

**TAP**

Trans Adriatic Pipeline



## Non Technical Summary

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## 1 ABOUT THIS DOCUMENT

The Trans Adriatic Pipeline (TAP) (the 'Project') is a pipeline system proposed by the Trans Adriatic Pipeline AG (TAP AG) that will bring natural gas from new sources in the Caspian region to western and south-eastern Europe; starting from the Greek-Turkish border the Project will transport gas via Greece and Albania, across the Adriatic Sea and into Apulia Region.

As part of the planning, design and permitting process for the TAP, the Project must be subject to an Environmental Impact Assessment (EIA) according to Italian legislation. TAP AG is furthermore committed to follow international best practice, namely the European Bank for Reconstruction and Development's (EBRD's) performance requirements and the International Finance Corporation's (IFC's) performance standards.

Accordingly the Project identifies, addresses and manages all social, environmental and cultural heritage impacts, risks and opportunities in a systematic and comprehensive manner as part of its Environmental and Social Impact Assessment (ESIA).

The ESIA study for the Project includes the pipeline itself (offshore and onshore) as well as temporary infrastructure required for the construction phase, such as access roads and work sites, and permanent operational facilities, comprising a block valve station (BVS) and a Pipeline Receiving Terminal (PRT).

This document presents the Non-Technical Summary (NTS) of the ESIA conducted for the Italian section of the Project, according to the relevant legislation. The NTS aims to describe the key features of the Project and summarize the results of the assessment<sup>1</sup> in non-technical language.

More specifically, it:

- Sets out the background to the Project;
- Describes the Project (the pipeline route and associated permanent facilities) and provides an overview of the main activities and the resulting effects;
- Presents the alternatives that have been considered in developing the Project;
- Describes the current environmental and socioeconomic characteristics of the chosen route and associated facilities' location;
- Explains the stakeholder engagement that has already been carried out and what is planned for future phases; and
- Presents any significant beneficial and adverse impacts or risks that have been identified through the ESIA process and proposes measures to manage and monitor these.

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<sup>1</sup>The assessment was undertaken by a team of independent specialists in accordance with Italian legislative requirements as well as the European Union (EU) regulatory impact assessment and environmental framework.

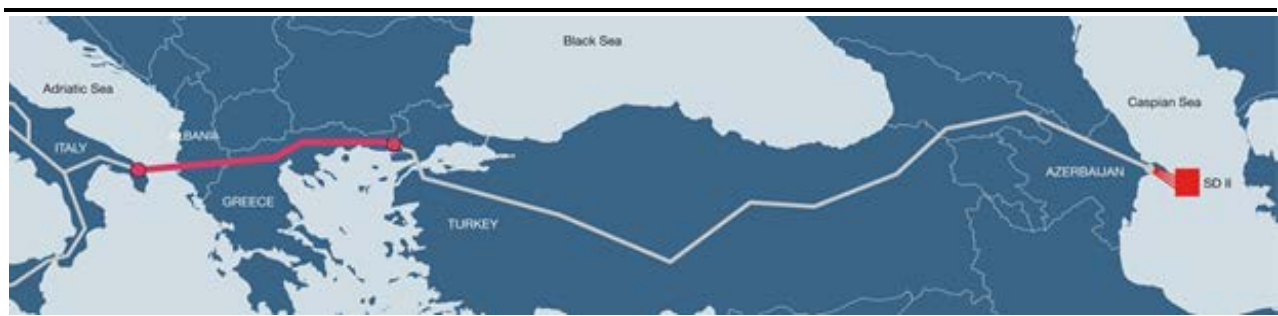
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## 2 PROJECT OVERVIEW

### 2.1 Project Rationale

The Project is intended to contribute to the security and diversity of Europe's energy supply by connecting to existing gas networks and will allow gas to flow directly from the Caspian basin into European markets. The Project will be providing the necessary infrastructure to transport gas from the *Shah Deniz II* field in Azerbaijan by the most direct route to Southern Europe (see *Figure 2-1*). The first supply of gas is planned for early 2019.

**Figure 2-1 Context of the Trans Adriatic Pipeline Gas Transmission Network**



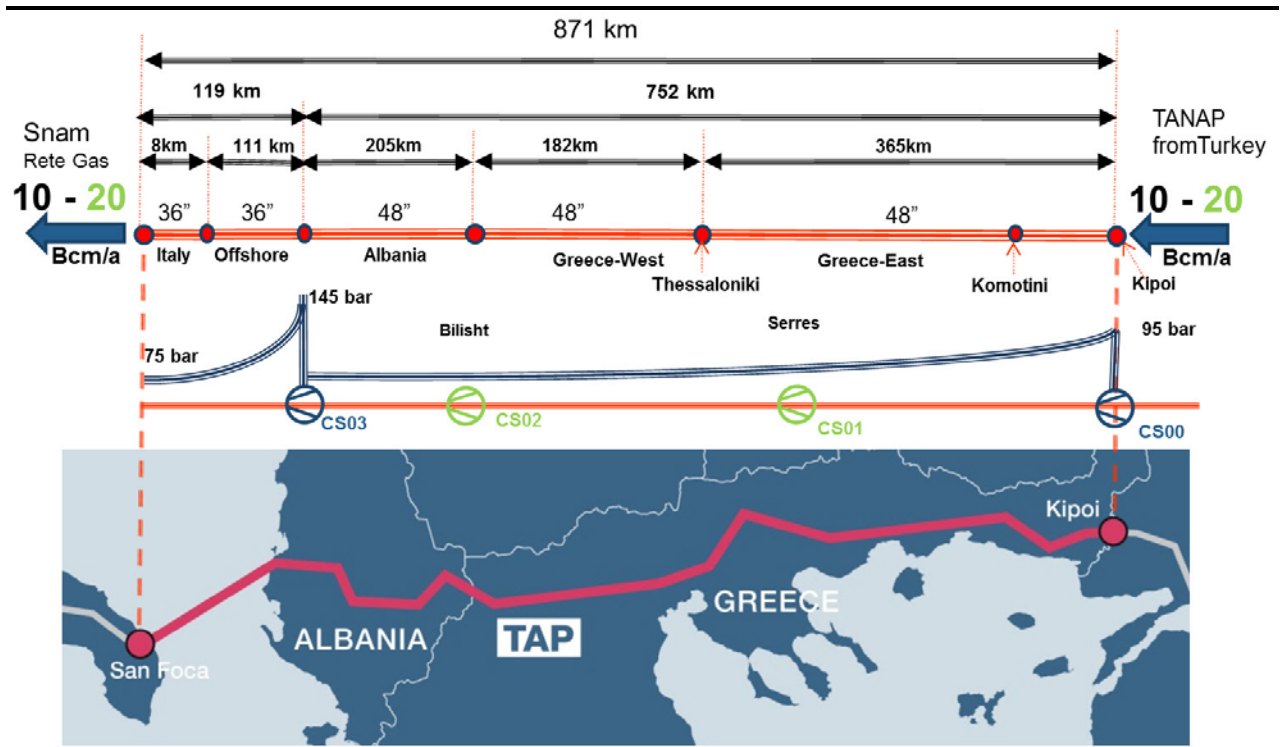
Source: TAP AG (2012) TAP\_Corporate\_Presentation\_Jan\_2012

The European Union has recognised the TAP Project under the so-called TEN-E (Trans-European Energy Networks) guidelines as a Project of Common Interest for the European Union's overall energy policy objectives. In February 2013 an *Inter-Governmental Agreement* (IGA) was signed by the three host countries of Greece, Albania and Italy. At the Italian National Level the TAP Project is included in and supported by the National Energy Strategy (Interministerial Decree, 8<sup>th</sup> March 2013). In June 2013 the Shah Deniz Consortium selected the Project as the preferred transportation route for Caspian gas to Europe.

The Project starts near Kipoi, at the Greek/Turkish border, from where it crosses northern Greece westwards, next through Albania, the Adriatic Sea and finally comes ashore in southern Italy at Melendugno, near the town of San Foca (in the province of Lecce).

An overview of the TAP Project as a whole is shown in *Figure 2-2*. *Figure 2-2* also shows the respective lengths in km, the pipeline diameter and the highest gas pressure during operation.

**Figure 2-2 Trans Adriatic Pipeline Route Overview**



*Legend: Bcm/a = billion cubic metres/year; CS = Compressor Station  
 Note: CS01 and CS02 are only required for the 20 bcm/a case.  
 Source: TAP AG (2013)*

In total the pipeline system is approximately 871 km long and designed with a diameter of 48 inches onshore, which is reduced to a diameter of 36 inches for the offshore section and onshore Italian section. The pipeline will initially have a capacity to transport 10 billion cubic metres of natural gas per year (bcm/yr). In a second stage this capacity can be doubled to 20 bcm/yr.

The design lifetime of the pipeline is 50 years; but based on international pipeline industry experience, it can well be expected that the pipeline could actually be used much longer.

The design will ensure that the system fulfils all safety requirements of the applicable Italian legislation, together with European codes and standards.

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## 2.2 Key Features of the Pipeline System in Italy

The pipeline system in Italy will consist of the following key components:

- A 36 inch sub-sea pipeline from the Adriatic Sea median line to the Italian landfall, approximately 45 km in length (145 bar-g design pressure, 75 bar-g normal operating pressure at the Pipeline Receiving Terminal - PRT);
- A landfall microtunnel, approximately 1.5 km in length;
- A 36 inch onshore pipeline buried, approximately 8.2 km in length, from the landfall to the Pipeline Receiving Terminal (PRT) (145 bar-g design pressure, 75 bar-g operating pressure at the Pipeline Receiving Terminal);
- A block valve station (BVS) at Kp 0.1; the purpose of the BVS is to interrupt gas flow and isolate onshore and offshore sections in case of maintenance or emergency;
- The Pipeline Receiving Terminal (PRT), at Kp 8.2, in order to monitor and fiscally meter the natural gas flow rate that is fed into the Snam Rete Gas (SRG) network, immediately downstream of the PRT;
- Associated facilities required during construction (access roads, construction strip, work sites, etc.).

An overview map showing the key components of the Project in Italy is presented at the end of this NTS.

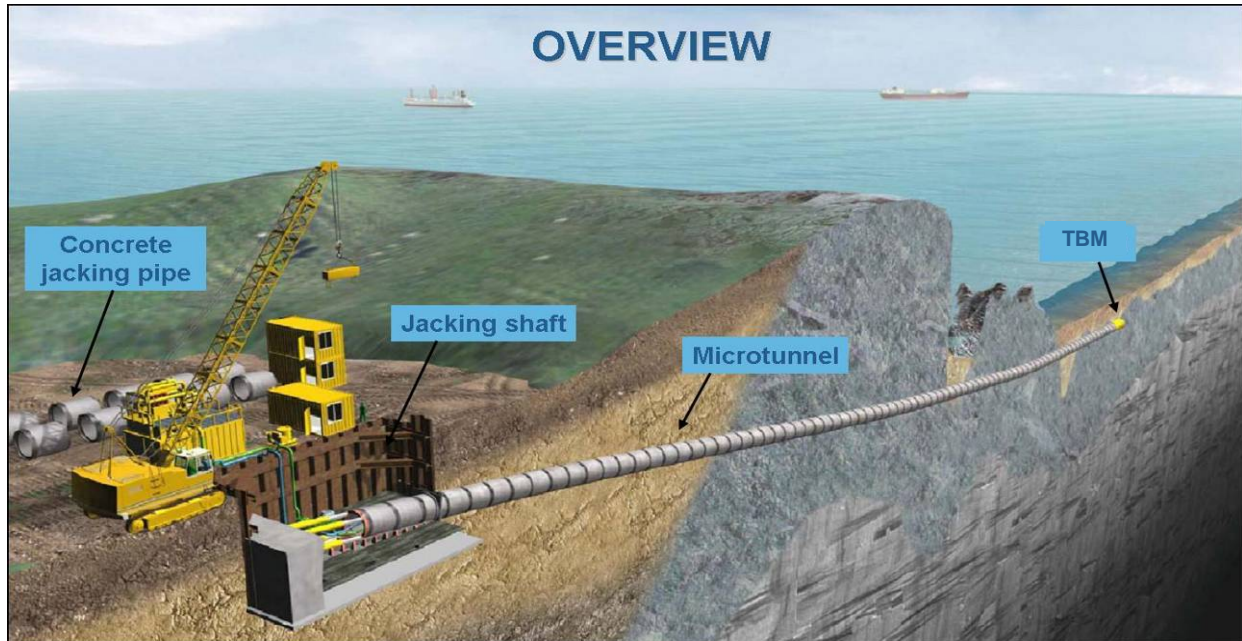
## 2.3 Project Construction

### 2.3.1 Landfall and Microtunnel

The landfall will be constructed using ‘microtunnelling’ technology to minimise interference with the coastline. Microtunnelling is a process that uses a remotely controlled Tunnel Boring Machine (TBM) combined with a ‘pipe-jacking’ technique to install concrete tunnel sections - refer to *Figure 2-3*. The microtunnel allows the installation of the pipeline without the need to excavate a trench.

A temporary worksite is required at about 600 m from the coast for the construction of the microtunnel and to install the pipeline inside the microtunnel by means of a pull-in from an offshore barge. The site will require an area of approximately 2.6 ha.

**Figure 2-3 Indicative Diagram of Offshore Microtunnel**



Source: ERM (January 2012)

### 2.3.2 Offshore Pipeline Installation

The offshore pipeline installation will be carried out after the completion of the landfall microtunnel. This will be a sequential pipe construction and installation process undertaken from a pipe laying vessel or barge. Pipe sections (approximately 12 m in length) will be transported by supply vessels from the support port to the pipelaying barge/vessel. The pipe joints will be welded together to form one long pipe string and then safely lowered onto the seabed.

The pipeline installation in the microtunnel will be performed by means of a direct pull-in from the offshore pipelaying barge or vessel. The vessels will continue the pipeline installation towards Albania, where it will connect with the Albanian section of the pipeline

A Fibre Optic Cable (FOC) will be installed along the Project route, at a distance of about 50 m from the laid pipeline.

### 2.3.3 Onshore Pipeline Installation

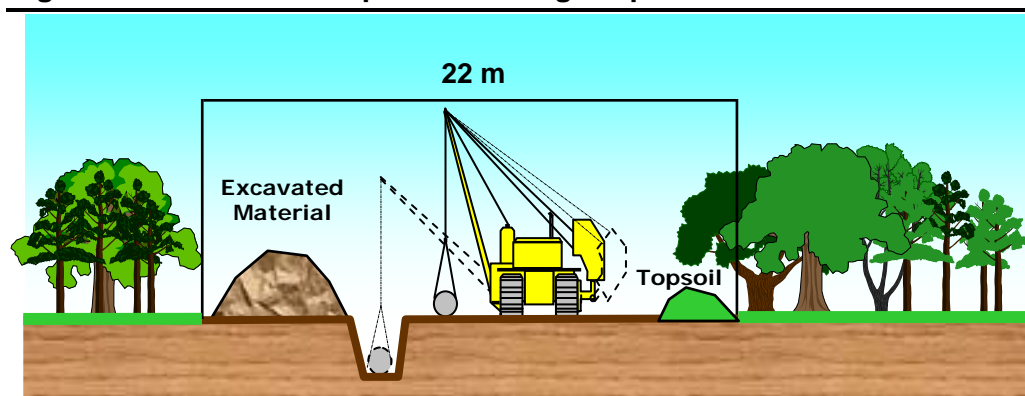
The onshore pipeline will be made of welded steel pipe sections which range between 12 m and 18 m in length.

The steel pipe sections will be coated both inside and outside. The internal coating will be an epoxy resin which reduces friction, whilst the external coating will be 3-layer polyethylene to protect the pipeline from corrosion. The entire pipeline will be protected against corrosion by a cathodic protection system.

