South Stream
Offshore Pipeline
ENERGISING EUROPE

Chapter 3: Impact Assessment Methodology

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3 Impact Assessment Methodology

3.1 Introduction

The impact assessment methodology used in this ESIA Report provides a basis to characterise the potential environmental and social impacts of the Project. The methodology is based on models commonly employed in impact assessment, and takes into consideration the International Finance Corporation (IFC) Performance Standards (PS).

Potential impacts arising from planned activities and unplanned events are assessed. Planned activities include routine and non-routine Project activities or events required for the Construction and Pre-Commissioning, Operational, or Decommissioning Phases of the Project; for example, the planned activity of pipe-laying might disrupt seabed sediments leading to an increase in water turbidity. Unplanned events are those not anticipated to occur during the normal course of Project activities; for example, the unlikely event of a vessel collision that may lead to a spill of fuel.

The impact assessment methodology for planned activities takes into consideration impact magnitude and receptor sensitivity. A matrix is also used to derive impact significance, for pre- and post-mitigation conditions.

The concept of likelihood is included in the methodology for unplanned events. The likelihood of the event occurring, and the likelihood of impacts arising are considered.

The assessment of discipline-specific impacts is presented in Chapters 8 to 18. Unplanned Events are addressed in **Chapter 19 Unplanned Events**, and Cumulative and Transboundary impacts are assessed in **Chapters 20 Cumulative Impact Assessment** and **Chapter 21 Transboundary Impact Assessment** respectively.

3.2 ESIA Process

The ESIA process is a systematic approach to identifying the environmental and social impacts of a project, and describing the mitigation, management and monitoring measures that will be implemented to address these impacts. Ultimately, it allows relevant organisations to make informed decisions about development proposals, and allows potentially affected stakeholders to participate in the process.

In order to ensure a robust and detailed impact assessment, the ESIA process has been structured over a series of progressive and iterative stages (Figure 3.1). Stakeholders, the Project team, and assessment team provided input to these stages during the ESIA process.

As part of the Project design process, measures to avoid or minimise impacts were identified and incorporated into the design. These are referred to as "design controls" and include physical design features and management measures. These design controls considered the IFC mitigation hierarchy as discussed in PS1. Section 3.3.10 of this report discusses this hierarchy and how it was applied to the Project's impact assessment in more detail. They are based on Good International Industry Practice (GIIP) and are intended to assist in the avoidance and

control of unacceptable impacts. Specific design controls are described in greater detail in **Chapter 5 Project Description**. Where the outcome of the ESIA indicates that design controls are insufficient to manage an impact to an acceptable level, further measures have been identified. These measures have been termed "mitigation measures" and are described in respective chapters and detailed in Environmental and Social Management Plans (**Chapter 22 Environmental and Social Management**).

As shown in Figure 3.1, the ESIA process comprised the following stages:

- **Screening**: an initial identification of potential interactions between the Project and physical, ecological and human receptors (Section 3.2.1) indicating the level of impact assessment required;
- **ESIA Scoping**: outlines the perceived required scope of the ESIA to be undertaken, taking into consideration the nature of the Project, the results of the screening and applicable requirements. This stage included:
    - Environmental Issues Identification (ENVIID): a process of systematic identification of potential interactions between Project activities / events and known receptors (Section 3.2.2.1);
    - Desk-based studies: a review of existing environmental and social information, and gap analysis to identify additional baseline information required for the impact assessment. This included review of previous environmental and geotechnical survey data collected by Peter Gaz on behalf of Gazprom between 2008 and 2012 (Section 3.2.2.1);
    - Identification of potential physical, ecological, and human receptors that may be affected by the Project (Section 3.2.2.3);
    - Alternatives: assessment of Project technical alternatives at the Scoping Stage, including alternative routes and methods (Section 3.2.2.4); and
    - Stakeholder engagement: in November 2012, the South Stream Offshore Pipeline – Russian Sector: Scoping Report was published by South Stream Transport on the company website. Copies were also made available in local communities, and provided directly to some stakeholders. Interested and affected parties were invited through advertisement and direct invitation to participate in scoping meetings, held in Anapa and in Moscow during the week of 10-14 December 2012 (see **Chapter 6 Stakeholder Engagement** for further details). Feedback from the scoping meetings was taken into consideration in the ESIA process.
- **Baseline field surveys**: Following a gap analysis undertaken as part of the ESIA Scoping Stage, baseline field surveys were undertaken to complement existing information. The baseline environmental and social conditions against which the impact assessment was to be undertaken (Section 3.2.3) were described;
- **Impact assessment**: This stage included:
    - Building on the ENVIID conducted during the Scoping Stage to describe activities and potential impacts (Section 3.3.1);
    - Determining the nature of impact (Section 3.3.2), the expected magnitude of impact (section 3.3.3) and the sensitivity of receptors (Section 3.3.4);
    - Assessing the significance of potential impacts (Section 3.3.5) prior to planned mitigation;

- Considering unplanned events, i.e. those events which are not expected to happen during the Project but for which the risk of the event occurrence needs to be assessed (Section 3.3.6);
- Considering the potential for Project impacts to combine with other impacts associated with existing or planned developments (cumulative impacts, Section 3.3.7) and the potential for Project impacts to extend across national boundaries (transboundary impacts, Section 3.3.8); and
- Assessing the significance of residual impacts (section 3.3.10) taking into consideration proposed mitigation measures (Section 3.3.9).

