ARCADIS Design & Consultancy for natural and built assets

ROMANIAN SECTION OF THE BRUA NATURAL GAS TRANSMISSION CORRIDOR PROJECT

Environmental & Social Scoping Report

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Incorporating

EC HARRIS BUILT ASSET CONSULTANCY

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Initial Environmental Scoping Matrix from Scoping Workshop 08/11/16

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1 Introduction

1.1 Overview of the Project

SNTGN Transgaz SA Medias (Transgaz) are the licensed operator of the Romanian National Gas Transmission System. As part of a planned network expansion, they are currently seeking international financing support to construct, and subsequently operate, the Romanian section of the Bulgaria-Romania-Hungary-Austria Natural Gas Transmission Corridor (BRUA) Project (the Project). The Project will connect the existing Bulgarian and Hungarian transmission systems via a new pipeline that will run for some 528 km from Podisor in the southeast via Hateg to Horia in the west. The pipeline will interconnect with the existing systems at the Giurgiu IP and Csanadpalota Interconnection Points and will have 3 new Gas Compressor Stations (GCS) located at Podisor, Bibesti and Jupa. In so doing the Project will connect the Romanian national transmission corridor to the European Southern Gas Corridor and will also support connections to other potential offshore sources in the Black Sea.

The proposed pipeline will be mainly buried and for most of its route will follow existing pipeline corridors. It will cross 79 administrative units (municipalities) within 11 counties, and will affect some 20,000 land plots, although most will only be temporarily during construction. Permanent land take will be required at the 3 GCS locations, of approximately 40,000 m^3 in area.

The proposed pipeline route has been selected to minimise impacts on existing settlements and areas of ecological interest. It does however transect 7 Natura 2000 Sites, 6 of which have been designated for Habitats and one for Birds. Additionally, the route passes through the Dinosaurs Geo-Park, a site that is protected at a national level as a UNESCO site. The route will also cross 115 rivers (of which 11 are major rivers that will require horizontal directional drilling) and 319 irrigation channels, drainage channels and tributaries that will be crossed by open-cut excavations.

1.2 Purpose of this Scoping Report

The European Bank of Reconstruction and Development (EBRD) are considering providing finance to Transgaz to construct and operate the Project. Given the scale and nature of the project, the EBRD has designated the Project as a Category A under their Environmental and Social policy. As such the Project requires a comprehensive Environmental and Social Impact Assessment (ESIA) as well as a public disclosure and consultation process for a minimum period of 120 days.

The existing Project Environmental Impact Assessment (EIA) has been undertaken to meet the requirements of the Romanian regulatory process and was produced in accordance with guidelines developed by the National Environmental Protection Agency (NEPA) during their screening and scoping stages[1]. Whilst this was undertaken in accordance with Romanian national EIA requirements and incorporated consultation with the relevant competent authorities, no separate Scoping Report was produced and no information on the scoping process or outcomes (including any stakeholder consultation) is described in the EIA Report.

This supplemental Scoping Report is therefore intended to both complement the EIA and form part of the Supplementary Lenders Information Package (SLIP). The Report describes the Scoping Process used to address the gaps identified between the regulatory EIA process and the expectations of the EBRD's Performance Requirements (see Section 2).

[1] This regulatory EIA is referred to as the "BRUA EIA Report by SC Support Unit for Integration SRL, May 2016" the "Regulatory EIA" or the "EIA").

1.3 Identification of Environmental and Social Impacts not Previously Scoped In

Prior to the start of the Scoping work, a gap analysis was undertaken of the Romanian EIA and permitting process conducted by Transgaz, compared to EBRD's Environmental and Social Policy (2014) and associated Performance Requirements (PRs). The analysis was based on a desktop review of available Project documentation provided by Transgaz, interviews with Transgaz management and a site visit to the pipeline corridor. The analysis identified a number of gaps in the EIA's compliance with EBRD's PRs including requirements for further information on:

- the Scoping Process
- the Area of Influence of the Project
- potential cumulative impacts
- potential transboundary impacts
- the socio-economic baseline and socio-economic impacts
- stakeholder identification and engagement
- land owners or users who will be potentially affected
- land acquisition process and potential economic displacement
- Priority Biodiversity Features and Critical Habitats
- Biodiversity features outside of the Natura 2000 network and approach to 'no net loss/net gain' of biodiversity
- cultural heritage baseline information, assessment and definition of mitigation measures

1.4 Approach to Scoping

The Scoping process identified:

- The people and environmental resources (collectively known as 'receptors') that could be significantly affected by (or could affect) the Project; and
- The work required to take forward the assessment of those potentially significant effects.

Conclusions made at the scoping stage about potential significance are based upon professional judgement, with reference to the project description, and available information about the magnitude and other characteristics of the potential changes that are expected to be caused by the Project, the sensitivity of receptors to those changes and the effects of those changes on relevant receptors (and where relevant the value of the receptors). Potential effects on receptors have been considered in relation to both the Project Construction and Operational Stages. At this stage decommissioning was excluded from the detailed scoping because 1) impacts are expected to be similar to those of construction 2) with a 40+ year lifespan, approaches to decommissioning in the future are hard to predict. Decommissioning will, however, be done in accordance with Good Industry Practice (GIP) prevalent at that time

A Scoping Workshop was conducted from 8th to 9th November 2016 in Cluj, Romania, with the objective of identifying all potential environmental impacts during both the construction and operational phases of the Project. Scoping of social issues was subject to a separate workshop conducted by Green Partners. The workshop was attended by the individuals shown in **Table 1.1**.

Table 1.1: Scoping Workshop Attendees

Name	Role	Organisation
Rob Evans	Project Director	Arcadis
Claire Penny	Environmental Expert/Project Manager	Arcadis
Martina Girvan	Biodiversity Expert	Arcadis
Sergiu Mihut	Environmental Consultant	USI
Peter Moore	Senior Environmental Advisor	EBRD
Dana Bratu	Senior Consultant	ERM
Florin Tudor	Biodiversity Consultant	ERM
Dan Niculaie	Advisor to the General Director	Transgaz
Sorin Keszeg	Head of Project Management Services	Transgaz
Iulian Butnaru	BRUA PMU OHS Manager	Transgaz
Lucia Popovici	Head of Environmental Protection Department	Transgaz
Irina Pirtea	Head of Legal Department	Transgaz

To facilitate the discussion and to capture the outcome of the Workshop, a Scoping Matrix was developed that aimed to identify all relevant environmental topics for consideration. This also included sources of potential impacts, the receptors that would be impacted, whether or not an impact should be scoped in or out due to the likelihood of it being 'significant' (and the justification for why), and any outstanding actions/information required in relation to the assessment. The Scoping Matrix that was developed during the Workshop is provided in **Appendix A**.

The Scoping Workshop covered a minimum content for the study. Following the workshop, and as more information became available, additional consideration was also given to a number of other potential issues. The impacts presented in this Scoping Report therefore reflect a combination of the outcome of the Workshop and additional work undertaken to identify the likely significant environmental and social impacts of the Project.

1.5 Structure of this Scoping Report

The remainder of this report is structured as follows:

- **Section 2:** provides a high level overview of EBRDs environmental and social performance requirements. It also gives a summary of the Romanian national planning policy context and regulatory framework for EIA and permitting requirements.
- **Section 3:** gives an overview of the project selection process, including the background to and need for the project as well as alternative approaches that were considered.
- **Section 4:** describes the Project and construction methodology.
- **Section 5:** presents the outcome of the scoping process and identifies those impacts that have been scoped in for further detailed assessment as well as those that have been scoped out (and the reasons why).

2 Regulations and Guidelines

This Section provides a brief overview of the relevant Romanian and International Regulatory Framework. It also outlines the EBRDs environmental and social performance requirements.

2.1 EBRD Performance Requirements

EBRD financed projects are expected to be designed, implemented and operated in accordance with its' Environmental and Social Policy (2014) and to meet 10 Performance Requirements (as relevant) covering key areas of environmental and social impacts. Direct investment projects must meet PR's 1 to 8 and 10. Compliance with relevant national law is an integral part of all 10 PRs, listed below.

PR 1: Assessment and Management of Environmental and Social Impacts and Issues
PR 2: Labour and Working Conditions
PR 3: Resource Efficiency and Pollution Prevention and Control
PR 4: Health and Safety
PR 5: Land Acquisition, Involuntary Resettlement and Economic Displacement
PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
PR 7: Indigenous Peoples
PR 8: Cultural Heritage
PR 9: Financial Intermediaries
PR 10: Information Disclosure and Stakeholder Engagement

For the BRUA Project, PR 7 and PR 9 are not considered relevant as there are no indigenous peoples in Romania according to the definition in PR7, and PR9 refers to Financial Intermediaries and does not apply to this Project.

2.2 National Romanian planning policy context

The Project is part of a Ten Year National Gas Transmission System Development Plan, which comprises additional major investment projects by Transgaz to ensure the strategic and sustainable development of the natural gas transmission infrastructure in Romania and its compliance with the applicable European regulations. The Ten Year National Gas Transmission System Development Plan was approved by the Romanian Regulatory Authority for Energy (ANRE) through the Decision no. 2819/17.12.2014.

2.3 The Romanian Pipeline Law

The 'Romanian Pipeline Law" relates to certain measures necessary for the implementation of projects of national importance in the natural gas sector, and has been developed in part to facilitate the development of the BRUA pipeline. The Law was adopted by the Chamber of Deputies (the decisional chamber of the Romanian Parliament) on 20th September 2016 and was signed by the Romanian President on 19th October 2016. The Law (185/2016) was published in the National Gazette and came into force on 25th October 2016.

Within the law, 'pipeline' is defined as, "*upstream supply pipeline, natural gas transmission pipeline located on the territory of Romania, which forms the object of the project of national importance, including installations above the ground and all the related facilities consisting of supplies with electricity with above- and/or under-ground installation, access roads, water supplies, sewerage and fibre optic*".

The General Provisions of the law include the following:

- Article 3 derogates a number of existing laws to address the temporary occupation of forest land.
    - Any forest land that is the public property of the state can be occupied to enable construction works, free of charge, and no compensation will be paid for the loss of revenue from any wood that would have been grown.
    - Consent for any forest that is under private ownership will be obtained via signature of a document to certify that temporary occupation for construction is approved. Compensation

will be paid upon completion of the works equivalent to “rent and counter value of the growth loss determined by the exploitation of the wood mass”.
    - Where no owners consent is obtained because the owner is unknown or there are no valid land titles the land can be occupied without consent.
    - Within 50m of the edge of the wood, it is not necessary to obtain permission of the territorial structure of the central public authority for forestry.
- Article 4 derogates a number of existing laws to address the temporary occupation of agricultural land.
    - The temporary removal of agricultural lands are effected by the BRUA law, based on the resolution of the Government approving the list of relevant agricultural lands, without being conditional upon obtaining consent of the agricultural bodies or land owner.
    - The Project promoter (Transgaz) has a duty to submit the list of relevant agricultural lands along with the request for the building permit.
    - The competent authority will have a duty to reinstate the agricultural lands for their former use within 1 year of the expiration of the building permit.

Chapter 5 deals with procedure applicable to works issuance of other endorsements, permits and authorisations.

Article 22 (h) deals with cultural heritage. Specifically, endorsements need to be issued by the county directorates for culture:

- **In principle** – further to a request from the project promoter, accompanied a theoretical archaeological assessment, environmental consent and building permit (amongst other things) provided that, until the initiation of works, the promoter conducts intrusive archaeological diagnostics and preventive archaeological investigations. And;
- **Actual** – further to a request from the project promoter, accompanies by the results of the intrusive archaeological diagnostics, ordered by the theoretical assessment report and the archaeological investigation for the sites identified by the intrusive diagnostic.

Article 23 states that: “(1) By derogation from the provisions of Art. 22 para. (5) and (71) and of Art. 27 para. (1) of the Government Emergency Ordinance no. 57/2007 on the regime of protected natural areas, preservation of natural habitats, wild flora and fauna, approved as amended and supplemented by Law no. 49/2011, as subsequently amended and supplemented, the development of the projects of national importance in the natural gas sector is allowed in the areas of full protection and in the buffer areas in the national and natural parks, respectively for the projects of national importance in the natural gas sector, the final or temporary removal from the agricultural circuit and temporary occupation from the forestry land within the protected natural areas of national/international interest shall be performed.
(2) The provisions of this article shall apply and shall be taken into account by the competent authorities for environmental protection in respect of any procedures for assessment of environmental impact and procedures of adequate assessment, if applicable, for the projects of national importance in the natural gas sector in progress as of the date of coming into force of this law.”