The pipeline will be installed by established, standard trenching techniques. The overall width of the standard working strip will be 26 m; one side approximately 11 m wide for the stockpiling of excavated trench material and the other side approximately 15 m wide to allow pipeline assembly, for the movement of vehicles/machinery required for pipeline construction and for the topsoil lay down. A reduced working strip, 22 m wide, will be applied along the route where technical reasons require (e.g. connection to access roads).

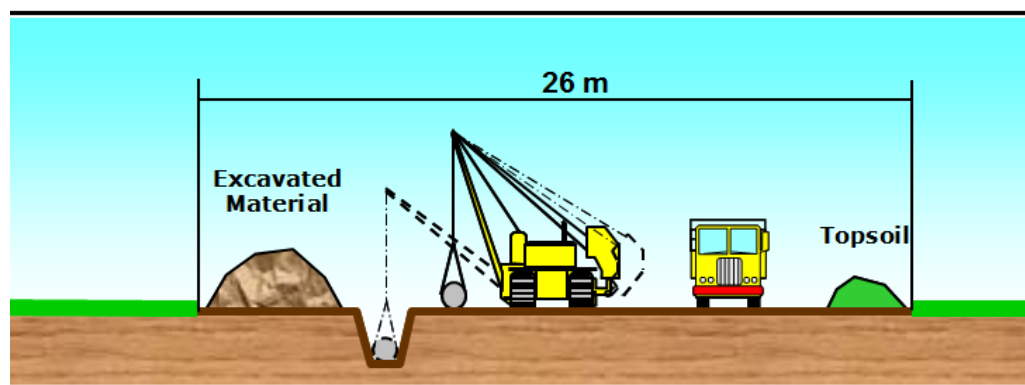
Indicative cross sections of the reduced and standard construction working strips are shown in *Figure 2-4* and *Figure 2-5* respectively.

**Figure 2-4 Reduced Pipeline Working Strip**



Source: Saipem SpA (October 2011)

**Figure 2-5 Standard Pipeline Working Strip**



Source: Saipem SpA (October 2011)

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The onshore pipeline will be buried for its entire length. For safety reasons and in order to minimise impacts on existing land uses (e.g. agriculture) the buried pipeline will have a minimum soil cover of 1.5 m. The burial depth can be increased in cases where local conditions and technical constraints require it.

After completion of backfilling the trench, the restoration operation will begin. The removed topsoil will be placed back along the working corridor. The original contours of the land will be restored as closely as possible.

Particular care will be taken to ensure that land drainage infrastructure, access roads, other networks and facilities will be reinstated to their former state. Photographic records will be made of the route, where necessary, before and after the works.



Although construction activities do not interfere with any tree included in the regional list of “monumental olive trees” (approved by the Regional Council through resolution n. 357 of 7 March 2013), there are olive trees of significant age and size along the working strip. TAP AG commits to restore the land to the pre-construction condition through the reinstatement of the olive groves. Alternative compensation measures could apply upon request of the landowner, and in agreement with the relevant authorities.

Certain dry stone walls will need to be taken down to allow construction; during reinstatement operations these walls will be rebuilt observing their original dimensions. For this purpose the original stone materials duly set aside before pipeline installation works will be used.

Other significant landscape features disturbed during construction will be considered on a case-by-case basis and the need for and nature of their reinstatement agreed with the relevant authorities/landowners.

During construction, traffic will predominantly use the working strip for access. However, in order to facilitate the movement of construction plant, equipment and the workforce for the PRT two new access roads (respectively about 900 m and 700 m in length) will be built. A new road (about 100 m in length) will also be built to access the BVS. In addition, it is foreseen that a section of existing road (about 570 m in length) will need to be upgraded to access this facility.

A single “work site” is foreseen mainly as a storage area for building material and bending yard for the pipes. The anticipated location is on uncultivated land at the western end of the route at Kp 8.2 within the footprint of the land take for the PRT. It will be used as the only stockyard for the onshore pipeline in Italy and will be easily accessible through the existing road network (SP 29 and connected asphalt roads) and the two new PRT access roads.

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#### 2.3.4 Block Valve Station (BVS)

A Block Valve Station (BVS) will be installed close to the pipeline landfall (Kp 0.1), in order to enable the isolation of the offshore pipeline from the onshore pipeline for maintenance and safety purposes.

The BVS is unmanned and contains a small cabinet with a fence to prevent any interference. *Figure 2-6* provides a visual representation of a typical BVS.

**Figure 2-6 Block Valve Station – 3D Model**



Source: E.ON (2012)

The BVS will be remotely operated from a control centre in the PRT through a fibre optic cable communication system and will be connected to the local power grid.

#### 2.3.5 Pipeline Receiving Terminal (PRT)

The Pipeline Receiving Terminal (PRT), at Kp 8.2, will be constructed by established, standard techniques. This facility will be where the TAP system connects into the Italian gas network, which is owned and operated by Snam Rete Gas (SRG).

For reliability reasons, the PRT will consist of identical 'trains'; each train corresponding to a process unit (filtration, electrical heaters and gas boilers, heaters, control system and pressure/flow control unit) with three identical lines in parallel.

The PRT will be equipped with a depressurisation system for emergency venting. The vent system will be composed of two 10m cold vent stacks, as the gas is lighter than air and will disperse quickly. The gas will be free of odour, and its dispersion will not have an impact on the surrounding environment.

The following provides a draft of the 3D model of the PRT.

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**Figure 2-7 PRT 3D Model – North View PRT 3D Model – North View**



Source: TAP AG (May 2013)

### 2.3.6 Pre-Commissioning Phase



The pipeline will be hydrostatically tested once installation is complete to confirm its integrity. The offshore pipeline will be flooded twice with non-chemically treated seawater. Both times the water will be discharged in Albania coastal waters. The first flooding of seawater will clean the pipeline and the second flooding is the true hydrotesting. After the pipeline has been cleaned, a pressurization unit will be used to increase the pressure in the pipeline up to a specific test level. The pipeline will be emptied upon completion of hydrotesting and dried using specific compressors. The onshore hydrotesting methodology is the same as that of the offshore hydrotesting but freshwater will be used instead of seawater.

## 2.4 Implementation Timeline

The main construction phase of the TAP Project in Italy is anticipated to commence in 2016 and take approximately 3 years (activities will be suspended during the peak tourist season). The first activity to begin with will be the PRT.

Start-up the Project will take place in early 2019.

Table 2-1 provides a summary of the expected timescales for the construction of the Project components.

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**Table 2-1 Duration of Construction for Project Components**

<b>Project Component</b>	<b>Duration of Construction</b>
Construction site and work sites	1 month
Landfall microtunnel	9 months
Offshore pipeline	2 months
Pre-trench excavation	2 months
Pre-trench backfilling	1 month
Post-laying Gravel dumping	1 month
Pipeline Receiving Terminal	18 months
Landscaping/Reinstatement and Road Construction	6 - 12 months
Onshore pipeline and Block valve station	6 months
Pre commissioning (i.e. hydrotesting)	5 months

Source: Saipem (2013)

## 2.5 Project Operation and Maintenance

The pipeline control system will be operated by TAP AG who will be responsible for the transportation of natural gas from receipt in Greece to delivery in Italy.


The central control centre, operated from the PRT, will:

- Control the pipeline flow and the gas temperature to meet gas network requirements;
- Measure the flow for fiscal and customs requirements;
- Deliver custody of the gas to SRG;
- Run and control the operation of the entire pipeline,.

The pipeline will be monitored by a leak detection system that operates on the basis of flow, pressure and temperature monitoring, thereby detecting losses automatically. The leak detection systems allow immediate notification and action in an emergency. Furthermore, a pipeline integrity management system will be developed to control ongoing monitoring / maintenance during system operation, with special focus on corrosion control.

A metering system will be installed in the PRT to measure the pipeline flow rate for the purpose of operational control and as a basis for the main pipeline leak detection system.

Heating of the gas at the PRT may be required to guarantee the minimum delivery gas temperature downstream of the pressure reducing system; this operation will only be required in transport transient conditions (such as during start-up), and in case of pressure fluctuations in the downstream SRG network.

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The gas will be heated using hot water heat exchangers. Hot water will be supplied by a closed-circuit system using an electrical heater and gas fired boilers. The heating system is designed to provide an 8.6 MW duty in total. The electrical heaters, which are designed to provide a duty of approximately 2 MW, are intended to cover most of the operational heating requirements. The gas fired boilers, designed for the remaining duty, are intended to cover mainly start-up and abnormal operational conditions. It is assumed that the duration of such occurrence will not exceed 2% of the time on a yearly basis.



## 2.6 Project Decommissioning

At the end of its useful life (currently estimated to be 50 years), the pipeline and associated facilities will be decommissioned safely and with due regard for the environment.

At this stage it is thought that both the onshore and offshore sections of the pipeline will be cleaned, purged, filled with a suitable inert substance and left in situ.

All above-ground buildings will be taken down, and the sites restored. Materials like steel will be recycled where possible.

The decommissioning operation will be completed with equipment similar to the ones used in construction activities. All waste will be properly treated in compliance with Italian law.

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### 3 PROJECT ALTERNATIVES AND PREFERRED OPTIONS

#### 3.1 Introduction

The final proposed Project has been selected following an extensive and thorough assessment of alternatives. The objective of this process was to select a technically feasible pipeline route with the least environmental, socioeconomic and cultural heritage impacts.

A number of alternatives were investigated with regard to the pipeline route and the location of the necessary supporting installations.

#### 3.2 'No Project' Alternative

The TAP Project is a strategic asset in the *Southern Gas Corridor*<sup>1</sup> and a priority energy infrastructure for the European Union.

The 'No Project' Alternative in the Southern Corridor development would mean that no gas would be supplied from Azerbaijan, through Greece, Albania and Italy, to the European network; therefore, none of the resulting benefits from the construction and operation of this infrastructure would occur.

The "No Project" alternative would prevent Italy and Europe as a whole receiving several benefits from the TAP Project. The consequences of the "No Project" alternative would span from the political to the economic level and damage Italy in terms of its geopolitical and economic interests recognized in several occasions at both the European and national level.

At the European level, the "No Project" alternative would mean missing crucial goals of European energy policy as well as indirectly preventing that Europe as a whole receiving the benefits of increased diversification, competition, security of supply and market integration.

At the national level, the "No Project" alternative would mean that no benefits deriving from increased competition, diversification, and security of supply, liquidity and integration would materialize in Italy.

An extensive discussion of the "No Project" alternative" is reported in *Annex 2* of the ESIA.

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<sup>1</sup> Term used by the European Commission to describe planned infrastructure projects bringing gas from Caspian and Middle Eastern sources to Europe, aimed at improving security of supply.

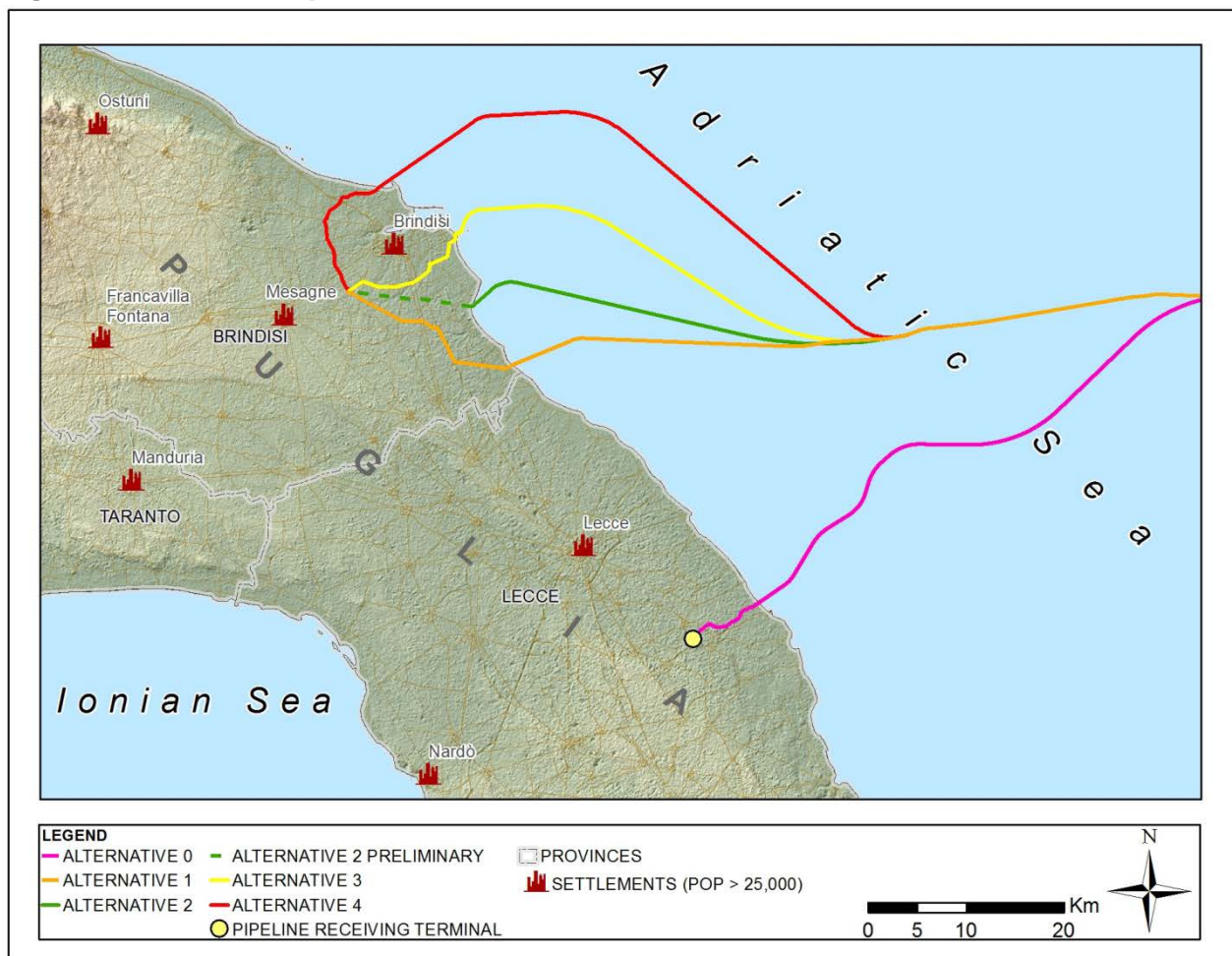
### 3.3 Pipeline Route Alternatives

#### 3.3.1 Alternative Assessment Process pre-March 2012

In the period leading up to the original ESIA submission in March 2012 a total of five alternative route options were investigated during the Basic Engineering phase of the Project, as shown in *Figure 3-1*:

- Alternative 0 Landfall north of San Foca;
- Alternative 1 Landfall north of the settlement of Lindinuso;
- Alternative 2 Landfall at the Cerano Power Plant;
- Alternative 3 Landfall at the Petrochemical Plant in Brindisi; and
- Alternative 4 Landfall north of Casale Airport (Brindisi).

**Figure 3-1 Pipeline Route Alternatives**



Source: ERM (January 2012)

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Detailed assessments of these alternatives were conducted from technical, safety, environmental, socioeconomic and cultural heritage perspectives. These assessments reached the following conclusions:

- **Alternative 1** was found impracticable because it crossed a marine Natura 2000 site designated for a protected seagrass species endemic to the Mediterranean (*Posidonia oceanica*);
- **Alternative 2** was found impracticable because it also crossed a marine Natura 2000 site designated for *Posidonia oceanica*, plus due to presence of areas with high geomorphological risk (coastal cliff erosion);
- **Alternative 3** was found impracticable due to technical criticalities: unconventional methods of construction (with inherent risk) would need to be used to adhere to security measures related to the industrial area of Brindisi; and the high level of maritime traffic in the area present offshore construction safety risks. Natural habitat and protected conservation sites (at regional, national and European levels) also constrain routing options in this area. These negative outcomes arose from a detailed evaluation undertaken on seven different route refinement options for Alternative 3;
- **Alternative 4** interferes with future land-use plans of the Municipality of Brindisi and is therefore not a viable alternative. Numerous clusters of houses are also located in proximity to the proposed route and therefore construction of the TAP Project along this alignment would not be acceptable.