- **Environmental and Social Management Plan**: This stage included the development of management plans and procedures as part of South Stream Transport's Health, Safety, Security and Environment Integrated Management System (HSSE-IMS), which captures all of the mitigation measures identified so that they can be practically applied as part of Project development (Section 3.3.11);
- **Stakeholder engagement**: Consultation with regulators and other stakeholders regarding the scope and content of the ESIA Report as well as aiding in the identification of potential Project impacts. Stakeholder engagement has and continues to run across the entire ESIA process (Section 3.4); and
- **ESIA report disclosure**: Release of the ESIA Report to the public so that they can provide opinion and comment on the report or the planned environmental and social management of the Project.

The process is summarised in Figure 3.1, and is described in further detail in following subsections.

3.2.1 Screening

Screening [1] was the first stage undertaken during the ESIA process to identify potential interactions between the Project and existing physical, ecological, and human receptors. Undertaking screening early in the ESIA process facilitated the incorporation of environmental and social considerations into the development of the Project design.

The Screening Stage included the following key steps:

- Identification of Project components and activities;
- Identification of likely physical, ecological and human receptors based on existing knowledge of the environmental and social baseline conditions and professional expertise;
- Examination of relevant national and international legislative requirements; and
- Development of a screening matrix to illustrate the potential interactions of Project activities with the physical, ecological and human receptors.

[1] Screening in the context of this section refers to early stage of scoping prior to the preparation of the Scoping Report (Ref 3.1).

Decommissioning activities were not considered in detail during the Screening Stage due to limited information available at that time. The resultant screening matrix is presented in Table 3.1.

Figure 3.1 Overall ESIA Process

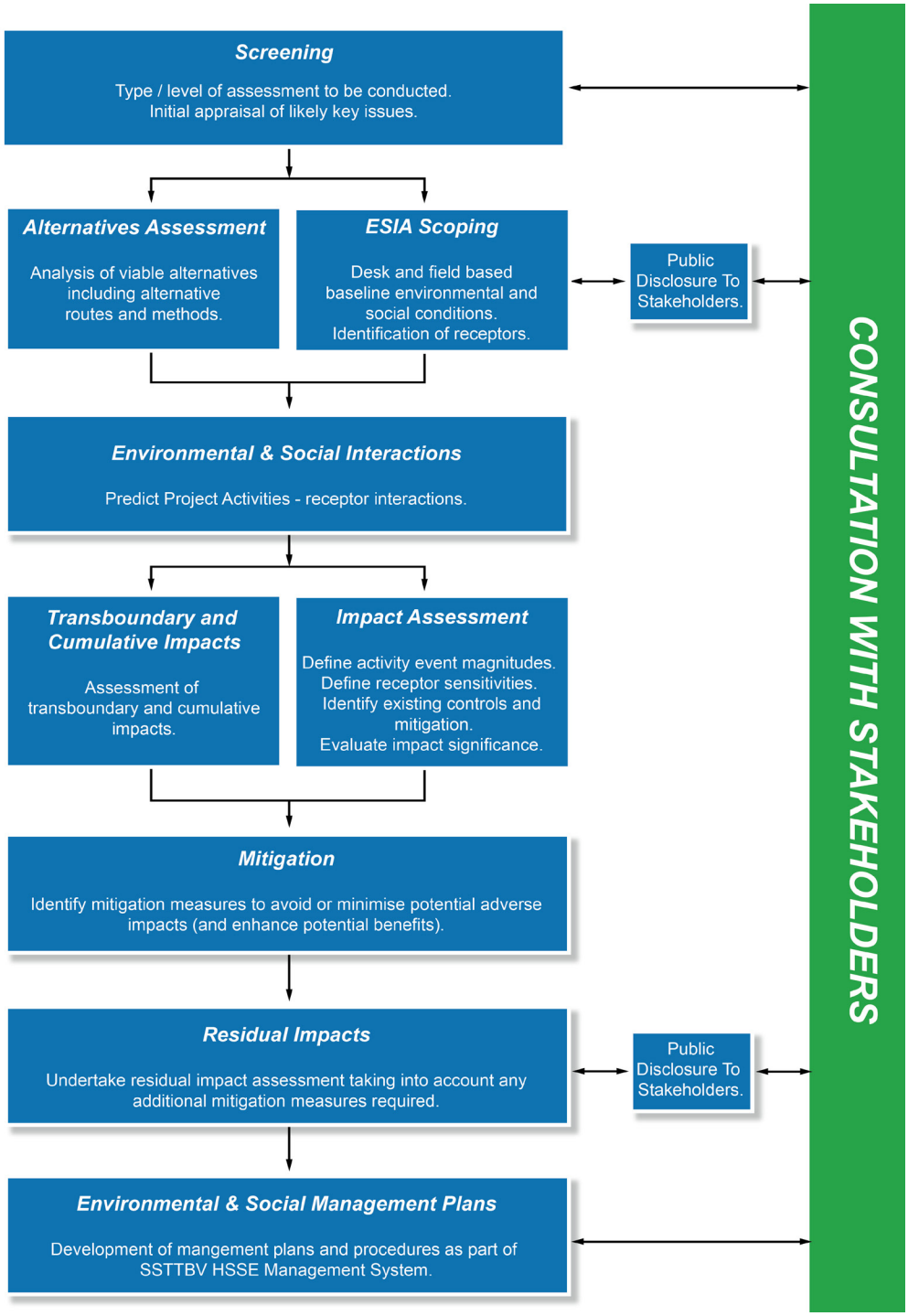


Table 3.1 Environmental and Social Screening Matrix

Impact Receptors	Project Activities		
	Construction Activities	Commissioning Activities	Operational Activities
Physical			
Water (Surface & Groundwater)	✓		
Water (Marine)	✓	✓	
Soils and Sediments	✓		
Landscape	✓	✓	✓
Climate / Air Quality	✓	✓	
Marine Ecology			
Marine Habitat (including plankton and benthic flora and fauna)	✓	✓	
Marine Mammals	✓	✓	
Shorebirds & Seabirds	✓	✓	
Marine Fish	✓	✓	
Terrestrial Ecology			
Birds	✓	✓	✓
Terrestrial Fauna	✓	✓	
Terrestrial Habitats (vegetation and ecosystems)	✓	✓	
Freshwater Fish	✓		
Human			
Local Communities	✓	✓	✓
Local / Regional Economy (including workers and businesses)	✓		✓
Land Users and Owners	✓		✓

Continued...

