410 Salted Mediterranean-type meadows	2340* *Pannonian dunes*
	2110 *Embryonic mobile dunes*	
	2160 *Dunes with Hippophae rhamnoides*	

	2190 Intradundial wet depressions	
	6420 *Wet Mediterranean meadows with high hygrophilous grasses from plains to mountain and alpine*	

Table 29. Number of species of Community interest listed in standard forms and management plans in the SCI less than 1.5 km from the elements of the Plan

	Scenario	Plants	Invertebrates	Amphibians	Reptiles	Fish	Mammals	Total no.
No. of community species in SCI at <1.5 km	Do-minimum	11	22	5	4	19	20	81
	Do maximum	18	30	6	6	21	23	104
No. of community species in SCI Romania		46	54	6	6	26	28	166

Table 30. Species found only in the SCI in the vicinity of the elements of the Plan at national level

Scenario	Species that exist only in the SCI at <1.5 km by the elements of the Plan from the two scenarios
Do-minimum	1356 *Mustela lutreola*
	2255 *Centaurea pontica*
Do maximum	1082 *Graphoderus bilineatus*
	1114 *Rutilus pigus*
	1356 *Mustela lutreola*
	2255 *Centaurea pontica*

Situation of species of Community interest in the vicinity of the elements of the Plan at SPA level

Table 31. SPA species in the vicinity of the elements of the Plan

Scenario	No. of SPA at < 1.5 km	No. of species of birds of Community interest in SPA at <1.5 km	No. of SPA in Romania	No. of species of birds of Community interest in SPA in Romania
Do-minimum	5	247	171	310
Do maximum	15	257		

Table 32. Species that are found only in SPA in the vicinity of the Plan at national level

Scenario	Species that exist only in SPA at <1.5 km by the elements of the Plan from the two scenarios
	Species of Community interest
Do-minimum	A025 *Bubulcus ibis*
	A037 *Cygnus columbianus bewickii*
	A095 *Falco naumanni*
	A143 *Calidris canutus*
	A159 *Numenius tenuirostris*
	A167 Xenus cinereus
	A173 *Stercorarius parasiticus*
	A174 *Stercorarius longicaudus*
	A278 *Oenanthe hispanica*
	A335 *Certhia brachydactyla*
	A375 *Plectrophenax nivalis*
	A464 *Puffinus yelkouan*
	A515 *Glareola nordmanni*
Do maximum	A025 *Bubulcus ibis*
	A037 *Cygnus columbianus bewickii*
	A095 *Falco naumanni*
	A143 *Calidris canutus*
	A159 *Numenius tenuirostris*
	A167 Xenus cinereus
	A173 *Stercorarius parasiticus*
	A174 *Stercorarius longicaudus*
	A278 *Oenanthe hispanica*
	A335 *Certhia brachydactyla*
	A375 *Plectrophenax nivalis*
	A464 *Puffinus yelkouan*
	A515 *Glareola nordmanni*

A brief description of Natura 2000 sites intersected or potentially affected by the elements of the plan is presented in Annex I. to this study.

3.3. Data on the presence, location, population and ecology of species and/ or habitats of Community interest present on the surface and in the immediate vicinity of the Plan, mentioned in the standard forms of protected natural areas of Community interest

In order to identify the species and habitats present in the areas of intersection of the elements of the strategic projects with the sites of community interest, we used the following resources:

- data extracted from specialized studies and environmental agreements for approved projects, which constitute the "Do-minimum" scenario - in this case we present a synthesis of the data
- for the rest of the strategic projects, for which the environmental approval procedure was not completed, which, together with the projects from the "Do-minimum" scenario constitutes the "Do maximum" scenario, we used a standardized methodology.

  This information is presented in Annex II to the appropriate assessment study, due to the large number of sites which have been analysed.

In the absence of a national database containing the location of habitats and species of Community interest in each Natura2000 site, it was not possible to accurately locate habitats and species of Community interest in the intersection areas of strategic project elements (usually transport of new gas or to be rehabilitated, refurbished) with protected areas at Community level (SCI and SPA). Only some of the intersected community sites have a management plan developed and approved (Table 33). During the analyzes, the management plans, the standard forms, as well as the data source Corine Land Cover (CLC), 2018 edition (Copernicus Land Monitoring Service, European Environment Agency service) were consulted. In the qualitative analysis, of the "expert judgment" type (expert opinion), satellite images were also used through the Google Earth application. At the same time, the experts used other data sources, as well as their own data, collected during other field trips.

Table 33. Intersected sites and the situation of management plans

	SCI		SPA		AP	
Plan Scenario	No. of intersected SCI	No. of management plans approved	No. of intersected SPA	No. of management plans approved	No. of intersected AP	No. of management plans approved
Do-minimum	15	7	11	5	5	5
Do maximum	63	28	31	17	10	10

In Annex II, section II.A. we present a summary of the situation of species and habitats of Community interest present in the intersection area of projects already assessed and regulated from an environmental point of view ("Do Minimum Scenario"), extracted from environmental studies assessed by the competent environmental authorities. The estimates regarding the potential impact on the environment presented for the projects included in the Do Minimum

Scenario were based on the conclusions extracted from the environmental studies prepared for the assessed projects, provided by the Owner – SNTGN Transgaz SA. These conclusions represent the opinion of the consultants who prepared the respective studies.

Where information was available in case of habitats, values were extracted such as the intersecting length from the site, the temporarily occupied surface from the site, the permanently occupied surface of the site, the type of habitat affected based on Corine Land Cover, respectively the code and number of the affected habitat from Natura 2000 and the relevance of the impact.

In cases of species of Community interest, the number of affected species from each taxonomic category, their percentage from the total of existing species from the standard sheet and the relevance of the impact for each species were extracted.

In all cases where the information was available, we extracted the coding on the relevance of the impact used by the authors of the environment studies, these studies being supported by detailed field analyses.

In Annex II, section II.B., we present the results obtained by applying the standardised methodology on the situation of species and habitats of Community interest from the intersection area of the projects from the Plan that have not been previously assessed and regulated.

These projects are:

- 7.5 Developing the bidirectional transport corridor Bulgaria–Romania–Hungary–Austria (BRUA-Phase III)
- 7.9 Interconnection of the national natural gas transmission system with the natural gas transport system in Ukraine, on the Gherăești – Siret direction
- 7.10. Development / Upgrading of natural gas transportation infrastructure in North-Western Romania
- 7.11. Increasing the natural gas transport capacity of the Romania-Bulgaria interconnection on the Giurgiu-Ruse direction
- 7.12. Eastring – Romania
- Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2
- 7.16. Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3
- 7.17. TNS interconnection to GNL Terminal, located at the Black Sea shore

Projects for natural gas storage:

8.2 Increase of the natural gas underground storage capacity of the storage facility in Ghercești

8.3 New natural gas underground storage facility in Fălticeni (Moldavia)

From the projects included in this scenario, two of them do not foresee construction works (project 7.13 Monitoring, control and data acquisition system for cathodic protection systems afferent to the Natural Gas National Transportation System and project 7.14 Development of SCADA system for the Natural Gas National Transportation System).

Projects 7.15 Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2 and 7.16 Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3 foresee works on existing premises, but no impact on the protected area network is expected.

For these projects, the impact on the environment has not been analysed, as the impact is insignificant. These projects refer to the implementation of some safety, monitoring and control systems, acquisition of equipments.

All the same, the analysis could not be performed for project 7.17. TNS interconnection to GNL Terminal, located at the Black Sea shore, as there are no data regarding the localisation.

The analysis on the work corridor could not be performed either for the two storage projects, for the same reasons, respectively due to the fact that the specifics of the projects are different. For these, we drew some conclusions.

For these analyses, standardised central forms have been used – SCI 2017, SPA 2017, downloaded from the European Environment Agency's portal and corroborated with the management plans. Data on the habitats area in the site, the number of species and their conservation status have been obtained from these sources. For the analysis of the surfaces of Corine Land Cover (CLC) types of habitats affected by the projects, the intersection of the 2018 version of Corine Land Cover with the official limits of Natura 2000 sites was used. Based on the Corine types of habitats, Natura 2000 habitats were identified by consulting the standard forms and management plans, using also satellite images. In order to obtain surface values, the use of two categories was chosen, as the linear intersection is not sufficient to identify the percentages of habitat types:

- Corine habitat categories intersected by an analysis corridor of 30 meters width, representing the corridor in which there may be direct impacts on the natural values following the works of installing a gas transport pipeline (15 meters buffer on the indicative route line calculated and overlapped on the data basis CLC in GIS); these categories of habitats have been used in order to calculate the direct potential impact represented by direct interventions on the work corridors (in most cases by stripping the topsoil), impacts which can be present only during construction works (temporary) or with impact also after finishing such works (medium or long term), because of differences in the rehabilitation potential that can be achieved actively (e.g. by planting tree

seedlings) or naturally (spontaneous habitat restoration, return of species from neighbouring areas, etc).

This analysis corridor represents a cautious approach and it is attempt to capture the most unfavourable scenario. According to the Technical Norm on the execution of gas transport pipelines, the total width of the working corridor is of maximum 24 metres for the pipes with a 1200 mm diameter, which represent the maximum diameter foreseen by the projects included in the TYNDP[9]. For some projects and sections, there is no final decision on the final routes or on technical details.

- Habitats intersected by the 100 meters analysis corridor along the pipeline (50 meters buffer in both lateral directions from the intervention corridor); these categories of habitats have been used to calculate the indirect potential impact, represented by fragmentation, disturbance, ruderalization, the occurrence of invasive alochtone species and other forms of anthropogenic disturbance. This approach is a cautious one too, the effective disturbance being limited in most cases to a narrower corridor, equivalent to the working corridor.

Data was extracted on categories of habitats according to Corine Land Cover and surfaces for each category were calculated.

Below we present centralized data for Corine Land Cover habitat types, overlapped with the impact corridors of the gas transportation pipelines routes and with Natura 2000 sites (SCI and SPA). Detailed data is presented in Annex II, section B.

Table 34. Centralized data for Corine Land Cover habitat types, superimposed with the impact corridors of the gas transport pipeline routes in the Do maximum scenario without Do-minimum and SCI sites

Corine Land Cover Code	Habitat type Corine Land Cover	SCI no.	Analysis corridor 30 m in case of pipeline construction / repairs (ha)	% of the total areas of CLC habitats in the intersected SCI	SCI No.	The area of influence is 50 m on both sides of the work corridor (ha)	% of the total areas of CLC habitats in the intersected SCI
112	Discontinuous urban fabric	2	0.586	0.23	4	1.266	0.18
121	Industrial or commercial units	1	0.008	5.52	2	0.097	10.00
132	Dump sites	-	-	-		-	-
211	Non-irrigated arable land	34	43.617	0.08	35	106.330	0.19
221	Vineyards	3	1.190	0.97	3	3.752	3.05

[9] According to information provided by the Owner

222	Fruit trees and berry plantations	1	9.071	0.90	1	20.108	2.00
231	Pastures	21	95.570	0.13	21	222.508	0.31
242	Complex cultivation patterns	7	7.947	0.17	9	19.789	0.42
243	Land principally occupied by agriculture, with significant areas of natural vegetation	19	30.922	0.18	19	73.720	0.43
311	Broad-leaved forest	17	73.258	0.03	20	185.775	0.07
312	Coniferous forest	3	3.089	0.02	3	6.818	0.04
313	Mixed forest	4	18.405	0.04	4	45.772	0.10
321	Natural grasslands	3	28.451	0.45	3	63.059	1.00
324	Transitional woodland-shrub	4	4.216	0.08	4	9.316	0.17
411	Inland marshes	3	1.657	0.49	3	4.264	1.26
511	Water courses	19	13.310	0.06	19	32.289	0.16
512	Water bodies	2	0.299	0.03	2	1.510	0.15

Table 35. Centralized data for Corine Land Cover habitat types, overlapped with the impact corridors of the gas transport pipeline routes from the Do maximum scenario without the Do-minimum and the SPA sites

Corine Land Cover Code	**Habitat type Corine Land Cover**	**SPA no.**	**Analysis corridor 30 m in case of pipeline construction / repairs (ha)**	**%**	**SPA no.**	**The area of influence is 50 m on both sides of the work corridor (ha)**	**% of total intersected SCI areas**
112	Discontinuous urban fabric	7	5.260	0.14	7	11.197	0.29

121	Industrial or commercial units	-	-	-	-	-	-
131	Mineral extraction sites	-	-	-	1	0.062	0.05
211	Non-irrigated arable land	16	114.383	0.08	16	263.043	0.19
221	Vineyards	-	-	-	-	-	-
222	Fruit trees and berry plantations	1	8.730	0.40	2	19.636	0.86
231	Pastures	16	199.185	0.09	16	463.930	0.22
242	Complex cultivation patterns	8	17.655	0.18	8	41.725	0.43
243	Land principally occupied by agriculture, with significant areas of natural vegetation	9	23.116	0.08	9	54.265	0.19
311	Broad-leaved forest	6	29.265	0.02	7	79.180	0.04
312	Coniferous forest	2	0.334	0.01	3	1.620	0.04
313	Mixed forest	2	1.767	0.02	3	5.404	0.07
321	Natural grasslands	3	53.915	0.51	3	116.157	1.09
324	Transitional woodland-shrub	2	4.086	0.06	3	8.857	0.11
411	Inland marshes	3	2.263	1.05	3	5.656	2.63
511	Water courses	5	2.182	0.03	6	5.210	0.07
512	Water bodies	3	1.514	0.01	4	4.723	0.03

Names and codes for Corine Land Cover type habitats are presented in the following table:

Table 36. Corine Land Cover Habitats: Codes and Names

Habitat Code	Habitat Name
111	Continuous urban fabric
112	Discontinuous urban fabric
121	Industrial or commercial units
122	Road and rail networks and associated land
123	Port areas
124	Airports
131	Mineral extraction sites
132	Dump sites
133	Construction sites
141	Green urban areas
142	Sport and leisure facilities
211	Non-irrigated arable land
212	Permanently irrigated land
213	Rice fields
221	Vineyards
222	Fruit trees and berry plantations
223	Olive groves
231	Pastures
241	Annual crops associated with permanent crops
242	Complex cultivation patterns
243	Land principally occupied by agriculture, with significant areas of natural vegetation
244	Agro-forestry areas
311	Broad-leaved forest
312	Coniferous forest
313	Mixed forest
321	Natural grasslands
322	Moors and heath land
323	Sclerophyllous vegetation
324	Transitional woodland-shrub
331	Beaches, dunes, sands
332	Bare rocks
333	Sparsely vegetated areas
334	Burnt areas
335	Glaciers and perpetual snow
411	Inland marshes
412	Peat bogs
421	Salt marshes
422	Salines
423	Intertidal flats
511	Water courses
512	Water bodies
521	Coastal lagoons

Habitat Code	Habitat Name
522	Estuaries
523	Sea and ocean

The detailed situation of the intersected sites are presented in Annex II, section B., grouped according to the strategic projects from the "Do maximum" scenario, unassessed projects (without the ones from the "Do minimum" scenario). These analyses were performed in case of strategic projects, in which it is proposed to install new pipes or repairs, refurbishment of some existing pipes. For these works, we have spatial data at plan level, data that we have used in order to obtain this indicative information regarding the situation of species and habitats.

In case of projects implemented in already existing premises (reengineer, other improvements) or projects that are not yet spatially located, these analyses were not possible.

We present the situation of potential areas directly affected and provide a summary of the situation of the species – number and percentage of the species potentially affected (not the percentage of their numbers). It is not possible to analyse in detail the situation of each of the affected species, both because of the excessive volume of information and the limited accuracy of this approach for a precise analysis of the species. Regarding the expert's opinion on the presence of Community interest habitats in the areas where elements of the strategic projects from the Plan intersect (in most cases – new pipes or pipes that will be rehabilitated or refurbished), the situation is presented at the level of each SCI site. These results are obtained based upon the quantitative and qualitative analysis and can be a starting point in what regards the subsequent analysis of the impacts at project level. In no circumstances these could be considered analyses with equivalent value with some field in-debth studies, fact that is to be expected in the case of appropriate assessment studies at project level (for the environmental agreement).

In order to identify the presence, location, population and ecology of the Community interest species present on the site and in the immediate vicinity of the areas intersected by the projects, this analysis can only be made with a medium degree of accuracy using some uniformly standardised methods and by refining the results obtained through the expert's judgement. Thus, every intersected Natura 2000 site received a score which show the damaging degree of the species; this score has been multiplied with the percentage of the occupied surface in order to obtain the final score. The methodology is presented in Chapter VII.

The analysis of the impact on habitats and species is detailed in the chapter dedicated to impact assessment.

The analysis of the species and habitats from the sites found in the vicinity of the Plan, with which the elements of the projects do not interfere it is not considered necessary at this point due to the localisation of the potential impacts only on the working corridor and in the close vicinity (50 – 100 m). These sites were taken into account only to be considered in analyses in case of route changes or implementation of related projects.

The centralised situation of the sites from the vicinity of the analysed projects is presented in the following table:

Table 37. Non-intersecting sites, less than a 1.5 km away

	SCI		SPA		AP	
Scenario / Plan	No. of SCI at < 1.5 km	No. of management plans approved	No. of SPA at < 1.5 km	No. of management plans approved	No. of AP at < 1.5 km	No. of management plans approved
Do minimum	15	7	5	5	4	3
„Do maximum”	35	14	15	11	24	14

3.4. The conservation objectives of the protected natural area of community interest, where they have been established by Management Plans

Among the Natura 2000 sites intersected by project elements in the Do Maxim scenario, 45 sites have an approved management plan. These sites generally have objectives and management measures grouped into categories:

a) Conservation of the criteria elements (species and habitats), maintenance and improvement of the conservation condition

b) Inventory and detailed evaluation of the criterion elements

c) Relationship with local communities, awareness of natural values, promoting the sustainable use of natural resources

d) Management of visitors and sustainable tourism promotion of the values of protected areas

e) Information, awareness and ecological education

f) Administration of protected areas

g) Monitoring and evaluation of management efficiency

The intersected sites are summarized, using the information available in the standard forms and management plans in Annex I.

In the case of intersecting sites for which there is an approved management plan, and also those for which there is only a draft plan, not approved, the general and specific conservation objectives are extracted and centralized in the form of an electronic database in Annex IV.

Under Chapter IV, the impact analysis was performed taking also into account the identified conservation objectives, respectively the management plans objectives. In the absence of setting out the management objectives, and the conservation ones, the impact on the criterion elements at the basis of sites designation, as presented in the standard forms, to the extent of the information available. was taken into account.

3.5. Description of the current conservation status of the protected natural area of community interest, including possible developments / changes that may occur in the future

The description of the intersected Natura2000 sites, with information on the current state of conservation of species and habitats in the standard form is presented in Annex I, due to the large volume of information.

A summary table of pressures and threats with negative effect (forms of impact) is presented in Annex III., due to the large volume of information.

IV. Identification of impacts and impact assessment

General aspects:

The appropriate assessment study aims the structure and the guide according to *Order 262/2020 for the modification of the Methodological Guide regarding the appropriate assessment of the potential effects of the plans or projects on the community interest* protected natural areas, *approved by the Order of the Minister of Environment and Forests no. 19/2010*. Thus, the impact associated with the plan is analyzed from the perspective of the impacts on the criteria that formed the basis for the designation of Natura 2000 sites - species and habitats (community interest). The purpose of the impact assessment is to identify the proposed elements of the projects presented within the Plan, which may affect the conservation status of the species or habitats, which may endanger the integrity of the sites. Following the identification of impacts, the aim is to identify measures to prevent, reduce and, if these are not sufficient, to compensate for the impacts. The impacts that persist even after implementation of the mitigation measures constitute the residual impact.

In terms of strategic plan, we distinguish two groups of strategic projects in terms of impact assessment:

(1) projects for which the environmental impact assessment procedure has been followed, and have been regulated by the competent authority for environmental protection before our analysis was carried out (environmental agreement, decision of the classification stage) - these projects are part of the "Do-minimum" scenario

and

(2) projects that are in the early stages of development, in the design and planning phase, with an approximate location and no technical details are known - these projects are part of the "Do maximum" scenario

Thus, the approach of identifying and assessing the impact in the case of the analyzed Plan must take into account the following aspects:

- presentation of a summary of the analysis carried out in case of the projects for which the environmental impact assessment procedure has been followed and for which regulatory acts have been issued by the competent environmental protection authorities
- a detailed impact assessment for projects that have not yet been subject to the environmental impact assessment procedure and have not been regulated by the competent authority for environmental protection
- synchronization of the results and formulation of conclusions necessary for the strategic evaluation of the whole plan

4.1. Identifying the impact

4.1.1. Forms of impact generated

The national natural gas transmission strategic projects development on the protected species and habitats, on the sites from the Natura 2000 network is manifested locally, in the areas of execution and maintenance of the infrastructure objectives. First of all, we speak of pipes laid underground. There are other structures, such as gas compression stations, measuring stations, and other equipment, which, however, represent a small segment of the transport infrastructure as a whole.

We consider that the most relevant forms of impact that will take place after implementation of the projects included in the strategic plan are those of installation, refurbishment and pipeline repairs, well-located interventions in space and time, involving well-defined technological processes.

To these, maintenance and inspection activities, which do not generate a significant impact are added. In the event of damage, sensitive location punctual interventions take place and may have an impact.

Details related to decommissioning activities will be presented at project level, as they are not universally valid at the level of the entire strategic plan.

