

Tunisia-Italy Power Interconnector Project

Environmental and Social Impact Assessment (ESIA)

Section 10 – Synopsis of impact assessment

Draft for Consultations

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TABLE OF CONTENTS

1.	INTRODUCTION.....	3
2.	IMPACT ASSESSMENT APPROACH AND METHODOLOGY	4
2.1	Methodological Framework	4
2.2	Impact Assessment Process	4
2.3	Assessment of Impact significance.....	5
2.3.1	Assessing the Sensitivity.....	5
2.3.2	Assessing the Magnitude of impact.....	7
2.3.3	Assessing the Significance of an impact.....	10
2.4	Mitigations Hierarchy.....	10
2.4.1	Evaluation of mitigation measures.....	11
2.5	Residual significance.....	11
3.	IMPACT MATRIX	12
3.1	Impact tree	12
3.2	Construction phase	13
3.3	Operation phase.....	14
3.4	Synopsis table.....	15

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<div>Contractor Doc No: ES-10 DRAFT FOR CONSULTATIONS</div>	<div>Date 2023-02-02</div>	<div>Pag. 3 of 15</div>			

1. INTRODUCTION

The present document illustrates through a series of synoptic matrixes and graphs the overall impacts of the project, which are described in the following sections of the ESIA document:

- Section 8 – Risks and potential impacts assessment – Terrestrial domain – Tunisian side
- Section 9 – Risks and potential impacts assessment – Marine domain

The impact assessment methodology is presented in each section and recalled again, for simplicity, in the following chapter.

