

TAP

Trans Adriatic Pipeline



**Scoping Report for the ESIA
(Environmental and Social Impact Assessment)
Greece**

Trans Adriatic Pipeline AG – Greece (Branch Office)
21st Floor, Athens Tower, 2-4 Messogion Ave., 11527
Athens, Greece
Phone: + 30 210 7454613 Fax: + 30 210 7454300

esia-comments@tap-ag.com
www.trans-adriatic-pipeline.com

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1.1

INTRODUCTION

The Trans Adriatic Pipeline (TAP) is a proposed pipeline in the Southern Gas Corridor that will bring gas from new sources in the Caspian region to Western and South Eastern Europe.

The 520 km pipeline will connect to existing gas networks and start in Greece, cross Albania and the Adriatic Sea and come ashore in southern Italy, allowing gas to flow directly from the Caspian basin into European markets. TAP's shareholders are Swiss EGL (42.5%), Norwegian Statoil (42.5%) and German E.ON Ruhrgas (15%).

TAP will contribute to the security and diversity of Europe's energy supply by providing the necessary infrastructure to transport gas from the Shah Deniz II field in Azerbaijan via the most direct route to Southern Europe once production begins in early 2017. As more gas becomes available, TAP will have the capacity to cater for an additional 10 Billion Cubic Meters (BCM) per annum of new gas, expanding to 20 BCM as required.

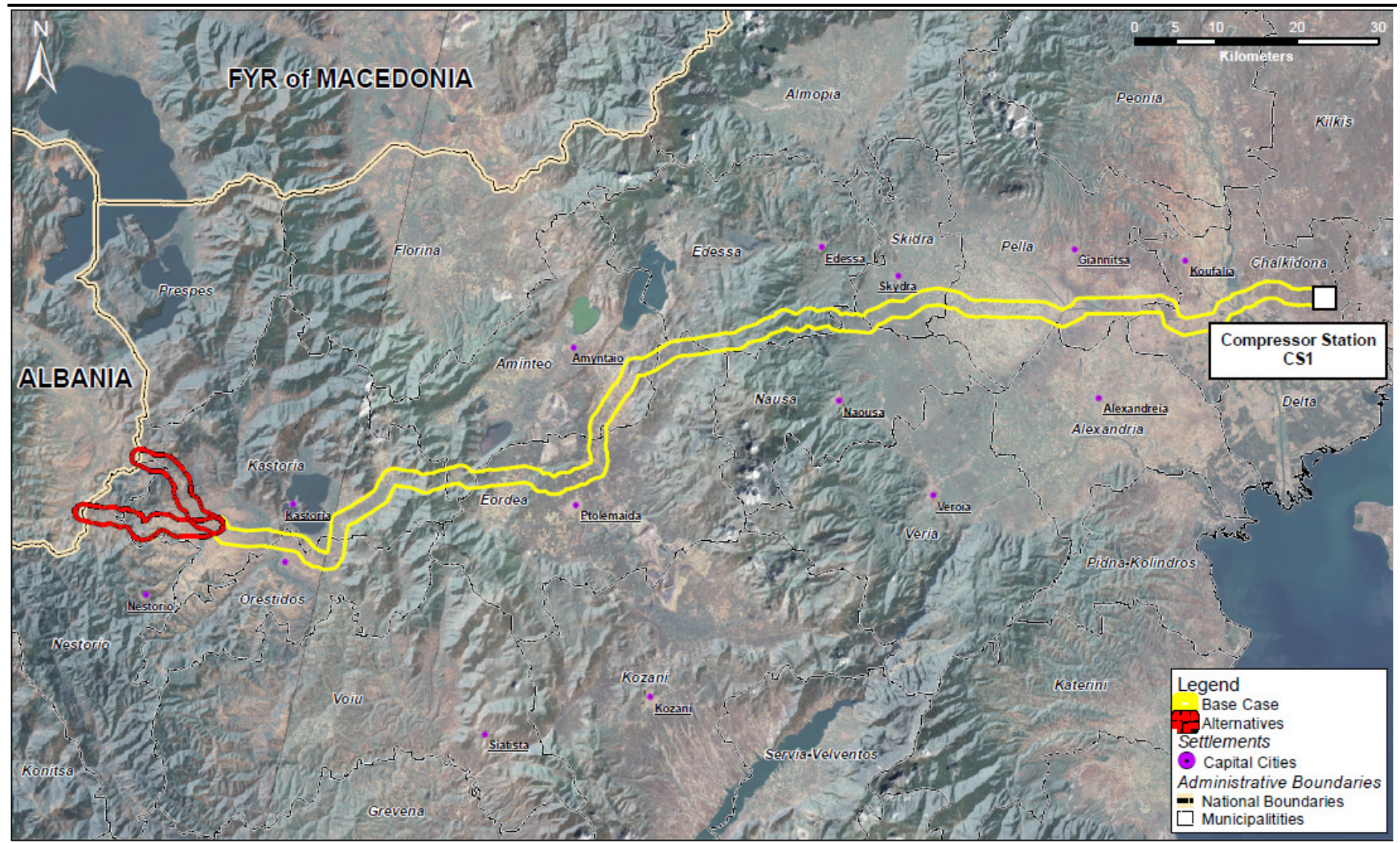
TAP is supported by financially stable/strong shareholders. TAP will require no funding from subsidies or from any of the governments of the host countries. TAP can deliver substantial benefits in terms of significant investment to the countries which it passes through. The European Union recognised the 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.

The pipeline through Greece would initially consist of an approximately 185 km long pipeline and a compressor station near Nea Mesimvria (also referred to as CS1) with a capacity of 10 BCM of natural gas per year (around 1.520.000 cubic metres per hour).

In line with international best practice, block valve stations will be installed approximately every 30km of the pipeline to interrupt the gas flow in case of maintenance or emergency. At a later stage the throughput capacity of the pipeline will be increased from 10 to 20 BCM per year (from 1.520.000 to 3.040.000 cubic meters per hour). The increase of throughput capacity will be obtained through the installation of a compressor station in Albania, near the Greek border (close to the town of Miras). The closest Greek town to the compressor station is Dipotamia.

Figure 1.1 shows the TAP route in Greece. The figure shows the 2 km wide project corridor (1 km width either side of the proposed centreline).

Figure 1.1 TAP Route in Greece



The base case route of the TAP in Greece is defined as a 2 km wide corridor at this stage of the project (see *Figure 1.1*). The corridor has been selected following an extensive and thorough alternatives route assessment process performed by TAP between mid 2010 and 2011 (see *Section 3*). The route refinement process has been completed for most of the base case route with the exception of an approximately 15 km long section between the town of Mesopotamia and the Greek/Albania border for which two alternatives have been identified, one crossing the border west of the village of Dipotamia and one crossing the border west of the village of Ieropigi (see *Figure 1.1 and Appendix A*). Similarly, the exact location of the compressor station near Nea Mesimvria is still under investigation (see *Appendix A* for the location of the two options currently under investigation).

1.2 *PURPOSE OF THIS REPORT*

TAP's overall approach to Environmental Impact Assessment (EIA) will be performed in compliance with Greek laws and regulations and with the European EIA Directive. Furthermore, the EIA will be performed in line with applicable international standards, as embodied in the *European Bank for Reconstruction and Development (EBRD) Performance Requirements (PR1-10)*.

One of the requirements of the EIA process (from now on called Environmental and Social Impact Assessment (ESIA) in line with EBRD terminology) is to carry out a Scoping Study. This is a process by which stakeholders are consulted to contribute to the identification of key issues to be investigated as part of the ESIA itself.

The first step in TAP's ESIA process was to conduct an assessment of the possible route alternatives across Greece. Once the preferred alternative was identified, TAP commenced the Scoping process with the aim to define the final scope and contents of the full ESIA, taking in account the input from relevant stakeholders, and the specific requirements of the Greek Authorities and other stakeholders. This report presents the findings of the scoping process.

In order to comply with the Greek legislation, a Preliminary EIA (PEIA) and an ESIA will be prepared and submitted to the *Ministry of Environment, Energy and Climate Change (MEECC)* in due course. The PEIA is scheduled to be completed and submitted in July 2011, whilst the ESIA is estimated to be submitted to the authorities approximately 2 months following the receipt of the decision on the PEIA.

1.3 *PROJECT DESCRIPTION*

1.3.1 *Overview*

The TAP in Greece will be entirely onshore and will consist of an approximately 185km from Nea Mesimvria to the Greece/Albanian border. The pipeline will be 48 inches (1.219 m) in diameter. The pipeline will be made

of welded steel pipe sections which will range between 8 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. Some of the pipeline sections will be additionally coated with reinforced concrete to protect the pipe from external damages. The entire pipeline will be protected against corrosion by a cathodic protection system.

The pipeline will be buried underground for the entire length. For safety reasons and in order to minimise impacts to existing land uses (e.g. agricultural) the buried pipeline will have a soil cover of minimum one metre. Greater depth will be required when crossing existing infrastructure. The TAP pipeline will be designed for a technical life time of 50 years. The design life for equipment and piping of the stations is 20 years. The design shall assure that the gas transport system fulfils all safety requirements of the base National and European Codes and Standards.

The pipeline initial transportation capacity is characterised by a throughput of 10 BCM/year but might be increased to 20 BCM/year. For the 10 BCM phase only two Compressor Stations (CS1 in Greece and CS3 in Albania) are required. A third Station (CS2) will be added in case of increase of the throughput from 10 BCM to 20 BCM, and will be located in Albania near the Albania/Greek border (near the town of Miras).

The TAP project in Greece consists of the following main components; onshore pipeline, approximately 7 block valve stations, one compressor stations (CS1) and associated facilities required during construction (access roads, camps, yards, etc.). TAP will need 6 temporary stock yards for the pipes and 3 worker camps.

The pipeline will be assembled in a conventional way by a construction spread that follows along the pipeline corridor. First, the top soil is stripped away and stored separately and then a trench is excavated. Individual 8 to 18 m long joints of pipe are then welded to the pipeline string which is subsequently lowered into the trench. The soil is placed back into the trench and the landscape reinstated while the construction spread moves forward. The main limitations on land use above the pipeline will be a narrow corridor of maximum 10 m (referred to as the Right of Way – RoW) in which the growing of deep routing trees will be restricted, a corridor of maximum 60 m in which the construction of houses will be restricted and a corridor of maximum 200 m in which the establishment of cluster of houses and/or industrial infrastructure is limited. The preferred route was selected to accommodate these criteria and allows sufficient space also for future developments of neighbouring communities.

To enhance pipeline safety, the pipeline will have approximately 7 block valve stations. With these valves the operator can isolate any segment of the line for maintenance work or isolate a rupture or leak. The block valves are unmanned and contain a small building with a fence around them to avoid any

interference, covering a total surface area of approximately 20 x 30 m. In line with international best practice, these stations will be installed in regular intervals of around 30 km and the main equipment of such station will be installed underground.

The compressor station is required to transport the gas by increasing the pressure. The compressor station will mainly comprise facilities for gas treatment (filter separators), metering, compression and cooling. The size of the land plot required for the compressor station is estimated to be approximately 100 ha. The surface area required for the buildings of the compressor station is approximately 2 ha. The remaining portion of the 100 ha area will remain empty as the compressor station will be positioned within this plot to ensure sufficient distance from other buildings or infrastructure.

During the operation the pipeline will be monitored and controlled from a central control room at a location yet to be confirmed. During operation, leak detection will be by continuous measurements of pressure and flow rates at inlet and outlet of the pipeline. If a leak is detected, emergency shutdown procedures will be implemented. To allow internal inspection, pipe inspection gauges (pig) facilities will be installed. The pipeline system has been designed to allow use of instrumented pigs, if necessary.

1.4

BASELINE CONDITIONS

In the east the project area comprises a large region with a mean altitude under 200 m; this is the Thessaloniki - Giannitsa Plateau which encompasses the downstream sections of four major river systems: Axios, Aliakmonas, Loudias and Gallikos. Most of the water bodies crossing the plateau are heavily modified and are mainly used for irrigation.

Vermio Mt. lies immediately west of the Thessaloniki - Giannitsa Plateau; its highest summit lies above the timberline (above 2,000 m a.s.l.). The western slopes of Vermio Mt. face the Eordea Plateau where major urban centres and industrial activities are present. The Eordea plain lies between 400 – 800 m a.s.l. and is crossed by several tributaries of the Aliakmonas River or streams that flow into the lake systems of the area (Chimaditida, Zazari, Petron and Vegoritida lakes). At the northwest of the Eordea plateau, Vernon (Vitsi) Mt. stands which continues into Askio (Siniatsiko) Mt. to the southeast and further south to Mt. Vourinos. The summits of both Vernon and Askio mountains rise above 2,000 m a.s.l. To the west towards the Greek-Albanian border and south of Kastoria Lake, the landscape is hilly with patches of cultivated land and grasslands as well as streams that flow into the upstream section of Aliakmonas River.

The study area hosts a variety of vegetation formations from sea to alpine level including evergreen and deciduous shrubland and forests, riparian forests, dry and wet grasslands and meadows, pastures and agricultural lands. The forest habitats found along the proposed route include beech forests (*F. sylvatica*), mixed broadleaved forest dominated by oak (*Quercus sp.*) and coniferous forests dominated by pine (*Pinus nigra*). Additionally, riparian

forests and galleries are found developing along rivers and streams throughout sections of the study area.

The proposed pipeline corridor and the working strip cross the Axios – Loudias - Aliakmonas Estuaries Natura 2000 site (GR 1220002; GR1220010). This area has been recognised as a wetland of major ornithological interest since the beginning of the '70s and as such has also been declared a Ramsar site and a National Park. The proposed corridor (but not the working strip) crosses the northernmost portion of the National Park.

The pipeline route passes through two regions Central and Western Macedonia, and 10 municipalities based on Kallikratis. There are 38 - 39 settlements whose boundaries are within the 2km corridor (depending on the alternative west of Mesopotamia). The most densely populated municipalities are located in the eastern section of the route (Pella, Chalkidona and Alexandria). Land use along the route is predominantly agricultural. State owned forest and some grassland make up most of the remaining land. The area crossed by the eastern section of the route – from Nea Mesimvria through the municipalities of Chalkidona and Pella – is dominated by permanently irrigated agricultural land. As the route passes into Skydra Municipality, agricultural activities are more diverse, including scattered permanent crops and cultivation of beans, tomatoes and cucumbers in covered greenhouses. From the border of Eordia Municipality until the settlement of Anatoliko, the corridor crosses concession areas for future exploration of lignite owned by the Public Power Corporation (PPC). West of the settlement of Polla Nera the pipeline route passes into a more mountainous area where the land is predominantly forested. Further to the west the area is mainly characterised by hilly terrain with agricultural areas and patches of forests.