2.4 Summary of other National Environmental Procedures

In general, for new projects in Romania, an Urban Certificate (UC) is initially needed in order to initiate the environmental permitting procedures. The UC defines the required technical parameters to be considered within an EIA and lists the approvals that are required for the project.

Transgaz has obtained 14 UCs for BRUA, 3 are for the gas compression stations and 11 were issued by each of the County Councils through whose administrative area the pipeline will pass. Each UC specifies the types of the approvals to be obtained from various authorities, utilities providers etc. in order to obtain the Construction Permit (CP). In total Transgaz has to obtain 423 approvals and agreements, including permits issued at local level required as precondition to obtaining the Environmental Agreement and then the Construction Permit (see below).

In Romania, environmental permitting of a project comprises three stages. The first two stages relate to environmental permitting during the construction stage (the first one being applicable only for plans and programs), whilst the third stage relates to the environmental permit required at the project operational stage.

Stage 1 - Environmental Approvals/Strategic Environmental Assessments (SEAs) for plans and programs (*aviz de mediu pentru planuri si programme*), in line with Governmental Decision (GD) no. 1076/2004, which transposes the Strategic Environmental Assessment (SEA) Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment.

The BRUA Project is part of the "Romanian Energy Strategy for 2016-2030, with perspectives for 2050", for which the Romanian Government has begun the process of completing an SEA. As such it is not expected that an SEA will be required for the Project itself.

Stage 2 - Environmental Agreement (*Acord de mediu*), in line with the GD no. 445/2008, which transposes the EIA Directive no. 85/337/EEC) with subsequent amendments and Ministry Order No. 135/2010, which describes the EIA permitting procedure. In accordance with the EIA Directive, the BRUA Project falls under Annex 1 - *Pipelines for the transport of natural gas, oil or chemicals with a diameter of more than 800 mm and a length of more than 40 km*, for which EIA is mandatory. The Guidelines for preparation of the EIA are detailed in Ministry Order No. 863/2002. Whenever projects have a potential impact on a Natura 2000 site, an Appropriate Assessment must also be undertaken in accordance with the EU Habitats Directive. The Environmental Agreement (in addition to permits issued by other authorities) is a pre-condition for obtaining the Construction Permit.

The Environmental Permit (Agreement) was issued on 05.12.2016. The permit (Section III) contains details of measures for the prevention, reduction and, whenever possible, compensation of the negative significant effects on the environment during construction. It also sets out (in Section IV) the conditions to be met 'during the accomplishment of the project'. These are included in **Appendix B** of this Scoping Report. The Permit obliges the constructor to draft the following plans:

- **Environmental Management Plan** which will include detailing the means to accomplish and comply with the conditions laid down by the Permit and measures proposed in the impact assessment report, reporting intervals, with responsibilities and terms.
- **Intervention Plan** in case of accidental pollution or other special situations which will include measures to be taken in these cases, the flow of reporting, responsibilities.

Stage 3 - Environmental Permit for Operation (*Autorizatie de mediu*), in line with national requirements (Ministry Order no. 1708/2007 on approval of the environmental permitting procedure), NACE code revision 2 – 4095- transport of gas through the pipelines.

This permit will not be issued until immediately prior to operations commencing and therefore is not expected until 2019.

2.4.1 Additional Permit Requirements

Table 2.1 outlines the additional permit requirements that are considered relevant:

Table 2.1: Additional Permit Requirements

Topic	Regulator	Current Status
Natura 2000 sites	The approvals from Custodians /administrators of the Natura2000 sites crossed by the Project	Approved: i) Nordul Gorjului de Vest; ii) Defileul Jiului National Park. Ongoing: iii) Padurea Bolintin; Not started yet: iv) Valea Oltului Inferior; v) Lunca Timisului, vi) Parcul National Gradistea Muncelului – Cioclovina No Custodians yet established: vii) Defileul Jiului, Parcul National Geoparcul Dinozaurilor Tara Hategului, viii) Strei – Hateg; iii) Rusca Monata - Tarcul Retezat; ix) Dealurile Dragasanului; x) Raul Timis between Rusca and Prisaca.
Water Management (water crossings)	Romanian Water Authority	Already obtained by Transgaz
Forestry approvals	Forestry authorities and public companies	Ongoing process
Cultural Heritage	Permit from national cultural heritage authority, based on county approvals.	A common approach for the type of the archaeological works (intrusive or non-intrusive prior construction) has not yet been defined and agreed at national level and this situation may cause delays in overall Project schedule. A contract was signed by Transgaz for theoretical and field observations studies in all 11 counties affected by the Project, however, theoretical studies are unlikely to be sufficient and intrusive works may be also required.

3 Project Selection Process

This Section summarises the background to and need for the Project, the assessment of route alternative that was performed by Transgaz and proposes the 'base case' or preferred route.

3.1 Need for the Project

Romania is the largest oil and gas producer in Central and Eastern Europe, but remains a net importer of both. Although the country has the EU's third-lowest dependence on energy imports, without new oil and gas sources this dependence is expected to exceed 50% in 10 years' time2. To address this issue, and as part of the European Southern Energy Corridor development, the gas network operators of Bulgaria and Romania signed a contract on 6 April 2016 to complete the Romanian-Bulgarian (Giurgiu-Ruse) gas interconnector linking the two countries.
The current National Transmission System (NTS) entry and exit points (located at Giurgiu and Nadlag) are connected by means of a pipeline system with a design pressure of 40 bar. However, the operating pressures do not exceed 30 bar and the diameter of the pipelines does not exceed 24". As such the existing NTS does not allow transportation of the gas volumes agreed in the Technical Agreements concluded between Romania and Bulgaria and Hungary. Romania had committed to provide bidirectional flow until 31 December 2016 towards Bulgaria and Hungary and to observe the agreed border gas volumes and pressures (30 bar at the Bulgarian border and 40 bar at the Hungarian border).

The BRUA project is part of a larger European level project and the investment is included in the list of Projects of Common Interest (PCI) (PCI 7.1.5 – Romanian section) of the European Union. As such, the construction of the pipeline has the following objectives:

- The diversification of natural gas supply sources in European markets;
- The transmission of natural gas volumes from the Caspian region to Central European markets;
- Assurance of 1.5 billion m^3 / year bi-directional gas flow to Bulgaria by the end of 2019; and
- Development of 4.4 billion m^3 / year reverse flow to Hungary as of 2019.

Key drivers for the Project also include the following:

- Helping Romania to achieve competitive transmission costs and consequently competitive gas transmission tariffs, as compared to other energy projects (including in comparison to the relatively high costs of liquefied natural gas produced in Northern African countries; representing one of the main gas supply alternatives);
- Meeting the forecast increase in demand in European countries in the context of an on-going decline in medium and long-term gas supplies from Russia.
- Ensuring future interconnection with pipelines supplying gas from the Black Sea region, helping to eliminate the risks of interruption of supply and provide constant energy for industrial production processes.

3.2 The Project Proponents

The beneficiary for this project is The National Gas Transmission Company**, '**Transgaz', that was established based on Governmental Decision no. 334/28 in April 2000. Transgaz's primary objective as a state owned

[2] These prospects could be significantly improved by the newly discovered Black Sea gas deposits. The largest gas deposit discovered in the Black Sea is the Domino-1 field, which could hold up to 84 billion cubic metres of natural gas. Therefore, Romania's natural gas reserves could see a twofold or threefold increase as a result of the development of Black Sea gas fields. As a result, the natural gas transmission system operator Transgaz SA is developing a pipeline which will feed the natural gas extracted from the Black Sea in the BRUA (Bulgaria Romania Hungary Austria) interconnector.

company is to provide and manage the infrastructure necessary for efficient gas transmission in Romania at a nation level, with its main focus residing in transmission, internal transit, natural gas dispatching and research-design in the field of natural gas. As the technical operator of the national gas transmission system within Romania, Transgaz is responsible for conducting its operations in accordance with relevant quality, safety, efficiency and environmental requirements. BRUA will connect to existing pipelines in Bulgaria, Hungary and Austria. However, the proponents involved in the construction of the other three sections of pipeline are not proponents for this project as these pipelines have already been constructed and therefore there are no transboundary impacts considered for this project.

3.3 Assessment of Alternatives

3.3.1 Design Parameters

At the project design stage, the following key parameters were taken into consideration:

I. **Safety and security**: Given both the strategic importance of the project (and investment), and the risks inherent in natural gas transport, the design sought to apply best practice in pipeline safety and technical quality wherever practical. For example, as with other Romanian pipelines of this nature, the Project has been designed to meet the requirements of "*ANRE Order no. 118/2013: Technical regulations for design and execution of gas transmission pipelines*";

II. **Economic criteria**: the design process took into account the most effective solutions to ensure a long design life aligned with minimal construction costs;

III. **Social criteria**: the aim was to select the pipeline route to minimise impacts on local communities during construction and operations. This meant avoiding, as far as possible, residential areas and existing transport routes.

3.3.2 Alternatives Considered

A number of route options were discussed for the project. These are described in the Project SEIA report.

Two main alternatives were also considered for installing the pipeline. Either to bury the pipeline beneath the surface or install it above ground. The advantages and disadvantages of each option are outlined below in **Table 2.2**.

Table 2.2: Advantages and Disadvantages of pipeline installation options

Approach	Advantages	Disadvantages
Above Ground Pipeline	Significantly lower construction effort and cost	• Significant social impact and fragmentation of the crossed areas. • Additional long term compensation costs relating to property rights. • Requires the inclusion of curved sections of pipeline to enable expansion of the pipeline due to temperature variations, or crossings (above or beneath) the pipeline to ensure access to each side. • Additional important pipeline protection must be considered during operational phase. • Permanent impacts on: the landscape/visual impacts; loss of land use function (agriculture etc.); fragmentation of habitats by creating a major artificial barrier.
Buried Pipeline	Limited residual environmental impacts during the operational phase.	• Requires an important financial as well as logistical and human effort, during construction phase.

Whilst the resources and cost required for a below ground pipeline were greater, this solution was preferred as it has a reduced environmental and social impact, especially regarding habitat fragmentation over the lifetime of the project.

4 The Project

This Section describes the main components of the proposed (preferred) Project and the main construction and operation activities.

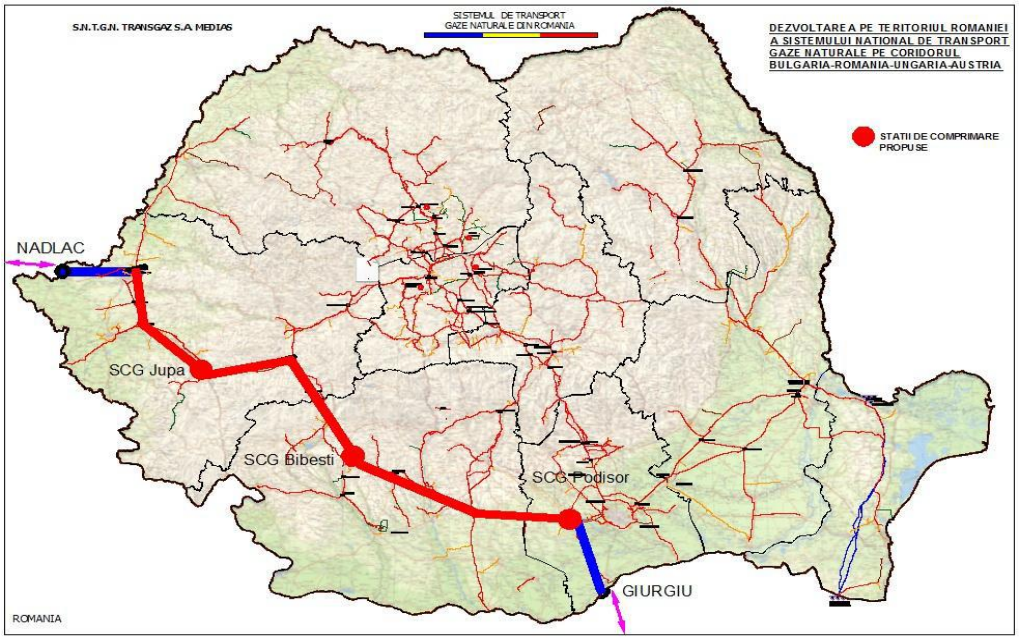
4.1 Description of the proposed Project

4.1.1 Description of the development

The proposed pipeline will run between the Podişor Gas Compression Station in the SE of Romania in a westerly direction to the Horia gas metering station (see **Figure 4.1** below). The pipeline will transport gas at a pressure of 63 bar and will have three gas compressor stations (GCS) at the towns of Podişor Bibeşti and Jupa.