In comparison with the other alternatives, **Alternative 0** was concluded to represent the optimal solution in terms of technical viability, safety considerations and environmental, socioeconomic and cultural heritage issues since:

- It did not interfere with offshore and onshore protected conservation areas;
- The onshore route passes through agricultural land, a safe distance from populated areas.

For the above reasons **Alternative 0** was considered the best option at this point and was chosen as the Project 'Base Case' route and as such was presented to the Italian Authorities within the original ESIA, submitted in March 2012.

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However, two main issues arose with respect to Alternative 0 through subsequent consultations presenting this route in the 2012 ESIA:

- The **landfall of Alternative 0** was located within a zone identified as being of very high geomorphological risk due to the potential instability of the sea cliffs. Although the proposed microtunnel would be an appropriate technical solution to prevent any negative effects on the stability of the cliff, the Basin Authority declared that the Project was not in compliance with the hydrogeological planning regulations;
- The **proposed PRT location** was found to fall within the landscape protection area (Coastal and Territorial area of Melendugno, acknowledged by the *Decree 42/2004, Art.136, Paragraph 1, letter c* and *Law 1497/39*). Given this location, the Ministry of Cultural Heritage highly recommended TAP AG to relocate the PRT outside this constrained area, even if a good landscape mitigation design could reduce the visual impact of the PRT facility.

As a consequence TAP AG revisited the route selection process and reanalysed the available information. This process is summarised below together with the final outcome, the ‘optimised Base Case route’.

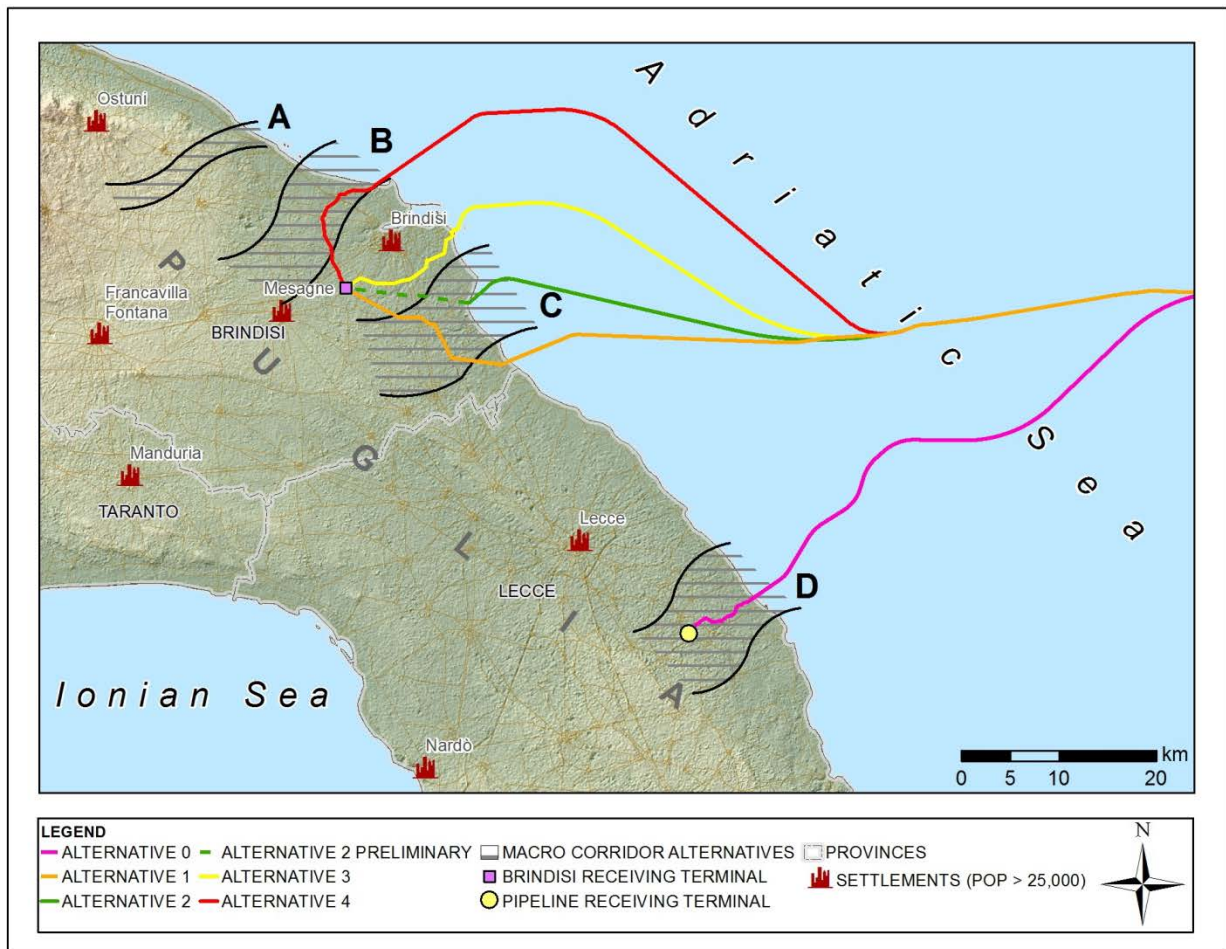
### 3.3.2 Alternative Assessment Process post-March 2012

Subsequent to the ESIA consultations pre-March 2012 TAP AG undertook additional studies to identify an optimal pipeline route. These studies were carried out for both the pipeline route (including landfall of the offshore section) and PRT site, providing new technical elements for consideration within the ESIA process.

This analysis followed a logical process: as a first step land uses along the Adriatic Sea coast and nearshore areas within the provinces of Brindisi and Lecce were assessed to identify preferred zones (referred to as “Macro-Corridors”). Within the identified Macro-Corridors an environmental/social/cultural heritage constraints/key indicators analysis was undertaken in order to select the most-suitable Macro-Corridor. Then, within the selected Macro-Corridor, specific Micro-Corridors and route alternatives were analysed again using a series of key indicators as well as cultural heritage, social and environmental constraints. A combination of such indicators allowed the final route alternative selection and PRT siting (the optimised “Base Case” alternative).

The Macro-Corridors assessed are shown in *Figure 3-2*. The results of the analysis and the quantification of each constraint were ‘weighted’ and maps produced summarizing the different indices.

**Figure 3-2 Macro - Corridor Alternatives**





Source: ERM (January 2012)

The different phases of the analysis described above led to progressively discarding the possible solutions Macro-Corridors A, B and C, as summarized in *Table 3-1*.

**Table 3-1 Macro-Corridor Analysis – Summary of Results**

Key Indicator	Component	Corridor A	Corridor B	Corridor C	Corridor D
Land Use	Safety and Social	Unsuitable (presence of continuous urban fabric)	Suitable	Suitable	Suitable
Protected Areas	Environmental	Unsuitable	Suitable (with limitations)	Unsuitable	Suitable
<i>Posidonia oceanica</i>	Environmental	Unsuitable	Suitable (with limitations)	Unsuitable	Suitable
Hydrological Hazard	Environmental	Unsuitable (risk PG3)	Unsuitable (risk PG3)	Suitable (with limitations)	Suitable
PUTT/p constraints	Environmental and Cultural heritage	Suitable (with limitations)	Suitable (with limitations)	Suitable (with limitations)	Suitable (with limitations)
Cumulated Analysis	All	Unsuitable	Unsuitable	Unsuitable	Suitable

Source: ERM (2013)

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The analysis (as fully described in *Annex 2* of the ESIA) resulted in selection of Macro - Corridor D for further consideration, thereby confirming the general conclusion of the assessments conducted up to March 2012 of a landfall/onshore route option in the vicinity of San Foca as the preferred alternative. A detailed assessment of Macro-Corridor D was undertaken and it was concluded that an ‘optimised Base Case’ could be identified within the Macro - Corridor where:

- There are no constraints from the presence of protected conservation areas, hydrological hazards (areas classified PG3), nor *Posidonia oceanica*; and
- Land-use planning constraints (PUTT/p constraints) in this area are compatible with the proposed construction and operation of the TAP Project.

### 3.4                    **Base Case Route Optimization**

Additional studies and consultations were carried out in 2012 and 2013 to optimise the route within Macro-Corridor D. The selected optimised Base Case consists of:

- A modified shore approach with its landfall point located at 400m south of the Alternative 0 location, submitted in March 2012. The landfall will be constructed using a micro-tunnelling technique that consists of:
  - A marginal modification of the offshore route (413 m), already designed for the Alternative 0 and connected with the Albanian offshore section (authorized by National Government);
  - A tunnel length < 1,500 m which avoids interfering with the Mediterranean maquis/woodland, onshore tourist facilities and offshore *Posidonia oceanica* beds;
  - Consideration of safety distances from existing buildings; and
  - An acceptable distance from San Foca harbour, in order to not cause interference during the construction phase.
- A new location for the PRT within the Municipality of Melendugno, completely outside the landscape protection area. The design and layout of the facility ensures minimum impact on the surroundings; and
- An optimised route for the onshore pipeline, deviating from the corridor of Alternative 0 and minimising the impact on the environment by avoiding natural habitats. The route runs parallel to existing roads and tracks for more than half of its total length. The remaining section of the onshore route is optimised in accordance with regional planning, in particular the proposed development of the *Archaeological Park of Acquarica*.

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## 4 ENVIRONMENTAL AND SOCIOECONOMIC CHARACTERISTICS OF THE PROJECT AREA

### 4.1 Introduction

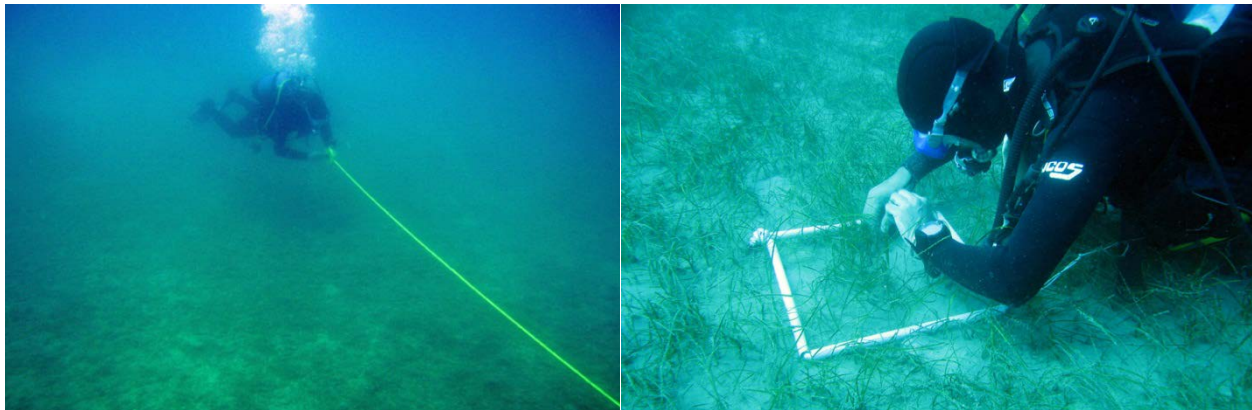
TAP AG has developed a ‘baseline’ (analysis of the existing environmental, socioeconomic and cultural heritage conditions), for both the offshore and onshore route. A detailed analysis of the different components is reported in the ESIA and predominantly focused on a 2 km wide corridor along the entire length of the Project route – forming the so-called *Study Area*.

### 4.2 Existing Offshore Physical and Biological Environment

Offshore environmental data was gathered from existing literature and field surveys undertaken specifically for the Project. Environmental and geophysical surveys were undertaken in the nearshore area of the Project from 2011 to 2013. These surveys included identification of water and sediment physicochemical properties through sampling and laboratory analysis and morphological analysis conducted through a preliminary assessment, using side scan sonar followed by multi-beam echo sounding to provide precise geomorphological data.

Biological surveys included sampling of seabed organisms (benthos) and identification of marine flora and fauna (see *Figure 4-1*). An extensive video survey was also completed to characterise and map marine habitats.

**Figure 4-1 Techniques used during Marine Field Surveys**



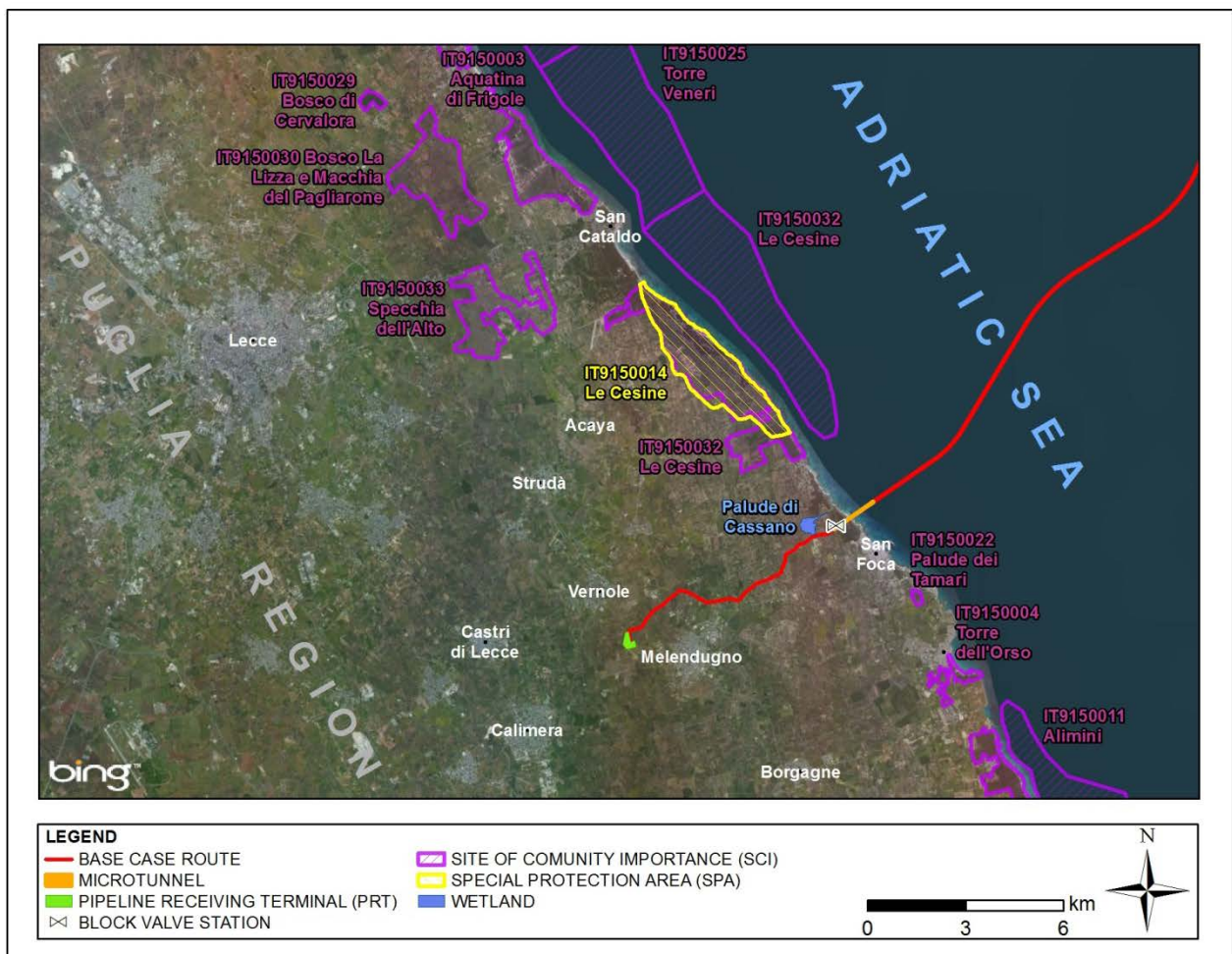
Source: ERM Field Surveys (2013)

The seabed gently slopes away from the shoreline in the Project Study Area down to a water depth of 20 m, with rocky outcrops in the coastal area and sand offshore. It then follows a steeper slope down to a depth of 50 m, which later flattens or gently slopes below 50 m until it reaches the edge of the continental shelf at around 150 m.