The Do-minimum scenario was analyzed taking into account the impacts identified in the environmental studies previously carried out, provided by the Beneficiary, i.e.:

- appropriate assessment studies:

  appropriate assessment study: Development on the Romanian territory of the National Natural Gas Transmission System on the Bulgaria – Romania – Hungary – Austria Corridor, Integration Support Unit, Cluj-Napoca, 2016 (project 7.1)

  appropriate assessment study: Black Sea - Podișor Natural Gas Transport Pipeline - Integration Support Unit, Cluj-Napoca, 2017 (project 7.2)

  appropriate assessment study: Developments of NTS in the north-eastern part of Romania in order to improve the natural gas supply of the area and to ensure the transport capacities to the Republic of Moldova, SC Ramboll South East Europe SRL, 2016 (project 7.4)

- environmental impact report:

environmental impact report: Extension of NTS by building a natural gas transmission pipeline from the Black Sea gas collection point (area loc. Vadu, Constanța County) - at the Transit 1 pipeline (area loc. Grădina, Constanța County), including the power supply for the Săcele cathodic protection station, the valve groups and sensitive optical fiber installation in the communes of Corbu, Săcele, Cogealac and Grădina, Constanța County", SC Greenviro SRL, Cluj-Napoca, 2017 (project 7.6)

environmental impact report: Development on the Romanian territory of the National Natural Gas Transmission System on the Bulgaria – Romania – Hungary – Austria Corridor, Integration Support Unit, Cluj-Napoca, 2016 (project 7.1)

environmental impact report: Natural Gas Transport Pipeline Black Sea Coast - Podisor area. Including cathodic protection, power supply and fiber optics. Integration Support Unit, Cluj-Napoca, 2018 (project 7.2)

environmental impact report: Developments of NTS in the north-eastern part of Romania in order to improve the natural gas supply of the area and to ensure the transport capacities to the Republic of Moldova, SC Ramboll South East Europe SRL, 2016 (project 7.4)

- presentation memoranda to obtain the environmental agreements (no further studies required):

  Project 7.3:

  Interconnection of the National Transport System with the International System and Reverse Flow at Isaccea - Isaccea Interconnection, Transgaz SA, 2018

  Repair of the Dn 800 mm pipeline Onești - Cosmești, following the inspection with intelligent PIG, Transgaz SA, 2018

  Interconnection of the National Transport System with the International System and Reverse Flow at Isaccea - Modernization of Siliștea Gas Compression Station (Including Siliștea technological node), Transgaz SA, 2018

  Interconnection of the National Transport System with the International System and Reverse Flow at Isaccea. Object: Works in the existing Șendreni technological node, Transgaz SA, 2018

  Interconnection of the National Transport System with the International System and Reverse Flow at Isaccea - Modernization of Onesti Gas Compression Station, including Onesti technological node (existent), Transgaz SA, 2018

  Project 7.7:

Interconnection of the National Natural Gas Transmission System Romania with the similar natural gas transmission system in the Republic of Serbia; including power supply, cathodic protection and optical fiber, Transgaz SA, 2018

Project 7.8:

Replacement of the SMG Isaccea 1 natural gas measuring station, Transgaz SA, 2018

The main forms of impact identified in the completed environmental assessments for the projects in the "**Do-minimum"** scenario include:

Direct and indirect impact in the execution stage

a. general disturbances due to site organization, pipe depots and work fronts

b. induction at landscape level of some elements and equipment specific to the planned works

c. landscape disturbance and fragmentation

d. noise, vibration, emissions during execution

e. specific impacts on species and community interest habitats, capable of directly affecting the specimens and areas occupied; impacts analyzed by assigning relevance marks from 0 to 5:

- 0 - the project does not generate any impact on the analysed species / habitat;
- 1 - the project generates a low impact on the analysed species / habitat, manifested mainly by indirect effects;
- 2 - the project generates a limited impact on the analysed species / habitat;
- 3 - the project generates an impact on the analysed species / habitat, but it is reversible even in the absence of ecological reconstruction measures;
- 4 - the project generates an impact on the analysed species / habitat, but ecological reconstruction measures are provided;
  5 - the project generates a significant impact on the analysed species / habitat; (taken from the assessments carried out by *Unitatea de Suport pentru Integrare, Cluj-Napoca, 2016; Ramboll, 2016*)

These **specific impacts on species and habitats** include:

- temporary occupation of work surfaces
- removal of some areas from forest management, and clear cutting
- disturbance of bird and mammal species by the noise produced, causing their temporary displacement
- disturbance of fish species, causing their migration upstream
- disturbance of fish species during horizontal drilling due to vibrations
- local change in the soil structure

- loss of areas of habitat from the feeding, rest, reproduction of bird species habitat by temporary withdrawal from agricultural use of some areas
- loss of feeding and passage habitat of bird species (agricultural land) for some common species due to construction works
- storage of the soil resulting from excavations has a negative impact on the feeding and resting habitats
- hitting - injury of some birds flying close to the ground, by the vehicles and the working equipment
- stress due to the movement of vehicles, equipment, workers
- change of the land use during the execution of pipeline installation works
- surface installations of the natural gas transmission system - groups of valves, launching stations, respectively godevil reception, cathodic protection stations, gas compression stations, gas measuring stations, technological nodes (direct impact, long-term, permanent, negative)

The relevance score given to the species and habitats in each site affected by the projects in the Do-minimum scenario are given in Chapter 3.3. Within the assessments carried out for the environmental permits of these projects, there were no scores higher than 4, which means that **all impacts on species and habitats of Community interest are controllable through specific** prevention, avoidance and reduction measures, and there are no permanent impacts affecting their conservation status.

The direct and indirect impact in the operation phase is represented by limited interventions at the level of the affected sections.

The short-term impact is manifested in the project execution stage, estimated to manifest at site level during a complete seasonal cycle (USI, 2016).

The long-term impact is identified where the soil is disturbed (through execution-assembly works), and the succession of vegetation required 2-3 seasonal cycles to recover. In case of implementation of complex ecological restoration measures, the impact can be extinguished in a shorter interval (USI, 2016).

With respect to the **impact of the construction, operation and decommissioning stage**

- the direct and indirect impact is manifested in the construction stage

- in the operation stage the effects of the impact will be extinguished, and will manifest only during punctual interventions of supervision, maintenance and remedy of some damages; monitoring colour will be maintained, grassy, at the level of the stands

No residual significant impact is identified in any of the environmental studies performed on the projects in the "Do-minimum" scenario.

4.1.2. Forms of impact on the components of biodiversity at the level of the Plan implementation

In addition to what has been described in the assessment studies on the "Do-minimum" scenario projects, we mention the main possible forms of impact on the species and habitats of community interest in accordance with the specifics of the projects included in the plan. In case of major unassessed projects included in the "Do Maximum" scenario, these forms of impact need to be analysed in detail at project level in order to obtain the environmental agreement. Analyses from this study can represent a starting point for these future analyses.

Table 38. The main forms of impact identified at the level of PDSNT

Component	Habitat loss	Habitat alteration	Fragmentation	Barrier effect	Mortality	Disturbance / trouble	Invasive non-native species
Habitats	Yes	Yes	Yes	No	No	No	Yes
Plants	Yes	Yes	Yes	No	No	No	Yes
Invertebrates	Yes	Yes	No	No	Yes	No	No
Fish	No	No	No	No	No	Yes	No
Amphibians	Yes	Yes	Yes	Yes	Yes	Yes	No
Reptiles	Yes	Yes	Yes	No	Yes	Yes	No
Mammals	No	Yes	No	No	Yes	Yes	No
Birds	No	Yes	No	No	Yes	Yes	No

Description of the forms of impact

Habitat loss

It is the best outlined and probably the most relevant impact. We speak of a temporary or permanent loss of the elements that constitute areas of shelter, reproduction, food sources or refuge for species. The loss of protected habitats areas at Community level, especially priority habitats, can affect the conservation status and / or the site integrity, and the reduction of the number of protected species. In the case of implementing the plan, the habitat loss is primarily temporary, but as some habitats (plant communities) are very difficult to restore in a natural progress or with human help, a temporary impact (which includes the period of land preparation,

excavation -assembly, land reclamation) can actually involve a long impact, of several seasons of vegetation, or even decades, in the worst case.

However, this type of impact, which results in habitat loss, occurs only in areas of direct intersection with habitats of Community interest, and relatively small areas - not the entire work corridors exerts this impact, while the prevention and reduction measures can be applied with a high success rate.

Habitat alteration

This includes any direct and indirect impact on habitats, the result of which is not as serious as the loss, even temporary, of the surfaces of those habitats. The areas immediately adjacent to the pipeline launching ditch, levelled, compacted, used as temporary land storage, areas where shrubs have been cut to allow access, areas of meadows crossed by machinery, edges of areas uncovered by vegetation of conservative value, others. Their regeneration is often done naturally, but can be affected by phenomena such as the invasion of non-native plants, ruderalization with indigenous plant communities, but which reduce the conservation value, leaving the area by characteristic species for different periods, etc. Human disturbance is not considered habitat alteration.

Fragmentation

Fragmentation is the result of interactions that result in limiting the mobility of some species, disrupting the continuity of plant communities, introducing foreign or barrier elements, or a combination of these. Deforestation of a strip of forest, construction of a road, fencing of areas, changing the use of a pasture by plowing it are classic examples of habitat fragmentation.

Normally, the interventions provided for in the Plan projects can cause fragmentation phenomena only on a temporary basis, during the execution, the pipelines being buried at least 1 m from the ground surface. Thus, the pipelines do not constitute a barrier for the restoration of the habitat continuity nor for the supra- or subterranean fauna species, which means that during their operation, the pipelines do not fragment the habitats. However, in certain situations, at the intersection of certain habitat types or areas where the movement of some species is concentrated, the temporary fragmentation can cause an impact, and must be addressed through specific measures. A specific case is the creation of new colours that intersect the forests.

Barrier effect

This effect is created by radical changes in the habitat or ecosystem. One classic example is a river dam, a highway or even a forest plantation at the level of a steppe. In the case of projects studied at the level of the plan, this effect can be felt only at micro level, and very limited in time, for example if a ditch separates the breeding site of some amphibian species from the wintering place, and this ditch is dug exactly during spring migration of amphibians.

Mortality

It is an impact through which natural mortality obviously increases, and is caused by activities closely related to, or as a result of, the project. A classic example is the phenomenon of road kill - mortality due to road traffic on invertebrate species, amphibians, reptiles, mammals or birds.

Human disturbance / trouble

It is a difficult to quantify indirect impact. However, it obviously manifests itself on specific species or situations, such as the nesting of birds of prey in a forest, and the implementation of a project in the vicinity of the nest which decreases the nesting success, or causes the brood to be abandoned. Usually this type of impact is felt on the bird and mammal species.

Occurrence of non-native and / or invasive species

It is a type of impact that is difficult to identify because it occurs late, especially in areas where the soil has been uncovered or the native plant communities have been severely affected. Bare soil and proximity to roads or streams is an ideal condition, but not unique for the emergence of invasive species. It is a very probable impact and very difficult to counteract, these species being very resilient; once established, they are difficult or even almost impossible to eradicate.

4.1.3. The areas affected inside and in the vicinity of Natura 2000 sites

Find below a summary of the project data from the "Do-Minimum" scenario taken from the environmental assessments carried out for the environmental permits.

Table 39. "Do-minimum" scenario - affected areas

strategic project code	site / AP code	site name	intersected distance (m)	Site area (ha)	Temporarily occupied area (ha)	Permanently occupied area (ha)
7.1	ROSCI0063	Jiu Gorge	542	10946	1.14	0
	ROSCI0129	North of the Western Gorj	13916	86958	29.22	0
	ROSCI0138	Bolintin Forest	2016	5737	2.82	0
	ROSCI0236	Strei Hațeg	3607	24968	7.57	0.0036
	ROSCI0292	Corridor Rusca Montană - Țarcu - Retezat	2933	24443	4.11	0
	ROSCI0385	The Timiș River between Rusca and Prisaca	739	1441	1.55	0
	ROSPA0106	Lower Olt Valley	1288	52786	2.07	0
	Total project		**25041**	**207279**	**48.49**	**0.0036**
7.2	ROSPA0039	Dunăre-Ostroave	1500	16243	0.00	0
	ROSCI0022	Canaralele Dunării	1500	26109	0.00	0
	ROSPA0012	Borcea Arm	3000	13299	3.74	0

strategic project code	site / AP code	site name	intersected distance (m)	Site area (ha)	Temporarily occupied area (ha)	Permanently occupied area (ha)
	ROSCI0319	Swamp from Fetești	3000	2110	3.74	0
	ROSPA0105	Mostiștea Valley	1130	6614	2.48	0
	ROSCI0131	Olteniţa-Mostiştea-Chiciu	1240	11521	2.73	0
	ROSCI0043	Comana	8550	26579	18.81	0
	ROSPA0022	Comana	6950	26109	15.29	0
	Total project		**26870**	**128584**	**46.79**	**0**
7.3	ROSPA0031	Danube Delta and Razim Sinoe Complex	ND	508302	0.67	0.63
	ROSCI0162	Lower Siret meadow	162	24981	0.36	0
	ROSPA0071	Lower Siret meadow	162	37480	0.36	0
	Total project		**324**	**570762**	**1.38**	**0.63**
7.4	ROSCI0059	Perchiu Hill	112	188	0	0
	ROSPA0138	Piatra Șoimului - Scorțeni - Gîrleni	7630	37383	12.25	0
	ROSCI0364	Moldova River between Tupilați and Roman	1220	4718	2.33	0
	ROSCI0378	Siret River between Pascani and Roman	304	3750	0.00	0
	ROSPA0072	Middle Siret meadow	1122	10329	0.00	0
	ROSCI0221	Salts from Ileana Valley	80	108	0.00	0
	ROSPA0150	Sârca - Iloaiei Bridge accumulations	118	1929	0.00	0
	Total project		**10586**	**58405**	**14.73**	**0**
7.6	ROSPA0031	Danube Delta and Razim Sinoe Complex	**10000**	**508302**	**15.36**	**0**
7.7	ROSPA0142	Teremia Mare -Tomnatic	**2306**	**6613**	**4.61**	**0.0334**
7.8	ROSPA0031	Danube Delta and Razim Sinoe Complex	**NA**	**508302**	**0.32**	**0.33**
Total Do-minimum			**75127 m**	**1988247 ha**	**131.54 ha**	**0.99 ha**

The projects proposed within the "Do Maximum" scenario are analyzed from the perspective of the temporary occupation of some surfaces inside the SCI and SPA sites, applying the buffer zone of 15 m on both sides of the intersection directions, intersecting with the site boundaries, thus obtaining an impact analysis corridor. This analysis was performed in the case of projects where the planned route was made available to the evaluators (projects 7.5, 7.9, 7.10, 7.11) or these analyzes were performed by the Beneficiary, the consultant receiving the results of the analyzes only (project 7.12). In the case of project 7.17, in the absence of a planned route, these analyzes cannot be performed. Projects 7.13, 7.14, 7.15, 7.16 are punctiform, and are carried out in the existing premises and structures.

In order to assess the indirect impact, a buffer of 50 m was used, equivalent to the area of influence on the left-right of the working corridor (details in Chapter VII.).

Implementation of these two types of buffer to all projects that have not yet been evaluated at the project stage is a precautionary approach aiming to assess the affected surfaces, taking into account the maximum possible width of the working corridors, which usually is not more than 24 m wide. Thus, the 2 types of buffer took into account the most unfavourable situation on the impacts of the planned investments. The results obtained are the result of a modelling.

Below is a synthesis of the overlap of the two types of buffer with the Natura 2000 sites on the route of the project 7.5 elements:

Table 40 . Overlapping the two types of buffer with the Natura 2000 sites on the route of the project 7.5 elements

AP	**Intersection (m)**	**Intersection segments**	**Total site area (ha)**	**Analysis corridor area 30 m (Ha)**	**30 m site corridor occupancy (%)**	**Surface in the area of influence (Ha)**	**On site occupancy of the area of influence (%)**
ROSPA0082	13835	4	56646.25	41.41	0,073	94.95	0,168
ROSPA0028	13212	1	86153.00	39.60	0,046	91.80	0,107
ROSPA0027	10731	4	36662.47	32.22	0,088	75.55	0,206
ROSCI0130	5344	1	15343.70	16.12	0,105	38.84	0,253
ROSCI0292	3046	1	24431.25	9.13	0,037	21.55	0,088
ROSCI0357	2031	1	6975.39	6.09	0,087	14.26	0,204
ROSCI0236	1830	2	24977.50	5.50	0,022	13.05	0,052
ROSCI0037	1115	3	5976.63	3.43	0,057	10.11	0,169
ROSCI0385	760	1	1400.37	2.28	0,163	5.32	0,380
ROSCI0384	367	9	315.50	1.09	0,345	3.06	0,971
ROSCI0383	239	2	448.2	0.74	0,166	2.11	0,470
ROSCI0382	192	1	888.67	0.58	0,065	1.45	0,163
ROSCI0329	75	1	1537.64	0.22	0,015	0.52	0,034
ROSPA0147	42	2	2314.54	0.13	0,006	0.29	0,013
ROSCI0374	42	2	2314.54	0.13	0,006	0.29	0,013
Total	**52861**	**35**	**266385.65**	**158.67**	**0,059**	**373.15**	**0,140**

Below is a synthesis of the overlap of the two types of buffer with the Natura 2000 sites on the route of the project 7.9 elements:

Table 41 . Overlapping the two types of buffer with the Natura 2000 sites on the route of the project 7.9 elements

AP	Intersection (m)	Intersection segments	Total site area (ha)	Analysis corridor area 30 m (Ha)	30 m site corridor occupancy (%)	Surface in the area of influence (Ha)	On site occupancy of the area of influence (%)
ROSCI0363	2724	6	3361.51	12.87	0,383	29.63	0,882
ROSCI0365	5026	2	5329.71	10.44	0,196	25.25	0,474
ROSCI0371	1921	1	395.78	5.76	1,456	13.43	3,394
ROSCI0380	1405	1	1253.86	4.20	0,335	9.70	0,774
ROSCI0184	3262	3	320.44	4.01	1,252	9.75	3,041
ROSCI0391	281	1	586.69	0.84	0,143	2.17	0,371
Total	**14619**	**18**	**11247.99**	**38.12**	**0,338**	**89.93**	**0,799**

Below is a synthesis of the overlap of the two types of buffer with the Natura 2000 sites on the route of the project 7.10 elements:

Table 42 . overlapping the two types of buffer with the Natura 2000 sites on the route of the project 7.10 elements

AP	Intersection (m)	Intersection segments	Total site area (ha)	Analysis corridor area 30 m (Ha)	30 m site corridor occupancy (%)	Surface in the area of influence (Ha)	On site occupancy of the area of influence (%)
ROSPA0015	13666	4	39158.62	40.97	0,105	95.01	0,243
ROSPA0114	10521	5	33208.38	31.53	0,095	73.53	0,221
ROSCI0021	8268	3	21224.57	24.83	0,117	60.82	0,287
ROSPA0097	7539	1	12093.33	22.62	0,187	52.79	0,437
ROSCI0025	4899	3	5224.07	14.69	0,281	34.04	0,652
ROSPA0103	4079	4	3600.91	12.24	0,340	28.57	0,793
ROSCI0231	3491	3	7802.56	10.44	0,134	24.16	0,310
ROSPA0016	2660	2	38351.26	7.98	0,021	18.15	0,047
ROSCI0322	667	2	34978.91	2.49	0,007	11.70	0,033
ROSPA0115	785	2	17162.37	2.36	0,014	5.81	0,034
ROSCI0099	707	1	3886.96	2.15	0,055	5.30	0,136
ROSCI0050	707	3	1996.31	2.12	0,106	5.15	0,258
ROSPA0104	520	3	1649.48	1.67	0,101	4.67	0,283
ROSPA0123	415	2	1858.38	1.24	0,067	3.00	0,161
ROSCI0302	371	1	70.37	1.11	1,580	2.59	3,674
ROSCI0314	340	3	10214.09	1.04	0,010	2.83	0,028
ROSCI0104	310	1	636.72	0.93	0,146	2.16	0,339
ROSCI0410	210	1	218.80	0.69	0,313	2.12	0,970

ROSCI0048	221	1	826.90	0.66	0,080	1.55	0,187
ROSCI0049	169	1	1822.81	0.51	0,028	1.36	0,074
ROSCI0436	138	1	2201.58	0.43	0,020	1.65	0,075
Total	**60683**	**47**	**238187.38**	**182.7**	**0,076**	**436.96**	**0,183**

Below is a synthesis of the overlap of the two types of buffer with the Natura 2000 sites on the route of the project 7.11 elements:

Table 43 . overlapping the two types of buffer with the Natura 2000 sites on the route of the project 7.11 elements

AP	Intersection (m)	Intersection segments	Total site area (ha)	Analysis corridor area 30 m (Ha)	30 m site corridor occupancy (%)	Surface in the area of influence (Ha)	On site occupancy of the area of influence (%)
ROSCI0043	1823	3	26579.22	5.48	0,021	12.97	0,049
ROSCI0088	831	1	10137.76	2.53	0,025	6.18	0,061
ROSCI0138	439	1	5638.03	1.99	0,035	8.66	0,154
ROSPA0146	1715	3	2574.84	5.16	0,200	12.21	0,474
Total	**4808**	**8**	**44929.85**	**15.16**	**0,033**	**40.02**	**0,089**

Below is a synthesis of the overlap of the two types of buffer with the Natura 2000 sites on the route of the project 7.12 elements for the three versions (come segments are common):

Table 44 . overlapping the two types of buffer with the Natura 2000 sites on the route of the project 7.12 elements