The design of the pipeline has been developed in house by Transgaz and is in accordance with the *Technical regulations for design and execution of gas transmission pipelines* approved by ANRE Order no. 118/2013. The pipeline will be constructed of 32 inch diameter steel sections designed to transport gas at a pressure of 63 bar. For the most part it will run parallel to existing pipelines belonging to the National Gas Transmission System. In some places deviations from these paths have been designed for safety reasons or to reduce environmental and social impacts. The optimised route was intended to avoid areas of conservation interest or environmental sensitive areas and housing areas.

Figure 4.1 Proposed Pipeline Route



In accordance with the *Technical Standards for the design and implementation of gas transmission pipelines*, the working strip width for pipeline laying/mounting is as follows:

- agricultural land, pastures, hayfields, and unproductive lands: 21m
- vineyards, orchards, forests and difficult areas: 14 m
- areas with slopes of over 5^{o} where terraces will be constructed with a width of 10m

The Pipeline will be buried below frost depth i.e. 1 m from surface level, except for passageways under crossings, when the pipeline will be mounted at a depth of at least 1.5 m. Protection tubes will be used where the pipeline crosses under roads and railways, which will be made of steel pipe (according to SR 6898 / 1-95) and the seals between the tubing and pipeline will be made with spacers and bellows seal that are

technically certified. A tele-transmission system of digital data for pipeline monitoring will also be built with communication of data via a group of optical fibre tubes that will run parallel to the pipeline. The route of the optical fibre cable will be marked with terminals and electronic markers except where the under crossings are created by directional drilling.

The proposed pipeline route crosses 11 counties and passes through 79 administrative units as shown in **Figure 4.2**.

Figure 4.2: Counties and Municiplalities Intersected by the Proposed Pipeline Route

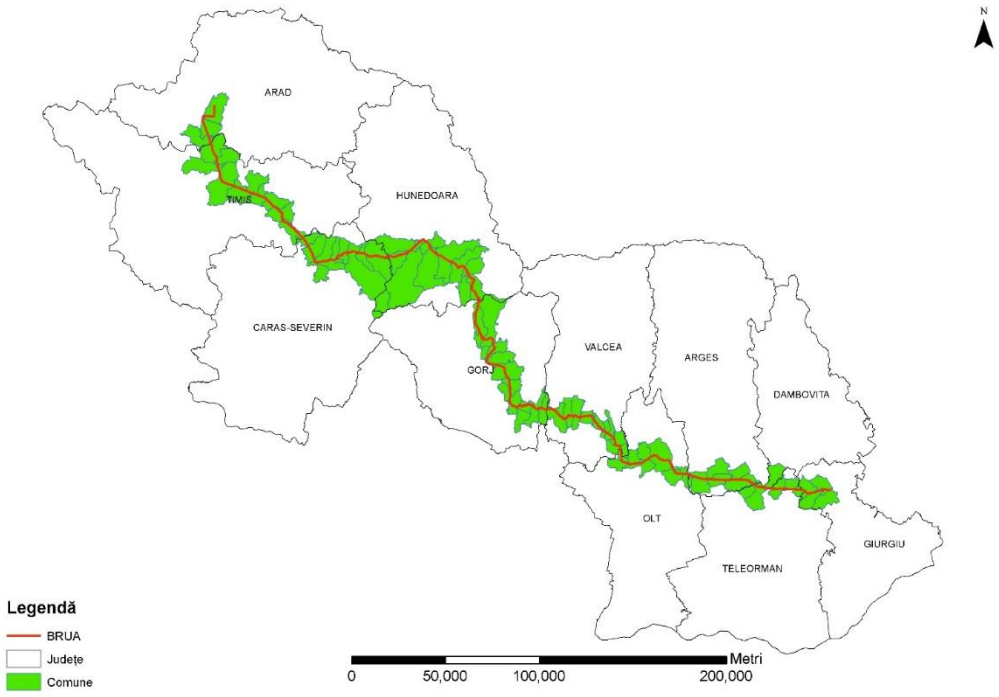


Table 4.1 below outlines the number of obstacles that will need to be crossed by each of the five sections of the pipeline. More details on each section of the pipeline are provided in the SEIA.

Table 4.1: Number of obstacles to be crossed by each pipeline section

Pipeline Section	No. Watercourse Crossings	No. National road crossings	No County Road Crossings	No. Communal Road Crossings	No. Railroad Crossings	Forest (~km)
Podişor-Corbu	**31**	**2**	**6**	**6**	**1**	**2**
Corbu – Hurezani	**77**	**6**	**14**	**18**	**2**	**9**
Hurezani – Hațeg	**135**	**5**	**44**	**12**	**7**	**29**
Hațeg – Recaș	**121**	**7**	**9**	**15**	**4**	**18**
Recaş–Horia	**25**	**3**	**5**	**2**	**2**	**9**

Three GCS are to be constructed as outlined in **Table 4.2**.

Table 4.2: Gas Compressor Stations

No.	Compressor Station Name	Location	Surface Area of Compound (m^2)
1	Podişor	Giurgiu county	35,027
2	Bibeşti	Gorj county	37,426
3	Jupa	Caraş-Severin county	33,883

Five Construction Sites (including workers accommodation) will be located along the BRUA route as shown in **Table 4.3**. Each site will facilitate the operation of up to 5 (simultaneous) work fronts.

Table 4.3: Construction Sites

No.	Location	Km pipeline
1	Căldăraru, Argeș county	61+255
2	Gușoeni, Vâlcea county	150+140
3	Turcinești, Gorj county	261+825
4	Bucova, Caraș Severin county	368+413
5	Petrovaselo, Timiș county	470 + 000

Dedicated pipe storage warehouses will also be located strategically along the BRUA route to enable a continuous flow of the materials required to the construction sites. Warehouses will be located between two work sites to provide two sources of supply, depending on the workflow. Each warehouse will occupy an area of approximately 1200 m^2 and be surrounded by a wire fence. Modular containers will be installed on site to provide facilities for workers.

The locations identified for the temporary storage of the pipe segments for BRUA are summarised in **Table 4.4**.

Table 4.4: Location of temporary pipe segment storage areas

No. crt	Location	Km pipeline
1	Poeni, Teleorman county	28+380
2	Corbu, Olt county	80+460
3	Cherlești, Olt county	118+160
4	Zătreni, Vâlcea county	176+400
5	Frasin, Gorj county	211+875
6	Jiu Paroșeni (Vulcan), Hunedoara county	292+800
7	Pui, Hunedoara county	329+120

8	Iaz, Caraș-Severin county	404+406
9	Lugoj, Timiș county	438+950
10	Fântânele, Arad county	512+600

4.1.2 Project Area of Influence

The 'spatial scope', 'study area' or 'Area of Influence' (AoI) for the Project is used to describe the extent over which project impacts will be realised. The AoI to be assessed can vary depending upon the type of impact being considered and the attributes of the potentially affected receptors[3] and may also extend across administrative or national boundaries (however in this instance there are no transboundary impacts for this project). In each case, however, the AoI includes all areas within which significant impacts are likely to occur taking into account the:

- physical extent of the proposed works, defined by the limits of land to be acquired or used (temporarily or permanently) by the Project; and
- nature of the baseline environment and manner in which impacts are likely to be propagated beyond the Project boundary.

For the proposed BRUA project, the AoI includes the footprint of all project activities[4] and a larger working strip typically of 150m either side of the pipeline to include the areas in which a direct or indirect impact on the physical, biological, social or cultural environment might occur. Where different areas are used this is discussed in the respective Baseline Sections of the SEIA.

4.1.3 Associated Facilities

The environmental and social assessment process also identifies and characterises, to the extent appropriate, potentially significant environmental and social issues associated with activities or facilities which are not part of the project, but which may be directly or indirectly influenced by the project, exist solely because of the project or could present a risk to the project. These associated activities or facilities may be essential for the viability of the project, and may either be under the control of the client or carried out by, or belong to, third parties.

- For the purposes of this Scoping Report, the following have been identified as Project related Associated Facilities: The corresponding elements of the BRUA pipeline in Hungary and Bulgaria, given that the pipeline will operate reverse flow.
- The interconnectors associated with these pipelines.

Other issues, such as potential Phase 2 connections and the potential to connect to the Black Sea are considered as potential cumulative impacts rather than Associated Facilities.

4.1.4 Construction Methodology

Construction work will be broken down into 15 manageable lengths called "spreads", and will utilise highly specialised and qualified teams of contractors. The estimated pipe laying rate ranges from 72 m/day in mountainous terrain up to 600 m/day in flat terrain. There will be several working teams operating simultaneously along the route; each of the spreads will consist of 5 teams along a rolling work front of approximately 25 km in length. Pipe laying will be undertaken using a series of processes that are outlined in the *Technical rules for design and execution of gas pipelines,* as approved by A.N.R.E Order no.

[3] For example, effects on archaeological features are typically confined to those areas physically disturbed by the construction works, whilst the effects of noise or visual intrusion can be experienced at some distance, and air pollution may be dispersed over long distances or even contribute to regional/global impacts (where relevant such changes are described in each section as appropriate).

[4] This includes the pipeline working strip (which has a width of approximately 21 m and includes room for pipeline fabrication and for simultaneous vehicle movements), access roads, Compressor Stations, Construction Yards, laydown areas, work sites and other related facilities.

118/2013. Permits will be obtained for all works within the working strip (the widths for working strips are given above) including for crossing both natural and public obstacles.

4.1.4.1 Clearance of the RoW

The pipe centreline (typically offset to one side of the Working Strip) and boundary will be cleared and levelled. This will involve removal of structures and vegetation from the RoW and then stripping of topsoil (and associated plant life and seed stock) from the Working Strip by suitable earth moving equipment. The topsoil will be deposited on one side of the working corridor where it will be stored in such a way that it is not mixed with other trenched materials or driven over by vehicles. If the topsoil requires long-term storage, then aeration and raking will be carried out regularly to avoid compaction. The Working Strip will then be levelled, using typical construction site machinery, to eliminate irregularities, large stones, tree stumps and other features.

4.1.4.2 Excavation of the Trench

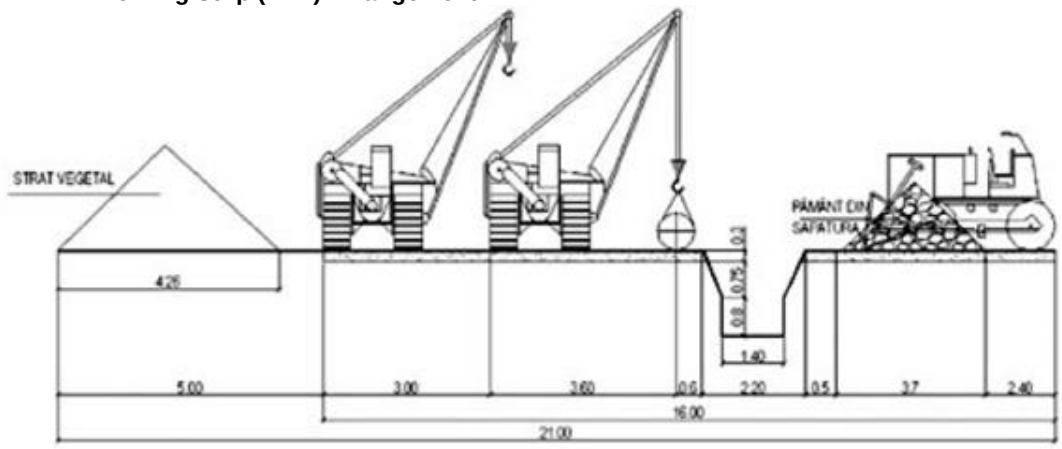
The method of excavation of the trench will be determined by a combination of factors as follows:

- **Manually**: in areas where the pipeline is to be laid a small distance away from other gas or sewerage pipelines, underground facilities or telecommunications or electricity networks, and where there is no access for excavation plant
- **Mechanically**: by rotary excavators and Castor type excavators, in areas where access is possible, as well as where the movement of large volumes of soil is required.

The pipeline will be installed to a depth of 1.0m below surface level (assumed to be frost depth), except where the route intersects communication channels, where the depth will meet the requirements of STAS 9312/88 (i.e. at least 1.5m).

Figure 4 illustrates the arrangement of a 21m wide working strip.

Figure 1: Working Strip (21m) Arrangement



4.1.4.3 Pipe Stringing, Bending and Welding

The pipeline will be constructed from approximately 12 m long sections of steel pipe. Before the pipe is prepared for welding, a bending crew will bend the pipe in place where necessary to match terrain contours. The crew will use a hydraulic bending machine to put gradual bends in the pipe. This equipment bends individual joints of pipe to the desired angle at locations where there are significant changes in the natural ground contours, or where the pipeline route changes direction. The bending will be limited to making many small bends along the length of a pipe section until the desired summary bend angle has been reached.