In terms of water quality, historical analyses carried out during the 2007-2011 period show that the marine and coastal water quality is good in the Project area. The Project survey work carried out in this coastal area shows similar results.

The closest nature conservation site called Le Cesine, designated as a Site of Community Importance (SCI), is located about 2 km north of the Project landfall and shore approach (refer to *Figure 4-2*). Le Cesine consists of an onshore and offshore section. The offshore section is designated to protect priority habitat *Posidonia oceanica* seagrass beds. Further south, approximately 7 km south of the landfall, is the SCI Alimini, which is also protected for *Posidonia oceanica* seagrass beds. The nearest Marine Protected Area is Torre Guaceto Marine Reserve, about 50 km north of the Project area, near Brindisi.

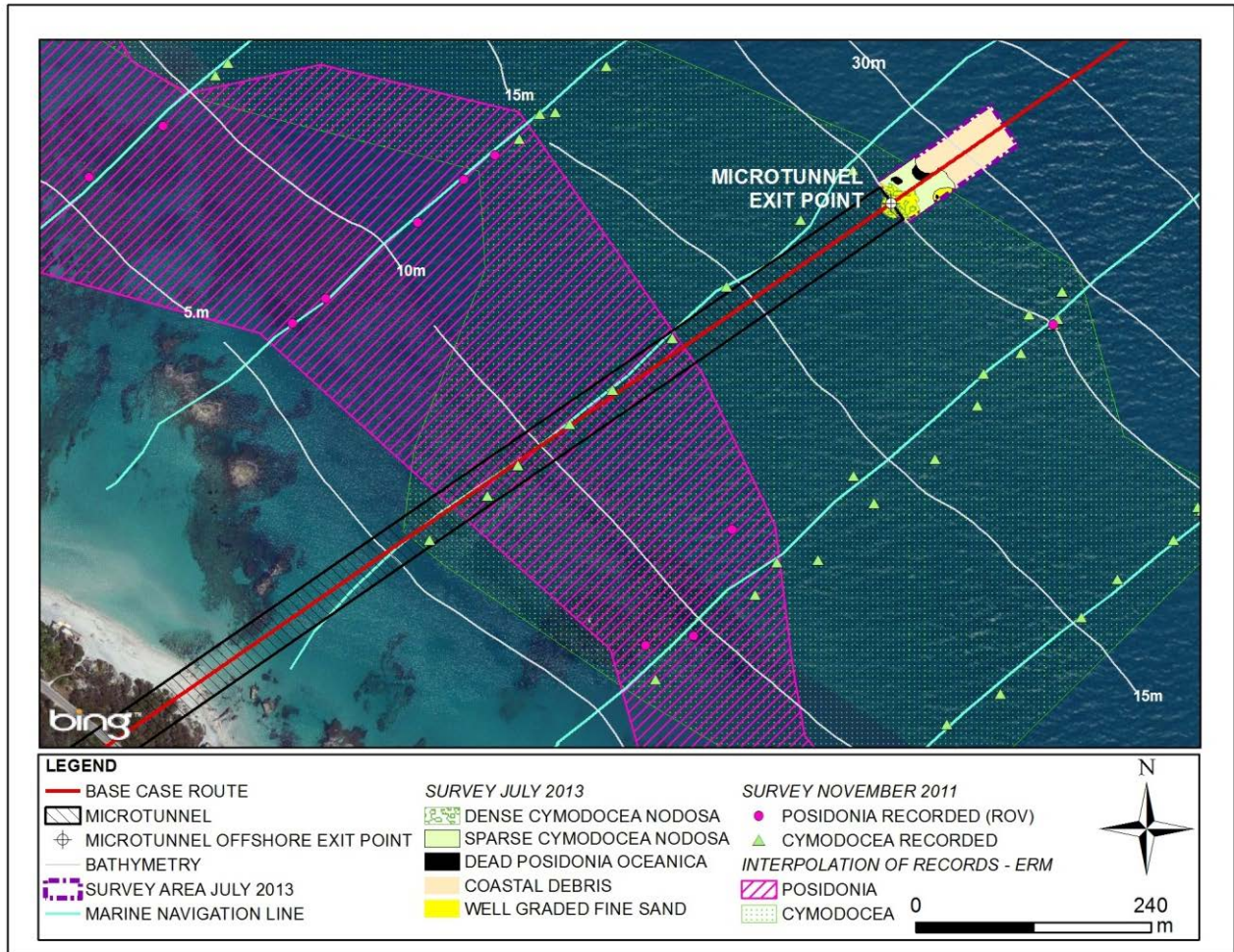
**Figure 4-2 Location of Project in relation to Nature Conservation Sites**



Source: ERM (2013)

The offshore Study Area contains some *Posidonia oceanica* seagrass, which appears more as patches in the pipeline shore approach area, rather than continuous beds. Another, smaller seagrass species, *Cymodocea nodosa*, was also found, occurring in an almost continuous band parallel to the shore at a depth of between 5 and 25 m. However the width of this band varied considerably across the Study Area – refer to *Figure 4-3*. This species, nevertheless, is not recognized as priority habitat under the Habitats Directive.

**Figure 4-3 Posidonia and Cymodocea Recorded in vicinity of Project Area**




Source: ERM (2013)

Benthic macrofauna sampled in the coastal area showed that no rare or protected species were found.

In terms of deep sea habitats, at a regional level the most notable are the white coral biocoenosis in the area of the Ionian Sea/Adriatic Sea interphase, consisting of living corals mainly represented by the ‘framework builders’ *Lophelia pertusa* and *Madrepora oculata*. Some of these offshore deepwater coral sites have been found in recent years on the Italian continental slope. The nearest known to the pipeline route are a colony off Apulia, now known as the Santa Maria di Leuca reef province, approximately 60 km south of the pipeline route, and the Bari-Gondola-Dauno area, approximately 150 km north. Both appear at approximately 700 m depth.

Species of commercial interest include fishes (e.g. hake, red mullet, anchovy, sardines, sprat, swordfish and albacore), crustaceans (e.g. rose shrimp and Norway lobster) and cephalopods (e.g. octopus and squid). Some of these, such as hake, spawn in the coastal waters off Apulia Region.

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The only sea reptiles in the Adriatic Sea are sea turtles; loggerhead and green turtles nest within the Mediterranean basin. A loggerhead nesting / birth event occurred at the beach of San Foca in 2007 and approximately 10 kilometres to the south in 2011. Due to the potential to affect reproductive female turtles in their potential route to the future potential nesting beach at landfall, and in order to apply the precautionary principle, landfall construction works are planned to take place outside the turtle nesting period (June to August).

Only a few of the 21 marine mammal species recorded in the Mediterranean Sea have been cited in literature to be potentially present in the Adriatic Sea. The bottlenose and striped dolphins, and possibly Cuvier's beaked whale, are considered regular inhabitants of the Adriatic and the Strait of Otranto.

The seabird population in the Study Area is not particularly abundant. Apart from the typical seagulls prevalent in any Mediterranean coastal area, mainly black-headed, Mediterranean and yellow-legged gulls, the only protected or threatened species within the Study Area are wintering little and sandwich terns. The great cormorant is also present in small numbers during winter in the Le Cesine coastal lagoon.

#### **4.3 Existing Offshore Socioeconomic Environment**

In 2009, the Apulia Region had the second largest fish catch and fishing-related income in Italy, after Sicily, reaching 15.5% of national catches and 16% of income. 55.5% of the regional fishing fleet consists of small-scale vessels and 33.6% use trawl nets.

- Brindisi harbour is located around 50 km north of the pipeline corridor and is an important tourist, commercial and industrial harbour. This harbour represents one of the main marine transportation corridors connecting Italy to a variety of destinations in the East Mediterranean Sea, such as Albania, Greece and Turkey. In contrast, the Port of Otranto and the Port of San Foca (Melendugno) are the landing ports used by fishermen working in the Study Area: Otranto Port is located about 20 km south of the pipeline route. Today only private boats and small commercial and fishing fleets dock there. These fishermen practice bottom trawling and typically travel anywhere from 3 miles to 12 miles off the coast to fish.
- San Foca Marina is located about 1.2 km south of the pipeline route. Boats longer than 25 m are not permitted at this marina. The Port of San Foca is an important centre for small-scale fishermen. These fishermen typically venture distances of 3 miles off the coast to fish. Two fishermen's organisations (*cooperatives*) which represent professional small-scale fishermen of Melendugno are also based in the Port of San Foca. These cooperatives provide important support to members as they serve to assist with administrative duties and protect fishing rights.

Fishing activities can be practiced up to 11 months per year. The non-fishing month changes every year according to a decision by relevant authorities. The peak nearshore fishing season for sardines is considered to be between January and April.

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#### 4.4 Existing Offshore Archaeology and Cultural Heritage

The offshore archaeological assessment has been conducted through the analysis of remote sensing data and a review of available literature.

No visible evidence of marine archaeological resources has been identified within the proposed pipeline route in Italian waters.

Notwithstanding this, the Project area still has relatively high potential for maritime archaeological finds. Throughout history and pre-history the area would have provided a useful shelter for seagoing vessels in poor weather; and reported finds of *amphora* in nearby waters indicate that ancient ships were present in the area. Furthermore, the nearby presence of coastal archaeological sites such as the Roman-era town of San Foca located a short distance from the Project area suggest the potential presence marine archaeological remains in the project area.


In order to obtain a comprehensive understanding of the submarine environment, a detailed seabed investigation has been undertaken by TAP AG to provide a preventive submarine archaeological risk assessment document as formally requested by the Italian regulator. The results will be managed and published in accordance with the procedure driven by the Cultural Heritage Superintendence.

#### 4.5 Existing Onshore Physical Environment

**Air quality** conditions over the Project area have been characterised by means of a desktop analysis and a dedicated air quality field survey. Data on atmospheric pollutant concentrations have been compared against normative thresholds set at international, European and national levels by IFC guidelines, Directive 2008/50/EC and Italian Decree 155/2010, respectively.

The desktop analysis was based on the latest regional state of the environment reports published by Apulia (2009, 2010 and 2011) and on data from air quality monitoring stations at Galatina and Maglie. The stations of Galatina and Maglie are located in the proximity of the Project area, thus are considered representative of its air quality conditions. With the exception of ozone (O<sub>3</sub>), particulate matter (PM<sub>10</sub>) and nitrogen dioxide (NO<sub>2</sub>) data for the analysed years met regulatory limits.

A specific air quality field survey was undertaken in July 2013 for four weeks. The survey focused on monitoring NO<sub>2</sub>, which is a ubiquitous air pollutant and one of the most prominent. Observed concentration values were always significantly below the regulatory concentration limit of NO<sub>2</sub> annual concentration of 40 µg/m<sup>3</sup> set by the D.Lgs 155/2010.

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Desktop analysis indicated that the Project area belongs to the **noise** zone defined as “*All national territory*” (DPCM 14/11/97) and identified several sensitive receptors (mainly residential buildings) along a 2 km wide corridor centred on the proposed pipeline route. The field survey monitored ambient noise levels at these receptors and found that:

- During day time, averaged noise levels lie within a range of 40 to 55 dB(A), mainly influenced by road traffic. In rural zones where noise sources are not intense, the ambient levels are generally below 50 dB(A) and mainly dominated by natural ambient noises of animals like dogs, insects and birds; higher noise levels have been monitored in proximity of roads, where noise levels reach also 53 dB(A).
- During night time, averaged noise levels are generally below 35 dB(A), and intrusive noises, such as road traffic noise, are not audible.
- Monitored ambient noise levels comply with Italian noise legislation for both day and night time (noise limit equal to 70 dB(A) for day time and 60 dB(A) for night time) and with the more stringent noise limits established by IFC (55 dB(A) for day time and 45 dB(A) for night time).

The desktop analysis carried out in order to characterise **surface water** features over the Project area confirmed that the proposed route does not cross any watercourses. The wetland area of the Palude di Cassano is located immediately to the north of the route in the vicinity of the landfall area (see *Figure 4-2*). Only two seasonal streams have been identified within approximately 500 m of the pipeline route. This was confirmed by the field survey undertaken in July 2013. Water quality samples were also taken as part of the survey work.

The **groundwater** conditions of the Salento sub-region are characterised by two aquifers: a multilevel aquifer close to the surface and a deep limestone aquifer. In the Study Area near to the coast groundwater is found at a depth of approximately 4 m, generally becoming deeper further inland. During the field survey carried out in July 2013, five privately-owned agricultural wells were sampled within 500 m of the pipeline route. The samples showed that the groundwater is generally of good quality but with elevated chloride concentrations (likely due to saltwater intrusion or the presence of clayey strata).

The **geology and geomorphology** of the coastal stretch affected by the Project is characterised by erosion, alternating sandy coves with small rocky headlands associated with an average environmental sensitivity and a ‘medium criticality level’ according to the Regional Coastal Plan. Regarding geomorphological risk, the pipeline landfall is located in a zone of 500m situated between two areas at risk of erosion. The selected landfall represents the only stretch of coastline in the Study Area with no geomorphological risk. The planned route crosses an area with a very low risk of seismic activity, both in terms of frequency of events and their magnitude.

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In order to assess existing **soil** contamination levels, a soil survey was undertaken along the onshore route (including landfall and PRT) in July 2013 (see *Figure 4-4*). Results from the soil sample analysis were compared against the Italian and Dutch<sup>1</sup> soil quality standards for ‘residential land use’. Only concentrations of beryllium and tin exceeded Italian threshold limits in some of these samples and is considered to be associated with natural background levels of the Study Area.

**Figure 4-4 Top Soil Sampling**



Source: ERM Field Surveys (2013)

The condition of existing **landscape and visual** amenity in the Study Area has been characterised by means of a desktop analysis of current literature and local cartography, and through a visual survey undertaken in April 2013. The landscape sensitivity was evaluated on the basis of the morphology and structure, visual amenity and symbolic value, as perceived by local communities.

Based on this evaluation, two ‘homogeneous landscape areas’ were identified:

- **Coastal territory** within which a short length of the pipeline, the microtunnel work site and BVS will be located - classified to be of *high* sensitivity; and
- **Agricultural plain** within which the PRT and the majority of the onshore pipeline will be located – classified to be of *medium* sensitivity.

<sup>1</sup> Dutch standards or *intervention values* are widely accepted in Europe as a benchmark for soil pollution and remediation (*Annex A of the 2009 Soil Remediation Circular: Target Values, Soil Remediation Intervention Values and Indicative Levels for Serious Contamination*).

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#### 4.6 Existing Onshore Biological Environment

In the past, the sub-region of Salento has been affected by extensive farming and other activities, reducing and fragmenting its natural habitat and resulting in a loss or alteration of the biodiversity. Nonetheless, the area has managed to retain many native species of plant with a high conservation value, and natural or semi-natural vegetation can still be identified today.

In the Study Area there is a general lack of natural habitats, predominantly due to the use of land for agriculture, such as olive plantations. Although the olive trees are not strictly a valuable type of vegetation within the area they are considered an important element of the local landscape (see *Figure 4-5*).