Impact Receptors	Project Activities		
	Construction Activities	Commissioning Activities	Operational Activities
Onshore Cultural Heritage	✓		
Offshore Cultural Heritage	✓		
Marine Users	✓	✓	✓

Complete.

3.2.2 ESIA Scoping

Following the Screening Stage, scoping was undertaken to provide further detail of potential environmental and social effects of the Project using additional engineering and baseline data. The Scoping Stage intended to facilitate impact identification in a consistent and robust manner.

3.2.2.1 Environmental Issues Identification (ENVIID) Register

Scoping included a systematic consideration of Project activities and their potential impact on physical, ecological and human receptors. An ENVIID was conducted to determine activities, receptors and impacts of all phases of the Project. This process, supported by interdisciplinary workshops (attended by Project engineers and environmental and social scientists), enabled a comprehensive identification of the Project's potential interactions (beneficial and adverse) with physical, ecological and human receptors. This information was recorded in an ENVIID Register that provided a reference for potential impacts requiring further investigation during the ESIA process.

3.2.2.2 Desk-Based Studies – Review of Existing Baseline Information

An important component of the Scoping Stage is the definition of existing baseline conditions (i.e. the prevailing environmental and social characteristics against which the potential impacts of the Project can be assessed). Baseline conditions were defined during the Scoping Stage through a review of existing environmental and social information.

A significant body of information was available in environmental and geotechnical survey data and reports prepared for the Project between 2008 and 2012 (Ref. 3.2). This information included the results of terrestrial and marine ecology, water quality, sediment and geology, soil and groundwater, cultural heritage and contamination surveys undertaken within the Project Area of Influence.

In addition to Project-specific information, scientific journals, reports by government agencies and by other groups, were reviewed for relevant baseline information.

Existing baseline information used for ESIA Scoping Stage also formed the core of baseline information in the impact assessment (Section 3.3). Where gaps were identified between baseline information available at the Scoping Stage and that required for the ESIA Report (e.g.

out of date, too narrow in scope, etc.), additional surveys or studies were undertaken to collect the required information.

3.2.2.3 Identifying Receptors

Receptors are environmental components, people and cultural heritage assets that may be affected, adversely or beneficially, by the Project. Potential receptors were identified through both desk and field-based studies, taking into consideration likely Project impacts. Based on the review of existing information, four high-level categories of Project receptors were identified:

- Physical (i.e. non-living environmental components, including air quality, water bodies, landscapes, terrestrial soils, marine sediments and geology);
- Marine ecology (i.e. marine habitat, flora and fauna);
- Terrestrial ecology (i.e. terrestrial habitat, flora and fauna); and
- Human (i.e. landowners and residents of local communities, local economy, marine users, cultural heritage).

Individual receptors within these groups were assessed as part of the impact assessment (Chapters 8 to 18) for their sensitivity to the potential impacts of the Project. Human receptors identified formed the basis of the stakeholder engagement activities undertaken (Section 3.4).

3.2.2.4 Analysis of Alternatives

An analysis was undertaken of technically and financially feasible alternatives that would allow the development of a new supply route that provides a safe and reliable means to export Russian gas to the countries of Central and South-Eastern Europe via the Black Sea.

The presentation of the Analysis of Alternatives followed a 'narrowing approach' involving a series of logical steps, starting with the high-level alternatives and progressively narrowing-in on more detailed alternatives. Using this commonly adopted approach the Analysis of Alternatives considers each of the following in series:

- South Stream Offshore Pipeline alternatives:
    - Alternative means of gas transportation; and
    - Offshore (macro) routing.
- The 'Zero' or 'No Project' alternative;
- Project alternatives:
    - Landfall site selection;
    - Shoreline crossing technique (open cut vs. microtunnelling);
    - Onshore routing; and
    - The offshore route optimisation.

The Analysis of Alternatives is described in **Chapter 4 Analysis of Alternatives**. Alternative mitigation and monitoring measures were also considered in the course of the assessment.

3.2.3 Additional Baseline Field Surveys and Studies

Field surveys and desk-based studies required to address identified gaps in baseline data were carried out during 2012 to 2013, and included:

- Air quality monitoring;
- Noise monitoring;
- Terrestrial ecology field surveys (habitat and species based surveys);
- Marine ecology surveys (habitat and species based surveys);
- Marine sediments and sea water quality sampling;
- Cultural heritage identification surveys;
- Beach-use surveys;
- Road traffic surveys; and
- Landscape and visual amenity characterisations.

The details of the surveys undertaken (timing, location, methods and results), together with information gathered through the desk-based studies, are presented in the relevant chapters of this ESIA Report.