1.5

POTENTIAL IMPACTS AND MITIGATION MEASURES

The project's environmental and socioeconomic impacts have been identified and preliminarily assessed during the scoping process. The assessment has been based on the project information currently available, the baseline information collected to date and the experience gained in similar projects constructed in similar environmental and socioeconomic contexts. Mitigation and management measures have also been preliminarily identified for each impact. The likelihood, magnitude and significance of the impacts identified during the scoping process will be further assessed in the detailed ESIA.

Major environmental, socioeconomic and cultural heritage impacts have been avoided by means of an extensive route assessment which had the aim of selecting a route with the least impacts.

Construction impacts of a pipeline and associated facilities are typically temporary in nature and localised. The main permanent impacts are related to associated facilities. Construction impacts include temporary noise and air emissions from construction machinery, impacts on land use, loss/disturbance of natural habitats (flora and fauna). The magnitude and

significance of construction impacts will depend on the local conditions. Typically construction impacts can be managed and mitigated efficiently.

The pipeline will be buried and the land will be re-instated to its pre-construction status. The main limitations on land use above the pipeline will be a narrow corridor of maximum 10 m in which the growing of deep routing trees will be restricted, a corridor of maximum 60 m in which the construction of houses will be restricted and a corridor of maximum 200 m in which the establishment of cluster of houses and/or industrial infrastructure is limited. The preferred route was selected to accommodate these criteria and allows sufficient space also for future developments of neighbouring communities. The operation of the compressor station will generate air emissions and noise and will have an impact on the landscape. The magnitude and significance of these impacts are comparable to those of small co-generation gas power plants. Best practice and mitigation measures will be adopted to minimise operational impacts. Landscape impacts will be managed through the restoration of the original landscape along the pipeline route and through vegetation screening of the permanent structures where required.

1.6 *TERMS OF REFERENCE FOR ESIA*

TAP will perform a PEIA and an ESIA to be conducted in accordance with Greek requirements. The main steps for the detailed ESIA include:

- Update and finalise the technical project description as further engineering details become available;
- Conduct additional consultation and further refine the scope of the ESIA as necessary;
- Collect additional baseline data through desktop research and field studies to complete a comprehensive description of the environmental, social and cultural heritage conditions;
- Develop mitigation and enhancement measures and outline an Environmental and Social Management Plan (ESMP) including an approach for monitoring;
- Report findings in a comprehensive ESIA report.

To develop a complete understanding of the existing environmental and social conditions of the project's area of influence and assess the impacts, further desktop and field studies will be carried out. These tasks will be performed by an interdisciplinary team of local Greek and international qualified specialists.

Field studies will include sampling and analyses of soil samples, surface and groundwater, river sediments, air quality and ambient noise levels. In addition environmental (flora, fauna, habitats, vegetation), socioeconomic (stakeholder engagement, household surveys, etc.) and cultural heritage surveys will be performed.

Consultation and engagement with stakeholders is an integral part of the Environmental and Social Impact Assessment (ESIA) process. In line with this, TAP has prepared a Stakeholder Engagement Strategy whose overall aim is to ensure that a consistent, comprehensive, coordinated and culturally appropriate approach is taken for consultation and project disclosure. The approach taken by TAP is in full compliance with Greek EIA Regulations, EBRD Performance Requirements, as well as relevant policies of the IFC and World Bank. TAP intends to undertake a process of stakeholder engagement through the phases of project planning, construction, operation and decommissioning. The plan for this engagement, including identification of stakeholders (i.e. people and organisations who have a role in the project or could be affected by the project activities or who are interested in the project) and disclosure of information, consultation, and handling of suggestions, comments and concerns, is documented in the Greece Stakeholder Engagement Plan. This plan will be updated as required as the project progresses.

The Project's ESIA and Stakeholder Consultation Schedule is reported in *Table 1.1* below.

Table 1.1 *ESIA and Stakeholder Consultation Schedule*

<i>Activity</i>	<i>Timing</i>	
	<i>Start</i>	<i>Finish</i>
Submission of Scoping Report*		June 2011
Route Refinement Disclosure and Scoping Validation*	June 2011	July 2011
Submission of Final PEIA to Authorities		July 2011
PEIA Consultation (estimate)	September 2011	February 2012
ESIA Specialist Field Surveys	June 2011	October 2011
ESIA Phase Consultation (including house hold surveys)	September 2011	October 2011
Submission of Final ESIA to Authorities		Approximately 2 months following the approval of the PEIA
ESIA Consultation (estimate)	May 2012	October 2012

Note: * Voluntary step. Performed by TAP to ensure compliance with the EBRD Performance Requirements

PUBLIC COMMENTS AND SUGGESTIONS

An important objective of the ESIA Scoping disclosure process is to allow stakeholders to provide feedback on the Project. Therefore, TAP has envisaged a process that allows stakeholders to address their comments and suggestions in writing to TAP after the scoping meetings have taken place.

In this regard, TAP would like to invite all stakeholders involved in the scoping process, including local communities and the general public, to

submit in writing their comments and suggestion concerning the Greek section of the Trans Adriatic Pipeline (TAP) until 15th of August 2011.

Appendix B presents a standard form to facilitate the submission of comments and suggestions in both English and Greek. Participants to the scoping meetings as well as the general public interested in the project will be invited to submit comment forms either via mail or e-mail to the following address:

Trans Adriatic Pipeline AG – Greece (Branch Office)
21st Floor, Athens Tower, 2-4 Messogion Ave.,11527
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ACRONYMS AND ABBREVIATIONS

AOX	Absorbable Organic Halides
ASCIs	Areas of Special Conservation Interest
BAP	Biodiversity Action Plan
BAT	Best Available Technique
BCM	Billion Cubic Meters
BOD	Biological Oxygen Demand
BV(S)	Block Valve (Station)
CEP	Community Engagement Plan
CLO	Community Liaison Officer
COD	Chemical Oxygen Demand
CORINE	Coordination of Information on the Environment
CS	Compressor Station
DESFA	Hellenic Gas Transmission System Operator
DO	Dissolved Oxygen
EBE	Extended Basic Engineering
EBRD	European Bank for Reconstruction and Development
ENT	E.ON New Build & Technology GmbH
ERM	Environmental Resources Management
ESD	ESIA Scoping Document
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMP FEED	Environmental and Social Management Plan Front End Engineering Design
EU	European Union
GIS	Geographic Information System
GPS	Global Positioning System
HSE	Health, Safety and Environment
IBC	International Building Code
ICH	Intangible Cultural Heritage
IUCN	International Union for Conservation of Nature
Kp	Kilometre Point
masl	Meters Above Sea Level
MEECC	Ministry of Environment, Energy and Climate Change
NGO	Nongovernmental Organisations
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychloro Byphenils
PEIA	Preliminary Environmental Impact Assessment
PIG	Pipe Inspection Gauges
QRA	Quantitative Risk Assessment
RAP	Resettlement Action Plan
REAs	Regional Environmental Agencies
RoW	Right of Way
SEP	Stakeholder Engagement Plan
TAP	Trans Adriatic Pipeline
TAP	Client
TOC	Total Organic Carbon
TOM	Total Organic Matter
TPH	Total Petroleum Hydrocarbons
UXO	Unexploded Ordinance

1.1 OVERVIEW OF THE PROJECT

The Trans Adriatic Pipeline (TAP) is a proposed pipeline in the Southern Gas Corridor that will bring gas from new sources in the Caspian region to Western and South Eastern Europe.

The 520 km pipeline will connect to existing gas networks and start in Greece, cross Albania and the Adriatic Sea and come ashore in southern Italy, allowing gas to flow directly from the Caspian basin into European markets. TAP's shareholders are Swiss EGL (42.5%), Norwegian Statoil (42.5%) and German E.ON Ruhrgas (15%).

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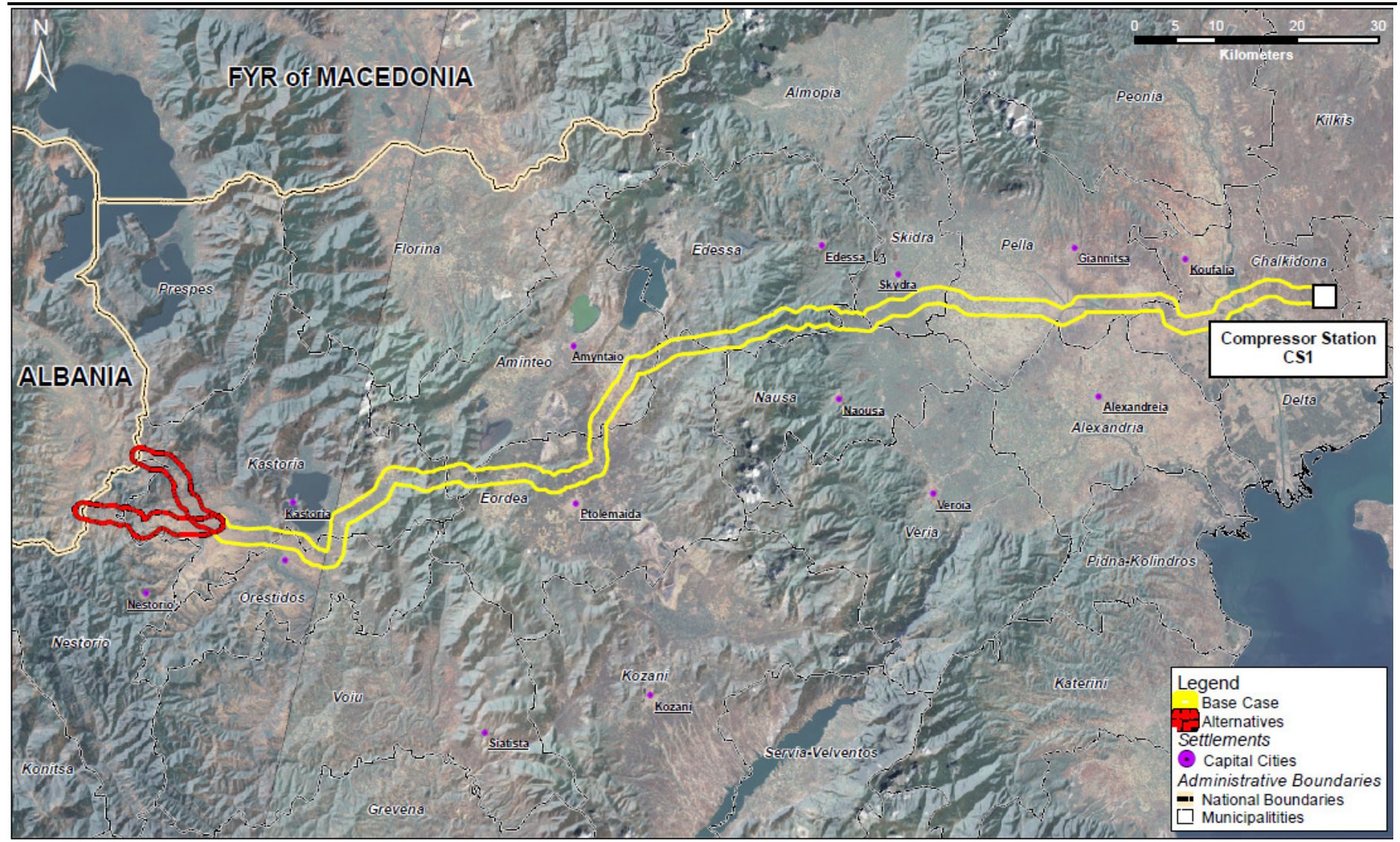
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Figure 1.1 shows the TAP route in Greece. The figure shows the 2 km wide project corridor (1 km width either side of the proposed centreline).

Figure 1.1 TAP Route in Greece



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1.2 THE PROJECT'S ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PROCESS

1.2.1 Introduction

TAP's overall approach to ESIA will be in compliance with Greek regulations and will be performed in line with the requirements of the European EIA Directive and applicable international standards, as embodied in the *European Bank for Reconstruction and Development (EBRD) Performance Requirements (PR1-10)*. The requirements of the Espoo Convention (Environmental Impact Assessment in a Transboundary Context) and the Aarhus Convention (Access to Information Public Participation in Decision-making and Access to Justice in Environmental Matters) will also be met (see *Section 2.2*).

The first step in TAP's ESIA process was to conduct an assessment of the possible route alternatives across Greece in mid 2010. The extensive and thorough alternatives route assessment process commenced in late 2010 with the aim to select a technically feasible pipeline route with the least environmental, socioeconomic and cultural heritage impacts (please see *Section 3*). Once the preferred alternative was identified, TAP commenced the Scoping process with the aim to define the required scope of the ESIA. This report presents the findings of the scoping process.

Since the commencement of the alternatives assessment process TAP has engaged with stakeholders with the aim to seek the views of interested parties so that these can be taken into account in the project design and implementation. This engagement has continued throughout the scoping process (see *Section 8*) and will continue throughout the Project life cycle.

Figure 1.2 graphically presents the ESIA process. The scoping phase and ESIA activities are briefly described in *Table 1.1*.