Version	AP	Intersection (m)	Intersection segments	Total site area (ha)	Analysis corridor area 30 m (Ha)	30 m site corridor occupancy (%)	Surface in the area of influence (Ha)	On site occupancy of the area of influence (%)
7.12.1.	ROSPA0099	48536	2	237779.78	145.57	0,061	339.59	0,143
	ROSCI0227	14141	2	89264.88	42.38	0,047	97.93	0,110
	ROSPA0114	10388	2	33208.38	31.15	0,094	72.44	0,218
	ROSPA0098	9620	3	71201.66	28.85	0,041	67.20	0,094
	ROSCI0194	4420	2	15904.85	13.32	0,084	31.80	0,200
	ROSPA0165	4420	2	15904.85	13.32	0,084	31.80	0,200
	ROSCI0352	4187	1	2253.06	12.56	0,557	29.16	1,294
	ROSCI0013	1715	1	38683.56	5.33	0,014	13.17	0,034
	ROSCI0088	820	1	10137.76	2.46	0,024	5.74	0,057
	ROSCI0099	657	1	3886.96	1.98	0,051	4.85	0,125

Version	AP	Intersection (m)	Intersection segments	Total site area (ha)	Analysis corridor area 30 m (Ha)	30 m site corridor occupancy (%)	Surface in the area of influence (Ha)	On site occupancy of the area of influence (%)
	ROSCI0122	499	1	198620.47	1.50	0,001	3.43	0,002
	ROSCI0436	272	1	2201.58	0.81	0,037	2.31	0,105
	ROSPA0104	213	1	1649.48	0.64	0,039	1.60	0,097
	ROSCI0314	190	1	10214.09	0.56	0,005	1.74	0,017
	ROSCI0384	172	1	315.50	0.51	0,162	1.31	0,414
	ROSCI0394	102	1	144.62	0.31	0,213	0.70	0,483
	ROSCI0367	76	1	640.78	0.23	0,035	0.53	0,083
	ROSCI0043	57	1	26579.22	0.17	0,001	0.42	0,002
	ROSCI0138	0	0	5638.03	0.02	0.0004	0.50	0,009
	Total 7.12.1	**100485**	**25**	**764229.51**	**301.67**	**0,039**	**706.22**	**0,092**
7.12.2.	ROSCI0129	18631	1	86980.46	55.96	0,064	130.98	0,151
	ROSCI0236	6450	1	24977.50	19.33	0,077	44.97	0,180
	ROSCI0292	2504	1	24431.25	7.51	0,031	17.45	0,071
	ROSCI0063	2470	1	10927.06	7.27	0,067	14.50	0,133
	ROSPA0106	1184	1	52789.83	3.55	0,007	8.28	0,016
	ROSCI0088	820	1	10137.76	2.46	0,024	5.74	0,057
	ROSCI0109	175	1	10172.57	0.52	0,005	1.22	0,012
	ROSCI0043	57	1	26579.22	0.17	0,001	0.42	0,002
	ROSCI0341	0	0	1524.65	0.04	0,003	1.14	0,075
	ROSCI0296	0	0	7605.63	0.02	0,000	1.05	0,014
	Total 7.12.2	**32291**	**8**	**256125.93**	**96.83**	**0,037**	**225.75**	**0,088**
7.12.3.	ROSCI0129	18631	1	86980.46	55.96	0,064	130.98	0,151
	ROSCI0236	6450	1	24977.50	19.33	0,077	44.97	0,180
	ROSCI0292	2504	1	24431.25	7.51	0,031	17.45	0,071
	ROSCI0063	2470	1	10927.06	7.27	0,067	14.50	0,133
	ROSCI0045	1073	2	71362.72	3.24	0,005	7.75	0,011
	ROSPA0023	489	1	19530.22	1.47	0,008	3.43	0,018
	ROSCI0109	175	1	10172.57	0.52	0,005	1.22	0,012
	Total 7.12.3	**31792**	**8**	**248381.78**	**95.3**	**0,038**	**220.3**	**0,088**

From the three options of project 7.12, only one will be implemented as a project, and the decision on the final version has not yet been made.

According to the centralized data, option 7.12.1 engages the most intersecting segments and the longest total length of intersection with protected areas and of course, the largest possible impacted areas.

Therein, options 7.12.2 and 7.12.3 are very similar, being in common segments in proportion of more than 50% of their length.

Still, no recommendation can be made at this stage regarding the proposed route option for the Eastring project due to the too little information available. The choice of one of the 3 route variants will be made at the environmental impact assessment phase of the project, taking into account several variables, in addition to the biodiversity component: proposed route characteristics, obstacles crossed, categories of land crossed, technical and economic analysis, etc

4.1.4 Impact in a transboundary context

For the analysis of the effects in a transboundary context, the projects that make the transboundary connections with the neighbouring countries have been considered. In this way**, 1project** was identified in the **Do-minimum** scenario, and in the **Do maximum** scenario**, 4 more projects** are presented in the following table.

Table 45. Projects located in the vicinity of border areas in the reference scenario Do maximum.

Project code	Project name	Neighbouring country	Interconnection locations
7.5	Developing the bidirectional transport corridor Bulgaria–Romania–Hungary–Austria (BRUA-Phase III)	Hungary	Szeged (HU)–Nadlac, Arad(RO)–Csanadpalota
7.7	Romania-Serbia interconnection	Serbia	UAT Comloșu Mare (RO)- Mokrin (Serbia)
7.9	Interconnection of the national natural gas transmission system with the natural gas transmission system in Ukraine, on the Gherăești – Siret direction	Ukraine	Siret (RO)- Cernăuți (UCR)
7.11	Increasing the natural gas transmission capacity of the Romania-Bulgaria interconnection on the Giurgiu-Ruse direction	Bulgaria	Giurgiu (RO)-Ruse (BG) by making a new underpass to Danube River
7.12	Eastring–Romania - Option 1	Hungary, Bulgaria	Csengersima (HU)-Satu Mare (Peles, RO) Giurgiu (RO)-Russe (BG)

	Eastring–Romania - Option 2	Hungary Bulgaria	Csanadpalota (HU)-Nadlac (RO) Giurgiu (RO)-Russe (BG)
	Eastring–Romania - Option 3	Hungary, Bulgaria	Csanadpalota (HU)-Nadlac (RO) Grojdibodu (Dolj, RO)-Dolni Vadin (BG)

Project 7.7. includes the construction works and involves the construction of a new gas transport corridor.

For this project, the environmental impact assessment procedure has already been completed, and the Decision of the classification stage no. 142 of 25.06.2019 has been issued by APM Timiș.

The interconnection will be made on the territory of UAT Comloșu Mare, about 2.5 km from the residential areas of the locality.

The analysis of the Decision of the classification stage no. 142 of 25.06.2019 issued by APM Timiș shows that the project does not induce a significant negative environmental and human health impact in a transboundary context.

The project is not located in the vicinity or inside Natura2000 sites in the neighbouring country - Serbia.

There are no designated protected areas in the Republic of Serbia, less than 10 km from the interconnection node, as reveals the map in Fig. 29.

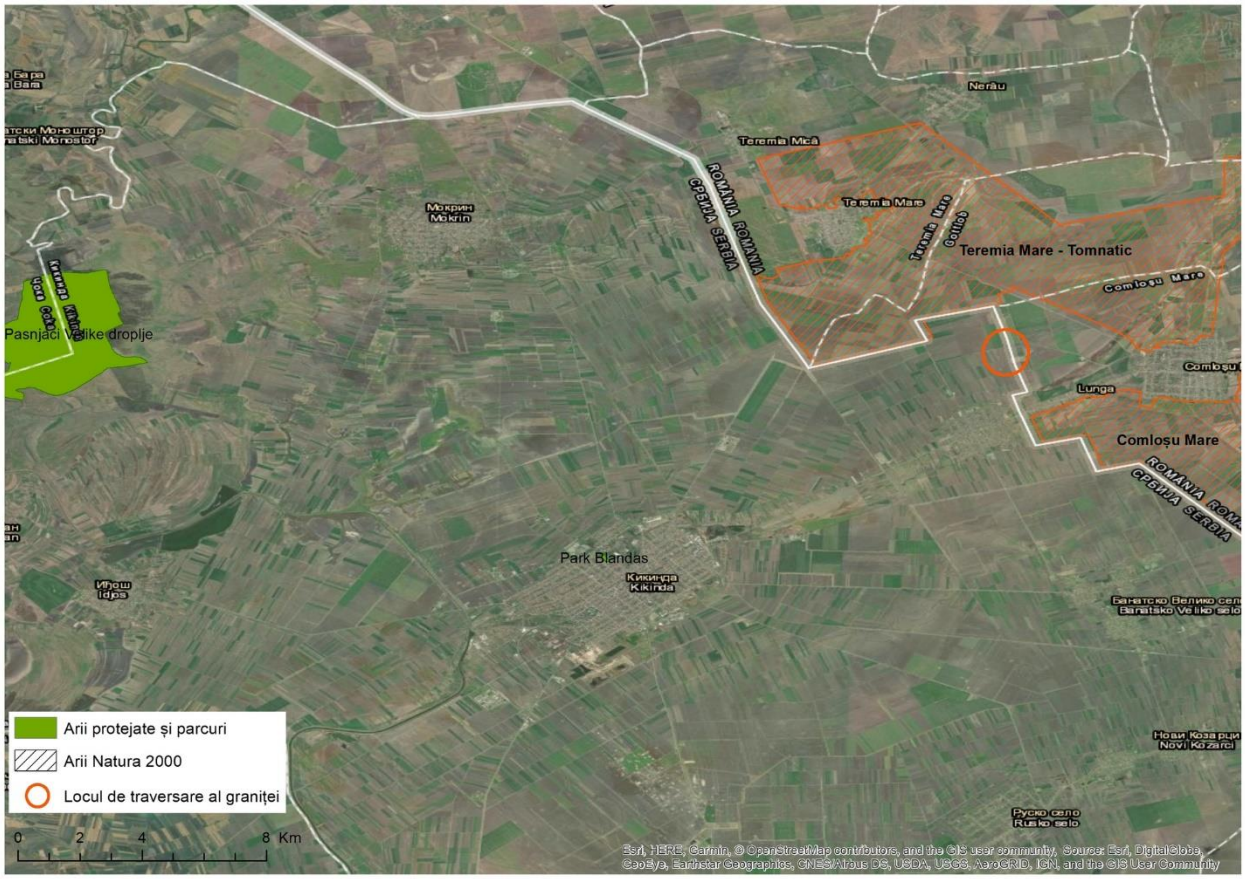

Figure 37. Project 7.7 interconnection with Serbia

A summary of the situation of the protected areas in the area of interconnection points is presented in the following table:

Table 46. Protected areas in the area of interconnection points

Project code	Project name	Neighbouring country	Code and name of protected area	Area type	Approximate distance from the interconnection point (m)
7.5	Developing the bidirectional transport corridor Bulgaria–Romania–	Hungary	Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site cod HUKM20001	1000
			HU01 Körös-Maros	National Park	4600

Project code	Project name	Neighbouring country	Code and name of protected area	Area type	Approximate distance from the interconnection point (m)
	Hungary–Austria (BRUA-Phase III)		Maros	Natura2000 site cod HUKM20008	4150
7.7	Romania-Serbia interconnection	Serbia	The project is not located in the vicinity or inside protected areas in the neighbouring country - Serbia		
7.9	Interconnection of the national natural gas transmission system with the natural gas transmission system in Ukraine, on the Gherăești – Siret direction	Ukraine	The project is not located in the vicinity or inside protected areas in the neighbouring country - Ukraine		
7.11	Increasing the natural gas transmission capacity of the Romania-Bulgaria interconnection on the Giurgiu-Ruse direction	Bulgaria	Komleks Aleko - Telika	Protected area code BG06	3600
			Marten - Ryahovo	Natura2000 site code BG0000529	1900
7.12	Eastring– Romania - Option 1	Bulgaria	Komleks Aleko - Telika	Protected Site code BG06	3600
			Marten - Ryahovo	Natura2000 site code BG0000529	1900
		Hungary	Szatmár-Beregi	Landscape Protection Area code HU02	7400
			Csaholc - Garbolc	Natura2000 site code HUHN20054	5400
			Szatmár-Bereg	Natura2000 site cod HUHN10001	0
	Eastring– Romania - Option 2	Bulgaria	Komleks Aleko - Telika	Protected Site code BG06	3600
			Marten - Ryahovo	Natura2000 site code BG0000529	1900

Project code	Project name	Neighbouring country	Code and name of protected area	Area type	Approximate distance from the interconnection point (m)
		Hungary	HU01 Körös-Maros	National Park	4500
			Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM10004	8000
			Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM20001	1000
			Maros	Natura2000 site code HUKM20008	1041
	Eastring– Romania - Option 3	Bulgaria	Cheshmata	Protected Site code BG06	6700
			Gendjov orman	Protected Site code BG06	9000
			Ostrov Malak Boril	Protected Site code BG 06	5300
			Karaboaz	Natura2000 site code BG0000335	9000
		Hungary	HU01 Körös-Maros	National Park	4500
			Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM10004	8000
			Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM20001	1000
			Maros	Natura2000 site code HUKM20008	1041

We see that only at the interconnection point of project 7.12 (Eastring), option 1 with Hungary one Natura 2000 site is intersected, which is a special protection area (SPA). Equally, we mention that, due to the confidential nature of the Eastring project documentation, the interconnection points were identified with a considerable margin of error.

Below we present the location of the protected areas in the areas of the interconnection points of the projects in the "Do Maximum" Scenario.

Project 7.12 option 1, interconnection Hungary

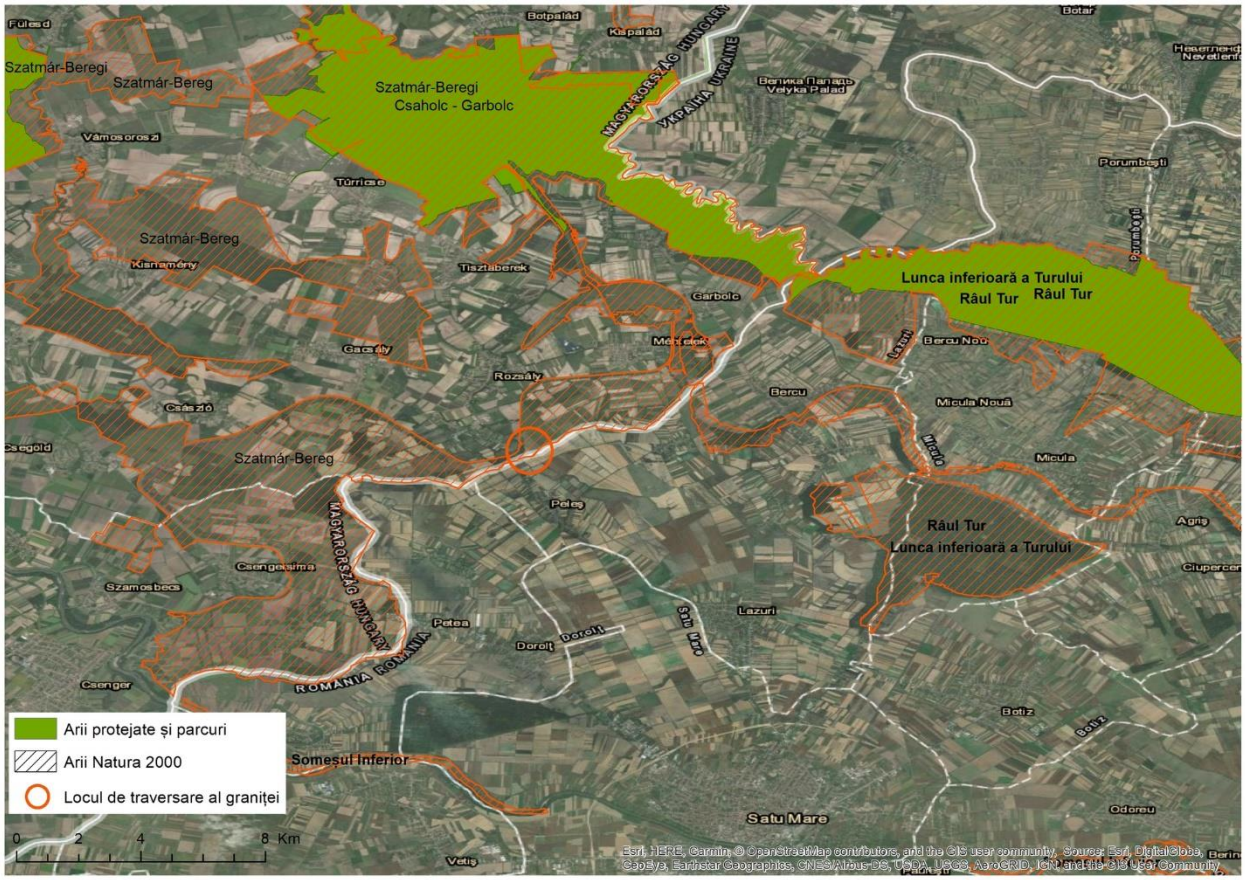

Figure 38. Project 7.12 Eastring–România, *option 1 interconnection area, with Hungary*

The special avifauna protection area HUHN10001 Szatmár-Bereg [10] was designated for the protection of 36 species of birds of Community interest in 2004. It has an area of 52847 ha, and includes the largest deciduous forests with natural origins in the Pannonian plain area. The site preserves hayfields rich in species, and other mesophilic meadows that host a very important population of corncrake (*Crex crex),* the largest in Hungary, of about 300 nesting pairs. The floodplain of the Tisza provides a habitat for species such as the black stork (*Ciconia nigra*), the honey buzzard (*Pernis apivorus*) or the kingfisher(*Alcedo atthis*).

[10] the standard form is available at the URL:
https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=HUHN10001
Additional data, description: https://www.mme.hu/natura-2000-teruletek/huhn10001

The conservation objectives of the site include the conservation and improvement of the conservation status of the species for which the site has been designated, and the provision of the land use forms that are necessary for the conservation and improvement of habitats.

The site does not have a management plan, but there is a management plan for the landscape protection area dating from 2003.

We consider paying greater importance to measures aimed at avoiding and reducing the impact on habitats, in particular avoiding vulnerable areas (hayfields, mature forests, water streams, floodplains, wetlands), and works outside the breeding season.

Project 7.12 option 1 and 2, interconnection Bulgaria

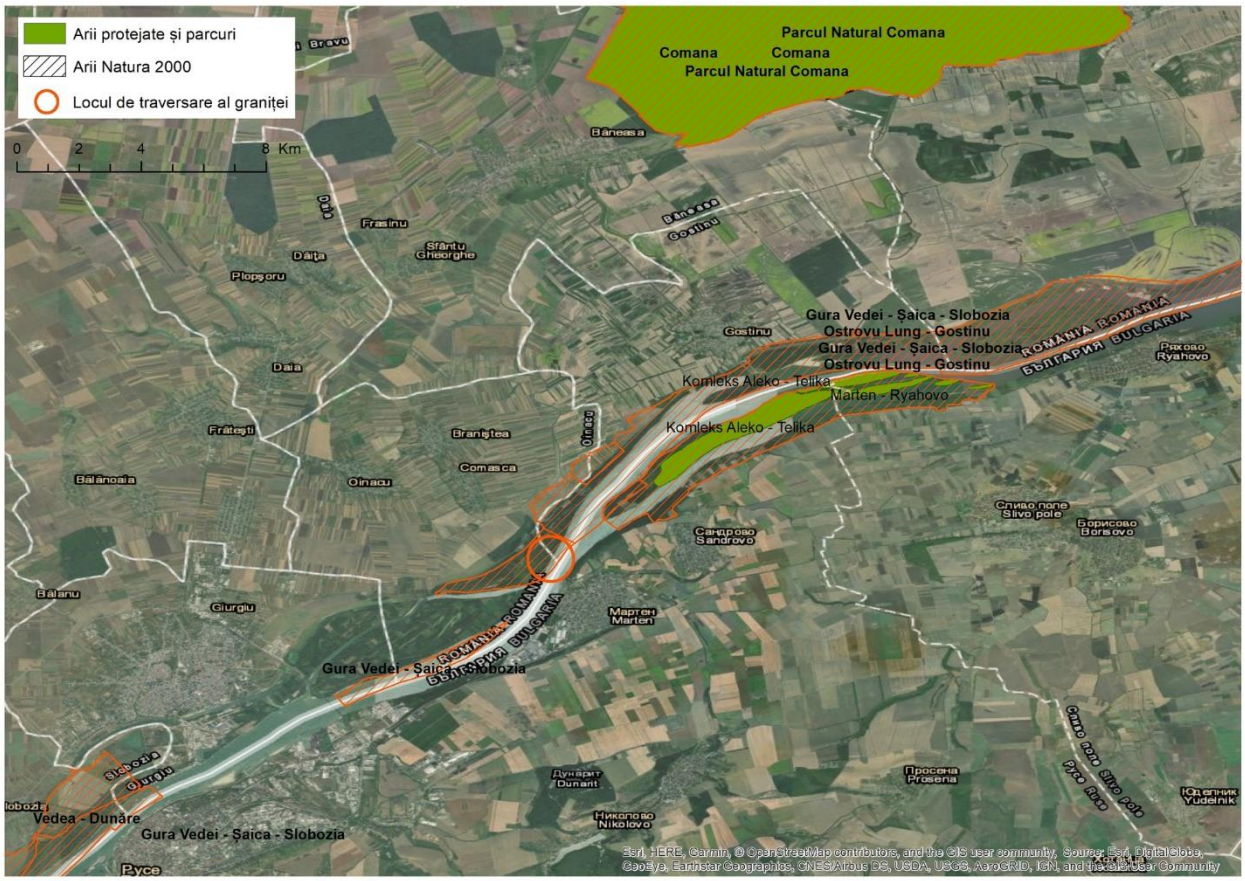

Figure 39. Project 7.12 Eastring–România, *option 1 and 2 interconnection area, with Bulgaria*

The project intersects the SCI Gura Vedei - Șaica - Slobozia site, a site located on the left bank of the Danube, the boundary is parallel to the Romania - Bulgaria border. The aim is to underpass the Danube. Underpasses usually follow the shortest route, so the bypass of the protected areas in Bulgaria can be anticipated.