3.3 Impact Assessment Framework

The process for assessing potential Project impacts is illustrated in Figure 3.2 and involved:

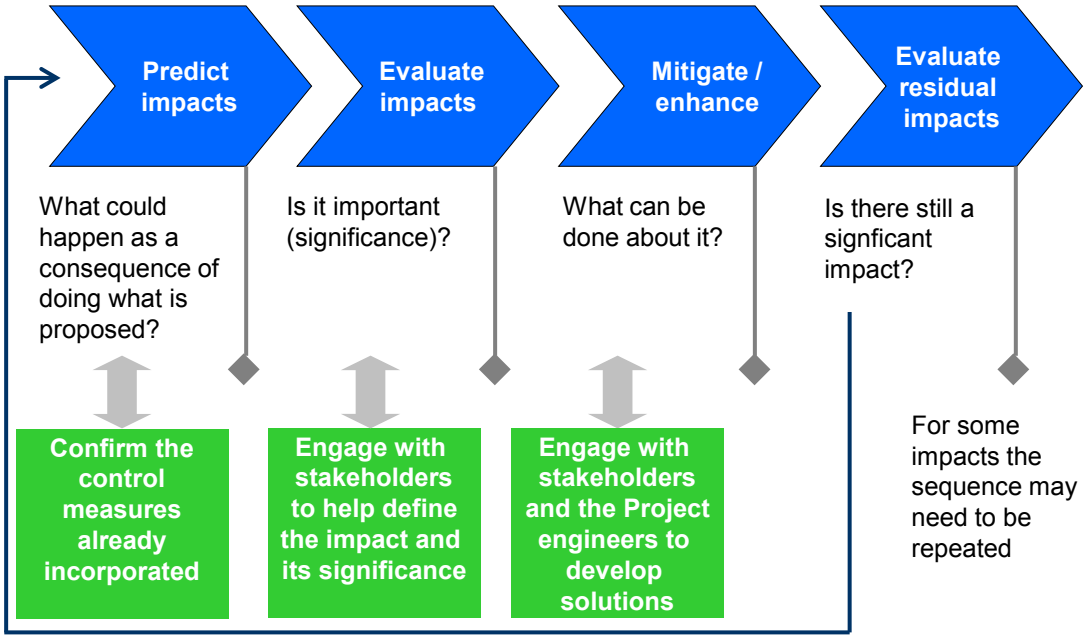
- **Prediction**: What will happen to the environment as a consequence of this Project (i.e. defining Project activities and impacts)?
- **Evaluation**: Will it have a beneficial or adverse effect? How big is the change expected to be? How important will it be to the affected receptors?
- **Mitigation**: If the impact is of concern, can anything be done to avoid, minimise, or offset the impact? Or to enhance potential benefits?
- **Residual Impact**: After mitigation, is the impact still of concern?

Impact significance was assessed with and without mitigation measures in place. The impact significance without mitigation measures was assessed with the design controls in place (Section 3.2). Impacts without mitigation measures in place are not representative of the Project's actual extent of impact, and are included to facilitate understanding of how and why mitigation measures were identified.

The residual impact is what remains following the application of mitigation and management measures, and is thus the final level of impact associated with the development of the Project. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this ESIA Report.

For some types of impact, there are empirical, objective and established criteria for determining the potential impact significance (e.g. if a standard is breached or a protected area is damaged). However, in other cases assessment criteria are more subjective and require professional judgement to a greater degree. The criteria against which the significance of planned impacts was evaluated, for the purposes of this Project, has been described in terms of two components: impact magnitude (Section 3.3.3) and receptor sensitivity (Section 3.3.4). The assessment of unplanned impacts is described in Section 3.3.6.

Figure 3.2 Impact Identification and Assessment Process



3.3.1 Activities and Impacts

Building upon the ENVIID conducted during the Scoping Stage, Project activities and potential impacts upon physical, ecological and human receptors were further defined. For this purpose, the definition of a Project impact was adapted from ISO 14001:2004 (Ref 3.3) [2] as:

- *"Any change to the environment [or social receptors], whether adverse or beneficial, wholly or partially resulting from an organization's environmental [or social] aspects."*

Definitions of an 'activity' and a 'receptor' are not included within ISO 14001:2004, but for the purposes of this Project the following definitions are provided.

[2] Although not designed specifically for use in impact assessment certain terms and principles of this standard were adopted to assist with the impact identification / Scoping Stage.

A Project activity is considered to be:

- A physical action or presence of infrastructure associated with the operation of Project plant, equipment or vehicles, or the actions of Project employees.

A Project receptor is considered to be:

- Someone or something that could be influenced by the Project, including human health, water resources, air quality, ecological habitats or species, cultural heritage assets, and the wider environment.

An impact therefore represents the effect of an interaction of a Project activity with the physical, ecological and human receptor. Two examples of these relationships are provided in Figure 3.3.

Figure 3.3 Examples of Project Activity - Impact Pathways

Term	Example 1	Example 2
ACTIVITY	Use of diesel generator set	Generation of wastewater
RECEPTOR	Air quality and climate	Seawater quality
IMPACT	Deterioration of air quality, global warming	Environmental degradation, economic losses

Project activities were identified through a review of the Project Description (Chapter 5). Potential impacts were identified based on the details of Project activities and their potential interactions with the surrounding environment (and physical, ecological, and/or human receptors). This also required an understanding of the potential sources of impacts and impact pathways, and was supported by:

- An understanding of baseline conditions and potential receptors (Chapters 8 to 18);
- Spatial and temporal extent of the Project Area of Influence (Chapter 1);
- Information from stakeholders, including authorities, experts, and the public (Chapter 6); and
- Professional knowledge and experience of comparable projects or developments.

To some extent, the identification and understanding of Project activities and impacts was an iterative process conducted throughout the ESIA process as more Project and environmental and social baseline information became available.