Figure 1.2 Schematics of the ESIA Process

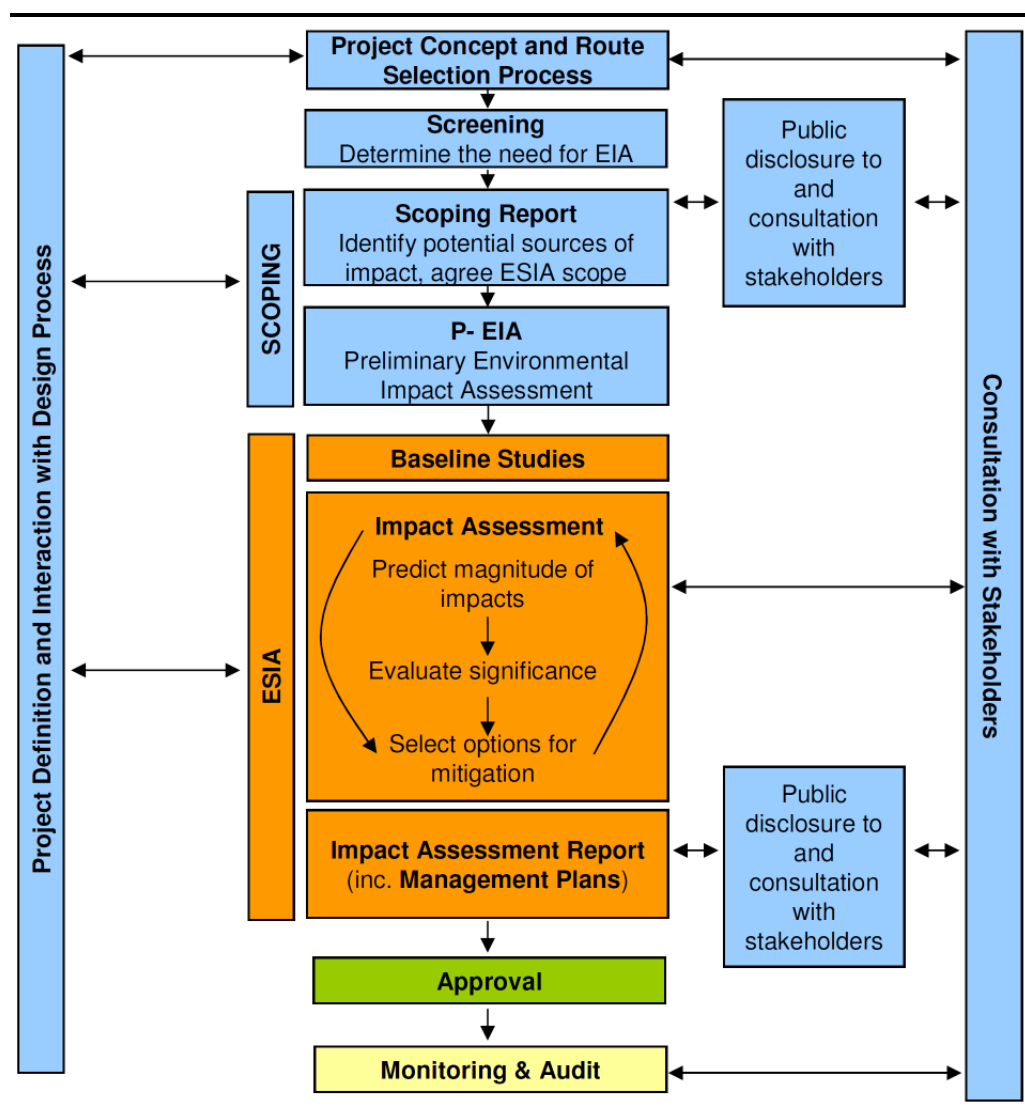


Table 1.1 Summary of the ESIA Process

Step	Description
Screening	Screening is performed to determine if the project requires a summary EIA or a detailed EIA
Alternatives Assessment	Assessment of alternatives with the aim to identify the project alternative with the least environmental and social impacts.
Scoping	Scoping identifies the key issues to be addressed in the ESIA. Scoping, as presented in this report, will ensure that the process is focused on the potentially significant environmental and social impacts which may arise from the project. It will take into account the results of consultations undertaken to date on the project. Ultimately scoping defines the scope of work of the ESIA, including stakeholder engagement.

Step	Description
PEIA	<p>The PEIA, which is specific to the Greek environmental permitting system, has been designed to incorporate the screening and scoping steps of the EU EIA process. In essence, the PEIA goes beyond scoping, with the aim to provide the competent authorities with sufficient information in order to make an informed preliminary planning decision.</p> <p>According to Law1391B/29-9-2003 "Determination of public participation, information and consultation during the ESIA process", public consultation falls under the jurisdiction of MEECC and competent authorities. MEECC and competent authorities inform the public after the submission of PEIA, giving a 35days timeframe for submitting any comments. There is no statutory requirement for stakeholder engagement during the PEIA.</p>
Baseline Studies	<p>For the key issues identified in scoping, available information on the existing environmental and social conditions (also referred to as baseline conditions) will be gathered. This will be supplemented by field studies and surveys where necessary. The future development of the baseline conditions in the absence of the project will also be considered.</p>
Impact assessment and mitigation measures	<p>This stage is focused on predicting environmental and social changes from the baseline as a result of the project's activities (considering the entire lifecycle of the project). Each impact will then be evaluated to determine its significance for the environment and society. Where necessary measures will be proposed to mitigate significant impacts.</p>
Environmental and social management plans	<p>The various mitigation measures will be presented in an Environmental and Social Management Plan (ESMP), describing how measures will be implemented throughout the different project phases. The ESMP will detail the resources and responsibilities for implementation, the timing and monitoring and audit plans to ensure all the mitigation commitments are met. It will also identify any requirements for training and other capacity building. The ESMP will include a Livelihood Restoration Plan and a Resettlement Action Plan detailing how land acquisition and easement will be managed in accordance with TAP policy and international good practice.</p>
Stakeholder Engagement and Consultation	<p>During the ESIA studies the team will seek the views of interested parties so that these can be taken into account in the assessment and reflected in the proposals for mitigation. Once complete, the ESIA Report will be subject to public disclosure and consultation. Comments will be taken into account in revising the final ESIA Report and ESMP.</p>

In order to comply with the Greek legislation a PEIA and an ESIA will be prepared and submitted to the *Ministry of Environment, Energy and Climate Change* (MEECC) in due course. The PEIA is scheduled to be completed and submitted in July 2011, whilst the ESIA is estimated to be submitted to the authorities approximately 2 months following the receipt of the decision on the PEIA. The PEIA, which is specific to the Greek environmental permitting system, has been designed to incorporate the screening and scoping steps of the EU EIA process. In essence, the PEIA goes beyond scoping, with the aim to provide the competent authorities with sufficient information in order to make an informed preliminary planning decision.

This scoping report has been prepared to ensure full compliance with the EBRD Performance Requirements, particularly with *PR 1 Environmental and Social Appraisal and Management* and *PR 10 Information Disclosure and Stakeholder Engagement*. As such this scoping report is the outcome of a voluntary step which has been performed with the aim to:

1. Identify people or communities that are or could be affected by the project, as well as other interested parties;
2. Ensure that such stakeholders are appropriately engaged on environmental and social issues that could potentially affect them through a process of information disclosure and meaningful consultation;
3. Maintain a constructive relationship with stakeholders on an ongoing basis through meaningful engagement during the different phases of the project (e.g. alternatives assessment, scoping, PEIA, ESIA and project implementation);
4. Preliminarily identify and assess environmental and social impacts and issues, both adverse and beneficial, associated with the project;
5. Identify measures to avoid, or where avoidance is not possible, minimise, mitigate, or offset/compensate for adverse impacts on workers, affected communities, and the environment;
6. Identify and, where feasible, adopt opportunities to improve environmental and social performance.

Scoping for this project has been approached as a communication, disclosure and consultation process, in which the project proponent and different stakeholders exchange information with the aim of mutual understanding and setting up of the PEIA and ESIA process and subsequent steps as outlined above.

It must be noted that since the early stages of inception and design of the project, up to the present stage, several activities involving communication and information exchange with different stakeholders have already taken place, which are part of the mentioned Scoping process. These activities are further detailed in subsequent sections of this report and will continue throughout the life cycle of the project.

The remainder of this report is structured as follows:

- Section 2 –Regulations and Guidelines:* provides a brief overview of the relevant Greek and International ESIA regulatory framework and international best practice with regards to scoping;
- Section 3 –Description of Selected Options:* summarises the alternatives route assessment performed by TAP and proposes the “base case” route;
- Section 4 –Project Description:* describes the main components of the project and the main construction, pre-commissioning, operation and decommissioning activities;
- Section 5 –Baseline Conditions:* provides an overview of the baseline environmental, socioeconomic and cultural heritage characteristics of the Study Area;
- Section 6 –Potential Impacts and Mitigation Measures:* summarises potential significant environmental, socioeconomic and cultural heritage impacts and provides an indication of potential mitigation and management measures;
- Section 7 –Terms of Reference of the ESIA:* presents the proposed terms of reference, the structure of the detailed ESIA and a tentative schedule of the ESIA activities;
- Section 8 –Stakeholder Engagement:* presents the proposals for consultation with identified external stakeholders i.e. individuals or groups who are affected or likely to be affected (directly or indirectly) by the project (“affected parties”), or may have an interest in the project (“other interested parties”) during scoping. The section also summarises the consultation activities undertaken earlier in the ESIA process.
- Appendix A-Maps:* Maps 1-3 represent the main technical, environmental, socioeconomic and cultural heritage characteristics of the base case route respectively and all the route alternatives assessed during the Alternatives Assessment Phase.
- Appendix B- Comments Form* – form to be used to provide comments and feedback on the scoping report.
- Appendix C* –List of stakeholders
- Appendix D- ESIA Action Plan* – presents the list of studies (baseline and modelling) to be performed during the ESIA and the timing of the activities.

2.1 GREEK AND EUROPEAN LEGAL FRAMEWORK FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

2.1.1 Introduction

The TAP Project in Greece is being developed in compliance with Greek laws and regulations as well as the EIA Directive of the EU and the EBRD Performance Requirements. This section provides a brief description of the Environmental Impact Assessment legislation in Greece:

- *Law No. 1650/1986* – is the main legal provision for the Protection of the environment in Greece. In particular the following articles are relevant to the EIA process:
 - *Art.3* – introduces the classification of projects and activities (Cat. A, B and C);
 - *Art. 4* – defines the approval of environmental terms, concerning the realization of any project or activity referred in the article 3;
 - *Art. 5* – defines the contents and the disclosure of the EIA.
- *Joint Ministerial Decision 69269/5387/90* – This decision was enacted in order to activate and implement the above mentioned articles 3, 4 and 5 of *Law 1650/1986* and simultaneously to enforce *EC Directives 84/360* (*Directive of 28.6.1984 on the combating of air pollution from industrial plants*) and *85/337* (*Directive of 27.6.1985 on the assessment of the environmental impacts of certain public projects and private activities*). This JMD describes the specific content of the environmental impact assessment studies, according to the category of the activity to be implemented. The JMD refers in particular to the activities of the A and B categories and to the description and minimisation of the environmental impacts related to these activities. The chapters that the environmental impact assessment study should contain are also set and explained. Also, the required papers, maps and documentations are described;
- *Law No. 3010/2002* – This Law sets the new legal provisions for environmental permitting procedures amending the framework Law on Environment (*Law 1650/1986*) in order to implement the *Directives 97/11/EC* (EIA) and *96/61/EC* (IPPC) in the Greek Legislation framework. These amendments refer in particular to the categorization of activities and works according to their environmental impacts, to the content and publicity of the environmental impact studies and to the conditions included in the environmental permits;
- *Joint Ministerial Decision 15393/ 2332/2002* – The JMD categorises all the works and activities in more specific groups as foreseen in the *Law 3010/2002*. All the activities and works are categorised in 10 groups;

- *Joint Ministerial Decision 11014/703/Φ104/2003* – This JMD sets environmental permitting procedures. More specifically, this JMD defines:
 - the specific EIA process until the acquisition of the permit;
 - the competent authorities;
 - the general content of the EIA studies for all installations (the specific chapters are described in the *JMD 69269/5387/90*);
- *Joint Ministerial Decision 37111/2021/2003* – The JMD sets the procedure of the public information and the participation in the framework of the environmental permitting system.

Table 2.1 *Greek Legal Framework on Environmental Impact Assessment*

Type	Number	Year	Subject
Law	1650	1986	Environmental Protection
JMD	69269/5387	1990	Project Classification and EIS Content
Law	3010	2002	Project Classification
JMD	15393/2332	2002	Project Classification
JMD	11014/703	2003	PEIS and EIS Process
JMD	37111/2021	2003	Public Participation

2.1.2 *Preliminary EIA (PEIA)*

The procedure for the PEIA in Greece, for projects like the proposed one, can be summarised in the following phases:

- *Preliminary Environmental Impact Assessment*: the applicant shall provide a preliminary EIA (PEIA) of the project to the MEECC;
- *Check for Completeness*: MEECC will check the PEIA for completeness and may request additional information, prior to distributing for consultation;
- *Statutory Consultation*: opinion/response from the Central Authorities or other co-competent Ministries or organizations (e.g. Physical Planning Directorate);
- *PEIA Decision*: MEECC will consider the results of the consultation and will issue its decision
- *Publication of Decision*: publication of the decision of MEECC through the relative Regional Council (through which the public is informed).

2.1.3 *ESIA*

The procedure for the Environmental Impact Assessment in Greece, for projects like the proposed one, can be summarised in the following phases:

- *Environmental Impact Assessment*: the applicant shall provide an EIA of the project to the *Ministry of Environment, Energy and Climate Change* (MEECC);
- *Check for Completeness*: MEECC will check the EIA for completeness and may request additional information, prior to distributing for consultation;

- *Statutory Consultation*: opinion/response from the Central Authorities or other co-competent Ministries or organizations (e.g. Physical Planning Directorate);
- *Public Consultation*: the project is presented to the Regional Council during an open hearing where people can express their views
- *Decision on Approval of Environmental Conditions*: MEECC will consider the results of the consultation (statutory and public) and will issue its decision, co-signed by other competent Ministries
- *Publication of Decision*: publication of the decision through the relative Regional Council.

2.2

EBRD PERFORMANCE REQUIREMENTS ON ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

TAP has adopted EBRD Performance Requirements (PRs) as the international reference standard for their social and environmental strategies and will comply with these requirements throughout all stages of the TAP project.

EBRD has an Environmental and Social Policy which seeks to ensure that sustainable development is achieved by projects that it finances. The Bank has adopted a set of Performance Requirements (PRs) that clients are expected to meet, covering key areas of environmental and social impacts and issues. The Bank is committed to promoting European Union (EU) environmental standards as well as the European Principles for the Environment, reflected in the PRs, to which it is a signatory.

The requirements of the EBRD Performance Requirements are summarised in *Table 2.2*.