2. IMPACT ASSESSMENT APPROACH AND METHODOLOGY

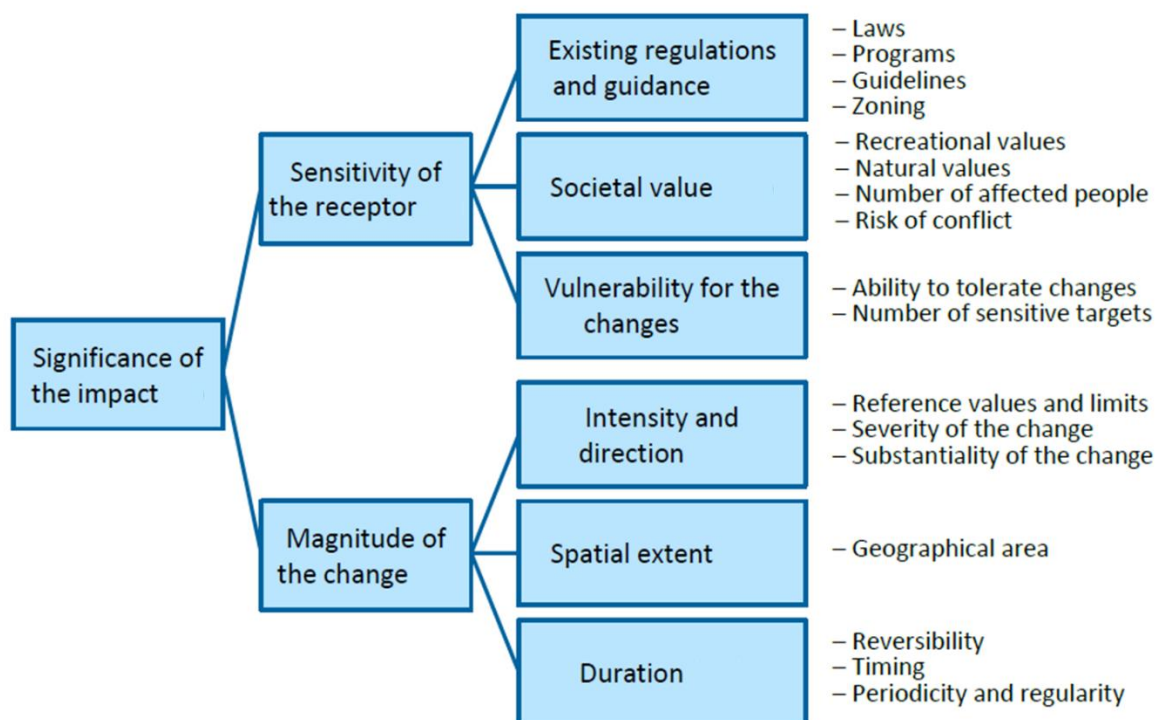
2.1 Methodological Framework

The Impact Assessment (IA) methodology adopted in the present study is based on the ARVI approach, developed within the European commission's LIFE + project, IMPERIA: "Improving environmental assessment by adopting good practices and tools of multi-criteria decision analysis"¹.

The fundamental principle of the adopted IA approach is that for each environmental and social component one first assesses the **sensitivity** of the component in its baseline state, and then the **magnitude of impact**, which would probably affect the component as a result of the proposed project. An overall estimate of the **significance of an impact** is derived from these judgments.

Both the sensitivity of the component being analyzed and the magnitude of impact are evaluated systematically based on more detailed sub-criteria, as depicted in the Figure below.

Figure 2.1: IA approach



2.2 Impact Assessment Process

Based on the ESIA methodology outlined above, the assessment of the Project's environmental and social impacts was performed according to the following steps:

- Definition of Sensitivity for each of the environmental and social components;

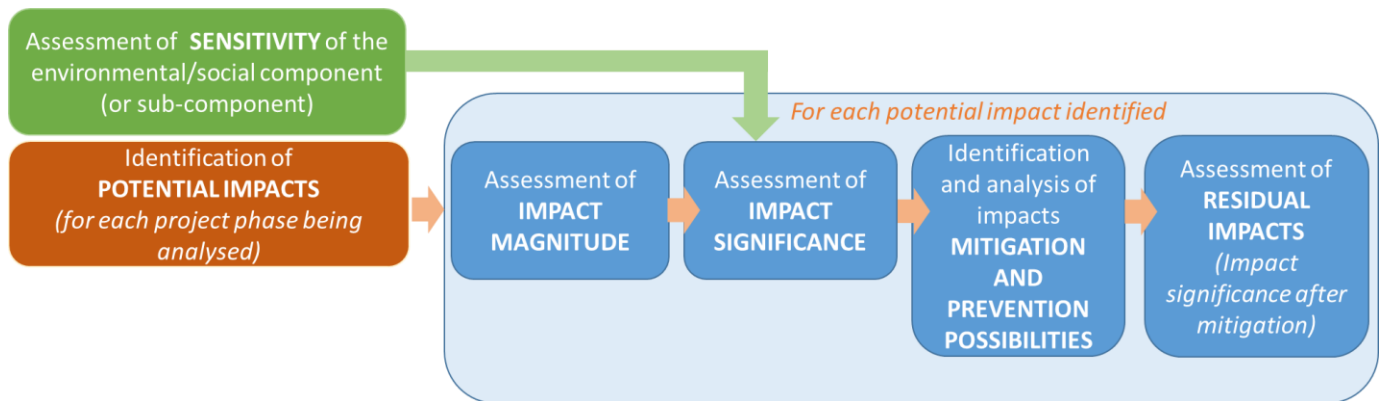
For each project phase (namely construction and operation) and each environmental and social component:

- Identification of Potential Impacts

For each potential impact identified:

¹ <https://www.jyu.fi/science/en/bioenv/research/natural-resources-and-environment/imperia-project>

- Assessment of Impacts Magnitude and Significance;
- Identification and analysis of impacts Mitigation and prevention possibilities;
- Assessment of Residual impacts (Impact significance after mitigation).



2.3 Assessment of Impact significance

2.3.1 Assessing the Sensitivity

Sensitivity of the receptor (intended as environmental and social components analyzed in the assessment) is a description of the characteristics of the target of an impact.

The sensitivity is assessed based on the following sub-criteria, as described hereinafter:

- existing regulations and guidance;
- societal value;
- vulnerability for the change.