Where the bend cannot be made gradual enough to meet specific conditions, a prefabricated factory bend will be inserted into the pipeline. These conditions will, however, be identified prior to construction. The individual sections of pipe will be welded together to form the pipeline. The weld will consist of several passes (layers) depending on the pipe wall thickness. The pipes will be joined together using a motor-driven welding machine by a continuous wire arc welding process. Pipes will be connected by electric butt welding by rotation, to create the sections, and on site (in the ditch) to create the line of the pipeline. All full line butt welds and curves will be insulated with heat-shrinking sleeves or cold applied tapes (reinforced insulation). Above-ground sections of the pipeline will be protected by applying a layer of anti-corrosive primer and two coats of paint.

Sections of pipes will then be joined by connecting and welding several together so that a pipes string is formed and placed on temporary supports along the edge of the trench. The weld will be tested by Non-Destructive Testing (NDT) with radio graphic inspection. Any welds indicating defects will be fixed by repair or replacement.

After the welds have been checked, tested and approved, the coating crew will clean the exposed steel section at the joint between the pipes, sand-blast the steel, and apply a protective coating to it. The coating will be heat-shrinkable polyethylene sleeves. The entire pipeline coating will be electronically inspected, using Direct Current Voltage Gradient (DCVG) or any equivalent technique, to assess the condition of coating to locate and repair any coating faults or voids.

4.1.4.4 Pipe Laying, Checking and Backfilling

Assembly of and laying the pipeline within the trench will be performed as follows:

- Sections of pipe (a maximum of two doublets) will be joined by electric welding adjacent to the trench;
- The sections of pipe will be laid in the trench using launcher type TL.4 mobile cranes (as shown in **Figure 5** below). Changes in direction, both horizontally and vertically, will be made through CMF curves (minimum 5 x DN). To avoid exceeding the material elasticity limit of the pipeline, the following conditions will be met:
    - Distance between launchers: max. 15m;
    - Maximum lifting height for pipeline during the laying process: 1.5 m;
- The pipeline will be assembled in the trench, in final position, by on site welding in accordance with API Std. 1104-1105.

Figure 2: Laying a section of pipeline into the trench

Once the pipeline has been assembled within the trench, the trench will be backfilled with excavated soil and topsoil. This can either be performed manually or mechanically, according to the "Technical regulations for the design and execution of gas transmission pipelines", approved by Order A.N.R.E. no. 118/2013.
Backfilling will only be performed after:

- Checking and insulation of all welds performed in situ;
- Installation of potential outlets (where applicable);
- Carrying out of strained soil layer;
- Carrying out of drainage vents (where applicable).

4.1.4.5 Specialist Excavations

Watercourse crossings will be performed either by open-cut excavation or by horizontal directional drilling (HDD). Where the pipeline crosses water courses that are not registered in the Land Register, the depth of the pipeline will be below the scouring level established in a hydrological study. Where the pipeline passes underneath drainage channels or minor watercourses, the pipe will be encased in concrete to compensate for the hydrostatic force. Any affected river banks will be restored to their initial state.

The following main rivers will crossed by HDD: Cotmeana, Olt, a torrent of the River Gilort, Jiu, Râul Mare, Timiș (at Jupa), Spaia, Glavița, Timiș (at Lugojel), Chizdia, Bega and Mureș.

Further details of watercrossings are included within the Project SEIA.

4.1.4.6 Other Crossings

Where the pipeline route crosses any communication lines, works shall be executed in accordance with STAS 9312-87 "*pipelines under-crossings of railways and roads outside town limits*", which requires that the pipeline will be mounted in metallic protection tubes. All national and county roads and highways will be crossed by HDD. Only private access roads (27 in total) will be crossed by open-cut methods.
In areas where there is a need to cross-cut into slopes to enable installation of the pipeline, terraces will be excavated in the hillside to allow safe access for construction equipment on the inside of the trench. Once the pipeline has been laid, the hillside will be filled in as far as possible.

4.1.5 Above Ground Installations

Within each GCS compound 7 main buildings will be erected as follows: compressor's warehouse, administrative building, warehouse and workshop building, electrical facilities building, fire logistics building, measuring and regulation building, security building. Further details are included within the Project SEIA.

4.1.6 Project Timeframe

Key dates for the Project are as follows:

- Feasibility studies and FEED: September 2013 - November 2016 (pipeline and GCS);
- Permitting: construction permits July 2016 - November 2016;
- Procurement for pipeline Contractors: September 2016 - November 2017;
- Procurement for GCS Contractors: July 2017 – February 2018;
- Execution (Construction) phase (pipeline and GCSs) March 2017 - December 2019; and
- Commissioning (Operations): expected December 2019.

The pipeline has been designed to be used for an unlimited period of time, and the operational phase is expected to be at least 40 years. The duration of safe, technologically efficient operation with no overhauling and major maintenance works for BRUA was estimated at 40 years.

5 Scoping of Potential Impacts

Further to the Scoping Workshop and based on current understanding and available information, the following **Tables 5.1** and **5.2** outline the potential environmental and social impacts during both the construction and operational phases of the Project (by topic) that have either been scoped in for further detailed assessment or out and the justification.

Table 5.1: Scoping Matrix – Project Construction Phase

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
Geology and Geomorphology	Landslides	Surrounding environment and construction workers	Physical harm to workers or destruction of surrounding habit or infrastructure (including the pipeline)	In areas identified as high risk of landslides extra precautionary measures to be taken during construction	In	Scoped in with regards to identifying high risk areas
Geology and Geomorphology	Faults	Surrounding environment and construction workers	Physical harm to workers or destruction of surrounding habit or infrastructure (including the pipeline)	High risk in areas exhibiting seismic activity	Out	Route follows existing infrastructure which hasn't experienced seismic activity
Geology and Geomorphology	Soil Liquefaction	Pipeline	Destruction of pipeline integrity	Areas of seismic activity with high soil saturation levels	Out	Route follows existing infrastructure which hasn't experienced seismic activity
Geology and Geomorphology	Karst Areas	Pipeline	Destruction of pipeline integrity	Areas with a high proportion of soluble rocks	In	Scoped in with regards to identifying high risk areas
Soils	Clearance of the working strip, excavation of the pipeline trench and reinstatement activities	Geological and soil resources	Deterioration in soil grade/quality and productivity	Careful soil handling is required to enable effective vegetation re-instatement and/or re-use of soils for agriculture.	In	Scoped in with regard to particularly high grade agricultural soils.
Soils	Use of/construction of access roads	Geological and soil resources	Compaction of soils by construction plant and vehicles	Reduced aeration, permeability and water-holding capacity of soils. Increased susceptibility of soils to wind and water erosion	Out	Scoped out with regard to additional studies, however GIP mitigation measures to be incorporated into the SLIP.
Soils	Accidental spills of oils or chemicals due to poor pollution prevention and control measures.	Geological and soil resources	Localised contamination of soil	N/A	Out	It is understood that Transgaz will be applying Good International Practice (GIP) to their construction activities as part of their HSE-MS.
Soils	Contaminated Land	Construction Workers	Exposure to contaminants present in soils via acute exposure scenarios such as inhalation of dust or vapour or ingestion	Construction workers could develop health problems as a result of exposure.	In	Scoped in for any known areas of significant land contamination.
Soils	Contaminated Land	Surface and Groundwater	Mobilisation of contaminants in the soil that would otherwise be immobile (e.g. from historic landfill sites) and the creation of new pathways for contamination to reach groundwater and surface water resources i.e. via leaching and run-off.	A reduction in water quality could further impact users of water resources (for agriculture or potable supply) and aquatic flora/fauna.	Out	Scoped out with regard to additional studies, however GIP mitigation measures to be incorporated into the SLIP. NB: water quality issues are covered in the Groundwater and Surface Water Sections.
Groundwater Resources	Contaminated soil	Groundwater quality; users	Mobilisation of contaminants in the soil that would otherwise be immobile and leaching of these contaminants into the groundwater	A reduction in ground water quality could further impact users of water resources (for agriculture or potable supply).	In	Scoped in with regard to groundwater abstractions from shallow aquifers, only in areas of significant contamination.
Groundwater Resources	Installation of the pipeline	Groundwater levels, users; dependent water bodies	Introduction of a below ground obstruction (i.e. the pipeline).	Groundwater recharge/flows may be impeded within any underlying shallow aquifers.	In	Scoped in with regard to groundwater abstractions from shallow aquifers and water level dependent sensitive wetlands.
Surface Waters	Clearance of vegetation from the working strip, excavation of the pipeline trench	Surface Water quality; water users; aquatic flora/fauna	Mobilising suspended solids or pollutants from soils in run-off from works areas. High concentrations of suspended solids can result in increased turbidity, if nutrients are added this can result in eutrophication and depletion of dissolved oxygen; all of which can	Abstractions from watercourses adjacent to construction activities. Watercourses in areas of priority habitats and species.	Out	Scoped out with regard to additional studies, however GIP mitigation measures to be incorporated into the SLIP.

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
			impact on users of water resources and aquatic flora/fauna.			
Surface Waters	Directional Drilling under water courses	Surface Water quality; water users; aquatic flora/fauna quality.	N/A	N/A	Out	No physical impacts are expected on the watercourse, all drilling will be conducted well below the river bed and entry point will be well back from the river bank.
Surface Waters	Effluents generated as a result of hydro-testing, accommodation camps, de-watering.	Surface Water quality	Direct discharges of pollutants from the hydro-testing process and other point sources into water courses.	water users; aquatic flora/fauna	In	Scoped in because the proposed treatment of discharges is not yet clear.
Surface Waters	Dust suppression	Surface Water quality;	Mobilising suspended solids in run-off from works areas	Water users; aquatic flora/fauna.	Out	Scoped out with regard to additional studies, however GIP mitigation measures to be incorporated into the SLIP.
Surface Waters	The use of construction plant	Surface Water quality	Accidental spills of oil/chemicals directly into watercourses or via run-off from works areas.	Water users; aquatic flora/fauna.	Out	Scoped out with regard to additional studies, however GIP mitigation measures to be incorporated into the SLIP.
Surface Waters	Abstraction from water courses for Hydro-testing and dust suppression.	Surface Water quality	Temporary reductions in flows and water levels	Water users; aquatic flora/fauna.	In	Abstraction rates, durations and volumes will need to be confirmed. Existing flow regimes within the water courses from which water will be abstracted will be needed to understand the magnitude of the effect.
Surface Waters	Cofferdams during pipeline installation	Surface Water quality;	Reduced flows downstream.	Water users; aquatic flora/fauna.	In	Scoped in for sensitive watercourses (i.e. existing abstractions or ecological sensitivities) otherwise managed through GIP.
Surface Waters	Introduction of pipeline into the watercourse (river bed). In stream construction activities (excavations etc.)	Surface Water quality; water users; aquatic flora/fauna quality.	Disturbance to and alteration of the structure and nature of the river bed.	Increased turbidity downstream, the potential release of nutrients resulting in eutrophication and deoxygenation of water	In	Scoped in for sensitive watercourses (i.e. existing abstractions or ecological sensitivities) otherwise managed through GIP.
Biodiversity	Vehicle mobilization, including transport of people and equipment within the works area;	Terrestrial habitats (includes Natura 2000 sites) Commuting mammals including bats Wintering and breeding birds	Disturbance of fauna due to noise, direct mortality due to RTAs and degradation of habitats due to compaction and vegetation destruction or the ingress of non-native invasive species	Currently the receptors are habituated to remote locations with little or no background noise or traffic therefore the additional vehicle traffic has the potential to have a significant effect. Less likely to have a significant effect on more mobile species such as birds and reptiles who can move away from the source of the disturbance. Although it is likely that many will become habituated and/or use other areas this avoidance may lead to a fragmentation of habitat for those receptors. There are a number of habitats present throughout the area that are likely to qualify as critical habitats or priority biodiversity features that would be sensitive to degradation, and slow to recover naturally. Mitigation developed for key receptors is likely to fulfil mitigation requirements for all receptors	In	Scoped in to ensure that impacts and mitigation for critical habitats and priority biodiversity features is adequate which may be in excess of Good International Practice Construction
Biodiversity	Compounds, field working camps	Terrestrial and riparian habitats	Disturbance of fauna, particularly	Currently the receptors are	In	Scoped in to ensure that impacts and mitigation for critical