**Figure 4-5 Olive Groves with Dry Wall Boundaries**



Source: ERM Field Surveys (2013)

No monumental olive trees included in the Regional List of Monumental Olive Trees (enacted in the *Regional Law n. 12*, dated 11 April 2013 and issued on the *Regional Gazette DGR 357/2013*), are affected by the Project. During the field survey of July 2013 about 250 olive trees with trunk diameters in excess of 70 cm were however identified within 30 m of the pipeline route.

The greatest diversity of flora, and that of conservation interest, mostly extends from the wetland area of Palude di Cassano (as shown in *Figure 4-2*) to the coast, where endemics and rare plant species can be found.

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**Figure 4-6 Biologists conducting a Flora Survey**



Source: ERM Field Surveys (2013)


The lack of biodiversity is also seen in the limited fauna species recorded in the wider area, usually congregating in the remaining pockets of natural habitat.

The Project footprint does not encroach into any protected conservation areas; the closest designated site, Le Cesine Site of Community Interest, is found approximately 2 km away. Le Cesine is a wetland of international interest and strategic importance for the protection of wild birds, and is due to become part of the European Natura 2000 network of nature protection areas. The SCI Palude dei Tamari is located approximately 3 km south of the pipeline route at the landfall (as shown in *Figure 4-2*).

#### **4.7 Existing Onshore Socioeconomic Environment**

Information at a national and regional level was gathered from secondary sources using publicly available information and is presented in the ESIA Report. Data on the Study Area has been gathered from publicly available secondary sources along with primary data gathered during field visits to the Project area during January, July, September and October 2011. Supplementary information was collected during a new round of field surveys in June and July 2013. The socioeconomic baseline was prepared in order to fulfil the following objectives:

- To understand the socioeconomic context of the Study Area including social, historical, political and economic conditions;
- To provide data that informs the impact assessment in order to predict and explain potential Project impacts as well as establish mitigation measures;
- To understand the expectations and concerns of potentially affected communities with regard to the Project.

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The Study Area is located in the Province of Lecce and considers the two municipalities of Melendugno and Vernole in order to identify settlements and communities that are likely to be affected by Project activities. The only settlement within the Study Area is San Foca, which is located in the Municipality of Melendugno. The northern portion of the settlement is within the 2 km pipeline corridor.

The Province of Lecce is the second most populous province in the Apulia Region (after the Province of Bari), has 97 municipalities and a population of 815,600 inhabitants, almost 12 % of which live in the provincial capital city of Lecce. Melendugno and Vernole have a population of about 9,800 and 7,400 inhabitants, respectively. The unemployment rate in the Province of Lecce has increased during the 2004-2010 period from 14.7 % to 17.7 %. The unemployment rate in Melendugno and Vernole is high with a notable gap between males and females.

The Province of Lecce has a lower number of olive producers and processors designated as *Protected Designation of Origin*, compared to other provinces in Apulia.

The main economic activities in the Study Area are similar to those represented at the provincial level, which are agricultural, fishing, services and trade (includes tourism), maintenance and construction activities. These economic activities make up 72 % of economic activities across both Municipalities of Vernole and Melendugno combined.

In Vernole, there are slightly more businesses involved in agriculture, silviculture (forestry) and fishing than in Melendugno, while Melendugno has more than twice the number of businesses involved in trade and maintenance activities. In Melendugno, there are also significantly more registered businesses engaged in service and tourism related activities. There is no heavy industry in the Study Area.

The Municipalities of Melendugno and Vernole are areas for olive production. In the Study Area within the 2 km corridor along the pipeline alignment, approximately 1,474 ha (79% of total land) are utilised for olive farming. Olives are the most important crop in the area with 81.1% of land in Melendugno and 67.5% of land in Vernole used to cultivate olives for olive oil production. A small percentage of land is also used to grow arable crops and raise livestock.

Tourism represents another main economic activity in the Study Area. According to data from the Local Tourism Authority (APT Lecce), it is growing considerably every year. Primary data gathered by TAP AG during field surveys indicates that tourism and associated activities represent an employment sector where a consistent number of inhabitants are employed or would like to be employed. TAP AG identified potentially impacted stakeholders along a corridor of 1 km each side of the route. Field observations reported only 14 tourism businesses within this pipeline corridor.

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Most of the land in the Study Area is privately owned agricultural land. Each individually owned parcel is typically characterised by the presence of rural complexes that, in the Apulia Region, are called *masserias*. Within the 2 km pipeline corridor there are 8 such complexes. Only one masseria was detected within 250 m of the pipeline route, together with 6 other residential structures.

Minor communal roads within the Study Area are mostly two-lane paved roads, and some country roads are quite narrow and frequently bounded by stone walls.

Most farmers in the Study Area use their own wells for irrigation.

#### **4.8 Existing Onshore Archaeology and Cultural Heritage**

In order to characterise the cultural heritage component of the local environment potentially affected by the Project and its activities, a detailed cultural heritage survey was performed.

The aim of the survey was to comprehensively define the cultural heritage of the Study Area by:

- Desk based research carried out to identify cultural heritage sites both within and near the base case corridor. The desk study involved the collection and analysis of relevant data from government agencies, databases, archaeological and historical literature, historic and topographic maps as well as consultation with experts and other knowledgeable individuals in Italy. This activity led to the creation of a catalogue containing information on the place-names of known sites, the topographical extent of sites, the types of archaeological evidence (*i.e.* area with pottery shards, settlement, burial mounds, etc.), the chronology and possible function of the sites, and the current preservation status of the sites. A total of 31 previously known sites of historical and archaeological relevance have been catalogued. Among these, 9 sites are within about 1 km of the pipeline corridor or PRT site;
- Direct field survey through the analysis of aerial photographs (recent and historical aerial and satellite images) and inspection within a 100 m wide corridor along the 8.2 km pipeline alignment and the PRT location. The primary purpose was to define, classify and map possible new discoveries arising from the direct analysis of the area.

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**Figure 4-7 A Team of Archaeologists, Topographers and Technical Surveyors Mapped and Photographed Drystone Walls along the Proposed Pipeline Route**



Source: ERM Field Surveys (2013)

The baseline data gathered indicate that settlements have existed in this area from prehistoric to modern times, with agriculture being the dominant economic activity (evident from pottery fragments and land-use patterns). A photograph of the drystone wall survey is presented in *Figure 4-7* and a photograph of one of the catalogued archaeological sites is shown in *Figure 4-8*.

The field survey within the 100 m Project corridor did not identify any areas of high archaeological risk or cultural heritage potential. Three areas of potential archaeological interest were identified comprising ceramic pottery fragments and a low wall structure but as there are all interpreted to be of quite recent age they are considered to be of only low or medium archaeological risk.

**Figure 4-8 Dolmen Gurgulante situated southeast of the PRT Site**



Source: ERM Field Surveys (2013)

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## 5 STAKEHOLDER ENGAGEMENT

### 5.1 Introduction

Stakeholder engagement is a key element of the ESIA process. The purpose of stakeholder engagement is to allow for stakeholders (those people or groups who may be directly or indirectly affected by a project, as well as those who may have an interest in or influence over a project) to interact with the decision-making process, express their views and influence mitigation and technical solutions to concerns voiced during the process.

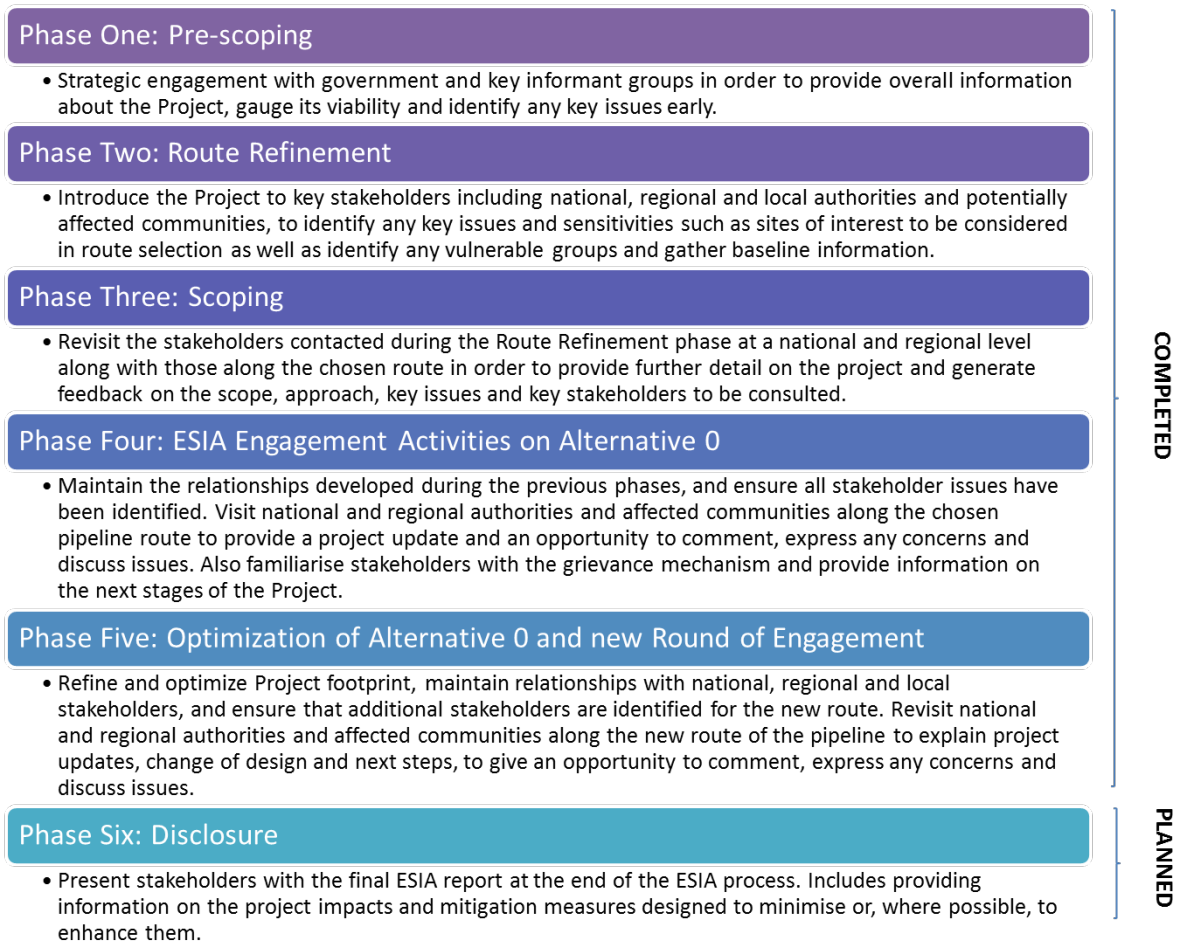
Stakeholder engagement is a process which involves the two-way sharing of information and knowledge, seeking to understand the concerns of others and building relationships based on collaboration. It allows stakeholders to understand the potential risks, impacts and opportunities of the project in order to achieve positive outcomes.

### 5.2 Engagement Phases

TAP AG has been engaging with stakeholders in Apulia Region since 2006, when the Project proposed the landfall of the pipeline in the area of Brindisi.

The summary of this process is broken down into six phases as shown in *Figure 5-1*. Phases One to Five have already been completed; Phase Six (ESIA Disclosure) will be conducted following submission of the ESIA to the Italian Ministry of Environment in September 2013.

**Figure 5-1 Phases of Stakeholder Engagement for the TAP Project – ESIA**

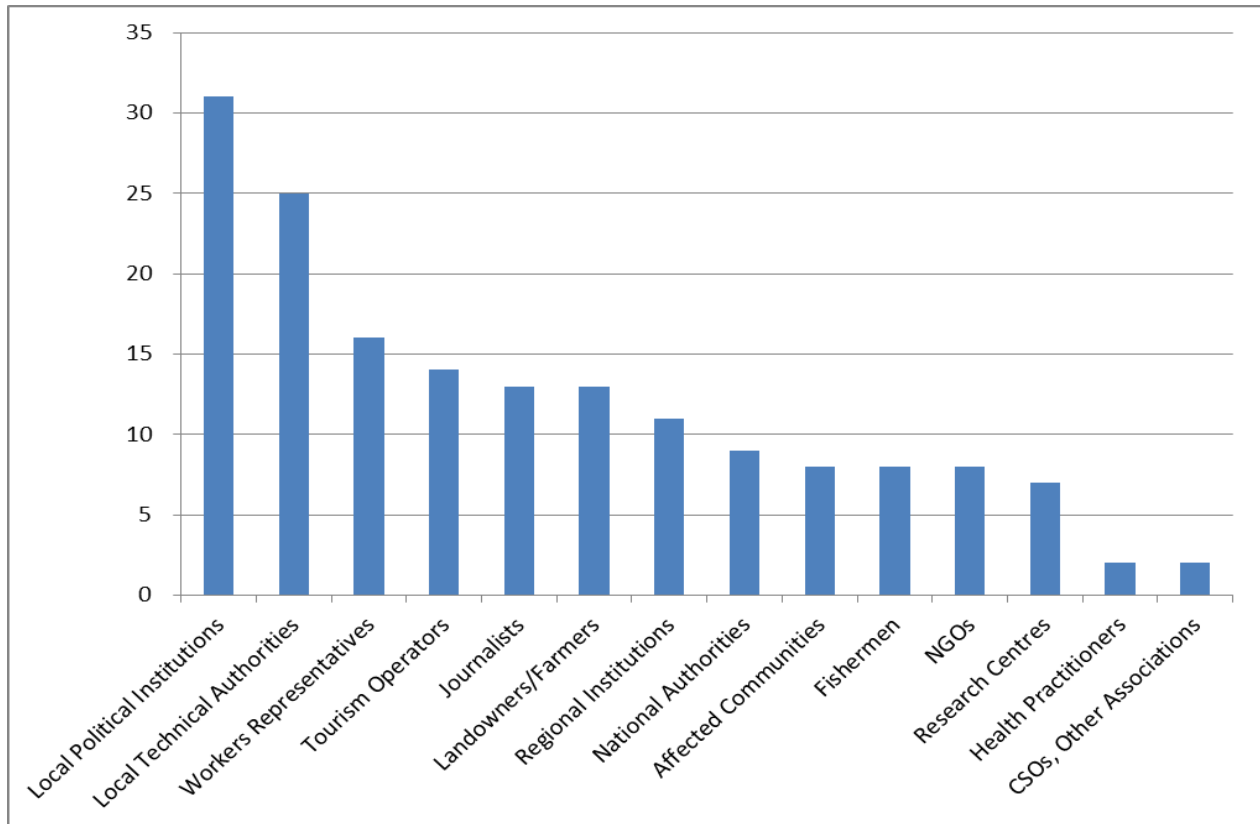


Source: ERM (2013)

### 5.3 Stakeholder Engagement Activities on Optimized Base Case

Between October 2012 and July 2013, TAP AG conducted 167 meetings with national, regional and local stakeholders. A graphic summary of the categories of stakeholders the meetings were held with is presented in *Figure 5-2*.

**Figure 5-2 TAP Meetings between January and July 2013**



Source: ERM (2013)

The highest number of meetings was conducted with local institutions, of both political or technical nature (31 and 25 meetings respectively). The first group includes representatives of the Municipality of Melendugno, Vernole, Brindisi and Lecce, and of the Lecce Province. In the second cluster, the Project engaged with a diverse group of technical bodies. These were the Cultural Heritage Superintendence, the Basin Authority, the Local Police, the Fire Brigades, Lecce Prefecture, etc.

Also at the institutional level, the Project consulted with regional and national authorities (i.e. Ministry of Environment) on a regular basis. Other important targets of the stakeholder engagement strategy included economic operators in the agricultural, fishing and tourism sectors, workers unions and business representatives (Confindustria, ANCE, Coldiretti, Labour Unions, Assobalneari, Farmers Cooperatives, Fishermen Cooperatives, etc.).