It is noted that the sensitivity of each environmental and social component is estimated in its current state prior to any change implied by the Project (ante-operam characterization).

2.3.1.1 Existing regulations and guidance

Existing regulations and guidance describe whether there are any such objects in the area likely to be affected by the Project, which have some level of protection by law or other regulations (e.g. prohibition against polluting groundwater and Natura areas), or whose conservation value is increased by programs or recommendations (e.g. landscapes designated as nationally valuable).

According to the adopted IA methodology, the sub-criterion “existing regulation and guidance” is evaluated and classified as shown in the figure below.

Very high * * * *	The impact area includes an object that is protected by national law or an EU directive (e.g. Natura 2000 areas) or international contracts which may prevent the proposed development.
High * * *	The impact area includes an object that is protected by national law or an EU directive (e.g. Natura 2000 areas) or international contracts which may have direct impact on the feasibility of the proposed development.
Moderate * *	Regulation sets recommendations or reference values for an object in the impact area, or the project may impact an area conserved by a national or an international program.
Low *	Few or no recommendations which add to the conservation value of the impact area, and no regulations restricting use of the area (e.g. zoning plans).

2.3.1.2 Societal value

Societal value describes the value to the society of the environmental or social component being analyzed and depending on the type of impact may be related to economic values (e.g. water supply), social values (e.g. landscape or recreation) or environmental values (e.g. natural habitat).

Societal value measures general appreciation from the point of view of the society but should not consider that much the point of view of individuals exposed to negative impacts. When relevant, the number of people impacted is taken into account.

According to the adopted IA methodology, the sub-criterion “societal value” is evaluated and classified as shown in the figure below.

Very high * * * *	The receptor is highly unique, very valuable to society and possibly irreplaceable. It may be deemed internationally significant and valuable. The number of people affected is very large.
High * * *	The receptor is unique and valuable to society. It may be deemed nationally significant and valuable. The number of people impacted is large.
Moderate * *	The receptor is valuable and locally significant but not very unique. The number of people impacted is moderate.
Low *	The receptor is of small value or uniqueness. The number of people impacted is small.

Note: For the purpose of the present IA the term “receptor” is equivalent to the environmental and social components or sub-component analyzed in the assessment

2.3.1.3 Vulnerability for the change

Vulnerability for the change describes how liable the environmental and social component being analyzed is to be influenced or harmed by pollution or other changes to its environment. For instance, an area which is quiet is more vulnerable to increasing noise than an area with industrial background noise.

According to the adopted IA methodology, the sub-criterion "vulnerability for change" is evaluated and classified as shown in the figure below.

Very high * * * *	Even a very small external change could substantially change the status of the receptor. There are very many sensitive targets in the area.
High * * *	Even a small external change could substantially change the status of the receptor. There are many sensitive targets in the area.
Moderate * *	At least moderate changes are needed to substantially change the status of the receptor. There are some sensitive targets in the area.
Low *	Even a large external change would not have substantial impact on the status of the receptor. There are only few or none sensitive targets in the area.

Note: For the purpose of the present IA the term "receptor" is equivalent to the environmental and social components or sub-component analysed in the assessment

2.3.1.4 Deriving the overall sensitivity

The overall sensitivity of the environmental and social component being analyzed is assessed on the base of the joint evaluation of the above presented sub-criteria.

According to the adopted IA methodology, the "sensitivity" is evaluated and classified as shown in the figure below.

Environmental and social expert judgement should be used throughout the sensitivity assessment to derive the most appropriate level of sensitivity to assign to each environmental and social component under study, on a case by case basis.

Very high * * * *	Legislation strictly conserves the receptor, or it is irreplaceable to society, or extremely liable to be harmed by the development. Even minor influence by the proposed development is likely to make the development unfeasible.
High * * *	Legislation strictly conserves the receptor, or it is very valuable to society, or very liable to be harmed by the development.
Moderate * *	The receptor has moderate value to society, its vulnerability for the change is moderate, regulation may set reference values or recommendations, and it may be in a conservation program. Even a receptor which has major social value may have moderate sensitivity if it has low vulnerability, and vice versa.
Low *	The receptor has minor social value, low vulnerability for the change and no existing regulations and guidance. Even a receptor which has major or moderate social value may have low sensitivity if it's not liable to be influenced by the development.