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
	construction and operation, including the effects of the production of wastes and indirect pressure of workers presence;	(includes Natura 2000 sites) Breeding birds Wintering birds Small and large mammals Reptiles Amphibians Fish Invertebrates	while breeding, degradation of habitats, direct and indirect pollution of habitats, potential for direct mortality through illegal hunting and fishing	habituated to remote locations with little or no human interaction additional numbers of people and their associated waste has the potential to have a significant effect. There are a number of habitats present throughout the area that are likely to qualify as critical habitats or priority biodiversity features that would be sensitive to pollution and degradation , and slow to recover naturally. Less likely to have a significant effect on more mobile species such as birds and reptiles who can move away from the source of the disturbance.		habitats and priority biodiversity features is adequate which may be in excess of Good International Practice Construction
Biodiversity	Pipeline working corridor vegetation clearance including compounds	Terrestrial and riparian habitats (includes Natura 2000 sites) Breeding birds Wintering birds Roosting bats Breeding mammals (small and large) (breeding and sheltering) Reptiles (breeding and hibernating) Invertebrates	Loss of vegetation, fragmentation, disturbance, direct mortality	The clearance of vegetation will remove habitat but more significantly increase fragmentation of existing corridors, this would lead to disturbance of faunal species and could cause direct mortality during the breeding or sheltering seasons of others and there is the potential to spread non-native invasive species throughout the works corridor.	In	Scoped in to ensure that impacts and mitigation for critical habitats and priority biodiversity features is adequate which may be in excess of Good International Practice Construction. To ensure that the need for any compensation measures are identified.
Biodiversity	Pipeline construction activities including top soil removal, pipeline soldering and water crossing construction	Terrestrial and riparian habitats (includes Natura 2000 sites) Breeding birds Wintering birds mammals Reptiles Amphibians Fish Aquatic invertebrates Other aquatic receptors such as broad clawed crayfish	Noise disturbance in the mid-term which may lead to habitat fragmentation Indirect and direct pollution due to sedimentation of water courses and construction consumables and waste. Riparian habitat loss and fragmentation	While many faunal receptors have the potential to be disturbed by ongoing construction activities it is likely that many will become habituated and/or use other areas however this avoidance may lead to a fragmentation of habitat for those receptors. The aquatic species are less likely to be significantly affected by general terrestrial construction disturbance as they can move away from localised construction activities but they may be affected by pollution and sedimentation during in water works. The banks may require additional stabilisation prior to the re-establishment of vegetation.	In	Scoped in to ensure that impacts and mitigation for critical habitats and priority biodiversity features is adequate which may be in excess of Good International Practice Construction. To ensure that the need for any compensation measures are identified.
Biodiversity	Water abstraction	Riparian habitats Wintering wildfowl and wildfowl and breeding birds associated with riparian environment's Otter Amphibians	Potential for degradation to banks and direct mortality to fauna, disturbance while breeding	The abstraction of water for construction purposes such as damping down and cleaning machinery could result in species being abstracted along with the water and during that abstraction habitat may be damaged and breeding birds and wintering	In	Scoped in to ensure that impacts and mitigation for critical habitats and priority biodiversity features is adequate which may be in excess of Good International Practice Construction.

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
		Fish Aquatic invertebrates Other aquatic receptors such as broad clawed crayfish		wildfowl disturbed		
Biodiversity	Unlikely Events, such as landslides, fires, collapse of trenches	All	There is potential for effects on all receptors due to unforeseen events	Although somewhat degraded through agricultural practices and logging, the area is otherwise relatively stable and undisturbed	In	Unlikely events could increase the likelihood and significance of potential impacts and effects assessed due to the project.
Biodiversity	Other projects	All	There is a potential for other projects to have an effect when assessed in combination with the BRUA Project	Increased disturbance or the need for wider infrastructure improvements to facilitate access	In	Within project cumulative works (i.e. working on the project at multiple locations at the same time by different contracting teams) and works required by other projects within the vicinity could increase the significance of any of the individually assessed effects and thus require additional mitigation or compensation.
Waste	Contaminated water	Aquatic Environments	Untreated waste water if returned to local water courses could disrupt and degrade aquatic habitats	Water sources in to which water used on the project is pumped back into	In	Assessment of practices in place to ensure waste water is treated sufficiently
Waste	Spilt contaminated waste and hazardous waste	Ecological environment	Degradation of local ecological environment due to introduction of waste materials into the system	Natura 2000 site and highly sensitive flora and fauna	In	Scoped in due to the necessity to understand how waste will be handled
Waste	Improper storage of contaminated waste and hazardous waste	Ecological environment	Degradation of local ecological environment due to introduction of waste materials into the system	Natura 2000 site and highly sensitive flora and fauna	In	Scoped in due to the necessity to understand how waste will be stored
Landscape and Visuals	Construction works and materials	Ecological and Human environments	Introduction of construction materials and invasive construction practices will change local environments throughout the route	Local Communities	In	Guaranteed disturbance of landscape due to construction works[5]
Cultural Heritage	Invasive construction procedures including: directional drilling and trenching	Culturally significant heritage sites and archaeological finds	Potential psychical damage to unidentified tangible cultural heritage sites	Any unexpected archaeological findings, most specifically located near to the Tibiscum heritage site	In	Due to unknown location of receptors
Cultural Heritage	Invasive construction procedures including: directional drilling and trenching	Culturally significant heritage sites	Potential psychical damage to identified tangible cultural heritage sites	Designated sites	In	Assessment will be needed to gauge whether known sites will be impacted upon
Cultural Heritage	Disruption caused by psychical construction/obstruction of roads and ROW's/noise during cultural tradition	Local tradition or cultural practise	Obstruction to culturally significant calendar event	Local communities neighbouring BRUA pipeline	In	Currently unknown interaction between cultural events timing and construction timing
Cultural Heritage	Introduction of non-local personal into local community areas which may lead to the disturbance	Cultural identity	Loss or disruption to cultural identity	Local communities neighbouring BRUA pipeline, especially in close proximity to workforce accommodation	In	Work force demographic is currently unknown, thus further assessment needed as to its impacts
Cultural Heritage	Vegetation Clearance	(Unknown) Archaeology	Limited Disturbance only	Designated sites, Unknown Sites	Out	Negligible impact upon cultural heritage

[5] Following the Scoping Workshop, a review of the proposed route and associated studies determined that over 70% of the proposed pipeline would be in agricultural land where give the buried nature of the infrastructure, landscape issues are not expected to result in a material impact. Within remaining areas, the majority of the pipeline route follows existing rights of way and as such will not result in a material landscape impact. In areas where the pipeline will pass through existing forested areas where there is no current right of way, impacts will be mitigated as addressed in the Biodiversity Section of the Supplemental Environmental Assessment Report. Landscape impacts are therefore scoped out.

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
Cultural Heritage	Pipeline Assembly**	N/A	Disturbance	N/A	Out	Impacts expected to be incur during excavation stage
Cultural Heritage	Trench backfilling	N/A	Disturbance	N/A	Out	Impacts expected to be incur during excavation stage
Cultural Heritage	Cleaning testing	N/A	Disturbance	N/A	Out	Impacts expected to be incur during excavation stage
Cultural Heritage	Site reinstatement	N/A	Disturbance	N/A	Out	Impacts expected to be incur during excavation stage
Traffic & Transport	Increased vehicle traffic to and from the active construction sites	Road Users (including local residents); Biodiversity*, Air Quality*, Noise and Vibration*	Vehicular access to active construction sites may result in localised congestion	Driver delays, pedestrian delays and a reduction in pedestrian amenity value (i.e. the pleasantness of the journey) and an increased risk of accidents, especially around site access points.	In	Delivery of 44,000 pipeline segments overall by road, plus other construction related vehicle trips is expected to have a significant impact on vehicle movements. Scoped in for known areas of traffic congestion.
Traffic & Transport	Partial road closures or diversions	Road Users (including local residents)	Alternative routes may result in Increased journey lengths and times; and localised congestion.	Driver and Pedestrian delays.	Out	This will be covered under the Socio-Economics Chapter
Traffic & Transport	Increased vehicle traffic/construction plant levels	Existing Road Network Users	The quality of access roads may reduce	There may be deterioration of roads, an increase in potholes, muddy roads etc.	Out	Scoped out with regard to additional studies, however GIP mitigation measures to be incorporated into the SLIP.
Ambient Air Quality and Green House Gases	Construction activities: earthworks, excavation, vehicle movement, stockpiles, unpaved surfaces, cement production, etc.	Human receptors: workers and residential population living near the construction sites;	Increase in the concentration of dust in the atmosphere due to fugitive dust emissions along the working strip, and work sites – pollutant of concern: construction dust	Environment surrounding construction site route	In	Particulates will deposit 10-20m from source in sensitive areas.
Ambient Air Quality and Green House Gases	Construction activities: construction machinery / equipment and movement of vehicles involved in construction (i.e. generators, excavators, bulldozers, side booms, trucks, cars)	Human receptors: workers and residential population living near the construction sites;	Increase in the concentration of gaseous pollutants in the atmosphere due to emissions of exhaust gases along the working strip, and work sites – main pollutants of concern: NO2 and CO.	Environment surrounding construction site route	In	Increase in emission levels in comparison to baseline is guaranteed
Ambient Air Quality and Green House Gases	Construction emissions from vehicles / traffic (Heavy Goods Vehicles) associated with transport of materials for construction activities (mostly pipe, water (?) and workers)	Human receptors: residential population living near the access roads used by Heavy Goods Vehicles involved in the construction of the project.	Increase in the concentration of gaseous pollutants in the atmosphere due to emissions of exhaust gases along the access roads used by Heavy Goods Vehicles involved in the construction of the project – main pollutants of concern: NO2, PM10, CO.	Environment surrounding construction site route	In (a)	Increase in emission levels in comparison to baseline is guaranteed
Ambient Air Quality and Green House Gases	Construction activities: welding and maintenance	Human receptors: workers and residential population living near the construction sites;	Increase in the concentration of other pollutants of concern (VOCs from lubricants, welding process) due to emissions along the working strip and work sites	Environment surrounding construction site route	Out	It is considered that these emissions will be managed from a H&S impact by regulation and that, provided that good practice is applied and general management / mitigation is implemented, these emissions are low and not susceptible to induce significant impacts.
Ambient Air Quality and Green House Gases	Construction activities (construction equipment and construction traffic)	Global	Increase in the concentration of GHG in the atmosphere	Global Environment	In	GHG emissions (initial calculation)
Noise & Vibration	Operation of fixed and mobile plant	Local residents	Increased noise and vibration	Local residents may experience	In	Scoped in to enable the determination of the impact of

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
	engaged in construction activities		levels	nuisance effects, if this occurs during night hours this could lead to sleep disturbance. Influence of vibrations caused by heavy traffic and other project related activities, on the structure of the houses, especially old houses in the rural areas		noise levels on sensitive receptors.
Noise & Vibration	Increased vehicle traffic	As above	As above	As above	In	Scoped in to enable the determination of the impact of noise levels on sensitive receptors.
Noise & Vibration	Operation of fixed and mobile plant engaged in construction activities	Users of local facilities (e.g. educational facility, healthcare facility, place of worship or open spaces – areas of landscape or historic value)	Increased noise and vibration levels	Disturbance caused by noise/vibration could result in interference with teaching, intrusion during worship, disturbance of the recreational use of an open space.	In	Scoped in to enable the determination of the impact of noise levels on sensitive receptors.
Noise & Vibration	Increased vehicle traffic	As above	As above	As above	In	Scoped in to enable the determination of the impact of noise levels on sensitive receptors.
Noise & Vibration	Operation of fixed and mobile plant engaged in construction activities	Construction Workers	Exposure to high noise levels	Health effects	Out	It is understood that Transgaz will be applying Good International Practice (GIP) for the protection of construction workers as part of their HSE-MS.
Noise & Vibration	Operation of fixed and mobile plant engaged in construction activities	Fauna	Increased noise and vibration levels	Disturbance, especially during sensitive seasons	In	Scoped in with regard to sensitive ecology receptors – addressed under the Biodiversity Section.
Noise & Vibration	Increased vehicle traffic	As above	As above	As above	In	Scoped in with regard to sensitive ecology receptors – addressed under the Biodiversity Section.
Public Utilities, Services and Transport infrastructure	Construction work	Local communities , business, public authorities,	Accidental or planned disruptions to the water / waste water / electricity / gas supply during construction works in the area of the intersection points with the public utilities and service networks	Disruptions of accessing the public utilities and services	In	Scoped in with regard to local communities – addressed under the SIA
Public Utilities, Services and Transport infrastructure	Construction work	Local communities , business, public authorities,	Potential increased pressure on the public electric grid by the compressor stations, construction camps and construction sites	Disruptions of accessing the public utilities and services	In	Scoped in with regard to local communities – addressed under the ESMP (construction sites management) and operation manuals for Compressor stations
Land use	Construction work	Land owners / users in the proximity of the working corridor	Temporary difficulties for land owners/users/workers to reach their lands. (including animal grazing activities)	Enable to access land	In	Scoped in with regard to local communities – addressed under the LALRP
Land use	Construction work	Land owners / users	Decrease of soil quality and productivity due to improper depositing of the top soil during construction works, and/or improper rehabilitation of disturbed land after construction and due to risk of soil contamination from poor waste management or spills/leaks of fuels, lubricants and solvents from equipment used during the construction of the pipeline.	Decrease soil productivity	In	Scoped in with regard to local communities – addressed under the ESMP