Project 7.12 option 2 and 3, interconnection Hungary

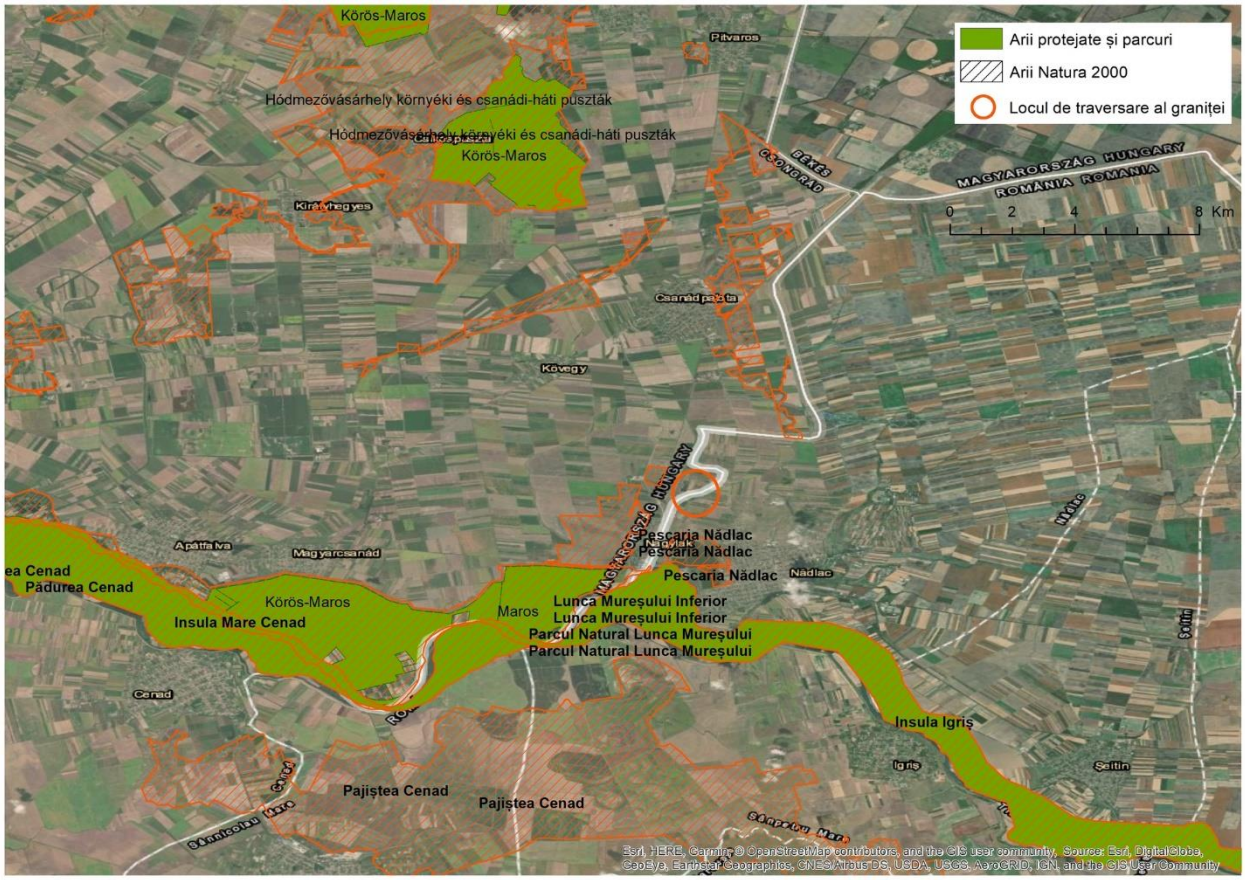

Figure 40. Project 7.12 Eastring–România, *option 2 and 3 interconnection area, with Hungary*

The options 2 and 3 of project 7.12 have a joined route in the area of interconnection with Hungary, the nearest protected area being the SAC site code HUKM20001 Hódmezővásárhely környéki és csanádi-háti puszták [11], Special Area of Conservation. It was appointed as SCI in 2004, while in 2010 it was designated as SAC. It was designated by the Government Order 275/2004. (X. 8.) for the conservation of three habitat types and 13 species of Community interest. The importance lies in preserving the salt steppes and loess steppes . The site has an approved management plan[12]. The specific objectives involve the conservation and management activities of these meadows.

[11] https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=HUKM20001

[12] http://www.kmnp.hu/_user/browser/File/2015/Natura2000_Fenntart%C3%A1si%20tervek/Fenntart%C3%A1si%20terv%20HUKM20001_KMNPI.pdf

In the event of change of the route and intersection of this site, it is recommended to pay more attention to avoid crossing the areas occupied by the three habitats listed in the standard form.

Project 7.12 option 3, interconnection Bulgaria

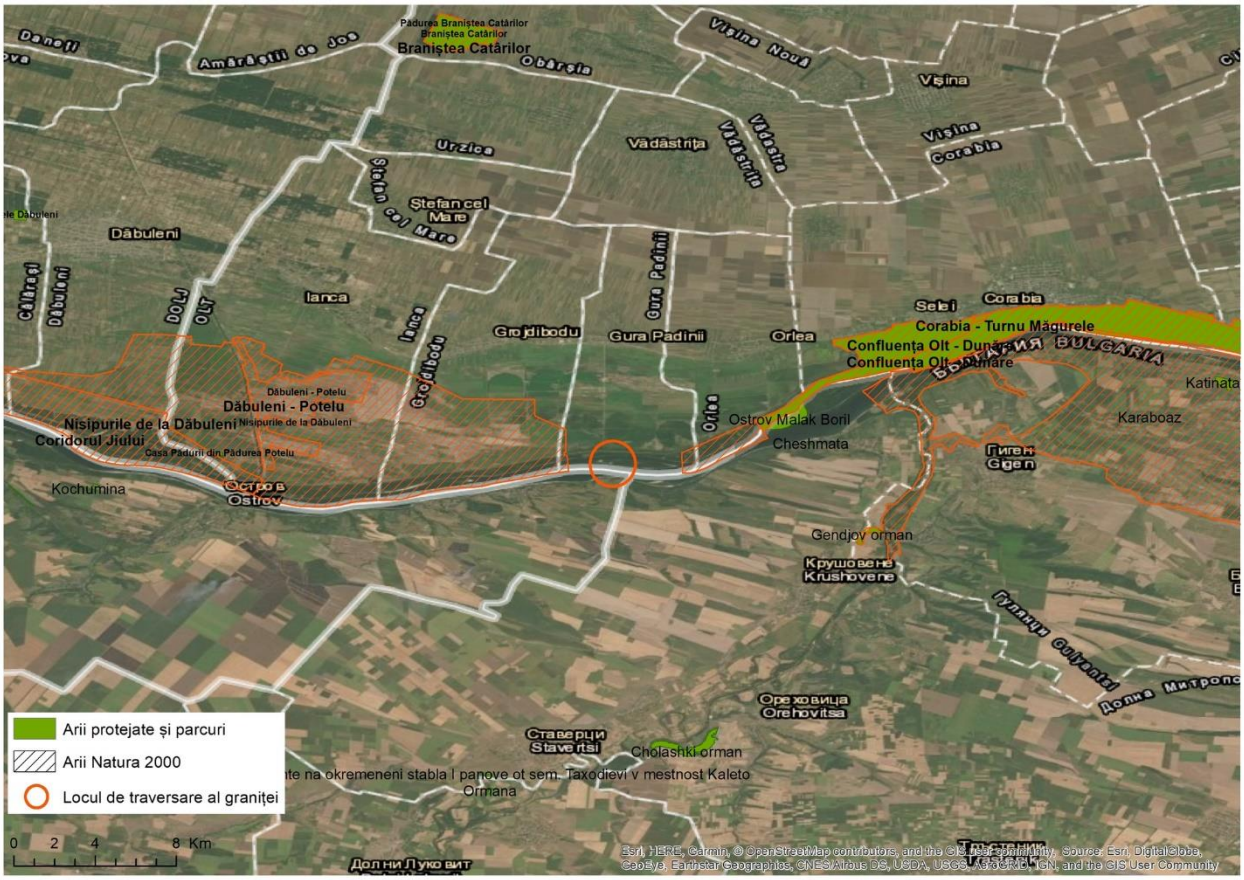

Figure 41. Project 7.12 Eastring–România, *option 3 interconnection area, with Bulgaria*

If the projected interconnection point is maintained, the intersection of sites of Community interest or other protected areas in Bulgaria, which are more than 5 km away, is excluded.

Project 7.9, Ukraine interconnection

Figure 42. Project 7.9 Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret *interconnection with Ukraine*

The project is not located in the vicinity or inside protected areas in the neighbouring country - Ukraine.

Project 7.11, Bulgaria interconnection

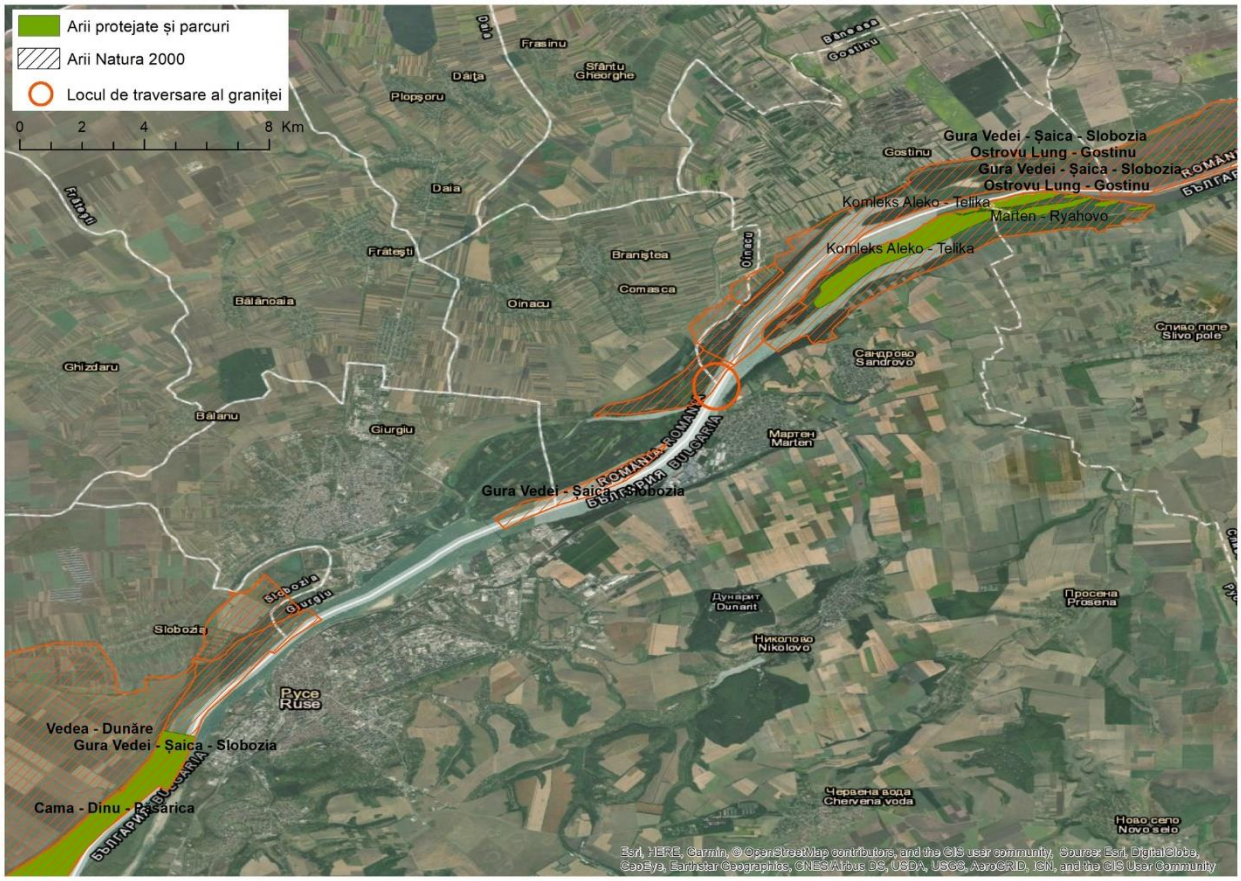

Figure 43. Project 7.11 Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction *interconnection with Bulgaria*

The interconnection point proposed will be achieved by underpassing the Danube. There are no protected areas in Bulgaria in the area where the interconnection point is planned, the closest being about 2 km to the east.

4.2. Impact assessment

In case of projects from the "Do Minimum" scenario, the impact assessment was performed prior to this study (except for the projects referring to the natural gas storage), the information being taken over, synthesised and presented herein.

Storage projects from "Do Minimum" scenario:

Project 8.2. Increase of the natural gas underground storage capacity of the storage facility in Gherceşti

According to the information obtained from the Owner and to the public available information, the project does not intersect with Natura 2000 sites or with other protected areas. No impact on Natura2000 sites network is foreseen.

Project 8.3. New natural gas underground storage facility in Falticeni, Moldavia

Regarding the location of the new natural gas storage facility, two of the localities proposed as locations for this storage have areas included in Natura 2000 sites:

- Pocoleni, Suceava County – has on its territory surfaces from Natura 2000 site ROSPA0064 Lacurile Falticeni and ROSCI0310 Lacurile Falticeni.
- Davideni, Neamt County – has on its territory surfaces from ROSCI0363 site - Raul Moldova between Oniceni and Mitesti.

In the absence of information referring to a more precise location of the proposed site for this storage, no conclusions can be drawn regarding the impact. A detailed analysis will be done at a project level.

In the following sections, we analyse the impact of the strategic projects from the "Do Maximum" scenario which have not been yet subject to environmental assessments at a project level. In the absence of details for a precise location and of technical data, the assessment of the impact follows especially to highlight the Natura2000 sites on which impacts can be produced as a follow up of project implementation. The assessment of the impacts at projects level cannot be made here, considering the lack of detailed information.

4.2.1. The impact assessment in terms of percentage of areas occupied temporarily or permanently

In the case of projects not evaluated in terms of environmental impact analysis and Natura 2000 network, based on the analysis of areas overlapping with the two types of buffer, we can conclude that there are very few sites where the directly affected areas (temporarily occupied,

equivalent or smaller than the buffer area of 15 m) is greater than 1% of the total area of the site. These sites are:

Project 7.5:

no site

Project 7.9:

ROSCI0371 Cumpărătura: intersected over a distance of 1921 m, buffer of 15 m = 5.76 ha, equivalent to 1.45% of the total area of 395.78 ha.

ROSCI0184 Zamostea-Lunca Forest: intersected over a distance of 3262 m, buffer of 15 m = 4.01 ha, equivalent to 1.25% of the total area of 320.44 ha.

Project 7.10:

ROSCI0302 Bozânta: intersected over a distance of 371 m, buffer of 15 m = 1.11 ha, equivalent to 1.58% of the total area of 70.37 ha.

Project 7.11:

no site

Project 7.12, in variants 1, 2 and 3:

no site

With respect to project 7.17, in the absence of coordinates, this analysis cannot be performed.

Projects 7.13, 7.14, 7.15, 7.16 cannot be analyzed in this way, because they take place mainly within existing locations and structures.

Storage projects:

Project 8.4: Increasing the underground natural gas storage capacity at the Sărmășel landfill

The safety zone of the underground storage warehouse development intersects ROSCI0333 Sărmășel - Milaș - Urmeniș meadows.

The project aims at developing the existing underground storage depot in Sărmășel by enlarging, new surface infrastructure for 59 injection-extraction wells, drilling new wells, etc. According to the information provided by the owner, the planned investments do not overlap with the site ROSCI0333 Pajiștile Sărmășel - Milaș - Urmeniș.

We note that all the three sites whose temporary occupancy exceeds the threshold of 1% of the total area, are small sites with areas of less than 500 ha.

4.2.2. Impact assessment using standardized analysis methodologies

The possible impact can be analyzed in more detail by applying a unitary approach on projects that are were not undergone environmental assessments. In the absence of implementation of schemes for obtaining field data on the numbers and location of species and habitats of Community interest in the area of implementation of various projects, the analyzes based on unitary resources, official and compatible with GIS applications are probably the only viable solution which can highlight areas with possible impact. The evaluators have chosen two types of analysis, one targeting the likelihood of affecting species of community interest in the sites, the other targeting habitats only. Both analyses are based on the accumulation of scores, but these are not equivalent in the case of species and habitats of community interest. Details of the methodology and the categories of scores can be found in chap. VII.

4.2.2.1 Impact assessment on species of Community interest in the case of unassessed projects

Corine Land Cover habitats were used to identify the probability of the impact on the species, a database available through the Copernicus Land Monitoring Service, the European Environment Agency's service. These habitat types were intersected with two types of buffer, to obtain overlaps that represent the potential direct and indirect impact, taking into account the most unfavourable situation.

It is important to note that this analysis, and the scores obtained, do not take into account the intersection of the two buffer zones with the absolute surfaces of the sites, but only with the surfaces of Corine habitats. Assuming a different sensitivity of species of Community interest in different types of habitat (some use only certain habitats, eg forests or meadows, other species use several habitat types), and the importance of the percentage occupation of these habitats by the project elements in the execution stage, the scores reflect these factors.

Consequently, we can signal the order in which the sites record scores, offering the possibility for these sites to perform project level impact assessments in an early stage of planning the location of pipelines and the rest of the structures.

The wide range of scores obtained does not necessarily reflect equivalent differences in terms of impact, because of the specificity of the methodology used. Sometimes, scores close to 50 in the case of the 15 m buffer, or 100 in the case of the 50 m buffer denote a high percentage of intersection in a Corine habitat type whose relative on site areas are small. Or, in other cases, the routes examined intersect significant areas of agricultural land, which, although used by species of Community interest, have a high potential for rehabilitation, with a short term impact.

Because of these differences, the potentially negative impact was determined, in addition to the scores recorded and the qualitative analysis, through the expert opinion, taking into account the

land conditions based on satellite images, the on-site existing data with respect to localization of species and their habitats in the areas, and the expected impact degree based on the existence of structures (pipelines, roads, other land conditions) in the area of the chosen indicative routes. The probability of negative impact at each site is set out in the table below.

We underline that in the absence of observations and data obtained from the field, this list of sites where species of Community interest may be affected is made with a considerable margin of error. These results can only be a starting point in carrying out project level appropriate assessment studies, studies that will also be based on data and observations obtained from the specialists visits on site.