Note: For the purpose of the present IA the term "receptor" is equivalent to the environmental and social components or sub-component analyzed in the assessment

2.3.2 Assessing the Magnitude of impact

Magnitude of impact describes the characteristics of changes the Project is likely to cause. The direction of change is either positive or negative.

The Magnitude of impact is assessed based on the following sub-criteria, as described hereinafter:

- intensity and direction;
- spatial extent;
- duration.

Assessment of magnitude evaluates the probable changes affecting the environmental and social component being analyzed without taking into account the sensitivity.

2.3.2.1 Intensity and direction

Intensity describes the physical dimension of an impact and direction specifies whether the impact is negative ("–"/red) or positive ("+"/green). Depending on the type of impact, intensity can often be measured with various physical units and compared to reference values, such as the decibel (dB) for sound.

The assessment is intended to evaluate the overall intensity across the impact area with due consideration of the closest sensitive receptor or at the most sensitive target at the impact area.

According to the adopted IA methodology, the sub-criterion "*intensity and direction*" is evaluated and classified as shown in the figure below.

With regard to the Figure content it should be noted that:

- The term "proposal" is equivalent to the Project.
- The classification "No Impacts" is equivalent to "Negligible impacts"; the latter expression has been preferred and used in the present the assessment

Very high ++++	The proposal has an extremely beneficial effect on nature or environmental load. A social change benefits substantially people's daily lives.
High +++	The proposal has a large beneficial effect on nature or environmental load. A social change clearly benefits people's daily lives.
Moderate ++	The proposal has a clearly observable positive effect on nature or environmental load. A social change has an observable effect on people's daily lives.
Low +	An effect is positive and observable, but the change to environmental conditions or on people is small.
No impact	An effect so small that it has no practical implication. Any benefit or harm is negligible.
Low –	An effect is negative and observable, but the change to environmental conditions or on people is small.
Moderate --	The proposal has a clearly observable negative effect on nature or environmental load. A social change has an observable effect on people's daily lives and may impact daily routines.
High ---	The proposal has a large detrimental effect on nature or environmental load. A social change clearly hinders people's daily lives.
Very high ----	The proposal has an extremely harmful effect on nature or environmental load. A social change substantially hinders people's daily lives.

2.3.2.2 Spatial extent

Spatial extent describes the geographical reach of an impact area, or the range within which an effect is observable. In principle, spatial extent can be expressed as distance from the source, but the extent of an impact area may vary by direction due to topography, vegetation or other factors.

According to the adopted IA methodology, the sub-criterion "*spatial extent*" is evaluated and classified as shown in the figure below.

Very high * * * *	Impact extends over several regions and may cross national borders. Typical range is > 100 km.
High * * *	Impact extends over one region. Typical range is 10-100 km.
Moderate * *	Impact extends over one municipality. Typical range is 1-10 km.
Low *	Impact extends only to the immediate vicinity of a source. Typical range is < 1 km.

2.3.2.3 Duration

Duration describes the length of time during which an impact is observable and it also takes other related issues such as timing and periodicity into account. These are relevant for impacts which aren't observable all the time such as periodic impacts.

According to the adopted IA methodology, the sub-criterion "*duration*" is evaluated and classified as shown in the figure below.

It is noted that for the purpose of the present IA the "*duration*" assessed refers to measurable impacts on the environmental or social component being analyzed (e.g. increase in noise levels, increase in water pollution etc.) and not to the duration of the cause of the impacts (e.g. release of noise emission, or pollutants into the environment. The latter can be continuous (i.e. permanent) but not necessarily induce any measurable impacts at receptors).