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## 5.4 Engagement Outcomes

During the ESIA field surveys, TAP AG took the opportunity to collect information on local socio-economic conditions, as well as stakeholders' feedback on the Project. The outcome of this process is reported in *Table 5-1*<sup>1</sup>.


**Table 5-1 Outcomes of Meetings during ESIA Field Surveys**

<b>Main Issues</b>	<b>Industrialization</b> - A considerable number of interviewees expressed concerns over the co-existence of the Project with agriculture and tourism-led economic development. Some people fear that the Project might give birth to an industrialization process, and ask TAP to consider already existing industrial areas.
	<b>Decrease of Tourism Flow &amp; Investment</b> - Stakeholders in the tourism business voiced concerns about the possible impact of the Project on their business activities. Some people reported that San Foca might lose appeal to tourists in favour of other areas in Salento, as a consequence of negative tensions that the opposition to the Project could engender.
	<b>Pollution and Environment Preservation</b> – Some stakeholders formulated worries about sea pollution, deterioration of air quality (mainly PRT emissions), ground and landscape degradation. A few number of people reported their adversity to whatever project might cause an environmental change to the status quo.
	<b>Project Benefits &amp; Communication</b> – Several stakeholders complained about the lack of detailed information on Project benefits for the community (i.e. jobs, compensations, investments). Some stakeholders acknowledged an intensification of communication opportunities with the Project, others complained about the lack of public community meetings.
<b>Other Issues</b>	<b>Safety Risks</b> – Incidents caused by inflammable gas were reported as a reason of concern for a part of the community. Some stakeholders also referred to a generic «psychological impact» of the pipeline presence.
	<b>Cultural Heritage</b> – A few community members have expressed concerns on the preservation of cultural heritage sites in the proximity of the route (i.e. Dolmen Placa, Basilica di San Niceta, Monumental Olive Groves).
	<b>Mistrust</b> - Based on previous negative experience (i.e. Ilva, Cerano), some stakeholders expressed doubts over the long-term commitments of the private sector to live up to the sustainability standards originally set, and over the capacity of the public system to protect community health and environment in the long run.
	<b>Gas Price</b> - The potential that the Project would improve access to gas was raised by a few stakeholders.

Source: ERM (2013)

<sup>1</sup> The table divides issues among 'Main Issues' and 'Other Issues', based on:

- a. The number of times that the issue was discussed during interviews and meetings; and
- b. The importance attributed to the issue by the stakeholders in expressing their views about the Project.

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## 5.5 Evaluation of Stakeholder Engagement Process

Stakeholder feedback is an aspect that informs the evaluation of impacts and the development of mitigation measures. Some local stakeholders reported a lack of information and communication on the Project. A limited number of stakeholders - including some local authorities, civil society organizations, fishermen and tourist operators - refused to interact with the Project in the ESIA framework.

The outcome of the main stakeholder engagement phase reports issues that had generally emerged during earlier rounds of engagement activities. Thus, TAP AG has already identified what the main driving forces behind people's concerns are and intends to define further management plans and social and environmental monitoring plans that can cope satisfactorily with the expectations of the community to ensure that these concerns are adequately addressed.



Despite complaints being raised towards different Project issues, only fishermen filed an official grievance for loss of livelihoods against the Project. The grievance mechanism is described in *Section 5.7*).

## 5.6 Next Steps

The process of stakeholder engagement will continue after the delivery of the ESIA and its public disclosure. TAP AG will continue to hold meetings with national, regional and local stakeholders and renewed efforts will be made to reach out to those stakeholders who are currently unwilling or unavailable to engage in an open dialogue with the Project.

TAP AG has already committed to produce and make available further documentation, including a revision of the Stakeholder Engagement Plan. Other documents intended to facilitate a socially sustainable approach to affected communities include, but are not limited to: a *Livelihood Restoration Framework* (with a study on compensation), a *Social-Environmental Investment Plan* based on the results of a *Needs Assessment Study*, an *Emergency and Preparedness Plan* and new *Communication Activities*.

In defining the documents above mentioned, TAP AG will be guided by the outcomes expressed by the stakeholder community during the ESIA consultation phase and by the ongoing stakeholder engagement process.

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## 5.7 Grievance Mechanism

TAP AG has established a two-tier *Third Party Grievance Mechanism* based on the provisions outlined in EBRD PR 10 and the EBRD guidance note on grievance mechanisms.

Through this instrument TAP AG provides all communities, individuals and other stakeholders with an efficient and quick process to voice their grievances and TAP AG has committed to respond to these and provide relevant solutions within 30 days.

A local grievance procedure will be established, informed by ESIA stakeholder engagement and data collection activities so that it is fully compliant with TAP AG's grievance procedures for the relevant project phase as well as appropriate for the local stakeholder context. TAP AG will ensure necessary resources for carrying out the requirements of the third-party grievance management process in direct engagement with local stakeholders. In order to address grievances, complaints and reports on non-compliance in a timely, impartial and transparent manner, TAP AG will maintain overall responsibility for the implementation of its third party grievance process;

Based on TAP AG's existing Third Party Grievance Mechanism and in line with EBRD PR 2, TAP AG will establish well before the start of construction a grievance mechanism for workers and non-employee workers (and their organisations, where they exist) to raise reasonable workplace concerns. TAP AG will inform all workers etc. of the grievance mechanism at the time of hiring, and make it easily accessible to them. This mechanism will mirror the proceedings of the existing Third Party Grievance Mechanism and address concerns promptly, use an understandable and transparent process that provides feedback to those concerned. The mechanism does not impede access to other judicial or administrative remedies that might be available under law or through existing arbitration procedures and/or existing workers grievance mechanisms of TAP AG contractors and/or subcontractors.

TAP AG will make every effort to keep grievances restricted to facts and will keep individual grievances confidential. In order to inform authorities and the public about common grievances, the outcome of the investigations and the results of corrective actions, TAP AG will produce an annual summary report and publish it via its webpage.

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## 6 ANTICIPATED IMPACTS AND RISKS, AND FORESEEN MANAGEMENT MEASURES

### 6.1 Scope of the Assessment and Studies Undertaken

Based on the pertinent regulatory requirements, the Project is subject to an Environmental Impact Assessment (EIA) as part of the permitting procedure in Italy.

In addition to the Italian standards TAP AG has selected the *Performance Requirements* (PR) of the *European Bank for Reconstruction and Development* (EBRD) to serve as the benchmark to ensure that adverse impacts and risks to people, their rights, livelihoods, culture and environment are avoided or, where avoidance is not possible, minimised, mitigated, offset and/or compensated and to identify and adopt opportunities to enhance the environmental and social performance of the Project.

Accordingly the Project identifies, addresses and manages all social, environmental and cultural heritage impacts, risks and opportunities in a systematic and comprehensive manner as part of its Environmental and Social Impact Assessment (ESIA). This approach also provides for conformance with European Union (EU) Directives and further with the requirements of the Performance Standards (PS) of the International Finance Corporation (IFC) and other international project finance institutions who refer to these standards (e.g. Equator Principles). TAP AG is committed to fulfil the above principles and the requirements of the PRs and has set this out in a policy on ESIA for the TAP Project.<sup>1</sup>

The ESIA considers the three main phases of the Project, *i.e.* Construction, Operation and Decommissioning and also includes the consideration of transboundary impacts to other countries (*i.e.* Albania).


The assessment was informed by a number of studies and supporting information, including a *Noise Assessment*, *Air Dispersion Modelling*, *Marine Sediment Dispersion Modelling* and studies on geophysical and geotechnical conditions.

The assessment of socioeconomic impacts and risks is further informed by a Human Rights Impact Assessment. A summary of the HRIA is provided in this Report (see Annex 13 of ESIA). The complete HRIA will be made available to the public as soon as possible.

TAP AG will define a management plan to mitigate potential impacts on workers human rights. The impact assessment used a commonly accepted, internationally practiced ESIA methodology.<sup>2</sup> Based on the nature of the predicted impacts and the evaluation of impact significance, mitigation and management measures were identified and further actions specified.

<sup>1</sup> <http://www.trans-adriatic-pipeline.com/tap-project/health-safety-and-environment/corporate-social-responsibility/>

<sup>2</sup> The significance of impacts is evaluated based on the importance of the receptor, its sensitivity towards Project specific activities and the characteristics of the impact, including considerations on mitigation and reversibility.

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The results of the impact assessment are summarised in the following sections. Although the majority of impacts originate from the construction phase, impacts assessed during the operation phase and decommissioning phase are also referred where appropriate.

## 6.2 Offshore Physical Environment – Impacts and Mitigation

### 6.2.1 Oceanography and Water Quality

Construction works on the seabed will result in the disturbance and subsequent re-suspension of sediments together with the associated compounds, such as nutrients, which may be present. Activities that will disturb marine sediment include pipe-laying, anchor handling and seabed intervention works during the microtunnel construction and the laying of fibre optic cable. Seabed intervention works are expected to generate the most re-suspension of sediment.

The amount of sediment disrupted will be dependent on the methods and equipment used during pipeline installation as well as the extent of the construction works.

Modelling of the spread and deposition of sediments has been carried out for locations along the pipeline route where trenching and post-lay rock dumping may take place. Sediment plumes will be limited in extent and duration. Combined with the low levels of contamination in the sediment and the limited patches of *Posidonia oceanica* seagrass in the proximity of the work areas (Note: survey work has confirmed that no *Posidonia oceanica* is present in the area of the microtunnel offshore exit) the significance of residual impacts is considered to be **minor**.

Impacts to the water column during the operation phase are limited to the release of pollutants from anti-corrosion anodes in place on the pipeline. Comparable data from pipelines in operation show that the expected release of metal ions from the anode material during the lifetime of pipelines and their effect on the water column are **not significant** compared with other sources of metals in the sea.


### 6.2.2 Climate and Air Quality

In quantitative terms, polluting air emissions from construction vessel engines are predicted to be small if compared with the general emissions from maritime traffic in this area; approximately 2% of vessel emissions on the Brindisi Province. Therefore, impacts on the ambient air quality from construction activities in the Italian offshore environment are expected to be **not significant**.

During operation, inspections and maintenance works on the offshore pipeline will have limited associated pollutant emissions (no external maintenance activities are foreseen unless in the remote case of repair), and therefore are **not significant**.

### 6.2.3 Seabed Geology and Morphology

During the construction phase, the seabed intervention works for microtunnel construction, pipe-laying and anchor handling could re-suspend and spread a limited amount of sediments and locally alter the seabed through direct actions or the spreading of re-suspended sediments.

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Data from similar sized projects show that most sediment deposition takes place in close proximity to the disturbance point. Impacts on the seabed from trenching and anchor handling are therefore deemed to be **not significant**.

Operational phase impacts on the seabed are limited to sediment accumulation and/or scouring/erosion resulting from the physical presence of the pipeline. The structure will change local current conditions and will potentially alter the erosion/accumulation zones of fine seabed material within the local environment. Given that the pipeline route will avoid major rocky outcrops, where these effects could be more noticeable, and from a review of data on similar projects, these effects are considered to be **not significant**.

No impacts are expected from the Project decommissioning phase.

### 6.3 Offshore Biological Environment – Impacts and Mitigation

#### 6.3.1 Designated Sites and Sensitive Habitats

The Project construction activities mentioned (mainly trenching and anchor handling) and general vessel activities could affect sensitive marine sites and habitats through re-suspension and spreading of sediments, direct physical interaction, and noise and vibration.

Direct physical construction activities and the deposition of any re-suspended sediments may have a detrimental effect on seagrass patches and coralligenous algae within a relatively localised area surrounding the pipeline. However, it should be noted that seagrasses are known to be resistant to a certain level of burial by sedimentation as happens naturally during storm events.

Impacts from the construction phase on marine protected areas and sensitive habitats are considered to be of **minor** significance because:

- There will be no direct impact on *Posidonia oceanica* or coralligenous algae formations since a microtunnel will be bored beneath this section of the nearshore seabed surface;
- There will be limited direct impact on *Cymodocea* at the microtunnel exit point. Although *Cymodocea* is not listed in the Annexes I or IV of the Habitats Directive and is not included among vulnerable species of the IUCN red list, it is important as a producer of oxygen, a nursery for marine animal species, and a substrate for algae and epifauna. Impacts on *Cymodocea* can be mitigated through specific measures (e.g. monitoring turbidity) and in the long-term by monitoring the recolonization of the trenched portion;
- The very limited length of trenching (110 m) at the microtunnel exit implies a relatively small amount of re-suspended sediments, and the predominant current direction (longshore towards south-east) determines spreading of sediments mostly along the coast, avoiding shallower habitats. Model analysis has shown that the distance to the nearest SCI prevents impacts on protected areas;

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- Anchor spreads will be managed to minimise effects on seagrass habitats in the construction areas; and
- Any impact on deep-water coral formations would be associated with direct physical destruction due to pipe-laying, which has a very small footprint. No evidence of deep-water coral was found during the 2013 survey.

Impacts during the operation phase are limited to the release of pollutants from anti-corrosion anodes installed on the pipeline, and noise and vibration from vessels. Noise and vibration generated by natural gas movement in the pipeline during operation and routine inspections are expected to be minimal. Operational impacts are considered to have a **minor** significance.

### 6.3.2 Nutrients and Plankton

Pipe-laying and seabed intervention works have the potential to cause re-suspension of nutrients and contaminants from sediments into the water column and increase turbidity. A release of nutrients, particularly nitrogen and phosphorus into the photic zone could increase the risk of eutrophication in the offshore region, thereby stimulating phytoplankton primary production. Whilst possible, the release of nutrients is not expected to rise above background levels during offshore construction activities.

Seawater abstraction for hydrotesting of the offshore pipeline is also not expected to have a detectable effect on plankton communities due to the expected depth of intake and the very low density of plankton at these depths.

For these reasons, the impacts of the construction phase on phytoplankton and zooplankton communities will be **not significant**.

No operational impacts are expected.

### 6.3.3 Marine Benthos

Impacts to marine benthos include physical loss of habitat, burial and smothering from increases in sedimentation and turbidity, and to a lesser extent noise, could arise from sea bed intervention and pipe-laying and anchor operations.

The area of seabed that will be affected due to construction activities is a small area restricted to the pipeline corridor. Impact from anchor activities is expected to involve an area no larger than 240 m<sup>2</sup> at any one time. The impact is short-term as re-colonisation of the area is expected once construction activities cease.

As previously described, any sediment plume is not expected to travel far, and the areas buried by sediments will be small with light deposition. The overall impact significance from the construction and pre-commissioning phase on marine benthos is expected to be **minor**.

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The physical presence of the pipelines and various support structures may alter the composition and abundance of the benthic community. Solid surfaces that are placed in marine environments often become colonised by marine organisms. In addition the hard substrates that are introduced by rock dumping operations and installation of support structures will further increase habitat diversity in the areas of such interventions. An overall increase in localised biodiversity and abundance may result.

The pipeline will require routine inspections, however, these will cause only low levels of disturbance to the seabed. The resulting significance to marine benthos from the operational phase is thus of **minor** significance.

#### 6.3.4 Fish and Other Free-Swimming Organisms

The Project has the potential to impact fish and other free-swimming organisms in the offshore environment during construction through impacts to water quality, changes to seabed habitats, underwater noise and disturbance caused by the presence of vessels involved in construction, the maintenance of pipeline and intake of pressure-test water during pre-commissioning (i.e. hydrotesting). Vessels associated with commercial shipping and fishing regularly pass through the Project area, and the presence and passage of a few additional construction and support vessels over the construction period will not represent a significant increase in disturbance to pelagic species. The fish species feeding in the vicinity of the pipeline construction activities will temporarily move away from any area of excessive noise and vibration created during the construction phase and return once it is completed. Effects on fishes from re-suspension of sediments and consequent increases in turbidity are expected to be non-distinguishable from natural variations, as described in previous sections. As a result, any impact to free-swimming organisms is considered to be **not significant**.