According to the preliminary, standardized analysis, the sites where potential negative impacts can manifest, are the following (in order of projects, sites with scores higher than 2, which take into account the sensitive areas intersected):

Table 47. Identification of sites which may have an impact on species of community interest

Project	Site code	Site name	Buffer score 15	Buffer score 50	Probability of negative impact on species
7.5	ROSCI0130	Oituz - Ojdula	48.51	92	High
	ROSCI0037	Ciomad - Balvanyos	14.64	60.64	High
	ROSCI0357	Porumbeni	27.35	63.36	High
	ROSPA0028	Târnavelor Hills and Niraj Valley	3.65	8.27	Low
	ROSCI0384	Târnava Mică River	9.86	30.15	Low
	ROSCI0292	Corridor Rusca Montană - Țarcu - Retezat	4.17	10.85	Low
	ROSPA0027	Homoroadelor Hills	2.62	9.18	Low
	ROSCI0385	The Timiș River between Rusca and Prisaca	6.39	14.89	Low
	ROSPA0082	Bodoc - Baraolt Mountains	5.36	11.69	Low
	ROSCI0383	Târnava Mare River between Odorheiu Secuiesc and Vânători	4.34	22.07	Low
	ROSPA0027	Homoroadelor Hills	2.62	9.18	Low
Project 7.9	ROSCI0184	Zamostea - Lunca forest	39.04	104.89	High
	ROSCI0371	Cumpărătura	18.13	42.27	High
	ROSCI0380	Suceava Liteni River	16.79	43.25	High
	ROSCI0365	Moldova River between Păltinoasa and Ruși	4.91	17.43	Low
	ROSCI0363	Moldova River between Oniceni and Mitești	11.17	25.65	High
	ROSCI0391	Siretul Mijlociu - Bucecea	4.01	10.51	Low
Project 7.10	ROSCI0314	Lozna	14.60	35.83	Low
	ROSCI0410	Sucutard hayfields	10.53	38.87	High
	ROSPA0103	Valea Alceului	9.74	22.46	High
	ROSCI0049	Crișul Negru	8.79	21.52	Low
	ROSCI0025	Cefa	7.04	18.02	High
	ROSCI0099	Știucilor Lake - Sic - Puini - Bonțida	6.58	20.22	Low
	ROSCI0050	Crișul Repede upstream of Oradea	6.05	15.06	Low
	ROSCI0104	The lower meadow of Crișul Repede	5.66	13.83	Low

Project	Site code	Site name	Buffer score 15	Buffer score 50	Probability of negative impact on species
	ROSPA0115	Crișului Repede Gorge - Valea Iadului	5.41	10.55	Low
	ROSPA0104	Fizeș Basin	4.87	12.52	Low
	ROSPA0114	The Middle Course of Someș	4.72	11.19	Low
	ROSPA0123	Accumulation lakes on Crișul Repede	4.35	11.58	Low
	ROSPA0097	Cefa Fishery - Rădvani Forest	3.29	8.45	High
	ROSCI0021	Ierului plains	3.12	6.84	High
	ROSCI0231	Nădab - Socodor - Vărșad	1.75	4.05	High
Project 7.11	ROSCI0138	Bolintin Forest	15.09	16.24	High
	ROSCI0043	Comana	0.71	1.70	High
	ROSPA0146	Câlnistei Valley	13.37	10.11	High
	ROSCI0088	Gura Vedei - Șaica - Slobozia	1.03	2.44	High
Project 7.12.1	ROSCI0013	Bucegi	38.14	86.13	High
	ROSCI0352	Perșani	25.96	58.58	High
	ROSCI0314	Lozna	7.54	18.57	Low
	ROSPA0099	Hârtibaciului Plateau	6.51	15.50	High
	ROSCI0194	Piatra Craiului	6.18	14.53	Low
	ROSPA0165	Piatra Craiului	4.65	10.85	Low
	ROSCI0099	Știucilor Lake - Sic - Puini - Bonțida	6.10	19.13	Low
	ROSCI0043	Comana	4.47	10.90	Low
	ROSCI0227	Sighișoara - Târnava Mare	4.45	9.75	Low
	ROSPA0114	The Middle Course of Someș	4.28	9.93	Low
	ROSCI0394	Someșul Mic	2.63	6.59	Low
	ROSPA0098	Făgăraș Piedmont	3.20	7.46	Low
7.12.2	ROSCI0236	Strei - Hațeg	5.24	12.31	Low
	ROSCI0043	Comana	4.47	10.90	Low
	ROSCI0292	Corridor Rusca Montană - Țarcu - Retezat	3.53	9.16	Low
	ROSCI0063	Jiu Gorge	3.18	6.33	Low
	ROSCI0129	North of the Western Gorj	2.67	6.22	Low
7.12.3	ROSCI0236	Strei - Hațeg	5.24	12.31	Low
	ROSCI0043	Comana	4.47	10.90	Low
	ROSCI0292	Corridor Rusca Montană - Țarcu - Retezat	3.53	9.16	Low
	ROSCI0063	Jiu Gorge	3.18	6.33	Low
	ROSCI0129	North of the Western Gorj	2.67	6.22	Low

Details of specific situations:

Project 7.10

ROSPA0097 Pescăria Cefa - Pădurea Rădvani

In terms of the impact on the community interest species, we want to detail the situation within ROSPA0097 Pescăria Cefa - Pădurea Rădvani. The discussion regarding the situation of Great Bustard (*Otis tarda* , code A129) is presented in chap. 3.3. The situation of the species is well

documented in the period 2008-2020, with direct observations frequently made by ornithologists in Romania and Hungary. In 2020, the nesting of the species was proven, which represents a small local-regional success in terms of efforts to conserve this vulnerable species globally, and disappeared almost entirely from the entire historical area of Romania due to the anthropogenic impact (hunting, change of agricultural practices, etc.) exercised between 1950 and 1980. The project 7.10 pipeline route passes through the ROSPA0097 site north of the city of Salonta. In this area, the closest observations of the species are at distances of over 2-3 km. West of the town of Salonta, the project route passes through agricultural lands, over a distance of about 1600 m from the meadow area where the species is most frequently observed, an area where nesting is assumed. This area is not inside the site. If this route is maintained, we assume that there will be no direct and significant impact. However, speaking of such a rare species, and with such a small number (around 40 specimens in the country, more on the Hungarian side, across the border), more attention is needed in the form of route planning, the execution method applied, and, in particular, the implementation period outside the reproduction period. This means the prohibition of any works in the ROSPA0097 area, inside the site and outside of it in the area between Salonta and the border, between March and July. We recommend contacting the specialists [13] involved in the research and conservation activities of the Bustard, and the collaboration with them throughout the planning and execution of the construction - assembly works.

4.2.2.2 Impact assessment on the Community interest habitats in the case of unassessed projects

Below is the list of the sites with high scores in terms of potential impact on habitats (in order of the projects, we mention only the sites with a score higher than 10, where there can be a probability of negative impact). The probability of negative impact at site level is mentioned based on the impact scores and the expert opinion.

Table 48. Identification of sites which may have an impact on community interest habitats

Project	Site	Site name	Score of the impact on habitats in total per site	Probability of negative impact on habitats
7.5	ROSCI0384	Târnava Mică River	22	High
	ROSCI0130	Oituz - Ojdula	20	High
	ROSCI0292	Corridor Rusca Montană - Țarcu - Retezat	18	High
	ROSCI0037	Ciomad - Balvanyos	18	High

[13] https://www.dropia.eu/ro/contact, https://milvus.ro/team/attila-nagy/

Project	Site	Site name	Score of the impact on habitats in total per site	Probability of negative impact on habitats
	ROSCI0236	Strei - Hațeg	17	High
	ROSCI0374	Râul Negru	14	Low
7.9	ROSCI0184	Zamostea - Lunca forest	21	High
	ROSCI0391	Siretul Mijlociu - Bucecea	14	Low
7.10	ROSCI0021	Ierului plains	22	High
	ROSCI0322	Mount Șes	22	High
	ROSCI0050	Crișul Repede upstream of Oradea	20	Low
	ROSCI0231	Nădab - Socodor – Vărșad	19	High
	ROSCI0025	Cefa	18	High
	ROSCI0436	Someșul Inferior	18	Low
	ROSCI0099	Știucilor Lake - Sic - Puini - Bonțida	18	Medium
	ROSCI0049	Crișul Negru	16	Low
	ROSCI0104	The lower meadow of Crișul Repede	16	Low
	ROSCI0314	Lozna	14	Low
	ROSCI0048	Crișul Alb	13	Low
	ROSCI0410	Sucutard hayfields	12	Low
	ROSCI0302	Bozânta	11	High
7.11	ROSCI0043	Comana	21	High
	ROSCI0088	Gura Vedei - Șaica – Slobozia	19	High
	ROSCI0138	Bolintin Forest	16	Low
7.12.1	ROSCI0227	Sighișoara - Târnava Mare	20	High
	ROSCI0043	Comana	19	High
	ROSCI0088	Gura Vedei - Șaica - Slobozia	19	High
	ROSCI0099	Știucilor Lake - Sic - Puini - Bonțida	19	High
	ROSCI0122	Făgăraș Mountains	19	Low
	ROSCI0013	Bucegi	18	Low
	ROSCI0194	Piatra Craiului	18	Low
	ROSCI0436	Someșul Inferior	18	Low
	ROSCI0314	Lozna	17	Low
7.12.2	ROSCI0129	North of the Western Gorj	21	High
	ROSCI0236	Strei - Hațeg	21	High
	ROSCI0292	Corridor Rusca Montană - Țarcu - Retezat	21	High
	ROSCI0063	Jiu Gorge	20	High
	ROSCI0043	Comana	19	High
	ROSCI0088	Gura Vedei - Șaica - Slobozia	19	High
	ROSCI0109	Lunca Timișului	13	Low

Project	Site	Site name	Score of the impact on habitats in total per site	Probability of negative impact on habitats
7.12.3	ROSCI0292	Corridor Rusca Montană - Țarcu - Retezat	21	High
	ROSCI0129	North of the Western Gorj	21	High
	ROSCI0236	Strei - Hațeg	21	High
	ROSCI0045	Jiu Corridor	20	High
	ROSCI0063	Jiu Gorge	20	High
	ROSCI0109	Lunca Timișului	13	Low

The following section shows several conclusions about the possible impact on the habitats in these sites. The details regarding the presence of the criterion species and habitats are detailed at Chapter 3.3.

Project 7.5

ROSCI0037 Ciomad - Balvanyos

The cumulative score on the site is 18 (average likelihood for negative impact)**,** which in the case of the first segment is reduced to 5, because here the pipeline does not cross forest habitats, but potential habitats of protected species only. There is an old pipe corridor in the valley, if the existing corridor or the route of the 11C road is followed, the impact can be reduced or eliminated.

ROSCI0130 Oituz – Ojdula

Project 7.5 intersects the site on a considerable length (over 5km), which includes various altitudes. Consequently, in the absence of a relatively recent and detailed map of forest habitats, all habitats were considered potentially affected, with a cumulative impact of 20 (average likelihood for negative impact).

ROSCI0374 Râul Negru

The site is covered by the project 7.5 in two segments, both with the same impact score: 14 (average likelihood for negative impact). Given that there is an old pipeline that intersects the SCI, the river crossed by air, if the pipeline follows the route, and no interventions on the riverbed, the impact can be reduced to an insignificant level.

ROSCI0384 Târnava Mică River

The habitat 91E0* has a vegetation with a complex structure, is sensitive to changes in the water level and the soil structure, difficult to rehabilitate in the short and medium term, at the same time, it constitutes an important habitat of protected flora and fauna species. The cumulative impact on the habitats of the site reaches the score of **22** (high likelihood for negative impact). It should also be mentioned that there is a gas pipeline that follows the course of the Târnava Mică

River. If the existing pipelines corridors are followed and considerable measures are applied at the project level the impact on habitats can be prevented / eliminated.

The Eastring project option 1 intersects the ROSCI0384 site, but - based on the analysis of CLC biotopes - the impact on the 91E0* priority habitat can be excluded.

ROSCI0236 Strei-Haţeg

The ROSCI0236 Strei-Haţeg site preserves five habitats of community importance, one (6240* - Subpanonic steppe meadows) being a priority. The habitats of the site are potentially affected by the project 7.5, which, according to the indicated route, crosses the natural habitats from the site on fragments of 1798 m (segment *a*), respectively 32 m (segment *b*), and the sections Eastring option 2 and Eastring option 3.

In the case of project 7.5 the impact on the priority habitat 6240* - Subpanonic steppe meadows can be excluded, and in the case of three habitats (beech forests and hornbeam forests: 9110, 9170, 91Y0) there is a potential direct negative impact; the possibility of direct impact on the caves closed to the public (8310) cannot be excluded, as it is an area rich in different sized unmapped caves. Thus, the impact score on segments *a* and *b* of the section that crosses the site is 17 (average likelihood for negative impact). In the case of segment *a*, the pipeline crosses the RONPA0533 reservation, a forest reserve, with a mature forest - it is recommended to plan the pipeline on the DN66 road route, in order to minimize the impact - it crosses valuable habitats, sensitive to fragmentation. For segment *b*, it is also recommended to plan the pipeline in less valuable areas, such as along the DN66 road route, which would significantly prevent the direct impact on sensitive habitats.

With respect to the Eastring option 2 and Eastring option 3 sections, the pipeline runs through both pastures and deciduous forests, and based on the evaluation made based on available information regarding the project, the Community importance 6240* priority habitat is potentially affected; the cumulative impact score reaches 21 (high likelihood for negative impact) in both cases.

ROSCI0292 Corridor Rusca Montană - Ţarcu

The ROSCI292 site has been designated for the protection of six Community importance habitats, one of which is a priority. Based on the analysis of satellite images and Corine Land Cover categories (in the case of Eastring sections), we can say that the direct impact is possible in the case of project 7.5, respectively of Eastring option 2 or Eastring option 3 projects.

Of the six protected habitats, in the case of project 7.5, based on the indicated route, three habitats are potentially affected (9110, 9170, 91V0); two habitats cannot be decided on the basis of the existing data, though, there is a risk of negative impact (habitats 6510, 9410). The cumulative impact score on habitats is 18 (high likelihood for negative impact). The main risk comes from the fact that the section passes through the mature forest. It is recommended to drive the pipeline through less valuable areas, such as along, or near the DN68 road, in order to

reduce the impact on forests, which are complexly structured habitats, with expensive and long-term rehabilitation possibilities, but also a place for feeding and breeding for most protected species living on the site.

In the case of the Eastring op.2 or Eastring op 3. project, the categories intersected by CLC biotopes are pastures and deciduous forests in both cases, so here the possibility of impact on grassland habitats (6510) must be considered. Thus, the cumulative impact reaches the score of **21** (high likelihood for negative impact)..

Project 7.9

ROSCI0184 Zamostea - Lunca forest

It is a meadow forest site, which also includes a reservation with the same name, protecting two types of forests of Community importance: 91F0 and 91Y0. Riparian mixed forests (91F0) are a rare habitat in the country, difficult to recover, especially because of the specificity of the water regime, and because of the loss of the specific biotope due to the expansion of agricultural and urbanized areas in the valleys of large rivers. It is equally an important habitat for most of the onsite preserved species. The Dacian oak and hornbeam forests are more widespread nationally, they have a well-stratified structure, but with less complex requirements compared to the water factor, so they are easier to restore in the long run.

According to the indicated project route, the site is intersected by project 7.9 in three segments, one of which does not affect the preserved habitats, but crosses important biotopes for the onsite protected species, thus summing up the score of **5** . The other two segments have a potential impact on the above-mentioned habitats, one with a considerable length of over 1 km, which also passes through meadow wood vegetation. Thus the cumulative score of the direct impact reaches **21** (high likelihood for negative impact).

The impact can be prevented / eliminated if the pipeline is projected on the eastern side of the river, outside the site limits, or it is decided to sub-cross this section of about 900 m by a directed horizontal drilling.

ROSCI0391 Siretul Mijlociu – Bucecea

The site preserves a single type of habitat, relatively common in protected areas (6430 - Hydrophilous tall herb fringe communities), with a good potential for medium and long term rehabilitation, especially if intact fragments of habitat in the area exist in the area. Project 7.9 has a potentially negative impact on Hydrophilous tall herb fringe communities. However, given the potential for rehabilitation, and the fact that the on-site protected species use this type of habitat optionally, alternatively, or in certain periods, the score of qualitative impact is **14** (average likelihood for negative impact).

Project 7.10

ROSCI0021 Ierului plains

The site was designated for the protection of ten plain habitats, meadows and steppe shrubs (1530 *, 40A0 - priority habitats), wetlands with aquatic and terrestrial vegetation (3130, 3150, 3260, 3270, 6430), respectively woody vegetation - steppe and alluvial forests (91I0 * - priority habitat, 91A0, 91F0). Based on satellite images, we were able to rule out the possibility of a negative impact on mixed riparian forests (91F0) and Euro-Siberian steppic woods (91I0). The hydrological factors balance is very sensitive in the area, both due to past changes and in the context of climate change, so - although their structure in terms of stratification is not very complex - wetlands and related habitats already highly fragmented need special protection.

According to the estimated route, the site is covered by the 7.10 project on 3 segments, two of which pass only through arable land, without directly affecting natural or semi-natural habitats, with the impact score 0. The first passes at a distance of 200 m from Lake Vasad - sensitive wetland - here an examination of the groundwater depth and stopping the expansion of invasive species in the construction phase are elements that must be considered in concrete analyses in the following stages.

The third segment crosses 3212 m of natural or semi-natural habitats, including one swamps area, here the score of the impact amounts to 22. So the total score of the impact on the site is 22 (high likelihood for negative impact).. To reduce the impact on wetlands, we recommend analyzing the possibility of route planning in the area of the Sălacea - Pișcolt road, thus avoiding the areas with protected natural habitats.

ROSCI0025 Cefa

Based on the analysis of satellite images of the probable project route 7.10 that crosses the site and intersects in three segments between 57m and 4594 m long, it was possible to exclude the direct impact on the riparian mixed forests (91F0), the other four being potentially affected (1530 *, 3160, 6430 , 6510). Intermediate habitat scores vary widely, both in terms of rehabilitation possibilities, structure characteristics and uniqueness of habitats.

The simplest structured are the salt steppes and salt marshes (1530*), usually with a single grassy layer, but - in addition to the water factor - they also depend intensely on the concentration and level of salts in the soil, so after an impact aimed at changing the soil structure, they cannot recover in a sequence. Though there are successful experiments restoring this type of habitat (especially in the area of Pannonian saline steppes), these interventions require recovery of abiotic factors, active planting/sowing, weed removal, subsequent introduction of stress-tolerant species in most cases. From protected flora and fauna viewpoint, the most important habitats are dystrophic lakes (3160) and hygrophilous weeds (6430).

Thus, the impact score for each of the segments that intersect the site reaches 18, the total score being also 18 (average likelihood for negative impact). The first segment goes through

regenerating forest vegetation - which requires a detailed analysis of the type of vegetation before construction. The direct impact on the habitats in the construction phase, can be reduced on segments 2 and 3, because there is already a pipeline, which crosses the site. The horizontal drilling directed to the sections where community habitats will be identified can apply, in order to prevent/eliminate the impacts.

ROSCI0048 Crișul Alb

It is a site with wetlands, mainly preserves grassland and woodland habitats associated with running water and the alluvial area (6430, 6440, 6510, 92A0, 91F0), respectively peripanonic subcontinental bushes (40A0). The latter is the only priority habitat preserved on this site, but - following the satellite images analysis - the direct impact on this habitat can be excluded. Habitat impact scores 91F0 were considered with a low weight, as the probability of impact is very low.

On a short segment, the site intersects project 7.10, which crosses the river Crisul - it is probably an aerial or underpass pipe through horizontal drilling, which would be recommended. This is a short segment, where the biggest threat in terms of biodiversity is the invasion of non-native plants. The total score of the impact on the site is 13 (average likelihood for negative impact).

ROSCI0049 Crișul Negru

It is a wetland site, preserving communities of hygrophilous weeds (6430) and willow and poplar galleries (92A0). It is a case very similar to the ROSCI0048 site, but the preserved species are more intensely attached to the mentioned habitats, respectively, the share of more complex structure habitats (92A0) is higher. Thus, the impact score on habitats reaches 16 (average likelihood for negative impact).

On a short segment, the site intersects project 7.10, which crosses the river Crisul Negru - it is probably an aerial or underpass pipe through horizontal drilling, which would be recommended. This is a short segment, where the biggest threat in terms of biodiversity is the invasion of non-native plants.

ROSCI0050 Crișul Repede upstream of Oradea

The site has been designated for the conservation of a single priority habitat, 91E0 * - Alluvial alder and ash forests, a habitat that provides a suitable biotope for most protected species on the site. It is strictly associated with running water and maintaining groundwater close to the surface in this area, thus being sensitive to changes in the hydrological regime. It has a well-stratified structure, with 3-5 layers of vegetation; in the mature stage the tree crown is also stratified, and in the well-preserved cenoses the guild of lianas also appears. As a woody habitat, its rehabilitation requires several decades, while the requirements for the hydrological regime can hinder the process of passive rehabilitation.

According to the analyzed route, there is a risk that the site is intersected by project 7.10 on three segments, one of which passes through a forest vegetation habitat, thus it could have a potential

direct impact on the priority habitat. The cumulative impact score is 20 (average likelihood for negative impact). The impact can be prevented/eliminated if the pipeline follows the existing village road or other technical solutions for route change / underpass trough horizontal drilling are applied.

ROSCI0099 Știucilor Lake - Sic - Puini - Bonțida

The site preserves grasslands (6210), salt marshes (1530 *) and steppe bushes (40A0 *) from Transylvania, associated with xerophilous forests of downy oak (91H0) and oak with sessile oak (91I0), respectively other habitats with a more mesophilic character or even associated with stagnant or flowing waters in this hilly area (3150, 6430, 6510, 91Y0).

The estimated route of the project 7.10 could cross the site on a segment of 707 m, in this case the impact on forest habitats was excluded from the analysis. If the estimated route remains unchanged, the salt and grassland habitats could be affected, two of which are a priority, and three are rare nationally. Thus, the impact score on habitats reaches 18 . The location of project 7.12 in relation to the site is not known, only that the intersection is not made on a route identical to project 7.10, so an increased impact can be exerted due to the two separate sources. For the Eastring option 1 project, we failed to rule out the impact on all forest habitats, thus the score raises to 19 (average likelihood for negative impact).

The final route planning must be carried out in such a way, that the intersection with priority habitats is avoided.

ROSCI0104 The lower meadow of Crișul Repede

The lower meadow of Crişul Repede river preserves three habitats associated with running waters in the Pannonian bioregion: rivers with muddy banks (3270), natural eutrophic lakes (3150) and willow and poplar galleries (92A0), all quite rare already at national level (with the score 4), due to intense anthropogenic changes, urbanization in the alluvial areas of the large rivers. The most complex structure belongs to the willow and poplar galleries, which - especially in the mature phases - can develop 4-5 layers of vegetation, including native lianas. The protected species on the site (fish, amphibians, mammals) use these habitats both as territory, for reproduction and for food. The first two habitats are relatively easily rehabilitated, but require fragments of a similar natural habitat nearby to repopulate the affected areas.

The site is intersected on a 310 m segment of project 7.10.1, the impact score (which cumulates the impact score of the three habitats, all potentially affected) is 16 (average likelihood for negative impact).

ROSCI0231 Nădab - Socodor – Vărșad

The site preserves a single type of habitat, saline Pannonian steppes (1530 *), priority habitat, representative formation in the Pannonian bioregion, composed of salted meadows and swamps,

especially important for the protected fauna of the site (potential rehabilitation, sensitivity and structuring - see the site ROSCI0025).

Although the score is only 19 (average likelihood for negative impact), there is a risk that natural and semi-natural habitats of the site are intersected in three segments by the project 7.10, all with potential direct impact on the habitat 1530*, To eliminate the impact on this particularly important habitat, it is strongly recommended to analyze the possibility of re-planning the pipeline route towards other, less valuable areas, so that the priority habitat is completely avoided, such as the DN79 road area, or find other technical solutions that prevent the damage to the priority habitat (underpass). The indicated section now passes along its entire length through salted meadows with different conservation statuses, already withstanding several anthropo-zoogenic pressures.