Very high * * * *	An impact is permanent. The impact area won't recover even after the project is decommissioned.
High * * *	An impact lasts several years. The impact area will recover after the project is decommissioned.
Moderate * *	An impact lasts from one to a number of years. A long-term impact may fall into this category if it's not constant and occurs only at periods causing the least possible disturbance
Low *	An impact whose duration is at most one year, for instance during construction and not operation. A moderate-term impact may fall into this category if it's not constant and occurs only at periods causing the least possible disturbance.

2.3.2.4 Deriving the overall magnitude of impact

The overall magnitude of impact on the environmental and social component being analysed is assessed on the base of the joint evaluation of the above presented sub-criteria, for each specific impact preliminary identified.

According to the adopted IA methodology, the "*magnitude of impact*" is evaluated and classified as shown in the figure below.

Environmental and social expert judgement should be used throughout the assessment to derive the most appropriate level of magnitude to assign to each impact, on a case by case basis.

Similarly to what reported for the "*intensity and direction*", with regard to the Figure content it should be noted that:

- The term "proposal" is equivalent to the Project.
- The classification "No Impacts" is equivalent to "Negligible impacts"; the latter expression has been preferred and used in the present the assessment

Very high ++++	The proposal has beneficial effects of very high intensity and the extent and the duration of the effects are at least high.
High +++	The proposal has beneficial effects of high intensity and the extent and the duration of the effects are high.
Moderate ++	The proposal has clearly observable positive effects on nature or people's daily lives, and the extent and the duration of the effects are moderate.
Low +	An effect is positive and observable, but the change to environmental conditions or on people is small.
No impact	No change is noticeable in practice. Any benefit or harm is negligible.
Low -	An effect is negative and observable, but the change to environmental conditions or on people is small.
Moderate --	The proposal has clearly observable negative effects on nature or people's daily lives, and the extent and the duration of the effects are moderate.
High ---	The proposal has harmful effects of high intensity and the extent and the duration of the effects are high.
Very high ----	The proposal has harmful effects of very high intensity and the extent and the duration of the effects are at least high.

2.3.3 Assessing the Significance of an impact

According to the adopted IA methodology, the assessment of significance of an impact is based on the following matrix, which combines:

- the magnitude of impact (labelled as "magnitude of change" in the figure below) affecting the environmental or social component being analyzed; and
- the sensitivity of the component (labelled as "sensitivity of the receptor" in the figure below).

As previously reported for the Magnitude, the classification "No Impacts" is equivalent to "Negligible impacts"; the latter expression has been preferred and used in the present the assessment.

Impact significance		Magnitude of change								
		Very high	High	Moderate	Low	No change	Low	Moderate	High	Very high
Sensitivity of the receptor	Low	High*	Moderate*	Low	Low	No impact	Low	Low	Moderate*	High*
	Moderate	High	High	Moderate	Low	No impact	Low	Moderate	High	High
	High	Very high	High	High	Moderate*	No impact	Moderate*	High	High	Very high
	Very high	Very high	Very high	High	High*	No impact	High*	High	Very high	Very high

* Especially in these cases, significance might get a lower estimate, if sensitivity or magnitude is near the lower bound of the classification

2.4 Mitigations Hierarchy

The ESIA process is intended to reduce the negative impacts and enhance the benefits induced by the Project, by identifying impacts and benefits and the ways of dealing with them during the planning and design stages of the project. The present assessment took into account the mitigation hierarchy summarized in the following Table.

Table 2.1: Mitigation Hierarchy

Mitigation Hierarchy	
Type of mitigation	Description
Avoid at Source; Reduce at Source	Avoiding or reducing at source is essentially 'designing' the project so that a feature causing an impact is designed out (eg a waste stream is eliminated) or altered (eg reduced waste volume). Often called minimization
Abate on Site	This involves adding something to the basic design to abate the impact - pollution controls fall within this category. Often called "end-of-pipe".
Abate at Receptor	If an impact cannot be abated on-site, then measures can be implemented off-site
Repair or Remedy	Some impacts involve unavoidable damage to a resource, eg vegetation disturbance. Repair essentially involves restoration and reinstatement type measures.
Compensate in Kind	Where other mitigation approaches are not possible or fully effective, then compensation, in some measure, for loss, damage and general intrusion might be appropriate

The Project includes several "design" measures aimed at preventing and reducing environmental and social impacts. These measures are incorporated into the design development and constitute an integral part of the Project. They are also referred to as "embedded mitigation measures" and are taken into account in the performed impact assessment.