Table 2.2 EBRD Performance Requirements

No.	Name	Requirements
PR1	Environmental and Social Appraisal and Management	<ul style="list-style-type: none"> • Identify all applicable laws, legislations, standards and best practice. • Through appraisal activities such as risk assessment, auditing, or Environmental and Social, Health, Impact Assessment, the client will consider in an integrated manner the potential environmental and social issues and impacts associated with the proposed project. • To identify mitigating measures to avoid, or where avoidance is not possible, minimise, mitigate, or offset/compensate for adverse impacts and enhance environmental/social performance. • Establish an Environmental and Social Action Plan (ESAP). • Enhance the environmental and social performance through a dynamic process of auditing, performance monitoring and evaluation.

No.	Name	Requirements
PR2	Labour and Working Conditions	<ul style="list-style-type: none"> • Establish and maintain a sound worker management relationship. • Promote the fair treatment, non-discrimination and equal opportunity of workers (freedom of association & collective bargaining). • Promote compliance with any collective agreements to which the client is a party, national labour and employment laws and the ILO (International Labour Organization) conventions • Offer wages, benefits and conditions of work offered comparable to those offered by equivalent employers in the relevant region and sector concerned. • Promote the health of workers, especially by promoting safe and healthy working conditions. • Assure for the entire supply chain compliance with ILO's core labour standards: (e.g. abolishment of child labour and the elimination of forced labour). • Provide a grievance mechanism for employees. • Adopt a clear human resources policy.
PR3	Pollution Prevention and Abatement	<ul style="list-style-type: none"> • Avoid or minimise the release of pollutants. • Consider resource conservation and energy efficiency measures. • Minimise waste generation. • Promote the reduction of project-related greenhouse gas emissions. • Adequately manage the hazardous materials (e.g. Integrated Pest Management (IPM) and/or Integrated Vector Management (IVM) approach, basing on the FAO's Code of Conduct on the Distribution and Use of Pesticides).
PR4	Community Health, Safety and Security	<ul style="list-style-type: none"> • Avoid/minimise risks to and impacts on the health, safety and security of the local community (both routine and non-routine circumstances). • Consider infrastructure and equipment safety rules. • If necessary develop plans to prevent or minimise potentials for community exposure to all the communicable diseases (resulting from project activities). • Avoid or minimise natural hazards (landslides, floods, etc) and other impact of the community natural resources. • Prevent driving accidents. • Exercise prevention and response plans at least on an annual basis. • Report on the risks, potential impacts and benefits of the project and implementation of any action plans on a regular basis to the EBRD and to the affected communities.

No.	Name	Requirements
PR5	Land Acquisition, Involuntary Resettlement and Economic Displacement	<ul style="list-style-type: none"> • Definition: Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition or restriction of access to natural resources. • Avoid or, at least minimise involuntary resettlement. • Carry out a census and a socio-economic baseline assessment. • Mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of and access to land by: providing compensation for loss of assets at replacement cost; ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected; improving or, at a minimum, restoring the livelihoods and standards of living of displaced persons to pre-project levels. • Develop the necessary plans (Livelihood Restoration Framework or Resettlement Action Plan).
PR6	Biodiversity Conservation and Sustainable Natural Resource Management	<ul style="list-style-type: none"> • Protect and conserve biodiversity to avoid, minimise and mitigate impacts on biodiversity with the aim of achieving no net loss or a net gain of biodiversity. • Avoid natural and critical habitats' conversion or degrade and act in a consistent manner with defined protected areas' management plans. • Promote the sustainable management and use of natural resource. • Provisions for Supply chain of living resources (timber, earth etc.): sustainable resources procurement policy. • Foster the development of pro-biodiversity business that offers alternative livelihoods in place of unsustainable exploitation of the natural environment.
PR7	Indigenous Peoples	<ul style="list-style-type: none"> • Identify through a social assessment all communities of Indigenous Peoples who may be affected, both positively and negatively, by the project within the project's area of influence. • Minimise, mitigate and compensate for adverse effects and to identify and share benefits a plan will be developed with the informed participation of affected Indigenous Peoples, such as an Indigenous Peoples Development Plan (IPDP), or a broader community development plan with separate components for Indigenous Peoples. • The Bank will require that the client compensate the affected Indigenous Peoples directly for any loss of livelihood incurred as a result of project-related activities and reinstate any land used to its previous status.
PR8	Cultural Heritage	<ul style="list-style-type: none"> • Support the conservation of cultural heritage. • Protect cultural heritage from adverse impacts of project activities. • Promote the awareness of and appreciation of cultural heritage where possible. • Screen for risks/impacts on cultural heritage. • Develop a chance find procedure. • In case there are adverse impacts, establish mitigation measure in a Cultural Heritage Management Plan.
PR9	Financial Intermediaries	<ul style="list-style-type: none"> • Not Relevant to this project.

No.	Name	Requirements
PR10	Information Disclosure and Stakeholder Engagement	<ul style="list-style-type: none"> • Requirements from Aarhus and Espoo Conventions shall be met. • Identify people or communities that are or could be affected by the project, as well as other interested parties incl. disadvantaged or vulnerable groups/people (as part of the scoping process under ESHIA process). • Information disclosed must include a full ESHIA report. • Stakeholder engagement will be free of manipulation, interference, coercion, and intimidation. • The engagement need to be done through a process of information disclosure and meaningful consultation. • The information will be disclosed in the local language and in a manner that is accessible and culturally appropriate. • Maintain a constructive relationship with stakeholders on an ongoing basis through meaningful engagement during project implementation. • Report on progress with implementation of the ESAP.

The TAP project should be classified as Category A according to EBRD criteria, and as such a special formalised participatory assessment process is required according to *EBRD Standards*. The process should include:

- A comprehensive Environmental and Social Impact Assessment in compliance with *PR 1 Environmental and Social Appraisal and Management* and *PR 10 Information Disclosure and Stakeholder Engagement*¹;
- An examination of the technically and financially feasible alternatives and the rationale for the alternative selection;
- Also addressing *PRs 2 and 4* the ESIA should identify the issues related to potential risks related to community health, safety and security, as well as labour and working conditions;
- An assessment of involuntary resettlement issues according to *PR 5 Land Acquisition, Involuntary Resettlement and Economic Displacement*;
- The sustainable use of the natural resources and the protection of biodiversity will have to be considered as instructed by *PR 6*;
- An assessment of impacts on cultural heritage according to *PR 8 Cultural Heritage*.

With respect to the Greek requirements for the ESIA, the application of EBRD standards requires the following additional processes:

- *Scoping*: a process by which stakeholders are consulted to contribute to the identification of key issues to be investigated as part of the ESIA. This Scoping Document is prepared in application of this requirement;
- *Stakeholder Engagement Plan*: a comprehensive approach to the communication and consultation with the identified stakeholders throughout the whole project lifecycle;

¹EBRD's definition of Stakeholder: Individuals or groups who (i) are affected or likely to be affected (directly or indirectly) by the project ("affected parties"), or (ii) may have an interest in the project ("other interested parties")

- *Focus on Social Issues*: whereas the Greek legislation mainly refers to environmental impacts the *EBRD* approach also focuses on the identification of impacts on the impacted communities and subsequent definition of necessary mitigation measures.

2.3

ESIA RELATED INTERNATIONAL CONVENTIONS/AGREEMENTS

In relation to ESIA process, Greece has ratified both Aarhus and Espoo international conventions (see *Table 2.3*). Compliance with public participation requirements defined by Aarhus convention will be fully covered by TAP through the compliance with Greek legislation and EBRD standards.

The approach to compliance with Espoo convention will be defined through collaboration with the three involved States (Albania, Greece and Italy).

Table 2.3 *International Conventions and Agreements Signed/Ratified by Greece in Relation to the ESIA Process*

<i>Convention name</i>	<i>Ratified by Greece</i>
• Espoo Convention (1991): Convention on Environmental Impact Assessment in a Transboundary Context	24/02/1998
• Aarhus Convention (Convention on Access to Information (1998) Public Participation in Decision-making and Access to Justice in Environmental Matters	27/01/2006

3.1 INTRODUCTION

A Feasibility Study of the TAP was first performed between 2003 and 2005 with the objective of identifying a best suitable corridor from south-eastern Europe to Italy. The starting point of TAP was identified in Nea Mesimvria as the eastern most point within the Balkan region and the crossing of the Greek/Albanian border northwest of Dipotamia.

A detailed assessment of the possible route alternatives across Greece was then commenced in mid 2010 with the aim to select a technically feasible pipeline route with the least environmental, socioeconomic and cultural heritage impacts. The findings of the alternatives assessment study are reported in Alternatives Assessment Greece and its appendices. The objective of this alternatives assessment process was threefold:

- Identify the optimal route;
- Identify options and measures to avoid and/or minimise residual environmental, social and cultural heritage impacts; and
- Engage with national, regional and local authorities and the populations at large.

3.2 METHODOLOGY OF ALTERNATIVES ASSESSMENT PROCESS

TAP adopted a 'narrowing process' starting from a study area approximately 185 km long and approximately 50 km wide centred around the direct line between Nea Mesimvria to the designated border crossing point northwest of Dipotamia. The 'narrowing process' was performed with the aim to avoid or minimise interactions with the main environmental, social and cultural heritage constraints namely: protected areas, settlements and known cultural heritage sites. As a result of a 'narrowing process' a total of four alternatives were identified (Alternatives N1, N2, S0 and S1 – see *Appendix 1*).

The technical, environmental, socioeconomic and cultural heritage baseline characterisation and appraisal of the four alternatives was then conducted through a combination of desk top studies and field surveys. For each alternative a 2 km wide corridor (1 km both sides of the proposed centreline route) was investigated.

Once the technical, environmental, socioeconomic and cultural heritage characteristics of each Alternative were established, 'impact indicators' for each discipline were used to highlight the key potential features of the alternatives that could be related to key potential impacts of a standard gas pipeline project and also on the specificities of the study area (i.e. based on the findings of the desk study and field survey). The use of these indicators

ultimately allowed the comparison and the identification of relevant differences and similarities among the Alternatives under study.

3.3

FINDINGS OF THE ALTERNATIVES ASSESSMENT

The outcomes of the interdisciplinary alternatives assessment study in Greece lead to the identification of two main corridors referred to as the northern and southern corridors. For each corridor a number of sub alternatives and local re-routings were identified. The assessment led to the selection of two preferred alternatives for which the main environmental, socioeconomic and cultural heritage aspects were identified and compared. The alternatives are:

- The northern route - Alternative N1;
- The southern route - Alternative S0.

For each alternative a number of sub-alternatives and re-routes were identified with the aim to minimise impacts to environmental, socioeconomic and cultural heritage sensitivities of the corridors. The sub-alternatives and re-routes identified and assessed throughout the alternatives assessment process are presented in *Map 2 – Appendix A*.

The main environmental, socioeconomic and cultural heritage characteristics of Alternatives N1 and S0 are presented in *Table 3.1* below.

Table 3.1 *Main Environmental, Socioeconomic and Cultural Heritage Characteristics of Alternatives N1 and S0*

<i>Aspects</i>	<i>Alternative N1</i>	<i>Alternative S0</i>
General	<ul style="list-style-type: none"> • Most direct route between Nea Mesimvria and the crossing of the Greek/ Albanian border northwest of Dipotamia • Approx. 190 km in length 	<ul style="list-style-type: none"> • Longer route which follows in part the route of the Egnatia Highway • Approx. 202 km in length
Environment	<p>Key environmental aspects along the alternative include:</p> <ul style="list-style-type: none"> • The northern slopes of Vermio Mountain which are covered by <i>Fagus</i> and <i>Quercus</i> forests. <i>Castanea sativa</i> and <i>Helleborus odorus subsp. cyclophyllus</i> were also found in the area. • The southern foothills of Verno Mountain with <i>Fagus</i>, <i>Quercus</i> and <i>Pinus nigra</i>. • All montane and alpine meadows and pastures of serpentine substrate • All riverine sites where riparian stands are preserved in relatively good condition. • Localised (but currently unknown) spots within the Thessaloniki – Giannitsa plain (including Axios valley) as 	<p>Key environmental aspects along the alternative include:</p> <ul style="list-style-type: none"> • The southern and south-eastern slopes of Vermio Mountain which host a variety of important habitats, such as broadleaved forests and montane and subalpine grasslands and pastures. • All alpine and montane meadows and pastures of serpentine substrate as such sites are suitable habitats for many rare flora taxa. • Localised (but currently unknown) spots within the Thessaloniki – Giannitsa plain (including Axios valley) as they may host colonies of <i>Spermophilus citellus</i>. • All riverine sites where riparian

<i>Aspects</i>	<i>Alternative N1</i>	<i>Alternative S0</i>
Protected Areas	<p>they may host colonies of <i>Spermophilus citellus</i>.</p> <ul style="list-style-type: none"> • The Olympias – Galatea plateau where <i>Circus pygargus</i> is reported to breed. • All riverine crossing sites that preserve water throughout the dry season including the Axios river crossing. 	<p>stands are preserved in relatively good condition. This mainly refers to: Aliakmonas River, Lianovrochi stream and Axios river crossing</p>
	<ul style="list-style-type: none"> • Alternative N1 passes through the NATURA 2000 sites GR1220002 & GR1220010 Axios – Loudias - Aliakmonas Estuaries • The Alternative is less than 1 km away from the Natura 2000 site GR 1320001 (Lake Kastoria) • Crosses two wildlife refuges (Flamouria – Grammatiko on Vermio Mt and Kouri in Eordea plateau) 	<ul style="list-style-type: none"> • Alternative S0 passes through the following NATURA 2000 sites: <ol style="list-style-type: none"> 1. GR1220002 & GR1220010 Axios – Loudias - Aliakmonas Estuaries 2. GR133002 North Vourinos Mt & Mellia (also an IBA) • The S0 alternative passes at less than 1 km away from the Natura 2000 site GR 1210001 while crossing the southern slopes of Mt Vermio. • The route crosses the following wildlife refuges: Koutsohori, Kouti – Agios Eleftherios and Tserverna – Vourinos
Socioeconomic context	<ul style="list-style-type: none"> • Alternative N1 crosses the territory of 10 municipalities that includes approx. 11968 people living settlements affected by the 2-km corridor. There are 39 settlements within the corridor and 52 settlements from which people are potentially using the land and resources within the corridor. • The population density within the corridor is low. As the route passes to the west across the mountains and ultimately to the Albanian border, the population density gradually drops – from 90 to 100 inhabitants/km² in Chalkidona and Pella to 66 inhabitants/km² in Eordia and finally six inhabitants/km² in Nestorio, the western-most 	<ul style="list-style-type: none"> • Alternative S0 crosses the territory of 10 municipalities that includes approx. 12,253 people living within the 2-km corridor. Three of the 10 municipalities have no settlements located within the corridor. There are 52 settlements within the corridor and 63 settlements from which people are potentially using the land and resources within the corridor. • The population density within the corridor is low. As the route passes to the west to the Albanian border, the population density gradually drops from 90 to 100 inhabitants/km² in Chalkidona and Pella to 46 inhabitants/km² in Kastoria and finally six inhabitants/km² in Nestorio, the westernmost municipality.