Impacts that will arise throughout the operational phase are anticipated to result from increased noise and vibration. As mentioned before, noise and vibration will be negligible, therefore impacts on free-swimming species from the operational phase are expected to be **not significant**.

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### 6.3.5 Marine Mammals and Reptiles

The main potential impacts to marine mammals and turtles during the construction phase of the Project are direct physical disturbance to nesting grounds, indirect disturbance from noise or vessel presence and increased water turbidity.

Noise and vibration will be generated during construction as a result of pipe-laying, seabed intervention work and vessel movement. Noise and vibration are the most evident impact on marine mammals. In general terms, the average noise output of the construction fleet is expected to be similar to small to medium sized existing traffic. Dredging and trenching generate similar noise levels. Thus both sources would be indiscernible from general traffic existing in the area beyond the immediate vicinity of the source. According to experiences in similar projects, marine mammals and turtles could move to a minimal distance. However, in order to avoid interferences, construction works are planned to take place outside the turtle nesting period (summer period) Also, as a protective measure, trained Marine Mammals Observers will be included during pipe-laying and coastal works. As mentioned for the impacts on the water column and fishes, it is expected that turbidity levels will not be increased significantly above background levels. Impact significance on marine mammals and turtles during construction is expected to be **minor**.

Potential impacts through the operational phase will be the same as those during construction however the level of vessel traffic is expected to be much lower. Therefore impacts on marine mammals and turtles from the operational phase are expected to be **not significant**.

### 6.3.6 Seabirds

The presence of Project construction vessels will cause physical and visual disturbance to seabirds (i.e. potentially disturbing migrating birds collecting on open water, post-moult flocks that stop on open water and birds feeding on open water). However, Project activities are predominantly not located close to the shallow waters that are regularly inhabited and used by seabirds in the Adriatic Sea.

Potential disturbance to birds during operation activities will be much less.

Thus impacts for the construction phase and operational phases on seabirds are considered to be **not significant**.

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## 6.4 Offshore Socioeconomic Environment – Impacts and Mitigation

### 6.4.1 Marine Traffic

Potential impacts to marine traffic in the Project Area during construction and operation phases are expected to be **not significant**, short-term and reversible. Special attention will be given to areas where shipping lanes and other heavy traffic areas are crossed. To minimise the risk of accidents, all activities will be announced to mariners/users of the sea well in advance of the activity taking place, and standby vessels will perform watch duties and alert vessels on intersecting course. After the pipeline is installed there will be no restrictions on marine vessel movements in the area.

### 6.4.2 Fisheries

Potential impacts to fishing activities in the Project Area during construction and operation phases are considered to be short-term, reversible and therefore **not significant**. The Project will determine a temporary and reduced fishing restriction due to the creation of a safety zone of about 2-3 km radius that will be used in order to prevent interference in the sea. This safety zone will affect only the area of pipe-laying, which will move progressively towards the landfall in Albania. No restrictions on using fishing equipment, including demersal trawling, will be applied during operation.

## 6.5 Offshore Cultural Heritage – Impacts and Mitigation

The potential sources of impact on cultural heritage will result from seabed and immediate substrate disturbing activities (i.e. landfall preparation activities, the removal of sediments and the excavation of trenches). However, considering the mitigation measures that will be adopted during Project activities (e.g. archaeological monitoring and implementation of a protocol for chance finds, the presence of a professional archaeologist for supervision of works and implementation of a stop work protocol if a site is discovered ), the significance of any residual impact is considered **minor to moderate**.

## 6.6 Onshore Physical Environment – Impacts and Mitigation

### 6.6.1 Ambient Air Quality

Potential impacts on local air quality in the Study Area are likely to arise from the Project construction and operation phases.

The following atmospheric emissions will take place during the Project construction phase:

- Temporary dust emissions from earth movement, excavation, vehicle movement, unpaved surfaces, stockpiles, etc. along the working strip, access roads and work sites;
- Temporary emissions of exhaust gases into the atmosphere from vehicles;
- Temporary emissions of exhaust gases into the atmosphere from the compressors used during hydrotesting.

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The main air pollutants produced will be nitrogen dioxide (NO<sub>2</sub>), particulate matter (PM<sub>10</sub>) and carbon monoxide (CO). The contribution of these emission sources in terms of pollutant emission load has been numerically estimated; subsequently, the induced ground level concentrations (GLCs) were obtained by means of dispersion modelling studies carried out with the CALMET-CALPUFF modelling system, for dust and hydrotesting emissions and with the CALINE model for vehicle emissions.

#### *Dust Emission*

During activities on the PRT site construction and along the working strip for the construction of the pipeline, dust emissions will be produced mainly from effects of re-suspension of dust caused by wind and vehicular traffic movements on unpaved roads and, secondarily, by movement of material handlings within the worksite during trench excavation, transportation of loose material and filling operations. These activities will be temporary, only lasting 6 months.

Based on the above long-term dust concentrations have been modelled only for the PRT site construction, which will last 18 months. During these activities measures will be put in place in order to limit any dust produced (i.e. spraying dusty work areas / access roads with water to suppress the dust, limiting the speed of construction vehicles; and maintaining the condition of the access roads).

Assuming the highest receptor sensitivity values and taking mitigation into account, residual impacts for long term dust concentrations are classified as **minor** significance, if compared with Italian limit values and Air Quality Standards, and as **moderate** if compared against IFC limits. In any case, they are in compliance with Italian legislation.

#### *Vehicle Exhaust Emissions Impacts*

Modelled GLCs induced by exhaust emissions released by the vehicles involved in the onshore pipeline construction, under the worst meteorological conditions, are considerably lower than regulatory limits even at the nearest receptors, located 5 m from the road's outline. Thus the significance of the impact on local air quality due to vehicles exhaust emissions has been classified as **not significant**.


#### *Hydrotesting (Engine-Driven Machinery Emissions Impacts)*

GLCs induced by compressor emissions during the hydrotest activities have been modelled and are shown tonational air quality standards. In particular for CO and PM<sub>10</sub>, modelled air quality parameters are 3 orders of magnitude lower than regulatory threshold concentration values.

NO<sub>x</sub> hourly concentrations modelled are the highest among the pollutants modelled, although lower than regulatory limits.

Thus the significance of the impact of CO and PM<sub>10</sub> emissions has been classified as **not significant**, whereas the significance of NO<sub>x</sub> emissions has been classified as **minor**.

#### *PRT Gas Heating System*

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During the operation phase the PRT gas-fired boilers for the Gas Heating System will be used primarily in start-up phase and in non-standard operating conditions of the system. It is assumed that the duration of such occurrence will not exceed 2% of the operating time of the PRT on an annual basis. These boilers will produce intermittent atmospheric emissions of NO<sub>x</sub> and CO, whose impact has been evaluated by mean of a dedicated modelling study performed with the CALMET-CALPUFF modelling system. Moreover, during the operation phase, general pipeline operation maintenance will produce minor emissions, the atmospheric impacts of which will be negligible.

Modelled emissions produced by the gas-fired boilers, under the worst case meteorological conditions , comply with international, European and National air quality standards.

Short term impacts on local air quality due to the PRT Gas Heating System activity during the operation phase have been classified as **not significant** for both NO<sub>x</sub> and CO. The significance of NO<sub>x</sub> long term impacts has been assessed as **minor**.

#### 6.6.2 Acoustic Environment



All phases of the Project (i.e. construction, operation and decommissioning) will produce some degree of noise emissions. After the pipeline system has been constructed it will be hydrotested to ensure its integrity prior to becoming operational. This temporary activity will produce the most significant Project noise emissions at sensitive receptors, mainly during dewatering phase, and therefore a noise prediction study was undertaken for this particular activity.

During hydrotesting noise impacts, evaluated according to the current progress of the project, will be of **major** significance in the proximity of the nearest sensitive receptors. For this reason TAP AG is committed to mitigating these temporary noise emissions to an acceptable level with a range of solutions currently being considered including: identifying lower noise emitting equipment; improved noise abatement measures and relocation of the compressor spread.

Low noise levels have been estimated at receptors during pipeline, microtunnel and PRT construction and are considered **minor** as the activities will be temporary and only conducted during day time.

Noise emissions during the operation phase will only arise from activity at the PRT. The foreseen noise levels at the nearest receptors, located at about 450 m from the PRT area, are in compliance with applicable noise legislation and will be well below current background noise levels. The estimated noise emission levels at receptors will be below 30 dB(A) and therefore will not be perceptible at these locations. The residual impacts are considered **minor**.

During the decommissioning phase, vehicles and equipment involved in soil movement and material handling will generate noise but are considered of **minor** significance.

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### 6.6.3 Water Resources (Surface and Groundwater)

Potential impacts to surface water features and groundwater will largely be confined to the 2 km pipeline corridor and associated access roads to the PRT and BVS. These could potentially arise from the construction and decommissioning phases of the Project, when excavation activities are being undertaken and machinery is present in the area.

Appropriate measures to prevent impacts on water resources due to accidental spills (from vehicles, storage tanks and stores in general), metalworking and welding residues, and process waste and effluent will be taken. The liquid wastes generated during construction will include hydrotest water from the onshore pipelines, slurry from micro-tunnel drilling and sanitary sewer coming from sanitary installations within the worksites. None of the waste water produced during the Project will be discharged into the environment but will be stored and transported separately in appropriate and approved bins and containers to approved disposal sites.


A wastewater management plan and a spill response plan will be designed with the aim to minimise the likely of accidental spills. Considering all the procedures planned for the safe handling, transport, storage and disposal of fuels and oils, the potential impact is considered **not significant** for surface water and **minor** for groundwater.

In areas with karstic formations and sinkholes, excavation works may cause the collapse of such structures. Geophysical investigations, as well as hydrological / hydraulic compatibility studies, will minimize potential interferences with these areas. The significance of any residual impact is considered to be **minor**.

Construction activities may increase suspended sediments in surface runoff; draining into surface water features. However, in consideration of the mitigation measures to be implemented (i.e. topsoil will be stripped and stored in designated areas away from surface water features such as the wetland area of Palude di Cassano) and the limited period of construction, any residual impact is considered to be of **minor** significance.

All water used during the construction and pre-commissioning phase will be provided by tanks; thus the significance of any residual impact on local water resources is considered **not significant**.

Any water consumption and waste production during operation will be localised to the PRT area. Wastewater will be appropriately treated prior to discharge into sewer. Any potential impact is considered **not significant** for surface water and **minor** for groundwater.

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#### 6.6.4 Subsurface and Soil Resources

During construction, a total of about 37.5 hectares (ha) of land will be required by the Project. In particular, approximately 22 ha for the pipeline working strip (8.2 km long, 26 m wide) and 12 ha for the sites of temporary and permanent supporting facilities (including PRT) and access roads. Considering that mitigation measures will be taken to avoid physical degradation of soil and the land within the working strip will be restored to its original condition after construction the significance of any residual impact is considered to be **minor**.

Moreover, appropriate measures to prevent accidental spills of fuels in the construction sites will be taken. Such potential sources of impact will however, be largely avoided by wastewater treatment, waste management, proper storage and storage of polluting substances. A *Pollution Prevention Plan* will be implemented to avoid / minimise the risk of accidental pollution during construction.

Land take during the operation phase will be related to the permanent Project facilities, including the PRT, the BVS and the necessary access roads (totalling approximately 14 ha). The significance of Project impact on the soil / land resource during operation is considered to be **minor**.

Residual impacts for the decommissioning phase will be similar to those for construction both in type and significance, with regard to the PRT and BVS areas, while there are no impacts relating to other areas.

#### 6.6.5 Landscape and Visual Amenity


Project elements that will impact the landscape and visual amenity of the local area are the pipeline working strip, new access roads and other work sites

The onshore pipeline will be buried and thus once reinstated as described below will not produce significant changes in the landscape. Although construction activities do not interfere with any tree included in the regional list of “monumental olive trees” (approved by the Regional Council with resolution n. 357 of 7 March 2013), there are olive trees of significant age and size along the working strip. TAP AG commits to restore the land to pre-construction conditions through the reinstatement of the olive groves. Alternative compensation measures could apply upon request of the landowner, and in agreement with the relevant authorities.

The dry stone walls that will be removed during the construction phase will be rebuilt observing their original dimensions during reinstatement operations. The original stone materials duly set aside before pipeline installation works will be used for this purpose.

Other significant landscape features disturbed during construction will be considered on a case-by-case basis and the need for and nature of their reinstatement agreed with the relevant authorities/landowners.

The residual impacts of the pipeline on the landscape are therefore considered **not significant**.

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The Block Valve Station (BVS) is a small cabinet with a fence covering a limited area of approximately 13 m x 14 m and it will be constructed on an olive grove area. Mitigation planting will be used as mitigation measures, if necessary. The BVS impacts on landscape are **minor**.

The Pipeline Receiving Terminal (PRT), due to its dimensions, is the Project element likely to have the biggest impact on landscape and visual amenities. Therefore, the PRT impacts have been analysed for each landscape component as presented in the following part of this section.

- Morphology - The landscape of the Study Area is characterized by a flat morphology and vegetation typical of agricultural areas, with more than 70% of the area covered by olive trees. The new structures of the PRT will be located in an area without other similar facilities; therefore they could modify the morphology of the area and relationships between natural elements. This change, however, will be localized and moderate, and its presence could only partially affect the overall perception of the naturalness of the area. Thus, the PRT impact magnitude on local morphology is *medium*.
- Visual Component - The PRT impact has been assessed by means of a visual impact modelling study. It was concluded that the presence of the PRT will constitute a visual obstruction only for the nearest viewpoints (nearer than 500 m). Therefore, the overall visual impact magnitude is classified as *medium*. The same conclusion can be drawn for nocturnal impacts arising from PRT lighting. Planting will be used as mitigation measures.
- Symbolic Component - The area influenced by the Project is characterised by the presence of historical and archaeological evidence. However, the Project does not interfere directly with these historical and archaeological sites and the volumes of the PRT will be only marginally visible from these areas. Thus, the PRT impact magnitude on the symbolic component is classified as *major*.

In conclusion, considering the *medium* landscape sensitivity the PRT impact significance on landscape is considered **moderate**.

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## 6.7 Onshore Biological Environment – Impacts and Mitigation

### 6.7.1 Flora and Vegetation

During construction flora and vegetation will be removed from the pipeline working strip and other construction areas, such as the PRT site. However, any degradation or fragmentation of natural habitats will be minimal. Specific mitigation measures, in particular a *Biodiversity Action Plan* and afforestation with native species, will be implemented to limit any impacts. The residual impact is considered to be of **minor** significance.

### 6.7.2 Fauna

Potential impacts to fauna will be restricted to the Project work sites and immediate surroundings (up to 500 m from source of impact), and mostly result from noise disturbance, deposition of dust on vegetation / habitat and possible vehicle collisions. However, due to the relatively low abundance of wildlife it is considered that any residual impact will be **not significant**.

In order to minimize impacts on wildlife, and particularly on species of conservation interest, a *Biodiversity Action Plan* will be adopted together with proper restoration of the working strip. This will incorporate an environmental restoration program to ensure affected trees and hedges are appropriately re-planted / re-established and dry stone walls rebuilt, etc.

### 6.7.3 Protected Areas

In accordance with the requirements of *Article 6(3)* of the *EU Habitats Directive (92/43/EEC)*, a screening exercise was carried out for Natura 2000 conservation sites within 5 km of the Project footprint. The screening considered three SCI (Le Cesine, Palude dei Tamari and Torre dell'Orso) and one SPA (Le Cesine) and concluded that Project activities during construction, operation and decommissioning will not have any significant impact on the Natura 2000 sites or the conservation features for which they are designated, predominantly due to the distance of these sites from the Project work areas.