In addition, when the assessment shows significant adverse effects on specific environmental and social components, further mitigations have been identified throughout the assessment to offset these impacts.

Both embedded mitigation measures and component-specific mitigations are detailed for each environmental and social component. These measures are taken into account in the impact assessment and in the evaluation of residual impacts (i.e. impact significance after mitigation) as described below.

2.4.1 Evaluation of mitigation measures

In accordance with the adopted IA methodology, when specific mitigation measures (in addition to embedded mitigations) have been identified to offset significant adverse effects potentially induced by the Project, the IA evaluated to what extent impacts can be mitigated on a scale: not at all / low / moderate / high.

Typically, mitigation measures influence the intensity of an impact and in turn its magnitude.

2.5 Residual significance

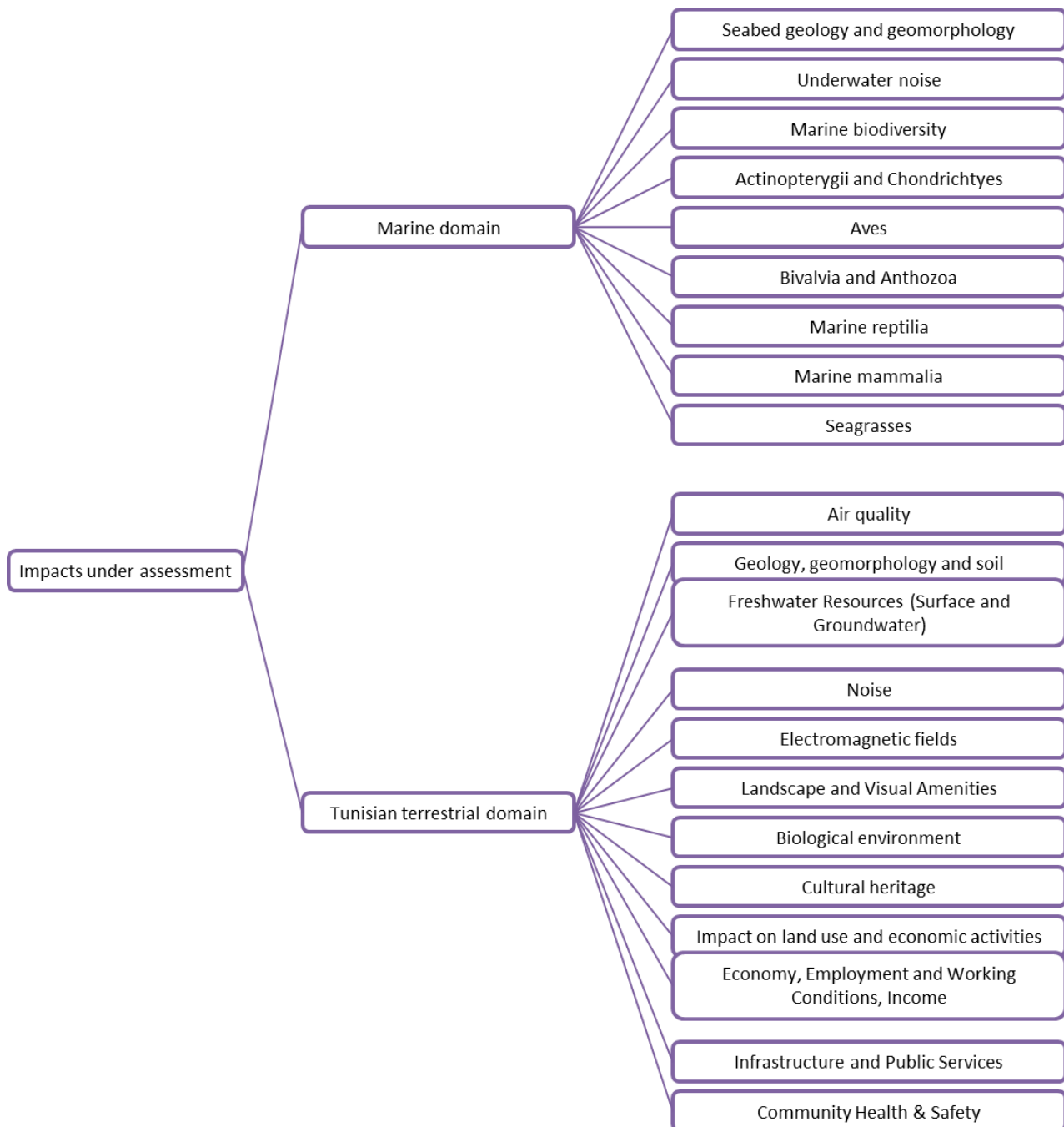
Where specific mitigation measures are identified and evaluated as described above, the assessment includes the estimate of residual significance, namely the significance after the specified measures are implemented.