<i>Aspects</i>	<i>Alternative N1</i>	<i>Alternative S0</i>
Cultural Heritage	<p>municipality.</p> <ul style="list-style-type: none"> • Total number of CH sites within the 2 km corridor: 45 • Overall Archaeological Potential of Corridor (% of land in highly productive agricultural use): 37% 	<ul style="list-style-type: none"> • Total number of CH sites within the 2 km corridor: 78¹ • Overall Archaeological Potential of Corridor (% of land in highly productive agricultural use): 37%

Alternative N1 potentially faces fewer challenges in terms of cultural heritage impacts as there are fewer known cultural heritage sites and higher challenges with regards to official planning zones, namely the interactions with the Public Power Corporation (PPC) concession areas. Alternative N1 will cross the Axios Natura 2000 site which is unavoidable. The impacts due to the crossing will be minimised by adopting trenchless crossing techniques (micro tunnelling or horizontal directional drilling underneath the protected area).

Alternative S0 faces fewer challenges with regards to official planning zones and potentially higher challenges with regards to cultural heritage due to a higher density of currently know archaeological sites within the corridor. Alternative S0 will also cross the Axios Natura 2000 site which is unavoidable and will further cross a second Natura 2000 site (North Vourinos Mt & Mellia - SPA GR1330002). The impacts due to the crossing of both areas would be minimised by adopting trenchless crossing techniques (micro tunnelling or horizontal directional drilling underneath the protected area).

As a result of the outcomes of the alternatives assessment, TAP decided to select Alternative N1 as the base case routing for its further planning and approval process in Greece.

3.3.1 *Compressor Stations*

Two optional locations have been identified for CS1 and are still under investigation: CS1 Options 1 and 2. Both options are located in proximity of Nea Mesimvria (see *Appendix 1 – Map 2*).

¹ The higher number in CH sites along Alternative S0 is in part due to the fact that more field research has been conducted in the vicinity of the alternative.

4 PROJECT DESCRIPTION

4.1 INTRODUCTION

4.1.1 General Description

The TAP in Greece will be entirely onshore and will consist of an approximately 185 km from Nea Mesimvria to the Greek/Albanian border. The pipeline will be 48 inches (1.219 m) in diameter.

The pipeline will be made of welded steel pipe sections which will range between 8 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. Some of the pipeline sections will be additionally coated with reinforced concrete to protect the pipe from external damages. The entire pipeline will be protected against corrosion by a cathodic protection system.

The pipeline will be buried underground for the entire length. For safety reasons and in order to minimise impacts to existing land uses (e.g. agricultural) the buried pipeline will have a soil cover of minimum 1 m. Greater depth will be required when crossing existing infrastructure (see *Section 4.2.1*).

The pipeline transportation capacity may be increased from an initial throughput of 10 BCM/year to 20 BCM/year. For the 10 BCM phase only two Compressor Stations (CS1 in Greece and CS3 in Albania) are required. The third Station (CS2) shall be added to increase the throughput from 10 BCM to 20 BCM and will be located in Albania near the Albanian/Greek border (near the town of Miras).

The TAP pipeline will be designed for a technical life time of 50 years. The design life for equipment and piping of the stations is 20 years. The design shall assure that the gas transport system fulfils all safety requirements of the base National and European Codes and Standards.

The pipeline shall have a design pressure of 95 barg (bars above atmospheric pressure), which shall be sufficient for the TAP capacity base case of 10 BCM/y and potential future extension of the TAP System capacity to 20 BCM/y. The final design pressure will be defined after finalisation of an iterative engineering process considering all relevant parameters.

Compressor stations and block valve stations shall be designed to European codes, except where specific equipment is designed to other standards nominated in the respective functional specifications. Design and construction of civil structures and buildings shall be according to National

Codes, the Eurocodes, European Standards and TR1827. Fire design and protection of structures shall be according to the International Building Code (IBC).

Project details will be further developed and defined in the next steps of the design. The following *Sections 4.2* and *4.3* provide information on the construction, pre-commissioning, operation and decommissioning methods that will be used for the project.

4.1.2 *Safety*

A preliminary risk assessment of the onshore pipeline route was performed with the aim of verifying the pipeline safety. The preliminary assessment determined that the route was feasible with respect to safety of the pipeline and the nearby population. In a few denser populated sections a potential for route optimisation was identified in order to further increase distances to settlements. Furthermore, the most populated sections identified are relatively short, enabling efficient technical risk mitigation to be applied where needed or required.

4.2 *PIPELINE*

4.2.1 *Introduction*

The TAP project in Greece consists of the following main components:

- Approximately 185 km pipeline;
- 7 Block Valve Stations (depending on final layout);
- 1 Compressor Station CS1;
- Associated facilities required during construction (access roads, camps, yards, etc.).

4.2.2 *Pipeline Construction*

The pipeline will be assembled in a conventional way by a construction spread that follows along the pipeline corridor. First, the top soil is stripped away and stored separately, and then a trench is excavated. Individual 8 to 18 m long joints of pipe are then welded to the pipeline string which is subsequently lowered into the trench. The soil is placed back into the trench and the landscape reinstated while the construction spread moves forward.

In flat soft terrain the average construction progress will be up to 600 m/day, in hilly or mountainous regions the average progress will be between 300 and 450 m/day whilst in difficult sections like steep slopes and rock the average progress could be as low as 50 m/day.

For communication and data exchange during operation, a fibre optic cable will be laid alongside the pipeline within the pipeline trench. Specialised

techniques will be used for crossing of roads and railways. The crossing of main roads/highways, railways and larger channels may require the use of trenchless methods (e.g. crossing with casing pipe, micro-tunnelling or HDD-Horizontal Drilling). Whether performing an open-cut or a trenchless installation, the pipeline shall be installed at least 1.5 – 2 m below the existing infrastructure to be crossed.

The standard onshore pipeline construction, applicable along most parts of TAP, has the following main elements:

- The working strip requires a width of approximately 40 m. The fertile top soil (typically 0.3-0.5 m thick) will be stripped off over a width approximately 22-24 m. The top soil is temporarily stored on one side of the working strip (see *Figure 4.1*).
- The non-fertile “sub-soil” obtained from the pipeline trench excavation will be stored on the opposite side of the working strip. Fertile top soil must be re-deposited on top of the non fertile soil to assure adequate crop- or vegetation growth.
- The width of the working strip must provide room for pipeline fabrication (pipe stringing and welding, protective coating and quality testing of the fabricated pipeline section, lowering into the trench), and for simultaneous vehicle movements, both to happen in a safe manner.

In areas where there are construction constraints (e.g. environmental or land use constraints) and in general where limited room is available, the working strip may be reduced from 40 m to 30 m (see *Figure 4.2*).

Figure 4.1 *Regular Working Strip*

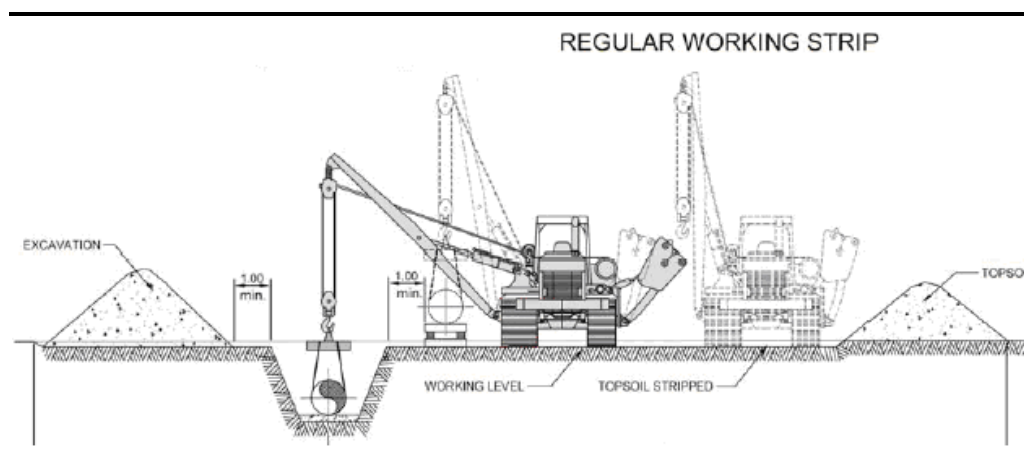
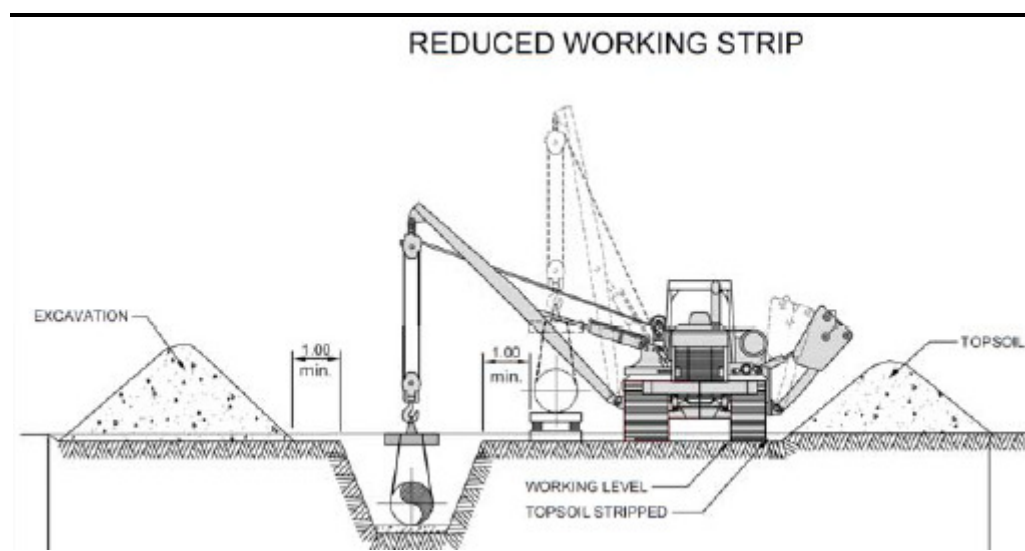


Figure 4.2 *Reduced Working Strip*



The main limitations on land use above the pipeline will be a narrow corridor of maximum 10 m (referred to as the Right of Way – RoW) in which the growing of deep routing trees will be restricted, a corridor of maximum 60 m in which the construction of houses will be restricted and a corridor of maximum 200 m in which the establishment of cluster of houses and/or industrial infrastructure is limited. The preferred route was selected to accommodate these criteria and allows sufficient space also for future developments of neighbouring communities.

The pipeline crosses 1 highway, 6 major roads, 54 secondary roads, various carriage ways and tracks and 1 railroad¹. In addition, it requires 22 river crossings, including 14 major rivers. Where necessary, construction methods that avoid interferences or visible long term impacts will be used in order to minimise impacts on traffic and the environment.

Block Valve Stations

To enhance pipeline safety, the pipeline will have approximately 7 block valve stations. With these valves the operator can isolate any segment of the line for maintenance work or isolate a rupture or leak. The block valves are unmanned and contain a small building with a fence around them to avoid any interference, covering a total surface area of approximately 20 x 30 m. In line with international best practice, these stations will be installed in regular intervals of around 30 km and the main equipment of such station will be installed underground.

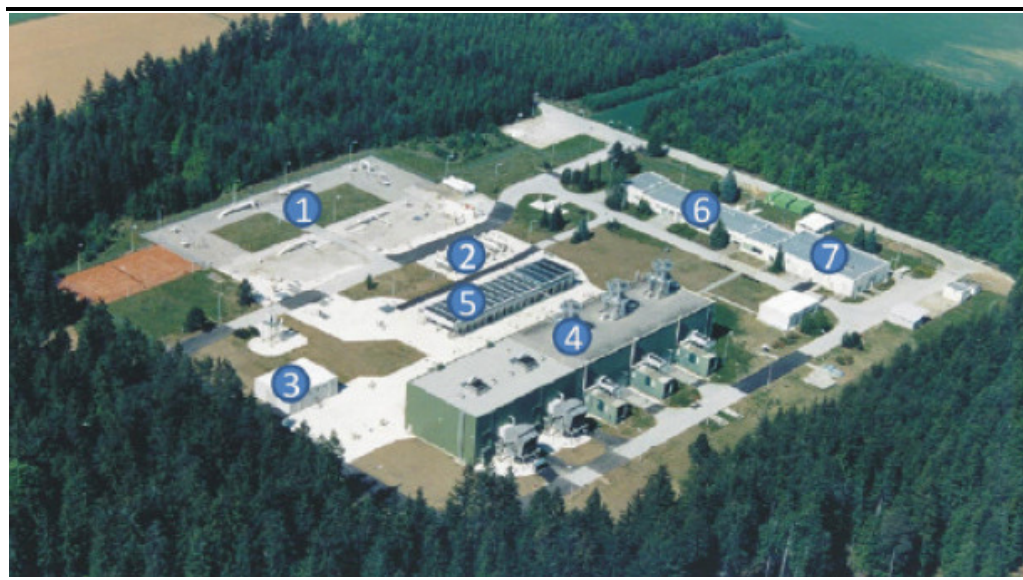
¹ Minor difference may exist depending on the alternative chosen between Mesopotamia and the Greek/Albanian border

Compressor Station CS1

The compressor station is required to transport the gas by increasing the pressure.

A typical compressor station consist of: 1 – Pipe Inspection Gauges (Pig) traps; 2 – Filters; 3 – Fuel gas heaters; 4 – Turbine-Compressor buildings; 5 – Gas coolers; 6 – Control building and 7 – Maintenance building & Warehouse (see Figure 4.3).

Figure 4.3 Compressor Station - Typical Layout



The compressor station will mainly comprise facilities for gas treatment (filter separators), metering, compression and cooling. The size of the land plot required for the compressor station is estimated to be approximately 100 ha. The surface area required for the buildings of the compressor station is approximately 2 ha. The remaining portion of the 100 ha area will remain empty as the compressor station will be positioned within this plot to ensure sufficient distance from other buildings or infrastructure.