The assessment of these environmental and social impacts has been structured according to the following technical disciplines:

- Terrestrial soil, water, and groundwater (Chapter 8);
- Air quality (Chapter 9);
- Terrestrial noise and vibration (Chapter 10);
- Terrestrial ecology (Chapter 11);
- Marine ecology (Chapter 12);
- Landscape and visual (Chapter 13);
- Socio-economics (Chapter 14);
- Community Health, Safety and Security (Chapter 15);
- Cultural heritage (Chapter 16);
- Ecosystem services (Chapter 17); and
- Waste (Chapter 18).

3.3.2 Impacts Nature and Type

Whether an impact is considered to be beneficial or adverse (impact nature), and the way in which it is related to the Project (impact type, e.g. direct, indirect) are relevant to the ESIA process. In particular, the degree to which an impact may be managed or modified by the mitigation measures is dependent upon the impact nature and type. Table 3.2 provides definitions.

Table 3.2 Impact Assessment Terminology

Term	Definition
Impact Nature	
Adverse Impact	An impact that is considered to represent an adverse change from the baseline condition or introduces a new undesirable factor.
Beneficial Impact	An impact that is considered to represent an improvement on the baseline condition or introduces a new desirable factor.

Continued…

Term	Definition
Impact Type	
Direct Impact	Impacts that result from a direct interaction between a Project activity and the receiving environment (e.g. between occupation of an area of seabed and the habitats which are lost).
Indirect Impact	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g. Project implementation promotes service industries in the region).
Secondary Impact	Impacts that follow on from the primary interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g. loss of part of a habitat affects the viability of a species population over a wider area).
Cumulative Impact	Impacts that act together with other impacts, from other projects or unrelated activities, to affect the same environmental resource or receptor.

Complete.

In considering impacts related to this Project, both adverse and beneficial impacts have been identified. Where appropriate, the impact assessment chapters further identify impacts as direct, indirect or secondary impacts. Where appropriate, both impact nature and type definitions have been applied throughout the ESIA Report to provide clarity regarding the significance of the impacts. Cumulative impacts are discussed in Section 3.3.8 and **Chapter 20 Cumulative Impact Assessment.**

3.3.3 Impact Magnitude

The magnitude of an impact is a measure of change from baseline conditions. This measure of change can be described in terms of its:

- Extent: Spatial extent (e.g. area impacted) or population extent (e.g. proportion of the population / community affected) of an impact;
- Duration: How long the impact will interact with the receiving environment;
- Frequency: How often the impact will occur; and
- Reversibility: How long before impacts on receptors cease to be evident.

Thus, these characteristics collectively describe the nature, physical extent, and temporal condition of the impact.

To facilitate a structured description of impact magnitude, a qualitative category scale of negligible, low, moderate, and high was developed for each of the magnitude characteristics.

Criteria for each impact magnitude category (i.e. negligible, low, moderate and high ranking criteria) were developed as appropriate for each discipline, and are described in Chapters 8 to 18.

The determination of overall impact magnitude rating was determined on the basis of professional judgement and Good International Industry Practice (GIIP), considering all four characteristics collectively where relevant.

3.3.4 Receptor Sensitivity (Resilience and Value)

Receptor sensitivity is the degree to which a particular receptor is more or less susceptible to a given impact. Receptor sensitivity takes into consideration receptor resilience and value.

Receptor resilience (or conversely, vulnerability) describes the ability of the receptor to withstand adverse impacts. It takes into consideration not only activity-impact-receptor pathways, but also environmental characteristics of the receptor that might make it more or less resilient to change. As such, a receptor can be considered as existing within a spectrum of 'vulnerable' to 'resilient', with the former more likely to experience significant impacts as a result of a given change.

Receptor value takes into consideration its quality and its importance as represented, for example, by its conservation status, its cultural importance and / or its economic value. It recognises that, for a given magnitude impact, different receptors (either directly or indirectly) may be deemed to be of greater importance and as such the significance of the impact is greater than the impact magnitude alone.

Similar to the approach adopted for impact magnitude, a structured description of receptor sensitivity employed a qualitative category scale of negligible, low, moderate, and high for each of the sensitivity characteristics, resilience and value. Likewise, criteria for receptor sensitivity (i.e. negligible, low, moderate and high ranking criteria) were developed as appropriate for each discipline, and are described in Chapters 8 to 18.

3.3.5 Impact Significance

Impact magnitude and receptor sensitivity were used to assess impact significance according to the impact assessment matrix in Table 3.3, and the impact assessment definitions in Table 3.4.

Table 3.3 Impacts Significance Matrix

		Receptor Sensitivity (Vulnerability and Value)			
		Negligible	*Low*	*Moderate*	*High*
Impact Magnitude (Extent, Frequency, Reversibility, Duration)	*Negligible*	Not significant	Not significant	Not significant	Not significant/Low*
	Low	Not significant	*Low*	Low/Moderate†	Moderate
	Moderate	Not significant	Low/Moderate	Moderate	High
	High	Low	Moderate	High	High

* Allows technical discipline author to decide if impact significance is Not Significant or Low.
† Allows technical discipline author to decide if impact significance is Low or Moderate.

Table 3.4 Impact Significance Definitions

Adverse Impacts	**High**	**Significant.** Impacts with a "High" significance are likely to disrupt the function and value of the resource / receptor, and may have broader systemic consequences (e.g. ecosystem or social well-being). These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
	Moderate	**Significant.** Impacts with a "Moderate" significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of the resource / receptor, although the overall function and value of the resource / receptor is not disrupted. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
	Low	**Detectable but not significant.** Impacts with a "Low" significance are expected to be noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause hardship, degradation, or impair the function and value of the resource / receptor. However, these impacts warrant the attention of decision-makers, and should be avoided or mitigated where practicable.
	Not Significant	**Not Significant.** Any impacts are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process.