Residual significance is estimated by plugging in new impact magnitude values to the impact significance matrix (see Section 2.3.3).

3. IMPACT MATRIX

3.1 Impact tree

Environmental and social components considered in impact analyses are summarized in the following graph.



3.2 Construction phase

The impact matrix for the construction phase is presented hereafter.

Environmental and social components	Characteristics of sensitivity				Characteristics of magnitude			MAGNITUDE	SIGNIFICANCE
	Existing regulations and guidance	Societal value	Vulnerability for the change	SENSITIVITY	Intensity and direction	Spatial extent	Duration		
Marine Domain									
Seabed geology and geomorphology	Moderate	Low	Low	Low	Low -	Low	Low	Low -	Low -
Underwater noise	Moderate	High	Low	Moderate	Moderate -	Moderate	Low	Moderate -	Moderate -
Marine biodiversity	Moderate	Moderate	High	Moderate	Moderate -	Low	Low	Low -	Low -
Actinopterygii and Chondrichtyes	Moderate	Moderate	High	Moderate	Moderate -	Low	Low	Low -	Low -
Aves	Moderate	Moderate	High	Moderate	Low -	Low	Low	Low -	Low -
Bivalvia and Anthozoa	Moderate	Moderate	High	Moderate	Low -	Low	Low	Low -	Low -
Marine reptilia	Moderate	Moderate	High	Moderate	High -	Moderate	Low	Moderate -	Moderate -
Marine mammalia	Moderate	Moderate	High	Moderate	High -	Moderate	Low	Moderate -	Moderate -
Seagrasses	Moderate	Moderate	High	Moderate	Low -	Low	Low	Low -	Low -
Tunisian Terrestrial Domain									
Air quality	High	Moderate	Low	Moderate	Low -	Low	Low	Low -	Low -
Geology, geomorphology and soil	Moderate	Moderate	Low	Moderate	Low -	Low	Moderate	Low -	Low -
Freshwater Resources (Surface and Groundwater)	Moderate	Moderate	Low	Moderate	No impact	Low	Low	No impact	No impact
Noise	High	Moderate	Moderate	Moderate	Moderate -	Low	Low	Low -	Low -
Electromagnetic fields	High	Low	Low	Moderate	No impact	No impact	No impact	No impact	No impact
Landscape and Visual Amenities	Low	Moderate	Moderate	Moderate	Moderate -	Low	Low	Low -	Low -
Biological environment	High	Moderate	Moderate	Moderate	Low -	Moderate	Moderate	Moderate -	Moderate -
Cultural heritage	High	High	High	High	Low -	Low	Low	Low -	Moderate -
Impact on land use and economic activities	High	High	High	High	Moderate -	Moderate	High	Moderate -	High -
Economy, Employment and Working Conditions, Income	High	High	High	High	Moderate +	Moderate	Moderate	Moderate +	High +
Infrastructure and Public Services	Low	Moderate	Moderate	Moderate	Low -	Moderate	Moderate	Moderate -	Moderate -
Community Health & Safety	Moderate	Moderate	Moderate	Moderate	Low -	Low	Moderate	Low -	Low -

3.3 Operation phase

The impact matrix for the operation phase is presented hereafter.