ROSCI0302 Bozânta

The ROSCI0302 site protects two wetland and mesophilic grassland habitats: 6440 (alluvial meadows) and 6510 (low altitude meadows). Both the regeneration potential and the complexity of the vegetation are average for these two habitats, and - due to the incomplete form - the importance in the life cycle of the species has been calibrated at an average level. It is crossed by project 7.10, which can affect both habitats, thus the score summed up is 11 (average likelihood for negative impact). It is recommended to cross the site and the river by horizontal drilling, or aerial pipeline.

ROSCI0314 Lozna

The site Lozna, of Community importance, has been designated for the conservation of forest habitats of various types: Dacian beech and acidophilic beech (9130 and 9110). Dacian and Middle European hornbeam oak forests (91Y0 and 9170), respectively Pannonian – Balkanic turkey oak – sessile oak forest forests (91M0), of which only the turkey oak and the sessile oak forests will not be potentially affected by the pipeline in project 7.10.

For small mammal and amphibian species conserved on the site, forest habitats are of particular importance, but most of them are not exclusively attached to a specific forest habitat. As representatives of the woody vegetation, they have a complex stratification and a medium regeneration potential - so its rehabilitation is possible, but has a long duration (the formation of the mature forest requires at least 50 years) and active effort.

Project 7.10 intersects the site on three short segments, two of which may affect natural forest habitats, the score summed up is 14 (average likelihood for negative impact). In both cases the effect can be significantly reduced if the project follows the route of the road 109E. In the case of the Eastring project option 1 the impact on habitat 91M0 cannot be excluded, here the impact score raises to 17 (average likelihood for negative impact).

ROSCI0322 Mount Șes

The site mainly preserves forest habitats in the low area of the Apuseni Mountains, a total of 17 habitats, of which 8 have woody vegetation, and those containing rocks, meadows and wetlands are closely interlinked. During the analysis of satellite images we managed to exclude the direct impact of project 7.10 on most non-forest habitats (3260, 3270, 6240 *, 7120, 8210, 8220). Potentially affected forest, grassland and shrub habitats generally have a highly complex or complex structure, low regeneration potential and great importance in the conservation of Community importance species on the site.

Project 7.10 intersects mature forests on 2 short segments, so the impact score reaches 22 (high likelihood for negative impact) . Reducing the direct impact is possible by bypassing the site.

ROSCI0410 Sucutard hayfields

The site has a steppe nature, similar to ROSCI0099, but officially preserves one habitat of community importance only (6210), it is a site with a small area. Xero-mesophilic meadows are not particularly rare nationally, they have a medium regeneration potential, a vegetal carpet consisting of two, maximum three layers of grasses and grassy dicotyledons, while the species preserved in the site (two species of amphibians) use this habitat type optionally. The site is crossed by the route of the project 7.10; on the current route it does not threaten the habitat, but if the route changes 200-250 m, the habitat will be potentially affected. The current proposed route passes through a reedbed and wet meadows, a valuable habitat for the bird species on the site. The cumulative impact score over the habitat is 12 (average likelihood for negative impact).

ROSCI0436 Someșul Inferior

It is a meadow site, located at the border of the Pannonian bioregion, but already in the continental bioregion, which preserves alluvial habitats from the minor riverbed, designated for the protection of mixed meadow forests of *Quercus, Ulmus, Fraxinus* (91F0), which are rare nationally. They are habitats with a complex structure, low potential for natural regeneration, especially due to the long period of formation of the characteristic tree layer, and also the invasion of non-native species and the rarity of these habitats native flora.

The site is intersected by project 7.10 on a short segment (138 m) and Eastring option 1 (272 m), both with an impact score 18 (average likelihood for negative impact) on the protected habitat. It is recommended to use the horizontal directed drilling method to avoid impacts on the habitats.

Project 7.11

ROSCI0043 Comana

Complex plain site with a high biodiversity, preserves 15 types of habitats, most associated with wetlands (92A0, 91E0 *, 91F0, 3270, 3260, 3160, 3150, 3130, 6430), others associated with the steppe-forest area. Out of the 15 community importance habitats, ten are potentially affected by the project, and 4 of the ten potentially affected habitats are priority habitats. The value as a

biotope for protected species is very high, lower in habitats 6430 and 40C0, the complexity of the layers varies between 1-5, due to the diversity of habitats (1 - for aquatic habitats, 5 in protected forests).

The site is intersected by the projects 7.11and Eastring option 1 or 2. Project 7.11 crosses the site on three segments of 100m, 828m, respectively 895m, having impact scores of 19, 20 and 20, the total score being 21 (high likelihood for negative impact). On the longest segment there is already a pipe, so the impact can be prevented/eliminated by following the already existing route.

For Eastring option 1 and 2 the impact score is 19 (average likelihood for negative impact). In this site the cumulative impact of two major projects can represent a problem.

ROSCI0088 Gura Vedei - Șaica - Slobozia

It is a meadow site, which conserves only forest habitats of streams and riparian forests (92A0, 91F0) with a complex or very complex structure (91F0), medium regeneration potential and special importance in species conservation.

It is covered by project 7.11, respectively Eatring options 1 and 2, the impact score for each project being 19 (average likelihood for negative impact). In the case of project 7.11, the pipeline crosses the alluvial forest, which is already very fragmented, thus it is recommended to adjust the section to the already existing cuts or under-crossing.

ROSCI0138 Bolintin Forest

The site preserves the largest oak forest in the plain area of the country, protecting three forest habitats (92A0, 91M0, 91Y0). All have a medium or weak regeneration potential, which requires active long-term rehabilitation interventions, complex or very complex stratification.

The pipeline follows the SCI boundary with minor exceptions, and the intersection with the forest habitat appears to be due to a planning error. The trajectory must be kept outside the boundaries of the site. In this case, the main impact would be that of the invasion of non-native plants, or other forms of temporary disturbance. The calculated impact is 16 (average likelihood for negative impact).

Project 7.12

ROSCI0122 Făgăraș Mountains

Mountain-subalpine site, which preserves 18 types of habitats, of which 11 potentially affected by the Eastring project option 1, and in the case of 7 habitats the direct impact cannot be ruled out for sure. The impact score per site is 19 (average likelihood for negative impact).

The site form contains a species that does not appear as a criterion element in any other site in Romania: *1927 Stephanopachys substriatus.* This small species of beetle has not been found in

the targeted research to reconfirm it (according to the information in the Management Plan) and the likelihood that the species be affected by the project is highly unlikely.

ROSCI0194 Piatra Craiului

The site has been designated for the protection of 18 habitat types of Community interest, of which 3 are priority, and 32 species of Community interest. Based on the Habitats Directive 4 species are a priority.

Based on information from the intersection of Corine habitats, the impact on priority habitat 91E0 * cannot be excluded, nor on the rest of the non-priority habitats in the site.

The score of the impact on habitats is of 18 (average likelihood for negative impact)**.**

ROSCI0227 Sighișoara - Târnava Mare

The site has been designated for the protection of 17 habitat types of Community interest, of which 5 are priority, and 38 species of Community interest, of which 4 are priority. In the absence of coordinates, no relevant conclusions can be drawn, due to the complexity and large size of the site. The impact score is 20 (average likelihood for negative impact)**.**

ROSCI0063 Jiu Gorge

The site has been designated for the protection of 21 habitat types of Community interest, of which 4 are priority, and 26 species of Community interest, 5 with priority. The impact on habitats 6410 and 6430 cannot be ruled out. The impact score is 20 (average likelihood for negative impact).

ROSCI0109 Lunca Timișului

The site has been designated for the protection of 6 habitat types of Community interest, of which 1 is priority, and 22 species of Community interest, none a priority. The impact on habitats from the standard form cannot be ruled out. The impact score is 13 (average likelihood for negative impact).

ROSCI0129 North of the Western Gorj

The site has been designated for the protection of 24 habitat types of Community interest, of which 4 are priority, and 34 species of Community interest, 6 with priority. The damage to these habitats cannot be ruled out, as the exact route is not known and the intersection distance is large. The impact score is 21 (high likelihood for negative impact)..

ROSCI0045 Jiu Corridor

According to the PM, the site has been designated for the protection of 18 habitat types of Community interest, of which 4 are priority, and 22 non-priority Community interest species.

The management plan includes 2 rare habitats, which are not mentioned in the standard form:

6260 * Pannonian and western-Pontic grasslands on sands - habitat that is not listed in any other site in Romania according to standard forms.

2130 Coastal fixed dunes with herbaceous vegetation (gray dunes) - the habitat is not listed in any other site in the continental region of Romania, being present in the coastal area of the Black Sea coast.

The Eastring project variant 3 can affect these habitats, which are of great conservative value. The habitat may be present in Corine types 211, 231 and 511, especially in the south of the site. We recommend increased attention if the Eastring Project will be implemented on this option, and the planning of the final route taking into account the location of the site habitats, with the consultation of specialists involved in research and site administration.

The impact score is 20 (average likelihood for negative impact).

We see that a large number of SCI sites can suffer negative impacts with a medium to high probability. This is not surprising, due to the specifics of the works, which strongly (but mostly temporarily), during execution and on relatively small areas) change the habitats intersected by the work corridor.

The method employed, which also includes the expert's opinion based on available satellite imagery, includes an estimate of the presence of habitats of Community interest in the area intersected by the work corridors, the potential impact and the suggestions for prevention/elimination and reduction. But this method has limitations in terms of accuracy. Also, there is not enough information in order to determine the significance of the impact and the residual impact, analyses that need to be done at project phase.

A set of general and specific measures for the intersected site are presented at chapter V. Complying with these measures, as well as including new measures during environmental assessments from the project phase will determine the elimination or reduction of impacts till an insignificant level. Thus, the integrity of the sites and Natura 2000 network will not be affected.

4.2.3. Assessment of the impact on site conservation objectives

With regard to the conservation objectives, their impact must be analyzed in detail at project level, for each site, taking into account the significance of the impacts. Based on available information, at Plan level, we do not have the possibility to analyse the importance of the impact on the conservation objectives in case of projects for which the analysis of the impact on the environment has not been yet completed in order to obtain the environmental agreement. Based on the existing information, at projects' level from the "Do Minimum" scenario, respectively taking into account the preliminary results from the standardised analysis made in this study, we can mention as follows:

Natura 2000 sites generally have conservation objectives and management measures grouped into categories:

a) Conservation of the criteria elements (species and habitats), maintenance and improvement of the conservation status

By its nature, the studied Plan does not contain elements that contradict the objectives set out. The impacts generated can cause temporary dysfunctions in the conservation of the criterion elements, and therefore more in-depth studies are needed at the site level, and compliance with and improvement of the established prevention and reduction measures.

b) Inventory and detailed evaluation of the criterion elements

The plan can have a positive contribution to the inventory objective by conducting field studies of species and habitats of Community interest, in the project phase, during environmental assessments. This data must also reach the site administrators, as an additional measure dedicated to supporting efforts to conserve natural capital.

c) Relationship with local communities, awareness of natural values, promoting the sustainable use of natural resources

The relationship between the administrators and the local communities, awareness of natural values and promotion of sustainable use are objectives that can be achieved in the medium or long term. By continuing the collaboration between the Beneficiary, the Contractor and the Administrator and the environmental authorities, there is a presumption that this objective is not jeopardized by the implementation of the projects in the plan.

d) Management of visitors and sustainable tourism promotion of the values of protected areas

With regard to tourism promotion, this objective may be affected in the short term, during the implementation period, because of the inconvenience caused and because of the undesirable interventions on the landscape. By streamlining the work, and relatively fast advancing the installation of the pipes, this inconvenience will be minimized.

e) Information, awareness and ecological education

Environmental information and education activities will not change, as they take place repeatedly, at least annually, in various forms. We remind you that through the evaluations for the environmental studies, this objective can receive added value through receipt of the information obtained.

f) Administration of protected areas

The management of protected areas is the general objective, and will not be affected by the implementation of the plan; however it is necessary to facilitate the communication and the decision making involving all the decision makers within the management

structures, and consulting the specialized forums and the public opinion. The protection and safety corridors of the existing and new pipes are in the records of the administrations, or will be taken into account by the administration structures, considering all the legal provisions.

g) Monitoring and evaluation of management efficiency

The monitoring activities of the project elements represent an opportunity to support the site management activities, by obtaining data that can also be used to implement the management plans.

4.2.4. Conclusions on impact assessment

Although the impact on species and habitats can be manifested in a large number of sites, and for some sites we can talk about a high probability of negative impacts on criterion elements, these are identified on relatively small areas, and mostly during the construction phase. Considering the relatively small areas (less than **0.05%** of intersected sites in the case of projects unassessed from "Do-maximum" scenario and only **0.0066%** according to data extracted from project environmental assessment studies of the "Do-minimum" scenario) of the corridors in which these impacts may occur, all the conditions for the prevention, elimination and reduction of these impacts are fulfilled by applying the measures proposed in this study and the ones developed in the subsequent analysis. The purpose of this analysis was the identification of these possible impacts and the identification of the Natura 2000 locations / sites where impact can occur, so that this information is available to the decision makers, planners and beneficiary.

We also know that the projects provided in the "Do-maximum" scenario do not involve new pipeline constructions on all studied lengths, and in many sections the routes will be designed in areas where there are already gas pipelines, following their maintained safety corridors.

Neither the "Do-minimum" scenario nor the "Do-maximum" scenario represent interventions that would generate impacts that would jeopardize the achievement of the objectives of the management plans or the long-term conservation objectives of the sites, if the proposed measures are taken into account. Thus, the integrity of the sites and the network of protected areas of community interest is not affected by the implementation of the Plan.

The potential impacts reviewed and identified can be substantially reduced by adopting during the implementation of PDSNT a strategy for managing the impact and potential effects on biodiversity, starting with the planning phase, the execution phase and the post-construction phase. By applying monitoring activities during and after the completion of the project execution phase, these measures can be completed and improved. The proposed general measures are presented in Chapter V.

4.3 Cumulative impact

The cumulative impact of the Plan can be reviewed in the light of the proposed strategic projects, and of the affected Natura 2000 sites.

Among the strategic plans and projects that can generate a cumulative impact on the level of protected natural areas in the Natura 2000 network together with the projects included in the Plan, we have identified the following:

Projects within **the Energy Strategy of Romania 2020-2030, with the perspective of 2050** :

- Construction of a new power set of 400 MW ultra-critical parameters in Turceni

  ROSCI0045 Jiu Corridor - in buffer 1 km, 75.3 ha

  This site is intersected by project 7.12, option 3.

- Construction of 90 MW hydroelectric power plants on the Jiu River (Livezeni, Dumitra and Bumbești Hp)

ROSCI0063 Jiu Gorge overlapping with RONPA0933 Jiu Gorge National Park, 8.59 ha inside the site, 3.46 ha in buffer 1 km

This site is intersected by the project 7.12, option 2 and 3

- Construction of hydroelectric power plants on the Olt River – 145 MW (CHE Lotrioara)

  ROSCI0122 Fagaras mountains, in buffer 1 km 2.56 ha

  This site is intersected by the project 7.12, option 1.

Projects within **General Transport Master Plan of Romania**:

There are a large number of projects that intersect Natura 2000 sites within the Transport Master Plan. Among these, we identify the projects with a potentially significant impact on sites intersected also by projects in the Do-maximum scenario of PDSNT:

Table 49. Projects within the General Transport Master Plan of Romania with potentially significant impact in relation to the projects in PDSNT

site code	Site name	Probability of significant	Projects intersection

		impact by the projects in MPGT	in the "Do Maximum" scenario of the Plan
ROSCI0063	Jiu Gorge	Yes	7.12.3, 7.1
ROSCI0382	River Tarnava Mare between Copsa Mica and Mihalt	Yes	7.5
ROSCI0385	River Timis between Rusca and Prisaca	Yes	7.5, 7.1
ROSCI0394	Someșul Mic	Yes	7.12.1

These two strategic plans contain projects that can affect many sites in the time horizon on which they are carried out. This is a good starting point for analyzing the cumulative impact on projects to be assessed for environmental agreement. The transport infrastructure and energy infrastructure projects are investments that involve physical interventions, often linear (roads, railways, runways, overhead or underground power lines, etc.), with a similar spectrum of possible impacts (but much more significant, being of permanent impacts) with that of the projects for the development of the gas transport system from the analyzed Plan, which has first of all temporary impacts, during the construction period.

At site level, the cumulative impact with any other investment that is not included in the strategic plans, but which involves physical interventions of a magnitude similar to the construction and maintenance of gas transmission infrastructure, will have to be analyzed. These include, but are not limited to, maintenance projects - repairs of transport infrastructure, water infrastructure - sewerage, tourist infrastructure, and other types of utilities. The agricultural and forestry sectors will neither be neglected, especially interventions that are meant to change land use.

With respect to the known pressures and threats, listed on the one hand in the standard forms, and detailed in the management plans, these are possible sources of cumulative impact when manifested simultaneously with project impacts, with overlaps primarily within the location, of time and at the same time at the level of protected species and habitats that may be affected by the projects within the plan.

A summary of the pressures and threats that are listed for the intersected sites is shown in Annex III.

The most frequent impact categories reported are the following:

E03.01 Storage of the household waste / waste from recreational facilities - in 16 SCI

D01.02 Roads, highways - in 14 SCI

C01.01 Extraction of sand and gravel - in 13 SCI

I01 Non-native invasive species (allogeneic) - in 13 SCI

B02.04 Removal of dry or drying trees - in 11 SCI

B03 Logging without replanting or natural restoration - in 10 SCI

H01 Air pollution, airborne pollutants - in 9 SCI

J01.01 - Fires in 9 SCI

A04 Grazing - in 8 SCI

E01.02 Discontinuous urbanization - in 8 SCI

H01.08 Diffuse surface water pollution caused by sewage and wastewater - in 8 SCI

H05.01 Garbage and solid waste - in 8 SCI

J03.01 Reduction or loss of specific habitat characteristics - in 8 SCI

M01.02 Droughts and low rainfall - in 8 SCI

A04.01 Intensive grazing - in 7 SCI

A04.03 Abandonment of pastoral systems, lack of grazing - in 7 SCI

B02.02 Forest clearing - in 7 SCI

D02.01.01 Suspended power and telephone lines - in 7 SCI

E01 Urbanized areas, human habitats (human dwellings) - in 7 SCI

E04.01 Agricultural infrastructures, landscape constructions - in 7 SCI

F02.03 Recreational fishing - in 7 SCI

H01.05 Diffuse surface water pollution caused by agricultural and forestry activities - în 7 SCI

J03.02 Decrease of habitat connectivity, due to anthropogenic causes - in 7 SCI

K01.02 Clogging - in 7 SCI

A03.03 Abandonment / lack of mowing - in 6 SCI

A05.01 Animal husbandry - in 6 SCI

A07 Use of biocides, hormones and chemicals - in 6 SCI

A10.01 Removal of hedges and groves - in 6 SCI

B02 Forest and plantation management and use - in 6 SCI

B06 Grazing in the forest / in a forested area - in 6 SCI

F03.02.03 Traps, poisoning, poaching - in 6 SCI

K01.01 Erosion - in 6 SCI

K01.03 Depletion - in 6 SCI

K02.01 Change in species composition (succession) - in 6 SCI

Residential and commercial developments: Houses and settlements - in 6 SCI

Among those listed, we consider that the execution of gas transmission projects can cause cumulative impacts with the following:

D01.02 Roads, motorways

C01.01 Extraction of sand and gravel

I01 Non-native invasive species (allogeneic)

B02.04 Removal of dry or drying trees

B03 Logging without replanting or natural restoration

J03.01 Reduction or loss of specific habitat characteristics

D02.01.01 Suspended power and telephone lines

K01.02 Clogging

K01.01 Erosion

K01.03 Depletion

K02.01 Change in species composition (succession)

Detailed project-level evaluations will take into account this accumulation of factors, and will propose specific measures.

We suggest a cautious approach in assessing the cumulative impact, with the intention of avoiding the overlap in space and time of the execution of the projects in the Plan with other projects of similar magnitude. Planning of the works is crucial, because most of the activities that come from the achievement of the projects will exert only temporary impacts.

A special situation is the intersection or proximity of several strategic projects from the TYNDP with the same Natura2000 sites, or other categories of protected areas. This situation appears in the following table:

Table 50. Sites intersected by several strategic projects in PDSNT

Site code	Site name	Strategic project intersection
ROSCI0043	Comana	7.2
		7.11
		7.12.1/7.12.2
ROSCI0088	Gura Vedei - Șaica - Slobozia	7.11
		7.12.1/7.12.2
ROSCI0099	Știucilor Lake - Sic - Puini - Bonțida	7.10
		7.12.1

ROSCI0138	Bolintin Forest	7.1 7.11
ROSCI0236	Strei - Hațeg	7.1 7.5 7.12.2/7.12.3
ROSCI0292	Corridor Rusca Montană - Țarcu - Retezat	7.1 7.5 7.12.2/7.12.3
ROSCI0314	Lozna	7.10 7.12.1
ROSCI0384	Târnava Mică River	7.5 7.12.1
ROSCI0436	Someșul Inferior	7.10 7.12.1
ROSPA0104	Fizeș Basin	7.10 7.12.1
ROSPA0114	The Middle Course of Someș	7.10 7.12.1

The accumulations are largely due to project 7.12 (Eastring). Thus, we can anticipate that the cumulative impact of the execution of the projects would present a challenge if these projects were carried out simultaneously, in the same calendar year. This is very unlikely, due to the different time horizon of these projects. As part of the planning and to prevent the accumulation of the short-term impact, measures will be taken to avoid commencement of several gas transmission corridor projects simultaneously within, and in the vicinity of, Natura 2000 sites.

V. Measures to prevent, avoid and reduce impact

Below we present the general measures to prevent, avoid and reduce the impacts, based on known and envisaged forms of impact, and the results of impact assessment for unregulated projects.