The above matrix and significance definitions have been used to assess adverse impacts of the Project. Although beneficial impacts of the Project are identified within this ESIA, beneficial impacts have not been assessed in terms of receptor sensitivity or impact magnitude. Rather, beneficial impacts have been described in qualitative terms and measures presented that South Stream Transport and other parties, where indicated, will employ to maximise benefits.

For adverse impacts, this methodology was applied to both pre- and post-mitigation scenarios for all impacts identified. The reasoning behind each evaluation is explained in the Chapters 8-18, depending on the relevant discipline, including a detailed discussion of the issues contributing to the determination of residual significance.

The impact assessment in each technical chapter includes an impact summary table for each phase of the Project (an example is presented in Table 3.5), including residual impact significance ratings for all impacts identified.

3.3.6 Waste

In contrast to the other environmental and social technical disciplines assessed within this ESIA, no pre-mitigation assessment of impact was undertaken for waste production, storage, management and disposal as this is considered part of the Project design as described in **Chapter 5 Project Description**. Rather, **Chapter 18 Waste Management** focuses upon identification of appropriate mitigation measures given the type and volume of wastes to be produced and identification of residual impact significance ratings. This methodology is described in further detail in **Chapter 18 Waste Management**.

3.3.7 Unplanned Events

Environmental and social impacts that might result from unplanned events (e.g. fuel spill, or wet buckle) are addressed in **Chapter 19 Unplanned Events**. In addition to impact magnitude and receptor sensitivity, the impact assessment methodology for unplanned events also considered the likelihood of occurrence of the event(s). This methodology is described in further detail in **Chapter 19 Unplanned Events**.

3.3.8 Cumulative Impacts

This ESIA adopts the IFC definition of cumulative impacts (Ref. 3.4): *"Cumulative impacts are those that result from the incremental impact of the Project when added to other existing, planned and reasonably predictable future projects and developments."*

The IFC has released a guidance note Cumulative Impact Assessment and Management – Guidance for the Private Sector in Emerging Markets in August 2013 (Ref. 3.5). The guidance note introduces a framework for identifying and assessing potentially significant cumulative impacts. The cumulative impact assessment (CIA) has been prepared taking into account the IFC draft guidance note.

A predominantly qualitative approach was taken in the identification and assessment of cumulative impacts during the construction and operations phases of the Project, taking into account geographic and scheduling overlaps with the Project. The methodology for the CIA is described in further detail in **Chapter 20 Cumulative Impact Assessment**.

Table 3.5 Assessment of Potential Impacts: Example Table

Activity	Potential Impact	Receptor(s)	Receptor Sensitivity	Impact Magnitude	Pre-Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Plant operation at landfall construction sites	Noise disturbance to local residents and land-users	Local communities and land-users	High	Low	Moderate	• Schedule construction works to occur only during daylight hours • All plant and equipment to be regularly maintained in good working order	Low (based on Table 3.3 matrix)
Construction of RoW	Damage / loss of wildlife habitat	Terrestrial fauna	Moderate	Moderate	Moderate	• Minimise footprint of clearance	Low
Dredging of microtunnel exit pit	Seabed disturbance may lead to localised decrease in light and/or dissolved oxygen as a result of re-suspended material, thereby affecting planktonic organisms	Plankton	Moderate to Low	Low	Moderate to Low	• Routing to avoid most sensitive areas • Use of silt curtains as appropriate • Avoid overspill from dredgers • Use lowest impact trenching technology as conditions allow	Low

3.3.9 Transboundary Impacts

Transboundary impacts are defined as "*impacts that extend to multiple countries, beyond the host country of the project, but are not global in nature. Examples include air pollution extending to multiple countries, use or pollution of international waterways, and transboundary epidemic disease transmission*" (Ref. 3.4).

As the South Stream Offshore Pipeline spans multiple countries and is being constructed across a dynamic marine environment, there is the potential for some Project activities to generate transboundary impacts. Such impacts may arise from Project activities which traverse country boundaries, or impacts that originate within one country, but have the ability to extend across national borders.

For the purposes of the transboundary impact assessment included within this ESIA, the Russian national borders and the boundary of the Russian EEZ in the Black Sea define the transboundary impact boundaries. Any changes in baseline conditions extending across these boundaries would be considered to be a transboundary impact.

IFC Performance Standard (PS) 1 Assessment and Management of Environmental and Social Risks and Impacts (Ref. 3.6) recognises the need to consider transboundary impacts. The transboundary impact assessment (Chapter 21) has considered the potential for transboundary impacts to be generated by the Project as required by IFC PS1 Further details regarding potential transboundary impacts can be found in **Chapter 21 Transboundary Impact Assessment**.

3.3.10 Impact Mitigation

As part of the ESIA process, where the impact assessment identified impacts as potentially arising, mitigation measures were developed (including avoiding, management and monitoring actions). Where an adverse impact is identified, the next step is to find a way to avoid or minimise the impact. The process of identifying "design controls" and "mitigation measures" considered the mitigation hierarchy (Figure 3.4), as specified in IFC PS1, which is widely regarded as a best practise approach to managing risks.

For the Project, efforts were made to firstly avoid or prevent, then minimise or reduce adverse impacts, which were principally achieved through the application of "design controls" (Section 3.2). Avoidance, minimisation repair and/or restoration were considered during the application of "mitigation measures" to manage the risks of adverse impacts. Any remaining significant residual impacts were then addressed via consideration of measures including offsetting and compensation.