Filter separators will be used to clean the gas from deposits with might occur in the pipeline upstream of the metering runs. After cleaning and metering the gas will be compressed to the required pressure. For the pressure increase the installation of gas turbine driven turbo compressors is planned. For the 10 BCM/y case gas turbines of the 15 MW class will be used. In case of extension to 20 BCM/y, compressors with gas turbines of the 25 MW class will be added. The fuel for the gas turbines is natural gas taken from the gas pipeline. Exhaust gas from each gas turbine will be discharged to the atmosphere via a dedicated stack per gas turbine of approximately 40 m height. A venting stack of approximately 70 m is also envisaged. After compression the gas will be cooled down to 50 °C via air cooled heat exchangers. Filter separators, metering runs and a gas cooler will be installed as free standing facilities, whereas the compressors and gas turbines are installed in buildings. Currently buildings each with two compressors are

foreseen. Further additional buildings are required, such as control, electrical, workshop and administration buildings.

Power consumption of the compressor station is approximately 2,000 kW with medium voltage. The electrical connection of the compressor station will be considered in the site selection of the station. Independently from this, each station will be equipped with a diesel engine to provide the power in case of loss of energy from the external source. Currently the installation of a combination of gas turbine and steam turbine driven turbo compressors is under investigation. In this case the lost heat from gas turbine driven compressors will be used to produce steam. This steam will then be used to drive one or more steam turbines connected to a turbo compressor for gas compression. Within this alternative the gas turbine driven compressors will be equipped with a heat recovery boiler. Furthermore a water treatment plant and steam recovery cooler are required.

Associated Facilities

For the storage and handling during construction, TAP will need 6 temporary stock yards for the pipes and 3 worker camps (see *Appendix A – Map 1*). The location of associated facilities was selected on the basis of proximity and ease of access to the construction sites and RoW. A desk-top assessment of the environmental, socioeconomic and cultural heritage impacts of the sites and roads was performed with the aim to minimise interferences.

Pipe yards sizes will range between 15,000 m² - 24,000 m² with capacities ranging between 1,260 – 2,772 pipes. Regular pipes of diameter 48" will be stacked in three layers, concrete coated pipes (e.g. for river crossings) will be stacked in two layers maximum.

Workers camps will range between 20,000 m² (200 x 100 m) and 50,000 m² (200 x 250 m) and will accommodate between 80 and 200 workers. The pipe yards and workers camps are expected to be operating for approximately 1 year during the construction phase.

The main point of entry for the pipes and those equipment that cannot be purchased in Greece will be the port of Thessaloniki, the main pipe yard will be situated in an industrial area to avoid impacts on tourism and urban populations. In order to transport the 15,000 pipes to the right location, TAP will upgrade existing roads and will build new ones as required for the execution of the project.

4.2.3

Pre-Commissioning

Once the pipeline has been installed a number of activities will be required to ensure that the pipe meets the operational requirements. The primary objective of these activities is to verify that the line has been laid without significant defects and that it is in a suitable condition to be filled and pressurised with the export gas. The pre-commissioning equipment will be

used for cleaning, hydrotesting and gauge pigging of the installed pipeline. The equipment will be mainly located at the compressor station CS1 and the block valve stations, so that it can be used to pre-commission the pipeline in sections. The water required for hydrotesting shall be fresh and clean water which will be drawn from (and discharged to) water sources along the route (rivers, reservoirs, lakes). A detailed concept and assessment for the proposed hydrotesting activities and water resources to be used will be defined in detail in the ESIA based on detailed studies. The maximum length of a test section shall be limited to 10 km horizontal. The length of nearly vertical sections will depend on the elevation of the terrain. Special sections such as main river crossings shall be tested individually.

4.2.4 *Operation*

Detailed operating procedures for the pipeline system will be developed. These procedures will be in place ahead of pipeline operation. The operating procedures will typically address the following:

- An administration system covering legal considerations, work control and safety;
- Clear and effective emergency procedures and operating instructions;
- Adequate and regular training of all personnel involved in operational and maintenance issues;
- A comprehensive system for monitoring, recording and continually evaluating the condition of the pipeline and auxiliary equipment;
- A system to control all development or work in the vicinity of the pipeline;
- Effective corrosion control and monitoring;
- A system to collect and collate information on third party activities;
- Monitoring of restoration, and the undertaking of remedial work as necessary.

The pipeline will be monitored and controlled from a central control room at a location yet to be confirmed. During operation, leak detection will be by continuous measurements of pressure and flow rates at inlet and outlet of the pipeline. If a leak is detected, emergency shutdown procedures will be implemented. To allow internal inspection, pigging facilities will be installed. The pipeline system has been designed to allow use of instrumented pigs, if necessary.

4.2.5 *Decommissioning*

The expected service lifetime of the pipeline is 50 years. Decommissioning of the onshore pipeline will be undertaken in accordance with the legislation prevailing at that time, in liaison with the relevant regulatory authorities. The eventual decommissioning requirements will be taken into account in the design stage by ensuring that all possible options will be available. The pipeline will carry only processed gas and therefore it is unlikely that the disposal of spent cleaning fluid will be of concern.

5.1 **INTRODUCTION**

The environmental, socioeconomic and cultural heritage baseline characterisation presented in the following sections has been focussed on a 2 km wide corridor (1 km either side of the proposed centre line) along the entire length of the route. The 2 km wide corridor is also referred to as study area.

Map 1 in Appendix A presents the main land use, environmental, socioeconomic and cultural heritage characteristics of the base case route.

5.2 **ENVIRONMENT**

5.2.1 ***Climatic Conditions***

Greece has a variety of climatic conditions, being situated in the transition zone between the typical Mediterranean climate in the east and the moderate continental in the west. The average annual temperature is around 15° C. Mild and rainy winters, and dry, hot summers are typical of the Macedonia region. Inland temperatures are affected more by differences in elevation than by latitude or any other factor. Low winter temperatures in the mountains are caused by the continental air mass that dominates the weather in Eastern Europe and the Balkans.

Annual precipitation ranges from about 470 mm on the coast to more than 1,000 mm in the mountains, where snowfall is usual in winter months and summer rainfall is more abundant.

5.2.2 ***Geography***

In the east project area comprises a large region with a mean altitude under 200 m; this is the Thessaloniki - Giannitsa Plateau which encompasses the downstream sections of four major river systems: Axios, Aliakmonas, Loudias and Gallikos. Until the end of 1920s the plateau used to be partially inundated and the Giannitsa marsh covered thousands of hectares. The marsh was dried up at the beginning of the 1930s and turned into agricultural land. Most of the water bodies crossing the plateau are heavily modified and are mainly used for irrigation.

Vermio Mt. lies immediately west of the Thessaloniki - Giannitsa plateau; its highest summit lies above the timberline (above 2,000 m a.s.l.). The western slopes of Vermio Mt. face the Eordea plateau where major urban centres and industrial activities are present. The Eordea plain lies between 400 – 800 m a.s.l. and is crossed by several tributaries of the Aliakmonas River or streams that flow into the lake systems of the area (Chimaditida, Zazari, Petron and Vegoritida lakes). At the northwest of the Eordea plateau, Vernon (Vitsi) Mt.

stands which continues into Askio (Siniatsiko) Mt. to the southeast and further south to Mt. Vourinos. The summits of both Vernon and Askio mountains rise above 2,000 m a.s.l. To the west towards the Greek-Albanian border and south of Kastoria Lake, the landscape is hilly with patches of cultivated land and grasslands as well as streams that flow into the upstream section of Aliakmonas River.

5.2.3 *Geology*

The route crosses a variety of different bedrock units and overlying soft rock deposits. In summary, these units comprise:

- Holocene soft rocks, mainly at the eastern section, Thessaloniki - Giannitsa Plain;
- Cretaceous Flysch-dominated bedrock sequences, Ophiolites and carbonate-dominated bedrock units and Cretaceous and Triassic-Jurassic carbonates, mostly marbles, at the Vermio mountains;
- Holocene and Tertiary soft rocks of the Ptolemais basin;
- Crystalline schists, multifolded and microfolded schist series of the Pelagonian Basement (Paleozoic) Mount Askion Pass (plains of Kastoria Lake);
- Old quaternary fluvial terraces and fluvial and lacustrine terrace deposits of Quaternary (Pliocene-Pleistocene) age (Aliakmonas River - terraces and recent floodplains);
- Mostly marls, sandstone and clastic limestones of tertiary age (Molasse Zone) at the Mountainous Greek/Albania border region

There are of 43 known or assumed faults along the route, the majority on the eastern and western sections.

5.2.4 *Vegetation and Flora*

The study area hosts a variety of vegetation formations from sea to alpine level including evergreen and deciduous shrubland and forests, riparian forests, dry and wet grasslands and meadows, pastures and agricultural lands.

The Thessaloniki - Giannitsa plateau in the eastern part of the study area is formed mainly by agricultural land followed to the west by mixed evergreen shrubland in the foothills of Vermio Mountain. Mixed deciduous and evergreen shrubland are characterised by the presence of the evergreen sclerophyllous kermes oak (*Quercus coccifera*) and the juniper (*Juniperus oxycedrus*) and several deciduous species, such as *Carpinus orientalis* and *Ostrya carpinifolia*.

The forest habitats found along the proposed route include beech forests (*F. sylvatica*), mixed broadleaved forest dominated by oak (*Quercus sp.*) and coniferous forests dominated by pine (*Pinus nigra*). These forests are found along the mountainous areas (from east to west: Vermio, Verno, Siniatsiko and

Vourinos). In the mountain areas, where forests are degraded areas of transitional woodland-scrub also exist, generally dominated by oriental hornbeam (*Carpinus orientalis*) and the kermes oak (*Quercus coccifera*). Mixed broadleaved forests are the most frequent forest type in the study area. Dominant species are different oaks (*Quercus frainetto*, *Q. pubescens*, *Q. cerris*, *Q. petraea*, *Q. trojana*). Among the most interesting mixed broadleaved forests are those with *Quercus trojana* (SE foothills of Siniatsiko mt.) and those with *Castanea sativa* (Vermio mt.), both being very rare species in Greece.

Beech forests (*F. sylvatica*) occur mainly on the mountains Vermio, Verno, Vourinos, Siniatsiko and Voras. They are among the rarest forest types in Greece, being restricted to altitudes between 800 and 1,700 m. In Vermio and Vourinos *Fagus sylvatica* occurs also in mixed stands with the Balkan endemic Macedonian fir (*Abies borisii-regis*).

Black pine (*Pinus nigra*) forests are the most frequent coniferous forests within the study area. Black pine forests occur in the Vermio and Vourinos mountains. In the 2 km buffer area around the alternatives patches of black pines are planted within the *F. sylvatica* forest at the S-SE foothills of Verno Mountain and northern slopes of Vermio Mountain.

Grasslands, pastures and meadows at montane and especially subalpine and alpine levels are of high botanical value since they host numerous rare, endemic and protected species. Several semi-natural dry grassland communities develop on mountainous regions of the study area. Among the most interesting are the species-rich *Nardus* grasslands, that occurs mostly in Verno Mountains above 1,600 m in flat or almost flat areas. Wet meadows are known to be present above 1,050 m in Vermio and Vourinos Mountains.

Additionally, riparian forests and galleries are found developing along rivers and streams throughout all the study area. They are considered among the most important vegetation formations in the region as they belong to one of the most threatened habitats in the world. Riparian forests or galleries develop specially along the Aliakmonas river and its tributaries, as well as several other rivers and streams flowing in the western part of the study area, such as the Kilada River and Amyntas stream. In the eastern part of the study area extensive stands of riparian forest develop at the Axios River.

5.2.5

Fauna

Short-grass steppes, abandoned cultivations or grasslands, like those found in the valley of Axios and the fields of Giannitsa are the habitat of the European souslik (*Spermophilus citellus*) a very important mammal from a conservation point of view. The coniferous and broadleaved forests of the mountain areas (Vermio, Grammos, Verno and Siniatsiko) are important habitats for large mammals and carnivores. These include species such as the brown bear (*Ursus arctos*) and the wolf (*Canis lupus*) but also a number of birds (woodpeckers, finches, tits, thrushes, tree creepers, nuthatches).

The bear (*Ursus arctos*) has a well-established population in Mt Grammos and is constantly present at Vernon (Vitsi) and Siniatsiko (Askio) mountains. Recordings in Vermio are thought to belong to vagrant animals and there is no evidence of a permanent population there. The wolf (*Canis lupus*) is known to occur throughout western Macedonia in middle and high altitudes wherever there is food availability.

Subalpine natural grasslands in the area are also important habitats for a number of mammals (moles, voles and mice) and birds (partridges, larks, buntings, crows, and birds of prey including eagles and falcons). Main rivers (e.g Aliakmonas and Axios Rivers) and its tributaries have a good potential for the presence of otter (*Lutra lutra*) but currently few data exists regarding its status or its local abundance.

Regarding the birds, the most important species occur in the major wetlands in the area. The Axios Delta, located some 15-20 km further south of the Alternative, assembles the deltas of Axios, Gallikos, Loudias and Aliakmonas rivers and includes one of the largest heron colonies in Greece, as well as colonies of gulls, terns, avocets (*Recurvirostra avocetta*) and collared pratincoles (*Glareola pratincola*). In winter, the delta hosts large numbers of ducks, including the largest wintering population of Shelduck (*Tadorna tadorna*) in Greece.

In Kastoria Lake there is a heron colony, and also resident and breeding populations of Pygmy Cormorants. This lake is the most important in Greece for wintering Goosanders (*Mergus merganser*). An important population of Ferruginous Ducks (*Aythya nyroca*) as well as other waterbirds breed in Lakes Chimaditis and Zazar.

In Prespa region, some 20 km to the north, there are the largest pelican colonies in Greece, including Dalmatian Pelicans (*Pelecanus crispus*) and White Pelicans (*Pelecanus onocrotalus*) breed there. Additionally Pygmy Cormorants, several species of heron, Glossy Ibis (*Plegadis falcinellus*) and Spoonbill (*Platalea leucorodia*) breed in the lakes of Prespa region. All of the mentioned wetlands, in particular the Axios Delta, are also important for migratory populations.

Main permanent rivers crossed by the project includes the Axios, the Aliakmonas and Grammatikou Rivers are known to host several freshwater fish species, including the vulnerable *Salmo pelagonicus* and *Vimba melanops*.