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
Economic activities	Construction work	Local businesses	Local construction firms can be exposed to loss of skilled and semiskilled staff due to opportunities available within the project.	Potential losses	In	Scoped in with regard to local businesses – addressed under the SEP
Livelihood	Construction work	Members of local communities	Social tensions between community members and non-local workers	Conflictual situations at community level	In	Scoped in with regard to local communities – addressed under the SEP
Livelihood	Construction work	Local businesses	Social tensions resulting from competition for employment	Conflictual situations at community level	In	Scoped in with regard to local communities – addressed under the SEP
Livelihood	Construction work	Skilled and unskilled labours engaged in agriculture	Potential temporary loss of employment for seasonal or permanent workers especially those engaged in agricultural activities.	Losses for persons engaged in agricultural activities	In	Scoped in with regard to local communities – addressed under the LALRP
Livelihood	Location of Construction corridor / Associated facilities	Land owners / users	Temporary/permanent loss of livelihood, income, land use rights for owners, users and workers due to land-take by the project	Losses encountered by land owners/users due to permanent land take	In	Scoped in due to their entitlements for being compensated – addressed in the LALRP
Livelihood	Location of Construction corridor / Associated facilities	Land owners / users	Reduced levels of compensations due to lack of property transactions data in the area	Land owners / users are not able to access compensations	In	Scoped in due to their entitlements for being compensated – addressed in the LALRP
Livelihood	Location of Construction corridor / Associated facilities	Land owners/ users	The compensations provided for temporary and permanent land take may be potential sources of conflict and community tensions, and may include - Tensions between owners and users in case of informal (verbal) agreements - Tensions in the community caused by different levels of compensation (or lack of transparency about eligibility criteria and entitlements) - Conflicts between multiple owners of the same land plots	Land owners / users are not able to access compensations	In	Scoped in for understanding the local expectations and for being able to prepared the SEP
Livelihood	Location of Construction corridor / Associated facilities	Vulnerable groups	Temporary/permanent loss of livelihood for persons depending on affected land or natural resources as a result of land acquisition and construction works	Vulnerable groups are not properly identified and the compensation packages are not adequately adapted for them	In	Scoped in due to their entitlements for being compensated – addressed in the LALRP
Labour and Public Health	Construction work	Workers	Risk of labour accidents for workers associated with construction activities	Potential injuries for workers	In	Scoped in with regard to workers – addressed under the Health and Safety Management plans
Public Health	Construction work	Members of local communities	Risk of accidents due to open trenches and other project related accidents for community members	Potential injuries for members of local communities	In	Scoped in with regard to local communities – addressed under the Community Health and Safety Management plan
Settlement and Housing	Location of Construction corridor / Associated facilities	Assets located within the construction corridor	Possible loss of structures/assets (permanent or temporary) located on the pipeline corridor (either	Losses encountered by legal or illegal owners/users of assets	In	Scoped in due to their entitlements for being compensated – addressed in the LALRP

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
			authorized or illegal)			
Settlement and Housing	Project information provided to local communities / Communication methods	Local communities	Unrealistic expectations that the pipeline project will benefit their settlement by providing gas supply (for those settlements that are not connected to gas supply networks)	Increase number of grievances / requests from local communities Local resilience towards project development	In	Scoped in for understanding the local expectations and for being able to prepare the SEP
Settlement and Housing	Pipeline and AGIs	Land owners	Perceived decrease of property value due to proximity of the pipeline to the houses (for the houses located in the AoI).	Losses encountered by land owners which would like to sell their properties after the construction is finished	In	Scoped in due to their entitlements for being compensated – addressed in the LALRP
Settlement and Housing	Location of Construction corridor / Associated facilities	Land owners	Decrease of property value due to the restrictions imposed by the Project for land plots situated in the build-up area crossed by the pipeline	Losses encountered by land owners which would like to sell their properties after the construction is finished	In	Scoped in due to their entitlements for being compensated – addressed in the LALRP
Awareness	Location of Construction corridor / Associated facilities	Local communities	Public perception of negative impacts of the pipeline project, especially for those not benefiting from compensation	Increasing expectations and increased number of complaints	In	Scoped in for understanding the local expectations and for being able to prepare the SEP
Emergencies and non-routine operations	Emergencies and non-routine events/operations	Workers, local communities and the natural environment	Injuries to individuals, multiple sources of disturbance and pollution emissions	Unexpected health and environmental impacts with similar effects to other sources of impact identified.	In	Impacts cannot be predicted at this stage but are addressed through construction management systems and the associated Emergency Response Plan.
Transboundary Impacts	Construction activities	N/A	N/A	N/A	Out	Scoped out given that the entire project is located within the national boundaries of Romanian and due to the distances between the interconnectors and the Bulgarian and Hungarian borders.
Cumulative Impacts	Construction activities	Human and natural resources receptors	Potential for multiple sources of disturbance to receptors and pollutant emissions arising from multiple concurrent projects	Impacts would be as identified for other sources of impact should cumulative effects be applicable.	Out	At this time, no other projects have been identified that will in combination with this Project result in a significant impact.

Table 5.2: Scoping Matrix – Project Operational Phase

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
Groundwater Resources	Groundwater abstraction	Groundwater levels; users; dependent water bodies	Abstractions of groundwater to supply the GCSs. Localised lowering of groundwater levels (a cone of depression)	Lower groundwater levels would reduce the ability of other groundwater users to access supply. Any groundwater dependent water bodies could suffer from a reduced base flow.	In	The volumes of water required to supply the GCSs and the locations of any existing abstractions are not known at this stage.
Biodiversity	Rights of Ways (RoW) Maintenance requiring the clearance of vegetation for access to the pipeline	Terrestrial and riparian habitats Commuting mammals including bats Wintering and breeding birds Reptiles	Degradation to existing habitats Introduction of non-native invasive species. Also disturbance and direct mortality of breeding animals Permanent fragmentation effects	The maintenance itself could cause degradation to existing habitats outwith the working corridor for access but also compaction of habitats within the working corridor and the potential to prevent the establishment of previous restoration and/or in introduce non-native invasive species. Also disturbance of breeding animals and potential for direct mortality if they have occupied the area in the interim. The increased fragmentation could make some animals more vulnerable to prey when attempting to cross the gap or could “sterilise” some areas by preventing commuting	In	ROW maintenance requirements and operation not yet fully understood, requires further information for assessment.
Landscape and Visuals	Permanent changes to landscape	Ecological and Human environments	Permanency of new infrastructure causing visual and environmental disturbance	Throughout route	In	Guaranteed disturbance in landscape due to introduction of permanent infrastructure
Cultural Heritage	AGI use	Known Arch	Visual, air, noise	Designated sites	In	Potentially affect known archaeology
Cultural Heritage	ROW / pipeline maintenance	Known Arch	Visual, air, noise	Designated sites	In	Potentially affect known archaeology
Noise & Vibration	Operation of the GCSs	Local residents	Increased noise levels	Local residents may experience nuisance effects, if this occurs during night hours this could lead to sleep disturbance.	In	The distance of sensitive residential receptors from the location of GCSs and expected levels of noise that will be generated by the GCS are not known at this stage.
Public utilities	Maintenance work	Local residents	Accidental events involving the pipeline/AGIs could affect public utility networks.	Local residence may experience disruptions in accessing public utilities (water, heating etc.)	In	To be addressed within Emergency Response Plan for operational period
Land use	Maintenance work	Land owners/land users	Potential temporary loss of crops for landowners/users in case of maintenance activities	Income losses for land owners/ users	In	To be addressed within LALRP
Public health	Operation	Local communities	Perceived safety risks for the community living in proximity of the pipeline	If not properly informed, members of local communities might raise concerns about safety aspects	In	To be addressed within SEP
Emergencies and non-routine operations	Emergencies and non-routine events/operations	Workers, local communities and the natural environment	Injuries to individuals, multiple sources of disturbance and pollution emissions	Unexpected health and environmental impacts with similar effects to other sources of impact identified.	In	Impacts shall be addressed through operational management systems and the associated Emergency Response Plan.
Transboundary Impacts	N/A	N/A	N/A	N/A	Out	Scoped out given that the entire project is located within the national boundaries of Romania and due to the

ESIA Topic	Source of Impact	Receptor(s)	Impact	Key Receptor Sensitivities	Scoped In/Out	Justification for Scoped In/Out
						distances between the interconnectors and the Bulgarian and Hungarian borders.
Cumulative Impacts	Operation	Human and natural resources receptors	Potential for multiple sources of disturbance to receptors and pollutant emissions	Impacts would be as identified for other sources of impact	In	Phase 2 of the Project will potentially result in cumulative impacts. These will be assessed separately by Transgaz.

There are not expected to be any significant impacts during the Project Operational phase for the following topics:

- Geology and Soils
- Surface Water
- Traffic & Transport

6 Additional Environmental Information Required

6.1.1 Social Aspects

The key documents to be developed for the social aspects are:

- S**ocial impact assessment (SIA)**. The SIA will focus on detailing the socio-economic context for the current investment and on identifying all the impacts, both positive and negative, during the entire life span of the project

- L**and acquisition and livelihood restoration plan (LALRP)**. The LALRP will focus on defining the categories of persons that will be entitled for compensations. Also, the document will define the type of compensations and the institutional arrangements necessary for granting them. The LALRP will include also a guide for Land Acquisition and Compensation that will define the concrete actions and measures needed in order to ensure a smooth LALRP implementation process. The Guide to Land Acquisition and Compensation will set the general and specific framework for communication and engagement with affected persons.

- **Stakeholder Engagement Plan (SEP).** This document will provide guidance and feedback for Transgaz to prepare a SEP that is in accordance with the SIA and LALRP.

APPENDIX A

Initial Environmental Scoping Matrix from Scoping Workshop 08/11/16

Topic	Project Phase	Sources of impact	Receptors	Scoped In/out	Justification (significance and magnitude)	Outstanding Actions
Air Quality	Construction	Construction plant, vehicle traffic, dust, cement, VOCs from lubricants, welding process.	Workers, local residents, flora, fauna.	In	Particulates will deposit 10-20m from source in sensitive areas. Dust GHG emissions (calculations)	Clarification of the biodiversity elements perceived to be sensitive and distance of impacts.
	Operation	Emissions (GCS)	Local residents	In	Located nearby to communities GHG emissions (calculations)	Clarify distances from receptors
Noise & vibration	Construction	Plant operation, vehicle traffic.	Fauna (particularly during sensitive periods), local residents, workers.	In		Vibration effects on fauna, distance from sensitive receptors, levels of expected noise.
	Operation	GCS operation	Local residents	In		Distance of receptors from GCS
Water Quality (surface and groundwater)	Construction	Trenching, directional drilling, clearance of vegetation near water bodies, spills, dust, hydro testing discharges, accommodation camps.	Flora and fauna, abstractors, recreational users.	In		Aquifer use and extent, hydrological connectivity, distance of water bodies from construction activity (for sig criteria). Treatment of hydro test water.
	Operation	Maintenance (vegetation clearance)	Flora, fauna, abstractors	In	Volumes of waste water (domestic) in GCS too low to result in impact.	How will ROW be maintained e.g. biocides????
Water Resources	Construction	Cement production, hydro testing, dust suppression, hydro seeding, and accommodation camps.	Flora and fauna, abstractors, recreational users.	In		Volumes of water required, source of abstractions. Potential impacts
	Operation	None	N/A	Out	Volumes of waste water (domestic) in GCS too low to result in impact.	
Traffic and Transport	Construction	Plant, traffic, road access.	Flora, fauna, local residents, road users (existing road network).	In	Especially note new access roads, upgrades of existing roads and bridges etc.	Number and type of plant and vehicles, proposed diversion routes, existing infrastructure quality.
	Operation	None	N/A	Out	Access for maintenance not considered significant	