Table 51. General measures to prevent, avoid and reduce the impact:

Component	Code	Measure	Result
Planning, design and environmental impact assessment	M1	Appropriate assessment and environmental impact assessment will be started in the early stages of design and continued throughout the development and implementation of projects, with particular emphasis on those projects that may have negative effects on protected areas (Natura 2000 sites and other protected natural areas).	Reducing environmental costs
Habitat loss Habitat alteration Disturbance	M2	Rigorous scientific substantiation of appropriate assessment studies, respecting best practices in the field for projects that intersect or are designed in the immediate vicinity of Natura 2000 sites. Impact assessment and avoidance / reduction / compensation measures will take into account the ecological needs of species and habitats of Community interest and the conservation objectives of the sites, in order to maintain the integrity of the sites.	
Fragmentation	M3	The design of the routes and the technical solutions adopted for the realization of the gas transport elements will take into account the approach aimed at preventing and avoiding impacts from the design phase. The hierarchy of solutions adopted will aim to avoid impacts on Natura 2000 sites and other protected natural areas, develop solutions to reduce impacts, and compensate impacts only as a last resort.	Prevention of impacts
	M4	Avoid intersecting the boundaries of protected natural areas in the case of natural gas transport projects where this is possible.	

Component	Code	Measure	Result
	M5	Where it's possible, tracking existing corridors of gas transport infrastructure when designing new pipelines, including water crossing points.	
	M6	Avoiding from design phase to intersect new elements of gas transport projects with priority habitats, either by choosing routes that bypass the areas where such habitats are identified or by approaches of under or over crossing to avoid direct impact.	
	M7	If avoiding the intersection of protected areas is not possible, resources must be maintained for establishing the final route based on the identification of sensitive areas from the intersection area, thus avoiding the impact on the main conservation objectives and prevent the endangering of the integrity of the sites. The final routes will be established according to the recommendations made in the appropriate assessment studies and / or in the impact assessment studies. Applying the concept of "micrositing" can be a measure to reduce the impact on a small scale.	Avoid damaging the sensitive points from protected areas, minimising the impact from the design phase
	M8	Integration of solutions with the lowest impact on the biodiversity components and on the sensitive areas from the technical projects, such as under-crossing of watercourses by directed horizontal drilling, avoiding forested areas, floodplain areas, meadows and wetlands. Tracing new transport routes mainly in agricultural lands.	Reduce impact on natural values
	M9	In case projects intersect protected natural areas, all technical solutions that can reduce the affected areas to a minimum will be considered. No construction site organisation will be made inside protected areas. Access roads, material and earth deposits will be reduced to what is strictly necessary, and solutions to narrow the working corridor will be adopted.	Reduce the perimeter where the impact takes place
Monitoring and additional measures Occurrence of non-native and / or invasive species	M10	Training of staff with minimal knowledge of protected species and habitats, and measures to reduce the impact on them.	Application of reduction measures at local level.
	M11	Development and implementation of a Biodiversity Monitoring Plan. The monitoring will be started at the time of picketing the route and continued after the completion of the works. Reporting the current state as well as complying with the measures included in the environmental agreement to the environmental authorities. The success of measures to avoid, reduce	Increasing the success of reduction measures. Gather important information on the residual impact.

Component	Code	Measure	Result
		and compensate for the impact will be analyzed, and whether other measures are needed.	
	M12	In the case of works that require the stripping of some land surfaces (most of the construction-assembly works of pipes or pipe repairs), especially if these works are implemented over long distances and in a continuous form (working corridor), the monitoring and management of invasive non-native plants is required to prevent their establishment and spread within and in the vicinity of protected areas.	
Habitat alteration Disruption	M13	In the case of overlaps with sensitive areas, maintaining the possibility to by-pass, or applying solutions to avoid the destruction of elements of high biodiversity value, such as secular trees, periodic ponds, springs, bogs and other wetlands, species-rich meadows, colonies of mammals or birds or any other values identified by applying the concept of "micrositing".[14] This measure is a recommendation based on good practice from the field.	The possibility of preventing and reducing impacts on a local scale, through expertise and collaboration between experts in biodiversity conservation, executor and beneficiary.
	M14	By carrying out interventions on surface water bodies, any changes on the flow of water, banks or substrate that could significantly affect species of Community interest strictly dependent on water (fish, amphibians, reptiles and mammals) must be avoided.	Prevention of damage to water bodies and aquatic species
	M15	Planning the access of the equipment on the already existing access roads, limiting the construction of new access roads to the strictly necessary. Avoiding the access of the equipment during rainy periods or in extreme drought, in order to prevent the phenomena of accentuated erosion.	Reduction of affected areas. Prevention of erosion phenomena.
Mortality	M16	Solutions to avoid structures that can create traps for wildlife. Application of fencing for amphibians, reptiles and small mammals. The works will be done in stages, without keeping ditches dug for long periods of time.	Reducing mortality rates caused by project implementation.
	M17	If areas where there are colonies or individuals of protected animals or plants cannot be bypassed, and their impact cannot be prevented by other methods, temporary capture and relocation shall be considered.	
	M18	Identifying areas where collision of animal machinery is likely during the execution phase and implementing measures to prevent this: installation of fencing to control small mammals and herpetofauna, speed	

[14] Micrositing is a concept that makes small changes to the location of a project at the local level, before execution, without influencing the technical solution adopted

Component	Code	Measure	Result
		limitation, inclusion of tubular bridges, staff training, etc.	
	M19	Avoid storing dangerous or harmful substances, poisons, antifreeze, oil or other toxic substances in the work perimeters.	
Disturbance	M20	Avoidance of periods of high sensitivity to species of Community interest present in the project execution area, as identified in the specialized studies, and planning of works outside these periods. If the sensitivity periods are different for the identified species, the most optimal periods will be chosen taking into account the specifics of the area and the species that use that segment in the most intensive way. For example, in the case of a segment that can separate wetlands from forests, the spring migration period of amphibians will be completely avoided. Areas where many species of birds of Community interest nest (eg heron colonies, shore swallow colonies, birds of prey nests) should be avoided between April and June. No work will be carried out in riverbeds during the breeding season of fish species. Work will be carried out in short segments and in a short time to reduce the inconvenience caused.	Reduction of disturbance, prevention of decreased reproductive success, prevention of mortality caused by project implementation.
	M21	In case of intersection with special avifauna protection areas (SPAs), the planning of works outside the breeding period will be considered, avoiding the periods: - March - June in forest habitats and near them up to 50 m of edges - April - July in open habitats	
	M22	Reducing noise during execution by choosing high-performance machines, and avoiding the simultaneous use of several machines.	Reducing noise disturbance.
	M23	Avoid light pollution at night. The use of security lights inside and in the vicinity of protected areas shall be limited to the minimum necessary.	Reducing the disturbance caused by artificial light pollution.
	M24	Prohibition on bringing, feeding and keeping dogs, cats or other pets in the execution areas inside and in the vicinity of protected areas.	Reduction of disturbance caused by domestic animals. Reducing indirectly caused wildlife mortality.
	M25	Avoidance of accidental pollution with substances from the maintenance of the machine park. Prohibition of maintenance work inside and in the vicinity of protected areas, surface waters and in the area of localities.	Prevention of soil and water pollution.

Component	Code	Measure	Result
	M26	Prohibition of disposing of food waste in the area of work surfaces, to avoid attracting large carnivores.	Preventing unwanted interactions between large carnivores and humans.
	M27	Proper waste management, compliance with the measures imposed by regulatory acts on environmental protection.	Reducing pollution by abandoning waste.
	M28	Prohibition of the capture, killing, collection or disturbance of animal species in the area of working corridors. Prevent the destruction of any form of shelter or breeding structures. Limiting the presence of the personnel responsible for the execution works in the perimeters designated for the works.	Reducing mortality rates caused by project implementation.
Barrier effect	M29	Avoid creating ecological barriers (for example between feeding and roost areas, feeding and breeding) by maintaining the site for long periods of time. The excavation works will be carried out in stages, keeping the site active only for short distances.	Ensuring habitat connectivity. Prevention of the barrier effect exerted on the fauna.

The measures described at table 51 are broadly formulated and can be applied to all strategic projects that have not been assessed and authorised from an environment protection perspective.

Below we present the specific measures recommended for the prevention and reduction of the possible and probable impacts indicated in Natura 2000 sites for the projects that have not been regulated until the moment of the analysis of the Plan. Specific measures based on the in-debth environmental studies from the design phase will be formulated and added the environmental agreement stage.

Table 52. Meeasures proposed for the prevention and reduction of possible impacts in case of Community interest habitats, including the priority habitats

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected habitat of Community interest	Potentially affected priority habitat	Measures proposed to prevent and reduce impacts
7.5	ROSCI0130	Oituz - Ojdula	Rehabilitation / replacement of pipes	9110, 9130, 91V0, 9410	91E0*	When setting the location of the works, avoiding the priority habitat 91E0* will be taken into account. In case of need to design new pipes, using the existing corridor, respectively design the pipes near DN11 road. Avoiding the impact on the

						mature forests from the site.
	ROSCI0037	Ciomad - Balvanyos	Rehabilitation / replacement of pipes	9110, 9130, 9170, 91V0	No	Use existing corridor. If the case of designing new pipe sections occurs, this should be done in parallel with 11C road, avoiding as much as possible intersecting the site, as the road represents the southern border in this section.
	ROSCI0384	Râul Târnava Mică	Rehabilitation / replacement of pipes	No	91E0*	When setting the location of the works, avoiding the priority habitat 91E0* will be taken into account. Preserving the existing corridor, river over-crossing or under crossing in the existing crossing locations, avoiding cutting mature trees.
	ROSCI0236	Strei - Hațeg	New pipe	9110, 9170, 91Y0, 8310	No	Careful design to avoid the intersection with the protected area of national interest RONPA0533 Pădurea Slivuț (overlapped with ROSCI0236) – the indicative route received from the Owner has a section that runs parallel with the border of the protected area intersecting it on a distance of about 250m. From the design phase, the areas with caves will be avoided. Designing the new pipe in the area overlapping with ROSCI0236 site will be considered in the parallel vicinity with DN66 road in order to prevent the impact on the forest habitats.
	ROSCI0292	Rusca Montană - Țarcu – Retezat Corridor	New pipe	9110, 9170, 91V0, 6510, 9410	No	For habitats 9110, 9170 and 91V0: the plan should take into account to avoid as much as possible the mature forest and plan the

				Maybe 6520		route in the vicinity parallel to the DN668 road. Habitat 6520: including some rapid rehabilitation measures where avoiding the impact is not possible. In order to set the final route, develop measures to prevent / avoid and reduce the impact from the planning phase.
7.9	ROSCI0184	Pădurea Zamostea - Lunca	New pipe	91F0, 91Y0	No	Plan the pipeline east of Siret River, outside the limits of the site or undercrossing this section of about 900 m, which intersects the floodplain forest vegetation, through directed horizontal drilling.
7.10	ROSCI0021	Câmpia Ierului	New pipe	Wetlands and meadows	1530*, 40A0*, 6240*	Plan the pipeline on the existing corridor in Buduslă – Vășad area. Bypassing from the planning phase the Sălacea meadow, because here a complex of priority habitats were mapped during an evaluation carried out during 2019 – 2020.
	ROSCI0322	Muntele Șes	New pipe	Community interest forest habitats	91E0*	From the planning phase, considering to bypass the site in Bătrânu – Bucea area, by engineering the pipeline to the eastern and southern part of the site.
	ROSCI0231	Nădab - Socodor – Vărșad	New pipe	No	1530*	Planning the pipeline in the vicinity parallel to DN79 road, or over crossing / under crossing the salted meadows of Nădab area.
	ROSCI0025	Cefa	New pipe	3160, 6430, 6510	1530*	During the planning phase, analyse the regenerating wood vegetation and plan the pipeline to bypass on the eastern part, or undercrossing the area (on

						a distance of 300m) in Berechiu area. Using the existing corridor or bypassing the site, by planning a new pipeline near DN79 road in Mădăraș – Marțihaz – Cefa area.
	ROSCI0099	Știucilor - Sic - Puini – Bonțida Lake	New pipe	6210, 6430, 6510	1530*, 40A0*	Bypassing the site from the planning phase to the eastern part in Sucutard area. When setting the location of the works, avoiding 1530* and 40A0* habitats will be taken into account. Measures to prevent / avoid and reduce the impact at planning phase, in view of avoiding the areas with protected habitats.
	ROSCI0410	Sucutard hayfields	New pipe	Maybe 6210	No	Avoiding from the planning phase the semi-natural meadows type 6210, by planning the route of the pipeline between the two fragments of the site, along the DN 109C road.
	ROSCI0302	Bozânta	New pipe	6440, 6510	No	Crossing the site and the river by horizontal drilling or aerial pipeline, or plan it on the eastern end.
7.11	ROSCI0043	Comana	New pipe	The majority of critical habitats are potentially affected	1530*, 40C0*, 91AA*, 91I0*, 91E0*	When setting the location of the works, avoiding priority habitats will be taken into account. Use the existing corridors and / or planning the pipeline in the vicinity parallel with 5B road that crosses the site in Căminească – Schitu area. Analyse the distribution of habitats possibly affected in a study at planning phase. Measures to prevent / avoid and reduce the impact at planning phase.

	ROSCI0088	Gura Vedei - Șaica – Slobozia	New pipe	92A0, 91F0	No	Adjusting the route to the already existing cuts from the riparian wood vegetation or over / under crossing them. Measures to prevent / avoid and reduce the impact at planning phase.
7.12.1	ROSCI0227	Sighișoara - Târnava Mare	New pipe	There is not enough information	There is not enough information	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0043	Comana	New pipe	There is not enough information	There is not enough information	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0088	Gura Vedei - Șaica - Slobozia	New pipe	There is not enough information	There is not enough information	Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0099	Știucilor - Sic - Puini - Bonțida Lake	New pipe	There is not enough information	Maybe 91H0*, 91I0*	Avoiding from planning phase the site to the eastern side of Sucutard. Measures to prevent / avoid and reduce the impact at planning phase, in view of avoiding the areas with protected habitats.
7.12.2	ROSCI0129	North of Gorjul de Vest	New pipe	There is not enough information	Maybe 4070*, 91E0*, 7220*, 9180*	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of

						Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0236	Strei - Hațeg	New pipe	There is not enough informatio n	Maybe 6240*	Avoiding the intersection with steppic subpanonian meadows or under /over crossing them. Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0292	Rusca Montană - Țarcu – Retezat Corridor	New pipe	Maybe 9110, 9170, 91V0 6520 6510	No	For habitats 9110, 9170, 91V0: The planning should consider avoiding as much as possible the mature forest and projecting the route in the vicinity parallel with DN68 road. 6520 habitat: inclusion of some rapid rehabilitation measures where impact cannot be avoided. Development of measures to prevent / avoid and reduce the impact at planning phase, for the setting of the final route.
	ROSCI0063	Defileul Jiului	New Pipe	There is not enough informatio n	Maybe 40A0*, 7220*	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. When setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent /

						avoid and reduce impact at planning phase.
	ROSCI0043	Comana	New pipe	There is not enough informatio n	There is not enough information	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0088	Gura Vedei - Șaica - Slobozia	New pipe	There is not enough informatio n	There is not enough information	Measures to prevent / avoid and reduce impact at planning phase.
7.12.3	ROSCI0292	Rusca Montană - Țarcu – Retezat Corridor	New pipe	Maybe 9110, 9170, 91V0 6520 6510	No	For habitats 9110, 9170, 91V0: The planning should consider avoiding as much as possible the mature forest and projecting the route in the vicinity parallel with DN68 road. 6520 habitat: inclusion of some rapid rehabilitation measures where impact cannot be avoided. Development of measures to prevent / avoid and reduce the impact at planning phase, for the setting of the final route.
	ROSCI0129	North of Gorjul de Vest	New pipe	There is not enough informatio n	Maybe 4070*, 91E0*, 7220*, 9180*	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. When setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent / avoid and reduce impact at planning phase.

	ROSCI0236	Strei - Hațeg	New pipe	There is not enough informatio n	Maybe 6240*	Avoiding the intersection with steppic subpanonian meadows or under /over crossing them. Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. At setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0045	Jiu Corridor	New pipe	Maybe 2130	Maybe 6260*	Analysis of distribution of Community interest habitats in relation to the location of the project and plan the final route taking into account the location of the habitats from the site, with consulting the specialists involved in research and site administration, as the site shelters very rare habitats. When setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0063	Defileul Jiului	New pipe	There is not enough informatio n	Maybe 40A0*, 7220*	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. When setting the location of the works, avoiding the priority habitats will be taken into account.

						Measures to prevent / avoid and reduce impact at planning phase.

Table 53. Measures proposed for the prevention and reduction of possible impacts in Community interest species - specific cases

Project code	**Site code**	**Site name**	**Type of investment foreseen in the overlapping area**	**Potentially affected species of Community Interest**	**Potentially affected species code of Community interest**	**Measures proposed to prevent and reduce impact**
7.10	ROSPA0097	Pescăria Cefa - Pădurea Rădvani	New pipe	*Otis tarda*	A129	Measures to prevent / avoid and reduce the impact at planning phase. Planning the route, the applied method and especially the implementation period outside the breeding period between March and July. We recommend contacting the specialists involved in activities of research and conservation of the bustard, and collaboration with them on the entire phase of design and esecution of construction and installation works, as we speak of a very rare species on a national level.

We recommend conducting field assessments, and documenting the results in a spatial database, so that design engineers have clear information (polygons drawn in GIS applications) on the location of vulnerable elements, of high conservation value. Often profile studies, in an attempt to meet all the requirements of form and content, are not easily interpretable by people outside the field. Therefore, maps and annexes must be executed to a high standard, but also in an easy to understand form. At the same time, it is recommended that specialized assessments and recommendations be made with the involvement and close collaboration with people who know the situation in the field: custodians, administration staff (if any), biologists or ecologists who were involved in collecting data for management plan, rangers, forestry staff, hunting fund administrators, representatives of local environmental NGOs, other interested persons and specialists. Thus, it is possible to identify areas that house species and habitats of conservative

interest, which might otherwise be overlooked in a routine analysis. Such areas of interest can be: secular trees, various wetlands of high conservation value (bogs, swamps, springs, temporary ponds), species-rich meadows, areas where birds of prey nest, colonies of birds (crows, herons), ground squirrel colonies *(Spermophilus citellus)*, bat shelter areas (buildings or other disused structures), oxbows of some rivers, and many other values, elements or fragments of some habitats. This is important because Natura 2000 sites are often very fragmented, and there are a few elements of the natural environment that host a large part of the species and habitats for which the site has been designated, while the site contains many areas of lower conservation value. Avoiding these elements while accurately tracing work lanes, access organization and construction site organizations is the best way to prevent and reduce impact. Of course, this is only possible in the case of tracing new infrastructure elements (routes). In the case of existing transport corridors, the routes will be followed exactly, as protection and monitoring corridors already exists there.

An important concept that can reduce the short and medium term impact of construction and assembly works is "micrositing". By providing a margin for design, by applying this concept of slightly deflecting the centreline of the pipeline inside the designated corridor (and thus changing the location of the actual excavation of the ground) can be a very effective means of avoiding and reducing the impact on local level, with concrete and important results. To apply the concept, specialists are needed who are present in the field during the picketing of the route.

The purpose of the measures presented is primarily to prevent and avoid possible negative effects. If prevention is not enough, and at the project level specific measures will be needed to reduce or even compensate for impacts, it is recommended that the achievement of objectives will be considered by applying the concept of "No net loss / net gain", a good practice on international level, described in the Guidance Note for Environmental and Social Standard 3 on Biodiversity and Ecosystems, document elaborated by European Investment Bank (2018). In short, the concept aims to avoid net losses of conservative values (biodiversity, ecosystem services), or, in case these cannot be avoided, to protect and restore the critical elements, resulting in a net increase of these values.

We specify that for the implementation of the projects foreseen in the Plan, regulatory procedures from the environmental protection sector will be carried out.

VI. Monitoring plan

6.1. Status of project-level monitoring proposals for regulated projects, and recommendations for future proposals

Within the environmental studies and regulatory acts related to the regulated projects within the "Do-minimum" scenario, there are proposals regarding the monitoring of investments during execution and during operation.

In the case of the project 7.1. *The development on the Romanian territory of the National Natural Gas Transmission System on the Bulgaria – Romania – Hungary – Austria Corridor*, the proposal of a detailed biodiversity monitoring program (chap. 4.1. Of the appropriate assessment study, Unitatea de Suport pentru Integrare -Cluj, 2016) is taken over within the medium no. 03 / 05.12.2016 issued by ANPM. The plan contains 4 actions for the construction phase, 6 actions for the operation phase, as well as 3 actions to remedy the effects of historical, residual and residual impact from the construction phases, and another 3 actions aimed at increasing the value of the perimeter for biodiversity in the operation phase. This plan is designed at a high level of detail, aimed at all elements studied and potentially affected, and with the clearly defined purpose of examining and improving the relevance of the measures proposed in the impact assessment procedure. The plan includes activities that are scheduled for both the construction phase (expected to be 24 months) and the operation phase, another 3 years from commissioning. The plan requires the employment of several independent experts in the fields of botany, zoology and ecology. The monitoring plan is complemented by a proposal for a Biodiversity Management Plan, with actions aimed at reducing the projected impact, as well as ecological reconstruction actions.

Regarding the project 7.2, in the environmental agreement no. 1 of 10.05.2018, there is a timetable for the implementation and monitoring of measures to reduce the impact on biodiversity, taken from the appropriate assessment study (Unitatea de Suport pentru Integrare -Cluj, , 2017) taking into account the period of execution and operation.