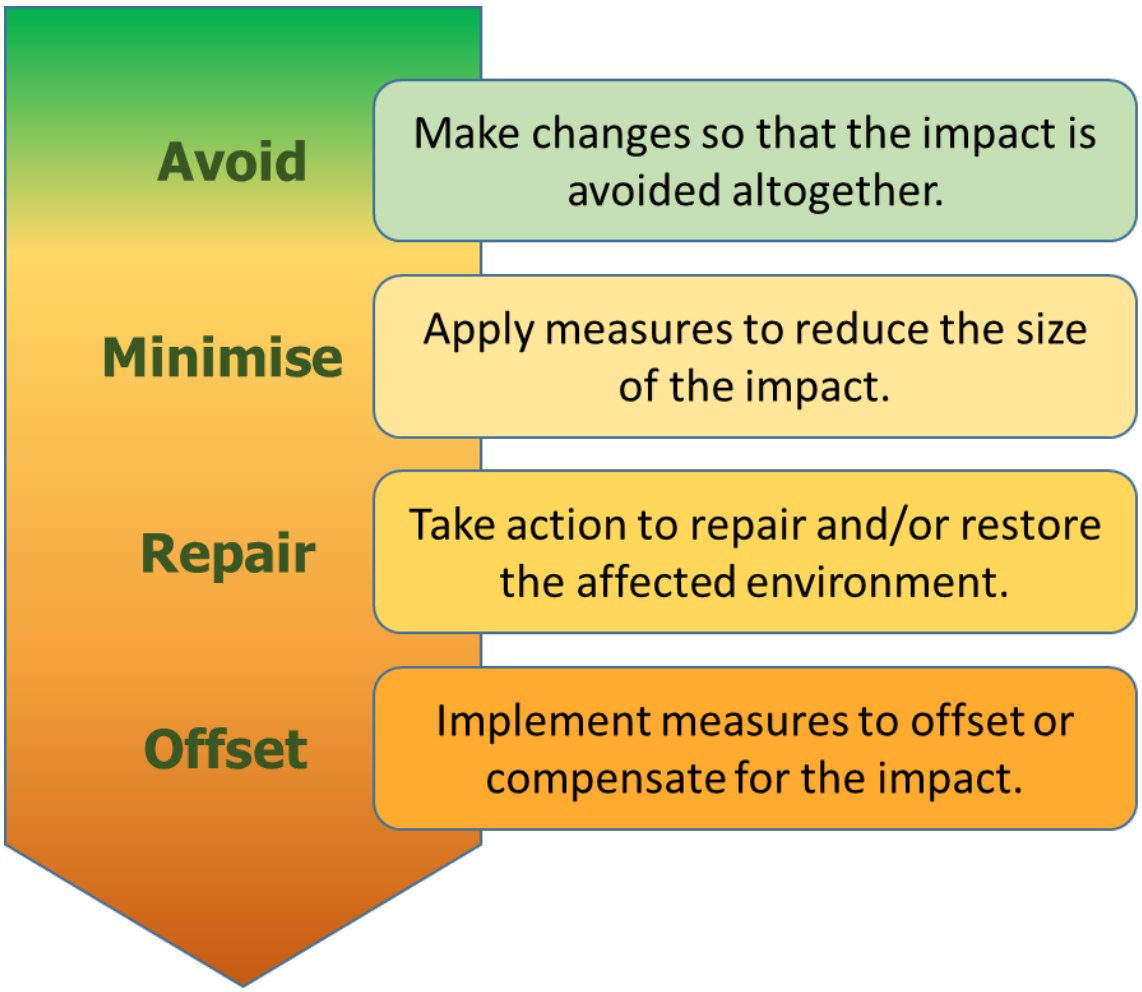
For biodiversity, the same hierarchy was applied to all stages of the impact assessment process, in order to achieve "no net loss" of biodiversity. The assessment of critical habitat for biodiversity was identified separately to the above impact assessment process, albeit using the same hierarchy, to achieve "net gain" of the biodiversity values for which the critical habitat was designated.

The mitigation hierarchy adopted for the Project is shown in Figure 3.4.

This process involved ESIA experts working with the Project team engineers to identify practicable and cost-effective approaches to mitigate impacts. These measures were agreed and integrated into the Project plan.

Specific mitigation measures are described in the relevant discipline chapters (Chapters 8 to 18).

Figure 3.4 Mitigation Hierarchy



3.3.11 Residual Impact Assessment

Once feasible mitigation measures were identified and agreed, the ESIA team reassessed the potential impacts, assuming the mitigation measures were effectively implemented as planned.

In general, impacts with "Not Significant" or "Low Significance" residual impact significance were not considered to be of concern to the development of the Project[3]. For adverse impacts of "Moderate" and "High" significance, an iterative process is undertaken to further investigate opportunities for mitigation, according to the hierarchy above. Where the significance cannot be further reduced, an explanation is provided of why further reduction is not practicable. Monitoring is required to confirm the measures used to mitigate adverse impacts are working properly and that the impact is not worse than predicted. Monitoring requirements are outlined in the respective assessment chapters.

3.3.12 Environmental and Social Management Plans

Environmental and Social Management Plans (ESMPs) have been developed to capture all mitigation and management measures and environmental and social commitments made within the ESIA Report. Adherence to these plans will be a condition of any Project construction and operation contracts awarded. It is noted that the ESMPs also incorporate environmental and social management commitments of Bulgaria and Turkey. How the ESMPs fit into this broader South Stream HSSE-IMS is described in **Chapter 22 Environmental and Social Management**.