Cultural Heritage	Construction	Trenching, directional drilling, timing of construction activities	Unknown valued assets, local community cultural events,	In	Unknown extent of impacts without further investigation,	Desk studies, construction schedule. Input from Stakeholder engagement
	Operation	None	N/A	Out		
Biodiversity	Construction	All construction activities, invasive species.	Flora, fauna (critical habitat, natural habitat)	In	Natura 2000 sites, hotspots & cold spots (opportunities for enhancement).	Alternatives analysis, habitat criteria for sensitivity and vulnerability, locations of abstraction points, access roads etc. Temporal sensitivities. ASSOCIATED FACILITIES and CUMULATIVE EFFECTS
	Operation	Vegetation clearance for maintenance, on-going offsets, invasive species, site restoration.	Flora, fauna (critical habitat, natural habitat)	In		Location of on-going works. Opportunities for compensation and enhancement.
Waste & Hazardous materials	Construction	Contaminated soils, general construction waste, domestic waste from accommodation camps, spoil from trenching, bentonite from drilling, storage of hazardous materials.	Water quality, soil quality, workers, local residents, flora and fauna, landfill sites.	In		Waste inventory, volumes expected to be generated and types, infrastructure capacity.
	Operation	Maintenance wastes	Soil quality, workers, local residents, flora and fauna, landfill sites.	In		Waste inventory, volumes expected to be generated and types, infrastructure capacity.
Contaminated Land	Construction	See water and waste		Out		Land quality (socio economics) covered under separate study.
	Operation	N/A	N/A	Out		
Natural Hazards	Construction	Landslides, earthquakes, floods, old mine subsidence.	The project, local residents, flora and fauna	In		Includes impacts from project and on project.
	Operation	Landslides, earthquakes, floods, old mine subsidence.	The project, local residents, flora and fauna	In		Includes impacts from project and on project.
Unforeseen events	Construction	Security issues, accidents, emergencies	All	In		Details through ESMPs and ESMS. Risks to be captured through e.g. HAZID/HAZOP or equivalent (Pece).
	Operation	Security issues, accidents, emergencies	All	In		Details through ESMPs and ESMS. Risks to be captured through e.g. HAZID/HAZOP or equivalent (Pece).
Landscape and Visual	Construction	Construction activities, vegetation clearance, removal of structures, creation of AGIs, soil storage, river crossings etc.	Local residents, recreational and other users.	In		CGIs, landscape character assessments, photomontages, key viewpoints. Later scoped out as apparent that existing RoW followed in the main

	Operation	AGIs and ROWs	Local residents, recreational and other users.	In		
Health and Safety	Construction	Construction activities				
	Operation					
Transboundary	**Both Phases**			Out		No transboundary impacts expected
Associated Facilities				In		Upstream and downstream pipes and interconnectors.
Cumulative Effects	**Construction**			Out		None identified
	Operation			In		Phase 2 of the Project

APPENDIX B

Environmental Permit Conditions during Project Construction

IV. CONDITIONS TO BE MET:

1. During the accomplishment of the project:

The holder must designate a person responsible for environmental protection during the project and during the operation, to monitor the compliance with the measures and conditions of environmental approval and monitoring plan and inform the environmental authorities of any accidental pollution occurred.

The **WATER environmental factor:**

■ The holder has the obligation to observe the water management permits;
■ Works related to the crossing of water courses will not be executed in high water periods; throughout the execution of the works forecast data will be requested from the Romanian Waters National Administration on flows and levels in watercourses crossed;
■ During the execution of the works strict rules shall be followed and working time technologies to prevent accidents with loss of material in the river beds;
■ The duration of the execution of the watercourse crossings will be shorten as much as possible to reduce the duration of the manifestation of adverse effects on water;
■ Avoiding the risk to drive construction materials when works are executed in the close proximity to water courses;
■ the site organization shall not be located near water courses;
■ the site organization will be equipped with sewage, treatment and disposal of sewage waste systems from canteens and hygienic sanitary facilities and sewage systems, treatment and disposal of rainwater that washes site management platforms;
■ the wastewater resulting from washing vehicles and construction machinery will be collected and treated in oil separators and decanters before unloading;
■ Ditches and sewers will be maintained for taking rainwater from the platform of the site organization;
■ Observe the rules of sanitary protection of water sources of surface and groundwater;
■ The discharge of untreated waste water and sludge from the settling surface water or groundwater is prohibited;
■ Waste storage in any water courses is prohibited;
■ Washing machines and means of transport in surface water is prohibited;
■ Storing and parking machines in the bed of minor or major watercourses is prohibited;
■ Storage of wood in stream beds and flood valleys or in exposed places is prohibited;
■ During the execution of the works and after their completion, materials that prevent normal water course will be eliminated from the bed;
■ In the event of accidental pollution, floods or upon the appearance or other critical situations on watercourses immediate actions will be taken to eliminate the factors generating pollution and notify the water protection authorities and the affected groundwater and water users;

For AIR environmental factor:

■ The use the equipment and means of transport technically regulated so as not to generate pollutants, noise, vibration and spills of fuels and lubricants;
■ Inspecting regularly the equipment and means of transport in terms of level and concentrations of carbon monoxide in exhaust gas emissions and startup only after the remedy of any malfunctions;
■ Application of clean technologies to minimize emissions of dust and particles resulting from earthworks and manipulation of land within the limits imposed by STAS 12574/1987 on air quality conditions in protected areas;

For the SOIL environmental factor:

■ The materials will be accepted, handled and stored in accordance with specific rules for each type of material, safe for personnel and the environment;
■ Avoid high quality land employment for site organization and pipe warehouse;
■ The site management platforms will be concreted and will be provided with collection systems, sewage and rainwater;
■ The maintenance platform and machines washing will be made with sufficient slope to ensure the collection of waste water from machines washing in pools of oil decanters and separators of oil products;
■ Exert rigid control during the transport of concrete from cement by cement mixers to prevent accidental discharge on the route;
■ The transport / handling of hazardous waste generated and will be used in such a manner as not to cause pollution of soil, surface waters and groundwater;
■ The transport of hazardous substances used in various operations, will be made only by authorized vehicles to transport hazardous substances as required by GD no. 1175/2007 approving the Norms of performing road transport activities of dangerous goods in Romania, the vehicles must be licensed and certified to transport hazardous substances and own an ADR certificate:
■ soil pollution is forbidden from fuel and oil storage operations, refueling equipment and means of transport, oil exchange in machines, or because of their malfunction;
■ accidental leaks of fuel or oil will be quickly collected and removed with absorbent materials to be collected in closed and labeled containers - temporarily stored in specially designed space until their delivery to an authorized operator for the collection / disposal of waste oil;
■ In case of accidental pollution, areas where the soil, subsoil and terrestrial ecosystems have been affected, the county agency for environmental protection will be notified to which the proposal to remedy it will be sent; the investigation and assessment of soil and subsoil pollution will be in accordance with Government Decision no. 1408/2007, and remediation and environmental construction, according to GD no. 1403/2007;
For noise reduction:
■ pipes transport on public roads through the village will be done at low speed to reduce the effect of vibration, and the wheels are cleaned beforehand to avoid dirt roads;
■ Use of equipment and vehicles in an appropriate manner in terms of minimizing noise emissions, including selection of quieter equipment, regular maintenance and the use of silencers;
■ Requiring contractors to observe regular working hours during the day;
■ minimize their potential operations generating noise at times that do not coincide with the rest period of the population;
■ measures will be taken to prevent noise and comply with the standard norms for vibration and noise in accordance with STAS no. 10009/1988 and STAS no. 12025/2/1981;

For waste management:
■ Waste management will be done in strict compliance with Law No 211/2011 on waste regime;
■ When the works are commenced, the contractor will have concluded contracts with valorization / recyclers of waste, sanitation operators or operators of landfills approved for eliminating them;
For the protection of cultural patrimony
Where, during construction, there are signs of possible vestiges, the perimeter will be isolated and the entire activity in the immediate vicinity thereof shall cease. The authorities and competent institutions will be informed in order to achieve the archaeological discharge and will subsequently establish perimeters where the BRUA project may continue. In the subsequent stages the archaeological discharge will be carried out where such items of archaeological heritage were discovered.
For the protection of biodiversity of the natural protected areas:

■ Given the presence of Natura 2000 species common to the whole national territory (ex. Bombina bombina, B. variegata, Callimorpha quadripunctaria, etc.) the management prescriptions mentioned in this regulatory document will be implemented on the entire BRUA pipeline route.
■ For all the impacted fauna and flora species located in the area of the project's implementation all the management prescriptions will be implemented in order to reduce to the maximum the potential impact, throughout the year, at the level of those sectors where they were highlighted. The detailed description of the management prescriptions are presented in the Descriptive charts within the Annexes to the documentation underlying the issue of this decision.
■The beneficiary and the constructors implementing the project in the field have to have a copy of this regulatory document, of the custodians of the natural protected areas as well as of all the documents underlying the issue of this regulatory document in view of the implementation of all the management prescriptions provided in it.
■ according to its scope this project requires the monitoring of the environment, both in the execution stage, so as for erosion phenomena or accidental pollution with fuels and oils not to occur following the non-observance of the provided measures, and most of all during the operation stage in order to identify the possible negative effects upon the environment, paying attention to the riparian habitats. In this respect, from the point of view of biodiversity management a quantity and quality inventory of some key groups will be prepared, following the enshrined monitoring schemes for comparing the effects of the investment with the preparation of the inventories for the key species, to be compared with the existent data about that area in the pre and post project implementation period (annex no 1 to this environment agreement). The possible negative effects which may be highlighted following the implementation of the provisions of the monitoring plan will be remedied by proposing impact mitigation measures and their evaluation until the compliance with the specific ecological requirements.
■ the biodiversity monitoring plan will be implemented during the entire duration of the construction and during the post implementation period for 36 months. Taking into account that as the BRUA project implies construction stages from the incipient months, part of the monitoring stages will overlap with the construction period to be developed at neighboring sectors.
■ prior to the commencement of the pipeline construction implementation, the team of specialists in subcontracted biodiversity will set the form of the notices protocols necessary for monitoring biodiversity and the form of the sample reporting forms. After the setting of the notices protocols and of the reporting sample forms they will be sent to the competent authority for environment protection and to the custodians. At the same time the number of the notices protocols for biodiversity monitoring (taking into account the ecology of the species) prepared in the field, the methods used for the observation in the field, the annual reporting models undertaken and the reporting stages will be also sent.
The number of the reports to the competent authority for environmental protection, beneficiary and third entities (custodians of the natural protected areas crossed by the pipeline or in its vicinity) will be at least one per year and will include all the information gathered from the biodiversity monitoring activity and from the efficiency related to the implementation of the impact mitigation measures.
At the competent authority for environment protection a report will be submitted per year to contemplate the results of the monitoring performed during the construction and operation period.
■ Before the commencement of the works the administrators and the custodians of the natural protected areas where the project is implemented will be notified and the conditions imposed by them will be complied with.
■ In case of the accidental occurrence of a harm affecting the species and habitats for which the natural protected area was designated the custodian/administrator of the natural protected area will be notified immediately as well as the Agency for Environmental Protection and GNM – Commissioner in that county in view of setting the mitigation measures to be applied by the person or entity which caused the harm.

■ the Beneficiary of the project must make sure that the provisions of this document are notified to the executors of the construction works.
■ the Beneficiary of the project must notify the constructor (either by the tender book or otherwise) the project implementation conditions and to make available to them the entire documentation underlying this regulatory document.
■ the responsibility related to the implementation of the measures and conditions from the documentation underlying the issue of this document is both with the beneficiary and with the constructors of the project. The beneficiary of the project is responsible for ensuring the implementation of the measures and conditions herein by the **specialists in the biodiversity field**.

a) technical conditions required by specific legal provisions (Romanian or Community):
■ Compliance with the legislation on environmental protection;
■ The execution of the works is in compliance with the submitted technical documentation, as well as specific technical norms and regulations related to the project;
■ It is essential to observe the route described in the documentation and the works presented in the report on environmental impact assessment and appropriate assessment study.
Specific conditions for **deforestation**:
■ Deforestation will be made only after obtaining necessary approvals from the Forest Directorate which manages the forest and forest owners;
■ Deforestations will be limited to areas strictly necessary for carrying out the works;
■ The directions for tree falling will be chosen so as not to affect the trees in the vicinity;
■ The falling of the trees will be made orderly so as to avoid their falling over trees outside the perimeter that is deforested;
■ Only the trees marked by representatives of forestry will be cut;
■ Fallen trees will be temporarily stored on the surface of the working stripe, then they will be loaded into vehicles and transported to the site;
■ The vehicles carrying the cleared wood will handle it carefully so as not to affect the trees in the area bordering the area to be deforested;
■ It is prohibited to store scrap wood in riverbeds or in places exposed to floods.

b) technical conditions arising from the report on the environmental impact that integrates the conclusions of the appropriate evaluation:
Given that areas of land occupied by BRUA at the level of Natura 2000 sites remain restricted, totaling 48.49 hectares, and of these only 55 square meters will be permanently occupied by a station of valves at ROSCI0236, there will be no significant effect on the surface of the sites following the implementation of the projects.
At the crossing of stands (including the level of Natura 2000 sites) a working stripe of 14 m will be executed, a 12 m strip will be subject to complex measures of ecological restoration and restoration in natural circuits comparable to the forestry , thus representing 86% of the total affected perimeters.