Environmental and social components	Characteristics of sensitivity				Characteristics of magnitude			MAGNITUDE	SIGNIFICANCE
	Existing regulations and guidance	Societal value	Vulnerability for the change	SENSITIVITY	Intensity and direction	Spatial extent	Duration		
Marine Domain									
Seabed geology and geomorphology	Moderate	Low	Low	Low	No impact	No impact	High	No impact	No impact
Underwater noise	Moderate	High	Low	Moderate	No impact	No impact	No impact	No impact	No impact
Marine biodiversity	Moderate	Moderate	High	Moderate	Low -	Moderate	High	Moderate -	Moderate -
Actinopterygii and Chondrichtyes	Moderate	Moderate	High	Moderate	No impact	No impact	High	No impact	No impact
Aves	Moderate	Moderate	High	Moderate	No impact	No impact	High	No impact	No impact
Bivalvia and Anthozoa	Moderate	Moderate	High	Moderate	No impact	No impact	High	No impact	No impact
Marine reptilia	Moderate	Moderate	High	Moderate	No impact	No impact	High	No impact	No impact
Marine mammalia	Moderate	Moderate	High	Moderate	Low -	Moderate	High	Moderate -	Moderate -
Seagrasses	Moderate	Moderate	High	Moderate	No impact	No impact	No impact	No impact	No impact
Tunisian Terrestrial Domain									
Air quality	High	Moderate	Low	Moderate	No impact	No impact	No impact	No impact	No impact
Geology, geomorphology and soil	Moderate	Moderate	Low	Moderate	Low -	Low	High	Low -	Low -
Freshwater Resources (Surface and Groundwater)	Moderate	Moderate	Low	Moderate	No impact	Low	High	No impact	No impact
Noise	High	Moderate	Moderate	Moderate	No impact	No impact	No impact	No impact	No impact
Electromagnetic fields	High	Low	Low	Moderate	Low -	Low	High	Low -	Low -
Landscape and Visual Amenities	Low	Moderate	Moderate	Moderate	Moderate -	Moderate	High	Moderate -	Moderate -
Biological environment	High	Moderate	Moderate	Moderate	Moderate -	Moderate	High	Moderate -	Moderate -
Cultural heritage	High	High	High	High	No impact	No impact	No impact	No impact	No impact
Impact on land use and economic activities	High	High	High	High	No impact	No impact	No impact	No impact	No impact
Economy, Employment and Working Conditions, Income	High	High	High	High	Low +	Low	High	Low +	Moderate +
Infrastructure and Public Services	Low	Moderate	Moderate	Moderate	No impact	No impact	No impact	No impact	No impact
Community Health & Safety	Moderate	Moderate	Moderate	Moderate	Low -	Moderate	High	Moderate -	Moderate -

3.4 Synopsis table

Environmental and social components	Construction phase	Operation phase
Marine Domain		
Seabed geology and geomorphology	–	
Underwater noise	– –	
Marine biodiversity	–	–
Actinopterygii and Chondrichthyes	–	
Aves	–	
Bivalvia and Anthozoa	–	
Marine reptilia	– –	
Marine mammalia	– –	–
Seagrasses	–	
Tunisian Terrestrial Domain		
Air quality	–	
Geology, geomorphology and soil	–	–
Freshwater Resources (Surface and Groundwater)		
Noise	–	
Electromagnetic fields		–
Landscape and Visual Amenities	–	– –
Biological environment	– –	– –
Cultural heritage	– –	
Impact on land use and economic activities	– – –	
Economy, Employment and Working Conditions, Income	++ +	++
Infrastructure and Public Services	– –	
Community Health & Safety	–	– –