The appropriate assessment study for project 7.4 (SC Ramboll South East Europe SRL, 2016) recommends an approach similar to that presented in case of project 7.2, focused on monitoring and identifying areas and populations of habitats and species listed in the site forms (which are conservation objectives): habitats, mammals, ichthyofauna and birds of community interest. It is recommended to start the sessions in the pre-construction stage, with at least an inventory, the results of which will be compared with those obtained from the sessions during and after the completion of the works. For habitats, it is recommended to analyze the lost percentages of the areas occupied by habitats, their structural changes, to document the dynamics of the translocated elements. In the case of birds, a classical protocol is recommended, in order to identify the distribution, numbers of specimens, of reproductive pairs and reproductive success.

The mammal species monitoring protocol aims at inventorying the species in the project area at the site level, and analyzing the distribution of the species population. In the case of ichthyofauna, it is proposed to monitor downstream and upstream of the Moldova river crossing area and the river quality indicator on turbidity in the same area. For the period of operation, the proposed plan provides for biannual monitoring of habitats, invasive or non-native species, in order to study the degree of return to initial status. For avifauna, mammals and fish, the quarterly repetition of the already implemented protocol is foreseen, for 3 years from the completion of the works, with the addition of an element: the study of the change of intensity of the use of the area compared to the period before the project implementation.

No appropriate assessment study was required for Project 7.6. The Environmental impact assessment report (SC Greenviro SRL, 2017) contains a simpler biodiversity monitoring plan, including the execution phase and the post-construction phase (12 months), based on the verification of the corridor and the registration of species effectives, the ways in which they adapt, and the degree of vegetation cover in the first year after the site was given back to its original use, including the appearance of invasive species.

We note that there are considerable differences between the approaches in these environmental assessments to biodiversity monitoring, in terms of their structure and detail, but the aim is common: to check the condition in the field, before, during and after the implementation phase, to compare results with the data collected in the environmental assessments, and the verification of the degree to which the application of measures to avoid, reduce and compensate for impacts had the expected results. As these are investments similar to the projects in the “Do Maximum” scenario that have not yet been regulated by the competent authority for environmental protection, we can anticipate that these existing approaches can be used in the environmental assessments in the project phase.

6.2. TYNDP monitoring approach

At the level of the analyzed plan, a detailed program cannot be proposed to monitor the effects of each strategic project on the conservation objectives, species and habitats within the affected Natura 2000 sites. Such programs have already been proposed for some of the regulated projects in the “Do-minimum” scenario, and will be proposed in the studies that will be carried out for strategic projects that have not yet been regulated.

At the same time, within the Environmental Report there is a proposal for a monitoring program, based on the identified environmental objectives, and with indicators proposed for each objective.

The environmental objective on biodiversity identified in the environmental report is *OMR 7. Reducing the pressures due to the realization of the transport infrastructure of natural gas*

networks that lead to biodiversity damage. This goal is a general one, our goal being to propose solutions to achieve this goal. The measures proposed in Chapter V. are meant to contribute to the achievement of the objective, and below we propose a set of monitoring indicators of the analyzed Plan, which can be reported following the results of the monitoring programs from each strategic project.

Table 54. Proposed monitoring indicators for TYNDP

No.	**Ratio**	**Target**
1.	Number of implemented monitoring plans.	Each regulated strategic project.
2	Natura 2000 site surface intersected by the overlapping of the execution corridor of pipes, other elements - direct impact surface.	Significantly smaller area than estimated in this assessment.
3.	No. of locations / areas where prevention / reduction / compensation measures have not yielded the expected results and need to be improved through corrective measures.	Value tending to 0.
4.	No. of incidents with significant, unexpected impact, reported through monitoring schemes.	Value tending to 0.
5.	Habitat areas of community interest permanently affected due to project implementation (habitat loss).	Area significantly smaller than estimated.
6.	Habitat areas of Community interest temporarily affected by project implementation (alteration, fragmentation)	Significantly smaller area than estimated.
7.	Areas affected by the establishment of non-native or invasive species following the implementation of projects	Value tending to 0.
8.	Areas / sections where mortality has been caused among species of Community interest due to the execution or operation of projects.	Value tending to 0.
9.	Areas / sections affected by malfunctions due to project execution or operation - disturbance, human disturbance, barrier effect	Value tending to 0.
10.	No. of reports to the authorities.	Provided in the environmental agreement.

VII. Methods used to collect information on potentially affected species and habitats of Community interest

7.1. General

In order to identify and analyze the impact at the level of detail known for the projects that have not been subject to the environmental impact assessment procedure and have not been regulated by the environmental protection competent authority prior to the analysis of the Plan, applying a unitary approach was in request. Thus, for the projects that are not part from the "Do Minimum" scenario, the evaluators opted for two types of analyses, one aiming for the probability of affecting the Community interest species from the sites and the other aiming only at the Community interest habitats.

In the absence of implementing certain schemes to obtain field data on the numbers and location of the Community interest species and habitats from the area of execution of unregulated projects, the analysis based on resources that are unitary, official and all the same compatible with the GIS applications represent probably the only viable solution, which can highlight the areas with possible impact.

This situation led to the use of a unitary approach for analysis, combining GIS spatial analysis with scoring, and estimating the impact by analyzing all the available information and taking into account the opinion of the experts involved in the analysis.

The review highlights the places where there is a possibility of an impact - but does not exclude other locations, where local impacts may exist at project level.

It may happen that the reviews to highlight sites where there are circumstances for the manifestation of negative impacts with a high probability. Most of these impacts will occur only at the construction phase. Also, due to other factors, a large part of these impacts can be avoided from the design phase - e.g. route following a road, works carried out on existing pipelines corridors whose impact exists and has been regulated, or mitigation measures have been applied, such as horizontal drilling for underpasses of water or other sensitive areas, etc.

We tried to prevent these errors that are due to the uniformity of calculations, the large scale analysis and uncertain data on the location, magnitude and interventions by applying the concept of **Expert Judgment** - which uses the expert knowledge of other projects, locations from affected protected areas, analysis of the impact, vulnerability and the degree to which some habitats and species can be restored.

7.2. Methods for analyzing the impact on habitats of community interest

Potentially affected habitats of community interest have been selected based on satellite images, where the pipeline route was established in advance (projects 7.5, 7.10, 7.11, 7.9), or based on the types of Corine Land Cover biotope crossed (Eastring options 1-3). We started from the premise that the route will be the one received for analysis from the Owner, and that interventions such as excavation – installation in open ditch will be made. Thus, 3 habitat categories have been established on each site: potentially affected habitats, habitats whose level / possibility of impact cannot be decided in the current stage of the project, respectively habitats that will not be affected. When establishing the final impact score, only the scores from the first two categories were taken into account.

Each pipeline section at each intersecting site has been assigned a quantified value of the potential direct impact that will take into account the following characteristics of the potentially affected habitats:

- The unique nature of the habitat(s) covered;
- Habitat rehabilitation/regeneration potential;
- Priority category of the habitat(s);
- The complexity of the habitat(s) structure from the point of view of the component layers;
- The value of habitat(s) as a biotope of species of Community importance.

Within the impact analysis on each habitat, each variable received a score between 0-5, so the probability of the potential negative impact on the site will be determined using the sum of the scores for each variable, with a value between 0-25, where:

21-25 will represent a high probability of negative impact in the areas of intersection with the sites of community interest

11-20 will represent a medium probability of negative impact in the areas of intersection with the sites of community interest

6-10 will represent a lesser probability of negative impact in the areas of intersection with the sites of community interest

0-5 will represent an insignificant impact.

The probability of manifestation of negative impact at the level of some working sections that intersect sites of Community interest (SCI) is proportional to high scores or indicated by the expert's opinion. However, these scores are not sufficient to determine the scale of the impact and the residual impact. They represent the level of risk for the manifestation of the impacts in the analysed site.

Description of the analyzed characteristics:

The unique nature of the habitat has been determined by the number of sites where the habitat is protected, according to Gafta and Mountford, 2008, as follows:

5 - for protected habitats in 1-10 sites nationally,

4 - for protected habitats in 11-20 sites,

3 - for protected habitats in 21-30 sites,

2 - for protected habitats in 31-40 sites,

1 - for protected habitats in more than 41 sites,

Several aspects have been taken into account in the rehabilitation potential, from the international bibliography regarding the habitat management, i.e national sources, regarding the costs, the duration, the chances of habitat restoration:

5 - habitats that - once destroyed - cannot be actively rehabilitated, by applying specific measures

4 - habitats, where active rehabilitation is possible but risky and expensive, passive (by natural succession) cannot be rehabilitated,

3 - it is actively rehabilitated successfully according to the specialized literature, not by passive succession or requires a long time,

2 - passive succession rehabilitation is a good method, which only requires maintenance and monitoring,

1 - rehabilitation is spontaneously achieved by natural succession.

The score for the priority category is set with a binary method, 5 for the priority habitats and 1 for the non-priority habitats.

The complexity of the structures and vegetation layers is an indicator for the variability of the biocenoses supported by these habitats and has been established as follows:

5 - forests with 1-2 layers of crown, 1 shrub layer, 1-2 grass layer (which includes the moss layer),

4 - woody vegetation with simpler stratification (3 layers in total) or grassy vegetation with a very sensitive layer (eg swamps / peatlands with a complex moss layer, very important in maintaining the habitat),

3 - herbaceous vegetation with at least 2 layers (high dicotyledons, with grasses and short dicotyledons - typical hayfield),

2 - herbaceous vegetation with simple stratification of pasture, simple,

1 - pioneer type vegetation, with simple stratification.

The value of the habitat(s) as a biotope of species of Community importance has been established on the basis of the information provided in the standard form about the species of Community importance for which the site has been designated and taking into account the use of the habitat by the species, as follows:

5 - habitats used for various purposes (feeding, shelter, breeding place) by species from several groups of plants / animals, for some being of crucial importance in the life cycle, without alternatives (they cannot use other habitats),

4 - habitats used by several species / groups of species, but for which there are alternatives within the site,

3 - habitats used by a single protected species, or group, with the possibility of using other habitats within the site,

2 - habitats occasionally and optionally used by one species, or few protected species,

1 - habitats of no importance in maintaining protected species.

To establish the score for each variable, was calculated the average of the scores, rounded over the values of 0.5, with one exception - the priority category. Here, if there was a priority habitat that was reported to have a potential negative impact, the overall score was 5.

The final score of the impact on the on-site protected habitats resulted from the summation of the values by categories.

In the case of pipeline segments whose route has already been established and analysis based on satellite images was possible, recommendations have been made to avoid or improve the negative impact on habitats.

7.3. Methodology for establishing the categories of intensity of impacts in the case of species of community interest

The purpose of the methodology is to establish a common framework for calculating the intensity of impacts for species of community interest based on the effect on their habitats on the surface of intersected protected areas Thus, based on this methodology, the calculated results are comparable between sites. This has the potential to highlight a scale of intensity of impacts and to identify the sites for which the intensity can be high.

For the analysis, two large data sources were used as bases: habitat categories based on Corine Land Cover (for habitat category analyzes) and existing data on species of community interest in the standard forms and the analyzed protected area management plans.

Analysis of Corine Land Cover type habitats

Data extraction. The habitat analysis was based on the Corine Land Cover (CLC) data source, the 2018 edition, the source used was taken from the official page of the Copernicus Land Monitoring Service, the European Environment Agency service, https://land.copernicus.eu /).

For the analysis, the data were extracted, for all intersected areas, on two categories:

- **Habitat categories intersected by the analysis corridor 30 meters wide**, representing approximately the installation corridor of a gas transmission pipeline (15 meters buffer from the proposed linear route); these habitats were used to calculate **the direct impact** represented by direct interventions on the work corridors (in most cases by stripping the topsoil, maximum 30 m wide depending on the diameter of the installed pipe, the type of terrain and other technical parameters), impacts that may be present during the construction (temporary) only or felt after completion of the construction as well (medium or long duration), due to differences in the potential for rehabilitation that can be actively achieved (eg by planting tree seedlings) or naturally (spontaneous restoration of the habitat, return of species from neighbouring areas, etc.).
- **Habitats intersected by the 100-meter analysis corridor** along the pipeline (50-meter buffer in both lateral directions to the intervention corridors); this aisle does not include the previous aisle; these habitats were used to calculate **the indirect impact** , represented by fragmentation, disturbance, ruderalization, occurrence of invasive non-native species, and other forms of anthropogenic disturbance.

The data were extracted by habitat categories according to Corine Land Cover , while the areas were calculated for each category.

Calculation of intensity categories. The intensity categories were calculated separately for the two analysis colours (30 meters and 100 meters). To calculate the categories, for each type of intersected habitat, the percentage represented by the intersected area of the total area of the Corine habitat in the protected area was calculated. These values (percentages) obtained were used as a multiplication factor to obtain impact scores that reflect the percentage affected by that type of habitat.

Species analyzes

For species analysis, the official data existing in the standard forms of the protected areas were used. The lists of bird species were used for the Special Protection Areas (SPA). For Sites of Community Importance (SCI), all species in the groups for which the site was designated were used cumulatively. As in the case of habitats, the intensity categories were calculated separately for the two analysis colours (30 meters and 100 meters).

In the case of species, two different scores were calculated for the intensity categories. These scores are based on both the number of species and the percentage of the number of possible species affected from the total number of species listed for that site.

Score based on the number of species affected

The number of bird species was summed up for the Avifauna Protection Areas. In the case of Sites of Community Importance, the number of species in all taxonomic groups was added together. The values obtained were divided into three categories, from 1 to 5, based on the size. However, the allocation of values was done in reverse order, based on the principle that an area designated for a smaller number of species is more important (and therefore more vulnerable) for that group of species. Thus, the large values were included in category 1, and the small ones in category 5. Exceptions were the values 0 that were used as such (if the list of protected area contains no species dependent on that habitat). The categories of scores are as follows:

More than 20 species in FS: 1

16-20 species: 2

11-15 species: 3

6-10 species: 4

1 -5 species: 5

0 species: 0

Score based on the percentage of species affected

For each intersecting habitat category (either in the 30-meter or 100-meter corridor), the number of species that use the habitat was calculated (for example: if a grassland habitat is intersected, the number of species using that meadow habitat). The same species can use several types of habitats, which is taken into account in the calculations. Thus, if the plan items interfere with several types of habitats, normally the impact is greater.

For each intersecting habitat category (either in the 30-meter or 100-meter corridor), the percentage of species that use the habitat was calculated of the total of species for which the area was designated. For each of the intersected habitats, the number of species dependent on that habitat was related to the number of total species on the site, calculating the percentage represented by them. The values obtained were divided into three categories, from 1 to 5, the same as in habitats. Exceptions were the values 0 that were used as such (if the list of protected area contains no species dependent on that habitat).

0%: 0

1-10%: 1

11 – 20%: 2

21-50%: 3

51-80%: 4

81-100%: 5

The final intensity value for the species was calculated for each individual protected area, summing the scores obtained as follows:

CLC1 habitat: % occupied habitat x (species score +% species score) +

CLC2 habitat: % occupied habitat x (species score +% species score) +

.....

= SCORE for species

The final scores were centralized into a database. The scores for each site were verified by the study authors, and were used to determine the probability of negative impact on the intersecting sites. Because of the large differences between the resulting scores, the probability of negative impact is determined with the help of the expert's opinion, after review of each result greater than 2, verifying the elements that have led to that score, and comparing with other available quantitative and qualitative data.

VIII. General conclusions

8.1. General conclusions on the results of the appropriate assessment study

The assessment of the Plan on the Natura 2000 network effects was carried out by applying a quantitative and qualitative analysis, using a wide range of information sources. These sources include the Plan, as published by the Plan Holder, the environmental documentation of the projects or the evaluated project elements and approved by the environmental authorities (reports, impact assessments and appropriate assessment studies, environmental agreements), information on the location and the routes of the structural elements of the projects that are not yet in an advanced design stage, (coordinates obtained from the Plan Holder), communication during the official meetings from the plan holder's representatives and other types of public information.

The inclusion in this Plan of two development scenarios determined the analysis of the existing information. Thus, the Do-minimum scenario includes projects that are already approved, in completed design phases or in the execution phase. These projects have been previously analyzed in detail in terms of the impact on the natural capital in order to obtain the environmental agreement; this information is centralized and used in the analyzes performed on the strategic plan. The “Do maximum” scenario includes the projects from the first scenario, and proposes in addition the projects that are in various incipient planning phases. The analysis of these projects from the perspective of the impact on the Natura 2000 network was possible at the level of known detail only; this was carried out using a unitary approach, taking into account only the generally valid details and the approximate routes known at the time of starting the analysis.

The projects included in the “Do Minimum” scenario intersect 15 sites of Community interest (SCI) and 11 special protected areas (SPA).

The analysis of information extracted from the environmental studies carried out at project level provides significant clues on the magnitude of the impact of the entire scenario.

The impacts identified at projects level from this scenario remained at an approachable and reversible level with specific measures, without a significant residual impact.

Although the projects in the “Do maximum” intersect 37 sites of Community importance (SCI) and 17 special areas of conservation (SPA) in addition to the Do-minimum the magnitude of the impacts remains similar, and affordable through general or specific prevention and reduction measures. Although we cannot fully analyse the magnitude of the impact and the residual impact of these projects in the absence of technical details and the in-debth field studies, we have identified the areas where there is a theoretical possibility (not a certainty) of negative impacts on species and habitats of Community interest, at the level of individual Natura 2000 sites on one hand, and on the national Natura2000 network on the other.

Potential negative impacts that can occur at the implementation of the projects, in case of project intersections with certain sites, can be managed by conducting in-depth studies, for the environmental accord, and developing specific measures of prevention and reduction at site / project level.

Based on the results obtained from this assessment, we consider that the integrity of the sites intersected by the planned investments will not be significantly affected, as the areas where potential impacts can occur are relatively limited. Thus, the temporary impact takes place on an area of approximately 132 ha (0.006% of the intersected sites area) in total for the Do-minimum, plus an area of approximately 889 ha (0.048% of the intersected sites area) with an impact in the unevaluated projects. However, the area of 889 ha is only an estimate obtained by a theoretical estimate (based on analytical models) of the maximum possible impact area, the actual area is probably smaller due to the restriction of the work lanes, and the fact that there will be no interventions on all these areas and interventions will not be performed simultaneously.
However, there is a possibility that these projects will have a negative localized impact at certain sites, in certain sensitive areas within them; by the assessment carried out at the strategic level, our goal was to identify these locations where these impacts can affect protected habitats or species, and to propose a series of measures to prevent, eliminate and reduce them.
With respect to the community sites near the strategic projects that are not intersected by these we can say that no direct or indirect impacts will occur due to the specifics of the works - temporary interventions in well-defined work corridors. However, all sites and the nationally protected areas have been identified to be integrated into the further analysis if the strategic projects in the Plan will undergo changes in their location.

8.2. Review of difficulties

The difficulties consisted primarily in developing an approach adapted to the complexity of the examined plan.
The fact that the Do-minimum consists of strategic projects that went through a proper environmental impact analysis and assessment, while for other projects included in the Do maximum scenario much less detail was available, made it difficult to perform a comprehensive comparative analysis.
Another obstacle was the different approaches in the analysis of the environmental impact made by the different consultants who performed the evaluations, for the projects included in the Do-minimum scenario. The results were presented with different levels of detail and indicators, which represented a difficulty in performing a unitary analysis.
The routes of the projects not assessed in the Do-maximum scenario were made available to the consultant with the mention that these are only indicative routes that may undergo changes in the technical project phase.
The analysis of the project 7.12 Eastring has been a challenge from multiple perspectives. There are three options considered and only one will be implemented as a project. The decision on the final version is not yet taken.
The route of project 7.12 was not made available, as it is confidential; centralized information was provided with respect to the types of Corine habitats and classes of use of the crossed lands. Based on these, all the intersected sites were analysed in order to highlight the areas where there is a possibility (not a certainty) that some impacts may occur. From this information, we could not highlight with certainty which is the most favourable version in terms of affecting the natural capital, because there are several considerations for each. The choice of one of the 3 route

variants will be made later, taking into account several variables, in addition to the biodiversity component: characteristics of the proposed route, obstacles crossed, categories of lands crossed, technical and economical analysis, etc.

The results obtained from this analysis can only be a starting point for more detailed analysis, at project / environmental agreement level.

No recommendation can be made at this stage regarding the proposed route option for the Eastring project due to the too little information available. The choice of one of the 3 route variants will be made at the environmental impact assessment phase of the project, taking into account several variables, in addition to the biodiversity component: proposed route characteristics, obstacles crossed, categories of land crossed, technical and economic analysis, etc.

The absence of a national database with GIS support providing centralization of all the data on the location of conservation objectives (species and habitats of Community interest) is a general issue in such analyzes, where this data cannot be collected from the field.

With regard to the storage projects, one challenge in the achievement of the analysis was obtaining information on the location of the expansion or refurbishment projects.

Despite these difficulties, we believe that that the analysis performed provide satisfactory details and accuracy with respect to the goal of the study. We remind you that the Owner and the Consultant worked easily together, that the missing information was obtained upon request, to the extent the information existed and could be made available.

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Interconnection of the National Natural Gas Transmission System Romania with the similar natural gas transmission system in the Republic of Serbia; including power supply, cathodic protection and optical fiber, Transgaz SA, 2018

Replacement of the SMG Isaccea 1 natural gas measuring station, Transgaz SA, 2018

IX. Appendices

Annex I. Description of Natura 2000 sites intersected by PDSNT elements

Annex II Situation on the Community interest species and habitats present in the intersection area of TYNDP with Natura 2000 network

Annex III. Summary review of the forms of impact within the sites intersected by the PDSNT elements

Annex IV. Status of the Management Plans of the intersected sites, identified conservation objectives - table in excel format, available in electronic format