The ecological restoration solution will involve the following**:**
• on a width of 2m (1 + 1) (situated at the side of the working stripe) the forest edges will be remade by planting saplings from the forest species characteristic to the vegetation floor and composition of the forest;
• on a width of 4m (2 + 2, 3 + 1) (situated further to the pipeline) shrub and woody medium and large species will be planted (root system to develop a footprint area of maximum 4m (and thus not be able to affect BRUA pipeline, species of hazel will be planted (Corylus avellana), which lends itself well to curdling skirts and provides a trophic source (and resource forest valuable secondary). In addition to hazel one can plant

species with high ecological value (depending on the resort), such as hornbeam (Carpinus betulus), alder (Alnus sp.), hawthorn (Crataegus monogyna), downy oak (Quercus pubescens), etc;
• on a width of 6m (3 + 3, 4 + 2, 5 + 1) (situated further to the pipeline) shrub species will be planted that develop root systems, modest, without affecting BRUA pipeline. We propose in this regard the use of damask rose (Rosa canina, Rosa sp.), Blackthorn (Prunus spinosa). It is expected that blackberry and raspberry species will enter free after installation of natural succession of vegetation, contributing to the unification skirts and restricting the opening of fragmentation;
• a strip of about 2 m which will follow the BRUA route will remain free to allow monitoring during operation;

Fragmentation of habitats of community interest:
Phenomena of fragmentation will occur only in the construction phase, the phenomenon remains limited in scope and temporary space, the forward speed of the works being high (average 1.1 km / month).
The duration or persistence of fragmentation:
One cannot speak about a fragmentation of the habitats of community interest and in the situation of the persistence of aggressive activities that might affect some species of fauna remains extremely low.
In each sector of the works a presence of more than 12 months disturbance was granted (Construction period, which includes ecological restoration measures).
Duration or persistence of the disturbance of the species of Community interest.
Given the absence from the implementation area of the project of the significant population of the criterion species underlying the designation of the site or the pace of work and persistence of post-implementation impact associated with it, it cannot be assessed the presence of a lasting disturbance to be felt as criterion elements within the site.
The works will take place outside the site (if ROSCI0296, ROSCI0087, ROSCI0109, ROSPA0045) or will affect a small percentage, well below 1% of their total surface.
In this regard:
■ it is prohibited to abandon waste, residue, material of any kind in the forest or in protected natural areas;
■ strictly control waste in accordance with the waste management plan;
■ it is prohibited to create new access roads, no shortcuts will be arranged, use the same routes and avoid unnecessary maneuvers;

■ forbidding the execution in natural protected areas or forest of maintenance or repair works to vehicles or equipment, including those who can no longer move;
■ prohibits the use of machinery or equipment leaking oil products.
■ given the absence of a direct or indirect impact on the criterion elements that led to the designation of the site gives a neutral level of cumulative impact, regardless of the number and intensity of other categories of impact occurred at the site.
conditions required to be met during the site organization:
■ the location of the site organization and pipe warehouses, according to the submitted documentation;
■ the site organization should not be located near water courses;
■ the site organization should not be located within the perimeters of protected natural areas of community interest;
■ the space occupied by the site organization will be limited to what is necessary and will be fenced to ensure security in the area;
■ the organization and equipping of the the PSI point to intervene in the event of fire;
■ the platforms of the site organization will be concreted and maintained clean;
■ ensure the necessary utilities for the smooth conduct of the works (water supply source, special place for

dining, sanitary facilities, waste disposal containers);
■ ensure auto access and appropriate horizontal and vertical signalling;
■ use of modular containers for offices, laboratory, staff accommodation, which will be relocated to another location of another site organization;
■ shield to reduce the effects of noise outside the site boundaries;
■ use of machinery and equipment in perfect condition;
■ for site organization is recommended to design a sewage system, water treatment and evacuation as waste from the canteen, hygienic-sanitary spaces and rainwater that wash the platform of the organization and water from machines washing;
■ the washing and maintenance ramp for the vehicles will be fitted with drainage channel from washing and decanter - separator for separating petroleum products;
■ the site organization platform will be provided with ditches or Pere gutters allowing rainwater collection, or drain holes;
■ selective waste collection in containers, temporary storage in dedicated facilities, safe until their transport to landfills or from authorized operators for final recovery;
■ fuel storage tanks equipped with locking devices located on platform (capacity 110%) in safe areas designated, located away from watercourses, geological protection areas and drains;
■ oils (engine, hydraulic, etc.) for the operation of transport vehicles and machinery should not be stored in the working front, the oil exchange, maintenance or repairs being accomplished at the site or in the premises of specialized units of the localities in the close proximity.

Environment monitoring plan: <u>During execution</u>:

In order to monitor the efficiency of the implemented measures and to establish corrective measures in case specific rules on environmental protection are not complied with, the holder:
■ shall establish a program of measurements to determine noise levels: inside the site organization, deposits pipe the gas pipeline route; when exceeding the allowable limits set by the rules of environmental or occupational health, organizational measures will be taken and / or appropriate technical noise mitigation;
■ will monitor the operation of facilities serving the site organization; the measurements will be made by RENAR accredited laboratories;
■ will check the operation of depollution installations and measures on cleaning them regularly;
■ will regularly check the equipment park for identifying failures;
■ check the tightness of fuel storage tanks or of hazardous substances;
■ check the waste generated on site as site organization and in the work fronts and report periodically to the territorial authority for environment protection organizations located in the counties where the site is located;
■ Establish an intervention program and take action, where quality indicators specific to environment factors (air, water, soil) do not fall within the limits of the applicable law;
■ Establish a program for prevention and control of accidental pollution: measures need to be taken, intervention teams, facilities and equipment in case of accident;
■ Organize a system where people can inform the holder of the discontent that he has regarding pollution, traffic through the creation of a hotline in site management and appointing a person from the employees to collect all opinions expressed in incoming calls and to send a response after the analysis of the situation. This phone number will be made public through the local media, by displaying it at the premises of town halls where the pipeline crosses.

<u>During the operation</u>:
a) the conditions required to be met according to specific legal provisions:

■ Comply with the specific legislation on natural gas transmission through pipelines.
b) conditions arising from the report on the environmental impact or the specific requirements of EU law:
For AIR environmental factor:
Avoid carrying out maintenance work on dust emissions during periods of strong wind;
For WATER environmental factor:
■ Maintaining gutters for taking rainwater from the platform of technological installations and compressor stations;
■ treatment stations inside the compressor stations will ensure a high degree of purification, so the treated water can be discharged into an emissary;
■ In hydrogeological protected areas of groundwater rainwater collected from the stations will not be evacuated;
■ sludge collected from trenches will be transported to authorized waste deposits;
For reduction of noise and vibrations:
■Take measures to limit noise by placing insulation noise level at halls and bonnet equipment of compression stations, so the noise level of facilities designed to keep within limits, without exceeding 65 dBA limit enclosure.
■ Take measures to prevent noise and framing the standard norms for vibration and noise in accordance with STAS no. 10009/1988 and STAS no. 12025/2/1981.

For waste management
■ During the operation of the pipeline no waste will be produced.
-If it is necessary to replace a pipe section, reassess the environmental conditions and develop a new impact assessment, suggesting appropriate measures depending on the size of the works, equipment used, etc.
-During pipeline operation no waste will be produced.
-The constructor and the pipeline operator will implement biodiversity monitoring plan for implementation period.
-the constructor will implement a plan on air quality monitoring, soil and noise level.
- the monitoring works of the impact of construction activities on surface waters will have a permanent character during the works.
-upon the reception of the materials, the compliance with quality certificates accompanying correspondence shall be verified.
- Substandard quality materials will not be used to execute the works.
-Any replacement or change of material can be made only with the written consent of the general designer and the beneficiary.
-Welds will be fully controlled by non-destructive methods to ensure tightness.
-Plugging pipeline will be made only after: checking and isolating all welds, performed in pits position, potential mounting sockets (where applicable) coating achievement, achievement with drainage vents (where applicable).

Monitoring the environment components:

Environment factor	**Protocol**	**Frequency**
Pre-construction stage		
Soil, water, biodiversity	Comparative analysis of the situation at the locations based on the sample charts prepared for each 5 km section	Before the commencement of the works

Construction stage		
Water	Analysis: pH, dissolved oxygen, oil products and temperature Comparison with NTPA	Quarterly
Air	Noise levels Comparison with	Quarterly
Biodiversity	Recording incidents caused by BRUA interaction with the fauna species; Documenting the dynamics of the translocated elements in line with the management requirements, Comparison with the local biodiversity indices	According to the seasonal stages
Post construction stage		
Water	The degree of restoration of the riparian area affected during the crossing, Documentation of the possible erosive effects, shore slides, etc.	Quarterly
Soil	The level of the morphological restoration of the working stripe (restoration to the initial condition);	Quarterly
Biodiversity	The degree of restoration of the vegetal carpet (coverage coefficient) The degree to which the land was restored to the natural/productive circuit, Dynamics of the alien, ruderal, invasive, synanthrope species, etc. Documenting of the persistent negative effects (erosion, compaction, etc)	Quarterly
Operating stage		
Water	Compliance to NTPA001/NTPA002 Documenting the possible erosive effects, shore slides, etc.	Annually
Air	Noise level Monitoring the level of emissions – combustion gas	Annually

b) compliance required by specific legislation in the field of air quality, water management, waste management, noise, nature protection:

■ concentrations of pollutants discharged into the atmosphere will not exceed the ambient air limit values laid down by Law no. 104/2011;

■ Quality indicators for storm water discharged into the environment shall not exceed the values prescribed

by GD 352/2005, 001/2005 NTPA document;
■ Managing all categories of waste will be carried out in strict compliance with Law no. 211/2011 on waste regime;
■ After analyzing the results of the monitoring additional measures will be proposed for the protection of the environment (if applicable);
3) During the closure, decommissioning, reclamation and post-closure
conditions required to be satisfied at closing / dismantling / demolition
■ Restore the initial environmental conditions after completion of closing the perimeter for the site organization;

b) conditions for restoration of original condition /rehabilitation for future use of the land

Dispose of all materials, equipment, waste from the site and land leveling in the site organization;
environmental monitoring plan, indicating the environmental components to be monitored, periodicity, parameters and monitoring the chosen location for each factor:
■ Observe the applicable provisions of the following legal acts:
- GEO no. 195/2005 on environmental protection, approved by Law no. 265/2006, as amended and supplemented;
- Law no. 104/2011 on ambient air quality;
- STAS 12574/1987 Air in protected areas;
- STAS 10009/1988 - urban acoustics. Allowable noise limits;
- O.M no. 462/1993 for the approval of the technical and methodological norms on the protection on determining atmospheric emissions of air pollutants produced by stationary sources;
- Law no. 458/2002 *** Republished regarding drinkable water quality;
- Water Law no. 107/1996 as subsequently amended and supplemented;
- GD no. 188/2002 for approving the rules on conditions for discharge of wastewater into the aquatic environment, with subsequent amendments and additions;
- Order no. 756/1997 approving the regulation on the assessment of environmental pollution.
- Order no. 119/2014 approving the Norms of hygiene and public health on the population's living environment;
- Law no. 307/2006 on fire safety, as supplemented and amended;
- O.M. no. 2387/2011 amending O.M. no. 1964/2007 regarding the creation of the protected area of sites of Community importance as part of the European ecological network Natura 2000 in Romania;
- GD no. 971/2011 amending and supplementing H. G. no. 1284/2007 declaring Special Protection Areas as part of the European ecological network Natura 2000 Romania
- GEO no. 57/2007 on the regime of protected natural areas, conservation of natural habitats, flora and fauna, approved with amendments by Law no. 49/2011;
- GEO no. 68/2007 on environmental liability with regard to the prevention and remedying of environmental damage, approved by Law 19/2008, as amended by O.U.G. no. 15/2009;
- Law no. 211/2011 on waste regime;
- GD no. 856/2002 for approving the list of waste management and waste, including hazardous waste, as amended and supplemented;
- GD no. 235/2007 on the management of waste oils;
- GD no. 170/2004 on the management of used tires;
- GD no. 1132/2008 on batteries and accumulators and waste batteries and accumulators, as amended and supplemented;
- Law no. 249/2015 on the management of packaging and packaging waste, as amended and supplemented;
- Order no. 794/2012 on the procedure for reporting data on packaging and waste packaging;
- GEO no. 5/2015 on electrical and electronic equipment waste;

- GD no. 124/2003 regarding the prevention, reduction and control of environmental pollution by asbestos, as amended by GD no.734/2006.

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