3.4 Stakeholder Engagement

As part of the ESIA process, stakeholder engagement was and continues to be undertaken throughout the development of the Project to ensure that all interested parties are aware and informed of the Project and have an opportunity to provide input regarding potential Project impacts and mitigation measures. To date, consultations have been undertaken with:

- National authorities;
- Municipal and local authorities;
- Local communities;
- Marine area users;
- Local businesses;
- Non-governmental organisations (NGOs); and
- Academic and scientific organisations.

South Stream Transport has developed a Stakeholder Engagement Plan which identifies stakeholders and their interests, describes the consultation undertaken and that planned as part of the Project's ESIA process, and establishes a framework for stakeholder engagement activities to be undertaken as the Project progresses beyond the ESIA phase.

[3] A more stringent approach was taken in the assessment of ecological receptors of high sensitivity, such as critical habitat, or species classified as having vulnerable or above conservation status. In this case, residual impact significance of Low and above was a concern to the further development of the Project.

The stakeholder consultation process has helped the ESIA to scope potential impacts and concerns identified by the public. As indicated in Figure 3.1, stakeholder consultation has been a part of the ESIA process from the initial screening phase, and will continue with the submission of this ESIA, and during Project implementation to ensure the management of impacts takes stakeholder's concerns into account.

Details of the stakeholder engagement process for the ESIA are discussed further in **Chapter 6 Stakeholder Engagement**.

This ESIA Report has been released to the public for review and comment. The purpose of this disclosure is:

- To help stakeholders understand the potential impacts, following the application of mitigation measures, that may arise as a result of the Project;
- To provide an opportunity for stakeholders to raise comments or concerns about the Project, and request any additional mitigation measures deemed appropriate; and
- To confirm to stakeholders that their opinions obtained through the stakeholder engagement process have been considered in both Project design and ESIA evaluation.

Further details about this disclosure are provided in **Chapter 2 Policy, Regulatory and Administrative Framework** and **Chapter 6 Stakeholder Engagement**.

3.5 Data Limitations

This ESIA Report has been based on design information available at the time of its preparation. Where necessary assumptions have been made and discussed in the relevant chapters. Consequently the ESIA has been undertaken on Project engineering design information at a Front End Engineering Design (FEED) level.

During the detailed design, Construction and Pre-commissioning, and Operational Phases of the Project, there may be a requirement to amend design elements or processes which results in a deviation from that presented in this Project Description. The Project has a management of change process to manage and track any such amendments, and to:

- Assess their potential consequences with respect to environmental and social impact; and
- In cases where a significant impact is likely to arise as a consequence of the amendment or change, to inform and consult with relevant parties on the nature of the impact and on proposed mitigation measures, where practical and appropriate.

All design changes will be added to a register of changes, which will summarise the change, the assessment, and the justification for South Stream Transport actions. The management of change process will be incorporated into the HSSE Management of Change Procedure, which is described in further detail in **Chapter 22 Environmental and Social Management**.

The Project design will continue to be refined to a final detailed design level, as informed by this ESIA. Any changes made to Project design following finalisation of this ESIA Report will be managed through the Management of Change Procedure (**Chapter 22, Environmental and**

Social Management), which includes the requirement to assess any potentially significant environmental and social impacts.

Comprehensive data have been used to inform this ESIA Report to enable sufficient confidence in the assessment conclusions. Notwithstanding the data set used, some gaps in baseline data necessitated some conservative assumptions as described in the relevant chapters and a precautionary approach to the mitigation measures adopted.

In this ESIA Report, predictions are made using accepted ESIA methods ranging from qualitative assessment and expert judgement to quantitative modelling. The technical discipline impact assessment sections in Chapters 8 to 18, detail specific relevant data and assumptions made.

References

Number	Reference
Ref 3.1	South Stream Transport B.V. Russian Sector Scoping Report (November 2012), available from: http://www.south-stream-offshore.com/media/documents/pdf/en/2012/11/ssttbv_south-stream-offshore-pipeline-russian-sector_30_en_20121115.pdf. Accessed on 18 June 2013.
Ref 3.2	Giprospetzgas (2011), Complex Engineering Surveys at the Phase 'Design Documentation' within the Framework of 'the South Stream' Gas Pipeline Marine Sector Project Implementation.
Ref 3.3	International Organization for Standardization (ISO) (2001), European Standard EN ISO 14001: 2004. Environmental management systems – Requirements with guidance for use. Accessed at: http://www.iso.org/iso/catalogue_detail?csnumber=31807. Accessed on 17 May 2013.
Ref. 3.4	International Finance Corporation (IFC) (2012), IFC Guidance Notes: Performance Standards on Environmental and Social Sustainability. Accessed at: http://www.ifc.org/wps/wcm/connect/e280ef804a0256609709ffd1a5d13d27/GN_English_2012_Full-Document.pdf?MOD=AJPERES&bcsi_scan_AB11CAA0E2721250=/Uuc1iQQbbCDfhp5zCA0mGTxe58/AQAAlCGIMA==&bcsi_scan_filename=GN_English_2012_Full-Document.pdf
Ref 3.5	IFC (2013), Good Practice Note: Cumulative Impact Assessment and Management – Guidance for the Private Sector in Emerging Markets (August 2013). http://www1.ifc.org/wps/wcm/connect/c8f524004a73daeca09afdf998895a12/IFC_Performance_Standards.pdf?MOD=AJPERES. Accessed on 20 September 2013.
Ref 3.6	IFC (2012), IFC Performance Standards on Environmental and Social Sustainability - Effective January 1, 2012Performance. Accessed at: http://www1.ifc.org/wps/wcm/connect/c8f524004a73daeca09afdf998895a12/IFC_Performance_Standards.pdf?MOD=AJPERES. Accessed on 17 May 2013.