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## 6.8 Onshore Socioeconomic Environment – Impacts and Mitigation

In general, the TAP Project will cause temporary and localised socioeconomic impacts. The majority of these are rated as **minor** significance, with a few rated as **moderate** and some of these being positive impacts (i.e. procurement during construction benefitting the local economy). Socioeconomic impacts are normally rated higher during the construction phase.

An independent economic impact assessment (*Nomisma Energia, 2013*) suggests that, during the three year construction phase in Apulia Region, the TAP Project will directly support 150 jobs per year (part-time and full-time) as well as 640 indirect jobs (part-time and full-time) via local companies providing services to the Project<sup>1</sup>.

During the 50 year operation phase the Project will support 32 direct jobs and 150 indirect jobs per year (both part-time and full-time). Particular attention will be given to the involvement of the local firms in tendering, through a widespread information, training and support to achieve the qualification criteria.

Economic opportunities arising from the implementation of the Project will have positive impacts on local economy and employment, particularly during the construction phase.

During the Project operation phase, revenues generated by the Project are likely to have a positive impact on the economy. The impact created by the payment of local taxes (IMU and TIA) to the Municipality of Melendugno is long-term and is expected to generate a moderate positive impact.

During construction, a total of approximately 37.5 ha of land will be required by the Project. Following construction, land will be reinstated and returned to its original owner and use, where possible. Land required for operations and aboveground installations (about 14 ha) is significantly less than the area needed during construction and will be purchased by TAP AG after extensive consultation with landowners. Moreover the construction of new buildings will be restricted along a 40 m wide ‘safety corridor’ for the onshore pipeline route (i.e. 20 m each side of the pipeline). The corridor will be 200 m wide (100 m for each side of the pipeline) for complexes of residential structures and industrial buildings.

Approximately 1,900 olive trees with trunk diameter exceeding 30 cm and about 130 landowners



will be potentially impacted by the Project. During construction, direct impacts on agricultural activity will be temporary in nature and mostly due to land clearing and land use activities. The Project will restore (or preferably improve) any impacted livelihoods, in line with the EBRD Performance Requirement (PR 5).

<sup>1</sup> Figures are averages calculated over a 4 year period (2015-2018).

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The temporary loss of olive trees and related income is perceived to be a significant impact in the community. Even if temporary, the significance of residual impact is **moderate**. Potential impacts on land value and use during operation will be limited to restrictions in land development along the safety corridors. The risk of soil degradation is considered to be **minor**, as the original contours of the land will be restored, and appropriate mitigation measures will be utilised by the Project. In the event that any dry stone walls are affected by construction activities, they will be removed and rebuilt during reinstatement operations observing their original dimensions. For this purpose the original stone materials duly set aside before pipeline installation works will be used.

Tourism is the most important source of income for the community of Melendugno. The construction schedule will avoid the peak tourist season, particularly on the coastline, to minimise the potential loss of visitors and revenue. Additionally, microtunnelling technology will be used to construct the landfall, minimising impacts on the coastal area. These are considered to be the most significant socioeconomic risks by the community and are therefore rated as **moderate**.

During the operations phase, no long term visual interference with the coastline is expected. The pipeline receiving terminal will be built 8 km inland, therefore residual impacts on tourism are expected to be **minor**.

Brindisi Harbour is likely to be chosen as the location of the lay-down yard for piping and other materials, plus supplies needed for offshore construction. Thus, considering the capacity of this port and the availability of areas, the Project is likely to have a **minor** residual impact on infrastructure and utilities during construction and operation.

Residual impacts on community health, safety and security are generally expected to be **minor**. The main exception is the potential impact on the environmental health and wellbeing for households living in proximity (500 m) of the main working sites (i.e. microtunnel entry point and PRT) or permanent facilities. In these specific cases residual impacts are considered to be **moderate / high**.

Considering the application of mitigation measures, the potential impact on workers' health is rated as **minor / moderate**.

Considering the implementation of the necessary security measures, the potential impact on workers' health was rated medium / low.

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## 6.9 Onshore Cultural Heritage – Impacts and Mitigation

The key sources of potential impact on cultural heritage will result from ground-disturbing activities during the construction phase. Considering the mitigation measures (included in the Cultural Heritage Management Plan) that will be adopted during the Project activities, such as known site avoidance, Chance Finds Protocol implementation and enforcement of guidelines in the workers' Code of Conduct, the residual impact related to construction phase is considered of **minor** significance.

In some cases, Project construction activities may cause difficulties in accessing important cultural heritage sites. Depending on the site, this impact may affect tourists, researchers, or users of sites with intangible cultural heritage (ICH) value. The Project should be aware of cultural heritage sites and their access as well as set up Project equipment and activities so that access to sites is not restricted. If users' access to a site with ICH value is blocked, the Project should engage with stakeholders to resolve the issue and provide an alternate means of access to the site. Based on this, the residual impact related construction is considered **minor**.


**Figure 6-1 Historic Barn or Pagghiarain vicinity of the Pipeline Route**



Source: ERM Field Survey (April 2013)

Aboveground portions of archaeological sites and monuments are subject to impact from air pollutants and vibration from construction and vehicles. This type of impact may occur near roads that will receive increased project-related heavy vehicle traffic and areas near the Project corridor where heavy machinery operates. The value of impact significance is considered **minor**, due to the mitigation procedures that will be adopted and included in the Cultural Heritage Management Plan.

The cultural heritage sites are closely connected to the surrounding landscape and their visibility in the landscape (the perception of a cultural heritage site often has bearing on its cultural value).

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Impacts on the setting or ambience of a cultural heritage site can affect its value to visitors. The impacts on the environment or on the perception of the sites are potentially related to the areas for which it is provided for in the project the construction of temporary or permanent structures. Those sites most at risk for this kind of impact would be located in areas near the PRT. Adopting specific measures in the Cultural Heritage Management Plan, the value of impact significance is considered to be **moderate**.

Impacts during the operations phase may come from the operation of machinery and maintenance of PRT, BVS and pipeline and from other associated operations. By monitoring of sites at risk, reducing the working strip when maintenance and repairs are in close proximity to sensitive areas, and adopting specific measures in the Cultural Heritage Management Plan, the value of impact significance is considered to be **minor**.

Impacts on the setting and ambience of sites are likely to occur in places for PRT presence and maintenance and repairs activities. Since the pipeline will be underground, most sites in the Project area are not at risk for permanent impacts. Adopting specific measures in the Cultural Heritage Management Plan, the value of impact significance related to pipeline is considered to be **minor**. However, the PRT is an above-ground facility that will affect the character of the landscape, but considering that efforts will be made to maintain/reinstate vegetation, the impact significance is considered to be **moderate**.


During the decommissioning phase, considering a series of mitigation measures to be included in the Cultural Heritage Management Plan, the value of impact significance is considered to be **minor**.

### **6.10 Non Regular Operation and Unforeseen Events**

All plant, pipe sections and equipment supplied to the TAP Project will be designed, manufactured, delivered, installed and operated in accordance with the relevant European, national and international codes, standards and regulations.

For instance, safety measures will therefore be inherent to the mechanical and process equipment installed and operated at the PRT facility, such as a corrosion protection system and a regular program of inspection and maintenance. Safety measures will also be implemented through the prevention of leaks, fires and explosions. Regarding this point in particular, the procedure relevant to the technical evaluation of the Project has already been agreed with the local fire brigade.

Safety measures for the offshore pipeline will be integral to its maintenance, for instance, through the corrosion protection and preventing damage from third party interactions (fishing, marine traffic, etc.). Moreover, a regular program of inspection is foreseen to check the integrity of the offshore pipeline.

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Inspection and maintenance activities for the pipeline and associated facilities will ensure safe gas transportation over the planned lifetime of the system, without interruptions. The system depends on the reliability of the individual components therefore it is necessary to monitor its condition, to execute planned maintenance and to resolve incidents and failures which could reasonably be anticipated to occur.

During the construction period, several working practices / procedures will be applied. These procedures will be included in the Site HSE Plan that represents the principal document for provide a description on how TAP intends to provide the Health, Safety and Environment strategy during the construction phase.


The HSE Plan will also include the *Emergency Response Plan* (ERP) detailing measures to limit the consequences in the unlikely event of an accident.

### **6.11 Cumulative Impacts**

Cumulative impacts may arise from the combination of activities associated with the TAP Project together with other third party developments or projects in the same area of influence and at the same time of implementation or in the reasonably foreseeable future.

Based on the available information at the time of writing this report, no other activities have been formalized in the area near the site where the TAP Project will be built. It is known, nevertheless, that a plan has been proposed to expand the existing road network, through the implementation of the "Regional Road n. 8" connecting Lecce to San Foca, crossing the municipalities of Lecce, Lizzanello, Vernole and Melendugno.

The works for this new piece of infrastructure could overlap with those of the TAP Project, however, the stretch of road included in the municipality of Melendugno is temporarily suspended with no final route definition. Therefore no cumulative environmental and social impacts in the Project area are foreseeable at present. If and when the final route of Regional Road n. 8 is defined, cumulative impacts shall be properly assessed provided there is possible overlapping between the projects.

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## 6.12 Transboundary Impacts

Transboundary impacts of the Project will be discussed with the Italian, Albanian and Greek Ministries of Environment. Notification Forms will be submitted in line with the Espoo Convention to the Ministry of Environment of each of the three countries.

Transboundary impacts between Italy and Albania could occur during the construction phase, mainly due to hydrotesting activities and vessel traffic. After completion of construction the offshore pipeline will be filled twice using sea water from the Italian side of the pipeline; once for 'pipeline washing' and once for the hydrotest. The water will be discharged in Albania (total amount of extracted and discharged water will be approximately 130,000 m<sup>3</sup>). No additives will be put into the water and therefore it is expected that the water discharged in Albania will only contain small amounts of corrosion products from the pipeline.

Transboundary vessel traffic and associated effects are expected to be generated in Italian territory during the construction phase of the Albanian section of the TAP Project, since the installation of the offshore pipeline on the Albanian side of the Adriatic will be serviced from an Italian port (possibly Brindisi). This impact would be similar in nature and significance (i.e. **minor**) to the one discussed in the ESIA and related to the construction phase of the Italian section of the TAP Project. No transboundary impacts are foreseen during the operation phase.

It is to be highlighted that the ESIA procedure on the Albanian section of the Project was completed with the approval of the Albanian National Authorities on 3<sup>rd</sup> April 2013.

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## 7 ENVIRONMENTAL, SOCIAL AND CULTURAL MANAGEMENT AND MONITORING

As a result of the impact assessment process an *Environmental, Social and Cultural Management and Monitoring Plan (ESMMP)* overview, is being compiled. This will provide a framework for the implementation of the measures identified in the assessment to avoid, reduce, compensate or offset adverse impacts and to minimise and manage risks from Project activities that may cause harm or nuisance on the environment, the construction workforce, operational staff or the local population. Where possible, measures are included to enhance positive effects of Project implementation. Actions defined in the ESMMP relate to the various management plans and procedures identified and specified in the ESIA. The relevant section of the ESIA contains more detailed information on the foreseen environmental, social and cultural management and monitoring arrangements, the roles and responsibilities of TAP AG and its contractors for implementing these measures, and provisions for monitoring to assess the effectiveness of measures.

A detailed Environmental, Social and Cultural Management and Monitoring Plan (ESMMP) reflecting the above will be fully integrated into an Environmental, Social and Cultural Management System (ESMS) which is designed to ensure that all mitigation measures and commitments made by TAP in the ESIA as well as in other relevant documents will be implemented in practice both by TAP themselves and the Contractors working on behalf of TAP. This system will be developed after the finalization of the ESIA and well in advance of any key contracts for construction being awarded. TAP AG will disclose the draft ESMMP on its webpage, invite for comments, organize a feedback workshop and finalise the ESMMP based on these comments before disclosing it at similar places etc. as the Final ESIA.

*Table 7-1* provides an overview of the main management plans, for both the onshore and offshore components of the Project where applicable, that TAP AG will put forward to its contractors and for TAP AG's management during all phases of the Project, from the construction phase through operation to the decommissioning phase.

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**Table 7-1 Overview Key Management Plans**

<b>Topic / title</b>	<b>Purpose / objective</b>
<i>Biodiversity Action Plan</i>	Deals with the management of Project onshore and offshore biodiversity impacts, the implementation of mitigation and compensation measures and any offsets. The plan will be related to construction, operation and decommissioning phases of the Project.
<i>Chemical Management Plan</i>	Defines how TAP AG and contractors will select, handle, store and dispose of the chemicals in order to prevent damage to people and the environment.
<i>Community Health Management Plan</i>	Manages local public health, safety and security issues that may arise from Project activities.
<i>Cultural Heritage Management Plan (including Chance Finds Procedure)</i>	Sets out the onshore and offshore construction phase requirements for dealing with known cultural heritage and chance finds.
<i>Emergency Response Plan</i>	Describes the site-specific actions to be taken, and procedures followed, in emergency situations occurring during operations associated with all phases of the Project.
<i>Health and Safety Management Plan</i>	A tool that will provide a framework for health and safety planning, accident and incident investigation, health and safety auditing etc. throughout all phases of the Project.
<i>Infrastructure and Utilities Management Plan</i>	Deals with minimising local road and utility interruption during construction.
<i>Landscape Management Plan</i>	It will include a summary guide towards ensuring that the reinstated landscape works following construction of the pipeline and the newly introduced planting works around large structures such as the PRT will become established and will conform to the mitigation measures outlined in the ESIA.
<i>Livelihoods Restoration Plan</i>	Address potential economic displacement (loss of assets or access to assets, leading to loss of income or means of livelihood) and physical displacement (relocation or loss of shelter) of stakeholders from Project land and easement acquisition.
<i>Local Content Development Plan</i>	Deals with measures to enhance participation of local businesses in the procurement of goods and services to the Project, and to enhance the job opportunities and local workforce.
<i>Pollution Prevention Plan</i>	Details (onshore) working site good practice to avoid/minimise pollution risk during construction (including handling of potentially hazardous materials, product specific practices, prevention of accidental spills etc.)
<i>Social and Environmental Investment Plan</i>	Sets out how investment opportunities are identified, assessed, selected, planned, implemented and supported over the entire lifespan of the pipeline system.
<i>Soil Management Plan</i>	Describes how excavated soil and rock from the construction of the Project will be managed.
<i>Stakeholder Engagement Plan</i>	Describes the public consultation and disclosure activities in the ESIA process and during Project implementation.
<i>Traffic Management Plan</i>	Sets out measures to manage construction traffic on the public road network, on construction sites and offshore vessels in order to minimise risk of accidents.
<i>Waste Management Plan</i>	Deals with the handling and proper disposal of wastes and waste water generated during construction, operation and decommissioning phases.
<i>Water Management Plan</i>	Established to monitor and minimise Project water use during the implementation activities (i.e. hydrotesting).
<i>Workers Management Plan</i>	Addresses potential risks to worker rights, labour standards, and health and safety by summarizing expectations and procedures to maintain quality working conditions.

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## 7.1 Environmental, Social and Cultural Monitoring

The construction of the TAP Project will be carried out by external Contractors. TAP AG will ensure that the Contractors take account of the mitigations outlined in this ESIA.

A Commitments Register will set out who is responsible for the delivery of each of the mitigation commitments and who will check the delivery of each commitment. TAP AG will be ultimately accountable for the delivery of all commitments.

Monitoring and reporting of environmental data will be undertaken in accordance with the TAP AG Monitoring and Measurement Procedure. TAP AG will record and monitor data covering the environmental (e.g. waste generation, water use and discharges) and social aspects. This process will enable TAP AG to understand how environmental performance is changing over time and facilitate improvements to the environmental, social and cultural management system.

An outline of the monitoring programmes proposed for the construction and operation phases, is presented in *Section 9 of the ESIA*.

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## TAP Italy Overview Map



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