5.2.6

Protected Areas

Protected areas closest to the study area are presented in *Map 1* in *Appendix A* and those crossed by the 2 km wide corridor are listed below:

- *Axios – Loudias - Aliakmonas Estuaries National Park*: The 2 km corridor (but not the working strip of 40 m) crosses the northernmost portion of the National Park. The area has been recognised as a wetland of major

ornithological interest since the beginning of the '70ies when it was declared a Ramsar site.

- *Axios – Loudias - Aliakmonas Estuaries Natura 2000 (GR 1220002; GR1220010)*: The Natura 2000 area is crossed by the proposed pipeline corridor and working strip. The area hosts at least two mammal species (*Spermophilus citellus*, *Lutra lutra*) and several reptile species protected according to Directive 92/43 EEC. Technical engineering solutions will be sought to minimise interferences with the Natura 2000 site.

In addition to the above, the 2 km wide study corridor also falls within the limits of the following areas:

- Axios-Loudias-Aliakmonas Delta – Ramsar Site; and
- Limni Kastorias – Natura 2000 site.

5.2.7 *Landscape*

The study area in terms of landscape can be divided in two sections: (a) the eastern flat section extending from the project's starting point in Nea Messimvria and towards the west, characterised by agricultural and transformed landscapes, with the exception of the Axios River valley, and (b) the mountainous western section extending from Vermio Mountain towards the west to the Greek-Albanian border.

The landscapes of most value are found in the western section, corresponding mainly to the mountainous areas, especially where broadleaved and coniferous forests are found.

In addition to these two main landscape features, there is the gently sloping hills, occurring near the borders to Albania, surrounding the western parts of the Aliakmonas River valley and the northwestern foothills of Vermio, parts that form a mosaic of agricultural land, stands of oak forest and human settlements.

5.3 *SOCIO ECONOMIC*

5.3.1 *Introduction*

Greece is located in the southeast corner of Europe, at the southern most part of the Balkan Peninsula. Since the Kallikratis programme reform entered into effect on 1st January 2011, Greece consists of thirteen regions subdivided into a total of 325 municipalities, each of which has a capital city. The pipeline route crosses two regions: Central and Western Macedonia, and in total 11 municipalities.

In Greece, the service sector is the largest economic sector contributing more than 59% of the GDP (2010 data) while agriculture and construction are the smallest sectors. The Greek economy went into recession in 2009 resulting in

the implementation of an austerity program in 2010. According to Hellenic Statistical Authority, public debt, inflation and unemployment are above the euro-zone average for 2010.

5.3.2 *Socio-economic Context*

The pipeline route passes through two regions Central and Western Macedonia, the socio-economic status of which is summarised below, and 10 municipalities based on Kallikratis. There are 38 - 39 settlements whose boundaries are within the 2km corridor (depending on the alternative west of Mesopotamia). Two of the settlements - Akontion (Kastoria Municipality) and Oik Pallinostounton (close to Mesopotamia village - Kastoria Municipality) - are uninhabited villages.

Central Macedonia has a total surface area of 18,811 km². The capital is Thessaloniki, the second largest city in Greece and other main cities in the region are Edessa, Katerini, Kilkis, Polygyros, Serres and Veroia. In line with the national economy the main economic activity in the region is the service sector which accounts for 71.4% of the GRP, industry provides the 21.1% while agriculture provides 7.5% of the total GRP.

West Macedonia has a total surface area of 9,451 km² and has a low population density with the majority living in rural areas. 82% of the total area is classified as mountainous or semi-mountainous. The capital of West Macedonia is Kozani with 47,451 inhabitants. Other main towns are Ptolemaida, Grevena, Florina and Kastoria ⁽¹⁾. The agricultural sector of the regional economy provides the 13.4% of GRP, the industry sector provides the 47.5% and the services sector provides the 39.1% of GRP (2001 data). The high contribution of the industry sector is attributed to the dominant presence of power generation activities (lignite mines) around the town of Ptolemaida as well as other traditional industrial sectors such as the fur industry in Kastoria. ⁽²⁾

Land use along the route is predominantly agricultural. State owned forest and some grassland make up most of the remaining land. The area crossed by the eastern section of the route – from Nea Mesimvria through the municipalities of Chalkidona and Pella – is dominated by permanently irrigated agricultural land. As the route passes into Skydra Municipality, agricultural activities are more diverse, including scattered permanent crops and cultivation of beans, tomatoes and cucumbers in covered greenhouses.

From the border of Eordia Municipality until the settlement of Anatoliko, the corridor crosses concession areas for future exploration of lignite owned by the Public Power Corporation (PPC).

Between the settlements of Polla Nera and Ano Grammatikon, the pipeline route passes into more a mountainous area where the land is predominantly

(1) www.westernmacedonia.gr/

(2) <http://www.westernmacedonia.gr/>

forested, after which it re-enters agricultural areas. From the settlement of Aghia Paraskevi onwards both alternatives pass mainly through non-irrigated arable land, with the occasional area of forest. The area south of Dispilo has a number of fur processing facilities and a small industrial park (also used for fur processing).

At the municipality level, employment ranges from over 90% (Chalkidona) to over 75% (Orestida). The highest unemployment levels are registered in municipalities in the west; Orestida, Nestorio and Kastoria with over 20% of the total economically active population unemployed. In eight of the 14 municipalities young people account for over 50% of those registered as unemployed. During the field visit it was reported that unemployment and underemployment are a big issue and the main problems for all settlements in the study area.

As of 2001, approximately 346,300 people in the eleven municipalities crossed by the route. The most densely populated municipalities are located in the eastern section of the route (Pella, Chalkidona and Alexandria) with the population density declining from East to West in general. There are nine settlements with a population over one thousand along the route. The largest population centres are Gefira (3,258 Chalkidona Municipality), Nea Mesimbria (2,343 Chalkidona Municipality), Perdikas (1,854 Eordea Municipality) and Mespotamia (1,802 Kastoria Municipality).

The age distribution in the study area is fairly even with the largest group being between the ages of 20-39 (29%), jointly followed by the 40-59 and over 60's group (24% each) and finally the under 19's group (23%). Age distribution at the settlement level is influenced by location in relation to the large population centres and industrial facilities. Larger settlements close to employment and population centres tend to have a more even age distribution, while smaller and more remote settlements tend to have a larger percentage of people over age 60.

The municipalities have experienced internal and external migration during the 1960's and 1970's. Lack of employment opportunities and poverty were the main driving forces for migration, particularly in rural areas. According to the 1991- 2001 census, a small increase both in household numbers and population was observed in most of the municipalities. However, the municipality of Nestorio experienced a population decrease of 8%.

Greece is a fairly homogenous country, with the majority of the population being of Greek origin and Christian Orthodox religion, this pattern is reflected along the proposed route although there are a limited number of Albanian families (1-2 families) in many settlements along both route alternatives.

Vulnerable groups are individuals or communities who are particularly susceptible to marginalisation for reasons of sex, age, gender, race, religion, disability, livelihood or location. Individuals or households may have a different vulnerability rating than the settlement or municipality as a whole.

This can be seen in urban areas where there are a diverse economy and easy access to services, but also residents who may be highly vulnerable such as ethnic minorities, the disabled or the elderly.

Data gathered during the field survey and secondary data is only sufficient to identify settlement level vulnerabilities. Household level vulnerabilities will be considered further during the main ESIA.

The main indicators of settlement vulnerability are considered to be the following:

- High dependence on agriculture as the main economic activity. These settlements will be potentially more vulnerable to impact from disruptions to livelihoods caused by project activities. Dependence on agriculture is more common in smaller settlements and at the most eastern (where there is flat agricultural land) and western sections of the alternatives.
- Settlements where plot sizes are generally small. Any crossing of the land by the pipeline will affect a greater proportion of the overall land available to any individual land user. Small plot sizes are generally more common in the western section of the route.
- Small rural settlements with a high percentage of residents over 60 are considered more vulnerable to project impacts.

Although access to infrastructure and utilities is also generally a factor that indicates vulnerability, the settlements within the study area generally have good access to infrastructure and all of the settlements have access to utilities, based on the available data.

5.4 *CULTURAL HERITAGE*

Sites of cultural heritage interest found along the route include

1. Prehistoric settlements from the Neolithic onward;
2. Prehistoric tombs from the Bronze age onward;
3. Classical period (antique period) settlements and tombs from Archaic to Byzantine times;
4. Churches from early Christian through modern times;
5. Intangible Cultural Heritage Sites including accident shrines, modern churches and contemporary traditional sites.

As result of the desk and field investigation performed to date, 45 cultural heritage sites have been identified within the 2 km wide corridor. The field investigations have been performed on a relatively small portion of the 2 km corridor. Further assessment will be performed in the ESIA to determine the presence/absence of other undiscovered sites within the study area.

6.1

INTRODUCTION

Tables 6.1 – 6.6 present a list of the main potential environmental, socioeconomics and cultural heritage impacts for the construction, pre-commissioning, operation and decommissioning of the pipeline project in Greece. The tables present the following information:

- **Impact Area:** list of impact areas intended as the environmental, socioeconomic and cultural heritage component potentially affected by the project's activities during construction, pre-commissioning, operation and decommissioning phases. Impact areas include:
 - Displacement of Land Uses, Property and People;
 - Resources and Waste;
 - Geology, Soils and Contaminated land;
 - The Water Environment;
 - Air Quality and Climatic factors;
 - Noise and Vibration;
 - Biodiversity and Nature Conservation;
 - Landscape and Visual Impacts;
 - Socio-Economic Impacts;
 - Community Health and Safety;
 - Working Conditions;
 - Cultural Heritage.
- **Potential Impacts of Significance:** list of types of impact or sources of impacts that could occur from the project on the basis of information currently available (project and baseline). The magnitude and significance of the impacts will need to be ascertained during the detailed impact assessment;
- **Area of Influence:** the geographical area which could be potentially affected by the impact. The definition of the area of influence is to be intended as indicative. The extent of the area of influence will need to be ascertained during the detailed impact assessment;
- **Mitigation Options:** list of types of mitigation and control measures that may be considered where significant impacts are identified during the assessment.

With regards to the Area of Influence the following criteria has been adopted:

- **Local** – impacts that affect local environmental, socioeconomic or cultural heritage resources or are restricted to a single habitat/biotope, a single (local) administrative area or a single community. Although considered

local, the geographical extent of each impact within this category can be variable, depending on the impact type and location. Local impacts may be restricted to the Right of Way (RoW, 10-20 m wide), the working strip (approximately 40 m wide) and areas directly affected by associated facilities (e.g. access roads, workers camps and pipe yards), however there will be local impacts that extend beyond but are still within the local context (e.g. within hundreds of meters or kilometric distances from the RoW). Orders of magnitude of distances for each local impact are presented in the following tables.

- **Regional/Provincial** – impacts that affect regional environmental, socioeconomic or cultural heritage resources or are felt at a regional scale as determined by habitat type, administrative boundaries or community. Tentatively the geographical extent of regional impacts will be up to tens of kilometres.
- **National** – impacts that affect national environmental, socioeconomic or cultural heritage resources or affect an area that is nationally protected/ important. Tentatively the geographical extent of national impacts will be up to hundreds of kilometres.
- **Trans-boundary/International/Global** – impacts that are experienced in one country (or several countries) as a result of activities in another, which could reach to planetary level in some occasions (e.g. global warming).

6.2 PIPELINE

6.2.1 Construction

Table 6.1 Potential Environmental Impacts and Mitigation Measures Related to Pipeline Construction and Pre-Commissioning

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
Resources and waste	<ul style="list-style-type: none"> • Use of large quantities of construction material • Disposal of construction waste • Transportation of construction material and waste • Consumption of fuel by vehicles and machinery • Sewage (black and grey water) management and disposal • Use of water for construction activities, camps, yards • Use of water for pre-commissioning (hydrotesting) 	<ul style="list-style-type: none"> • Local to Regional, depending on impact and specific location of waste disposal sites and origin of construction material and fuel 	<ul style="list-style-type: none"> • Materials to be sourced and disposed of with sustainable procurement principles and from as close as possible to the project so as to minimise impacts of production and transport. • Identify beneficial uses or opportunities for recycling construction spoil and other wastes wherever possible. • Waste management plan and system to be implemented • Environmental and social management plan • Evaluation/assessment of water sources for hydrotesting so as to minimise impacts to other water users and aquatic habitats
Geology, Soils and Contaminated land	<ul style="list-style-type: none"> • Excavation works during construction including off-site quarrying where needed (compressor station, block valve stations) • Clearance of working strip, logistic sites (yards, camp sites) and access roads will affect top soil with the risk of resource loss • Physical damage through soil compaction and accidental contamination should also be considered (see also resources and waste). • Contaminated sediments from past activities 	<ul style="list-style-type: none"> • Local, within working strip (40 m) and the footprint of associated facilities (compressor and block valve stations) • Impacts from contaminated sediments will be Local or Regional depending on the location of the waste disposal sites 	<ul style="list-style-type: none"> • Construction site management plan • Preservation of topsoil • Reinstatement of topsoil following completion of construction activities • Oil & Chemicals Spill Contingency Prevention & Planning • Detailed route investigations to avoid contaminated areas

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
Water Environment	<ul style="list-style-type: none"> Impacts to aquatic habitats, water quality & river morphology from river crossings of the right of way and access roads 	<ul style="list-style-type: none"> Impacts to river morphology will be local and typically within the working strip (40 m). Impacts to water quality will depend on the river/channel to be crossed but could be up to hundreds of meters upstream of the crossing (e.g. in tidal rivers/channels) and between hundreds of meters and a kilometre downstream. Same would apply to river crossings of new access roads. 	<ul style="list-style-type: none"> Minimise number of river crossings Select crossing locations in order to minimise impacts to riparian vegetation and to the river channel and habitat Select working window to minimise impacts on aquatic species (winter) Monitoring of water quality – Environmental Monitoring Plan Reinstate channel, banks and riparian vegetation to pre-construction status Audit management and reinstatement Alternative construction techniques to open cut trenching and backfilling (e.g. Horizontal Directional Drilling)
	<ul style="list-style-type: none"> Sediment plumes from working strip, yards, camps and access roads due to rainwater runoff 	<ul style="list-style-type: none"> Local, specific distances depend on local conditions. Could be up to a kilometre downstream of the discharge location 	<ul style="list-style-type: none"> Management of working strip, access roads, yards and camps to minimise sediment runoff into water courses (silt fences, silt traps, vegetation of stockpiles and of marginal areas, etc.) Monitoring of water courses/water bodies - Environmental Monitoring Plan
	<ul style="list-style-type: none"> Oil & chemical contamination from machinery on working strip, yards, camps and access roads 	<ul style="list-style-type: none"> Local, typically within working strip (40 m). Specific distances depend on local conditions. Could be up to a kilometre downstream of the accidental release. 	<ul style="list-style-type: none"> Fuelling/bunkering procedure for machinery, generators, etc. Bounded or contained oil/fuel storages Oil & Chemicals Spill Contingency Prevention & Planning Chemical handling procedures Oil & Chemical spill response kit on sites HSE Training of all on-site personnel on environmental awareness (including managing erosion and siltation on site and waste management) and oil & chemical spill prevention and response. This mitigation measure is valid for all impacts.
	<ul style="list-style-type: none"> Generation of waste water and solid waste (from camps, working strip) 	<ul style="list-style-type: none"> Local, specific distances depend on local conditions. Could be up to a kilometre downstream of the discharge location 	<ul style="list-style-type: none"> Treatment of waste water prior to discharge in any water body Locate yards and camps away from water courses/water bodies Waste management plan

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
Air Quality and Climatic factors	<ul style="list-style-type: none"> Impacts from dust generated from earth movements, excavation, vehicles movement, stockpiles, unpaved surfaces, etc. along the working strip, access roads, yards and camps. Receptors will include residential population, workers, fauna and flora species, cultural, historic, water quality, etc. 	<ul style="list-style-type: none"> Local, typically vicinity of working strip of pipeline (within 100 m) and associated facilities (new roads, yards, camps). Specific distances depend on local conditions and could be up to hundreds of metres in certain unfavourable meteorological situations 	<ul style="list-style-type: none"> Good construction site management practices such as covering of loose materials, vehicle speed limits, watering dusty surfaces in dry weather, sheeting of trucks, etc. Environmental and social management plan
	<ul style="list-style-type: none"> Impacts from emissions to the atmosphere from machinery and vehicles (i.e. generators, excavators, bulldozers, side booms, trucks, cars, compressors for hydrotesting etc.). Receptors will include residential population, workers, fauna and flora species, water quality, etc. 	<ul style="list-style-type: none"> Local, typically vicinity of working strip of pipeline (within 100 m) and up to hundreds of meters. Specific distances depend on local conditions. Global - Greenhouse gases (e.g. CO₂) 	<ul style="list-style-type: none"> Maintenance of equipment and vehicles Routing of construction traffic away from sensitive areas Training of operators and drivers Avoiding construction traffic from crossing densely populated areas or historic centres Traffic management plan Use of low sulphur fuels if available Modelling of pollutant dispersion from main emission sources (generators, compressors) Monitoring of main emission sources (generators, compressors) - Environmental Monitoring Plan Environmental and social management plan.
Noise and Vibration	<ul style="list-style-type: none"> Impacts from noise and vibration from machinery, construction vehicles, blasting of rocks (if required) and compressors for hydrotesting. Noise receptors will include residential population (and sensitive receptors like schools and hospitals), workers, fauna, cultural/historical buildings, etc.) 	<ul style="list-style-type: none"> Local, specific distances depend on local conditions and source: <ul style="list-style-type: none"> Machinery and construction vehicles. Typically between working strip (40 m) and up to hundreds of meters. Blasting. Up to 10 km 	<ul style="list-style-type: none"> Good construction site management Limiting working hours close to sensitive receptors Using specific mitigation on noisy equipment (acoustic shielding) Locating noisy equipment (e.g. generators, compressors) away from noise sensitive receptors Speed limits for vehicles Adequate Personal Protective Equipment (PPE) for workers Modelling of main noise emission sources (generators, compressors) Monitoring of main emission sources (generators, compressors) - Environmental Monitoring Plan Environmental and social management plan.

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
Biodiversity and Natural Habitats	<ul style="list-style-type: none"> Impacts from habitat loss. The impacts will be both temporary and long term/permanent. Temporary impacts will arise from the working strip, camps and yards which will be reinstated to pre-construction conditions once construction is completed. 	<ul style="list-style-type: none"> Local, working strip (40 m) and footprint of associated facilities 	<ul style="list-style-type: none"> Route and associated infrastructure location selection Alternative construction techniques to open cut trenching and backfilling (e.g. Horizontal Directional Drilling) Minimise footprint wherever possible (e.g. narrower working strip) Restore pre-construction conditions as far as possible (e.g. re-vegetation of working strip) - Vegetation/Landscape Restoration Plan.
	<ul style="list-style-type: none"> Impacts to fauna and flora species of nature conservation interest from the project's activities (e.g. noise, aqueous discharges, sediments plumes, uptake of water for hydrotesting, greater human pressure to previously inaccessible areas) during construction and pre-commissioning works with particular reference to sensitive areas such as nesting places, old growth forests, wetlands, rivers, riparian vegetation and areas identified as rich in endemic and protected species. 	<ul style="list-style-type: none"> Local, specific distances depend on source of impact and local conditions. Typically immediate vicinity of working strip of pipeline (40 m) and associated facilities (new roads, yards, camps). Specific distances depend on local conditions and could be up to hundreds of metres in certain unfavourable conditions. Impacts to water quality and aquatic habitats could be up to a kilometre depending on the impact and the conditions. 	<ul style="list-style-type: none"> As above for water quality, air quality noise & vibration impacts Management of dust, air emissions, aqueous discharges and waste to minimise impacts on flora, fauna and ecosystems (e.g. locating fixed machinery as far as possible from sensitive habitats) Restrict construction during certain periods/seasons at certain areas Monitor impacts on flora and fauna at sensitive locations - Environmental Monitoring Plan Environmental and Social Management Plan Biodiversity Action Plan (BAP) to be designed for the life of the project. Action Plans for specific important species (e.g. bear) and habitats/environments should be developed. Relocate endemic/rare plant species to suitable nearby habitats
Landscape and Visual Impacts	<ul style="list-style-type: none"> Temporary and permanent landscape and visual impacts from land take and above-ground structures. The impacts will be temporary for the working strip, camps and yards which will be reinstated to pre-construction conditions once construction is completed. Sections with potentially significant landscape impacts include mountain ridges or elevated terrain and old growth and mature forests. 	<ul style="list-style-type: none"> Local, specific distances depend on local conditions. Up to 10 km in certain circumstances (Regional) 	<ul style="list-style-type: none"> Minimise footprint wherever possible (e.g. narrower working strip) Restore pre-construction conditions as far as possible (e.g. re-vegetation of working strip) - Vegetation/Landscape Restoration Plan. Visual mitigation measures where deemed necessary (compressor stations) Location of new roads, temporary accesses and camps away from sensitive landscape locations

Table 6.2 *Potential Socioeconomic Impacts and Mitigation Measures related to Pipeline Construction and Pre-Commissioning*

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
Displacement of Existing Land Uses, Property and People	<ul style="list-style-type: none"> Impacts on land uses. Impacts will arise as a result of land take for the working strip. This land will be re-instated, where possible, following the completion of the construction activities returning the land to its original use. Impacts on annual crops will also be temporary along the working strip along which annual crops can be grown once re-instated. However, permanent crops (olive trees, fruit trees etc) are unlikely to be reinstated. Conflict over potential land use in particular in relation to the lignite concession and mining areas and areas ear-marked for industrial parks 	<ul style="list-style-type: none"> Local: Owners and users of land along the working strip of the pipeline (40 m) and associated facilities (new roads, yards, camps) and areas to be occupied by compressor stations, block valve stations and associated permanent facilities. 	<ul style="list-style-type: none"> Develop and implement a Resettlement Action Plan and Livelihood Restorations Plan (LRP) for Greece setting out how resettlement for permanent and temporary acquisition of land will be managed and mitigated in line with TAP’s Strategy for the Acquisition of Land and Easement and EBRD’s PR. Implement a land restoration plan to ensure previous use and users return on completion of construction, where possible. Ongoing dialogue with the PPC over land use in the concession areas in line with TAP’s Stakeholder Engagement Strategy and EBRD’s PR. Ongoing stakeholder engagement with municipalities along the route in line with TAP’s Stakeholder Engagement Strategy and EBRD’s PR.
Socio-Economic Impacts	<ul style="list-style-type: none"> Increased government revenues (e.g. permit & construction fees and levies) Impacts to local livelihoods and loss of household income as a result of construction works (e.g. temporary and long term occupation of agricultural land or reduced access). 	<ul style="list-style-type: none"> Local, regional and national: Authorities at the various levels may be the recipients of revenues Local: Owners and users of land within the working strip of pipeline (40 m) and associated facilities (new roads, yards, camps) and areas to be occupied by compressor stations, block valve stations and associated permanent facilities. Local: Land owners and users of land plots and areas affected by decreased accessibility due to the presence of construction sites. 	<ul style="list-style-type: none"> None Required – Authorities will determine priorities for spending government revenues. Ensure that the Livelihood Restoration Plan (LRP) provides for the restoration or improvement of livelihoods as stated in TAP’s Strategy for the Acquisition of Land and Easement. Robust monitoring of implementation and success of the LRP with corrective measures implemented where livelihoods are not fully restored in line with TAP’s Strategy for the Acquisition of Land and Easement and EBRD’s PR. Stakeholder engagement with local communities and affected people in line with TAP’s Stakeholder Engagement Strategy and EBRD’s PR. Engage a team of Community Liaison Officers (CLOs) to manage and monitor TAP’s community relations in line with TAP’s Stakeholder Engagement Strategy and EBRD’s PR.

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
	<ul style="list-style-type: none"> Economic benefits to households and to the local economy as a result of direct/indirect job creation during construction works. Benefit to the local community and economy as a result of local procurement of materials for construction and other services to supply the project. Limited national economic benefits due to employment or procurement of specialists or equipment not available in the regions 	<ul style="list-style-type: none"> Local and regional (municipalities and region): Individuals will benefit from employment and procurement opportunities. National: Employment and procurement opportunities for pipeline construction specialists and providers of goods and services 	<ul style="list-style-type: none"> Ensure maximisation of employment and procure opportunities for local people and businesses in line with TAP's Local Content Strategy and CSR Policy. Maximise local employment during construction and provide a fair and transparent recruitment process and to enhance local skills base through training provided by TAP in line with TAP's Local Content Strategy and CSR Policy As far as possible, procure goods from local suppliers through sub-contracts to local firms (subject to availability, quality and cost) and purchasing of goods from local retailers in line with TAP's Local Content Strategy and CSR Policy.
	<ul style="list-style-type: none"> The presence of workers on the site during construction works could have an impact on social infrastructures (water, electricity, roads, health centres). While there might be a temporary pressure on these infrastructures in the short term, there may be also a positive impact on infrastructure development in the medium to long term, if the project helps develop existing infrastructures. 	<ul style="list-style-type: none"> Local and regional: Use of facilities by the Project workforce thereby reducing access to communities in the vicinity of the working strip of pipeline (40 m), associated facilities (new roads, yards) and construction camps as well as areas around compressor stations, block valve stations and associated facilities. 	<ul style="list-style-type: none"> Provide access for the Project workforce to the required recreational, social and health facilities either at construction camps or through agreements with local facilities, to minimise pressure on local facilities. Identify through a focussed study infrastructure upgrades that would benefit local communities e.g. access roads in line with TAP's Strategy for Social and Environmental Investments.
	<ul style="list-style-type: none"> The presence of workers on the site and the money they earn and spend may cause changes to local customs and norms and result in local inflation. Impacts on local livelihoods (e.g. farming) from project construction could also impact on social institutions and cohesion of the local community since livelihoods and social institutions are often closely bound with each other. 	<ul style="list-style-type: none"> Local and regional: Communities, land owners and users in the vicinity of working strip of the pipeline (40 m) and associated facilities (new roads, yards, camps) and areas around compressor stations, block valve stations and associated facilities 	<ul style="list-style-type: none"> Stakeholder engagement with affected communities/ groups/ people in line with TAP's Stakeholder Engagement Strategy and EBRD's PR. Engage a team of Community Liaison Officers (CLOs) to manage and monitor the satisfactory implementation on effectiveness of all community relation procedures in line with TAP's Stakeholder Engagement Strategy and EBRD's PR. Develop a Workers Code of Conduct that will include disciplinary measures for those that break the Code requirements.

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
Community Health and Safety	<ul style="list-style-type: none"> Safety risks for communities as a result of construction works. Increased traffic loads on roads adjacent to the project. 	<ul style="list-style-type: none"> Local: Communities currently using and living along the roads to be transited by the project's vehicles, including mountain roads. Local and regional: Communities along transportation routes 	<ul style="list-style-type: none"> Develop a community Safety Management Plan to address safety risks for communities, including traffic related risks. Develop Journey Management Plan for all trips, including ensuring all drivers receive adequate training. Provide traffic awareness training at local schools and at community level to raise the awareness of communities regarding avoidance of road related accidents.
	<ul style="list-style-type: none"> Community severance between people's homes and infrastructure, family and friends and places of work including agricultural land and, in some cases, grazing areas. 	<ul style="list-style-type: none"> Local: communities located in the vicinity of construction sites. 	<ul style="list-style-type: none"> Provide replacement crossing points.
	<ul style="list-style-type: none"> Potential increased incidence of disease associated with the presence of the workforce or environmental degradation. Increased pressure on local services (health, leisure, police, etc) from the project's workforce resulting in decreased access for local communities. 	<ul style="list-style-type: none"> Local and regional: Communities near workers camps. 	<ul style="list-style-type: none"> Apply strict worker management policies and prevention measures Provide access for the Project workforce to the required recreational, social and health facilities either at construction camps or through agreements with local facilities, to minimise pressure on local facilities. Develop and enforce Code of Conduct for workers. Development of detailed management plans regarding environmental issues taking into account the health of the population.
	<ul style="list-style-type: none"> Location of workforce in camps near local communities could result negative worker – community interactions and reduced access for communities to services. 	<ul style="list-style-type: none"> Local: Communities close to worker camps. 	<ul style="list-style-type: none"> Avoid locating worker camps close to communities. Provide access for the Project workforce to the required recreational, social and health facilities either at construction camps or through agreements with local facilities, to minimise pressure on local facilities. Camp Management Plans and Worker Codes of Conduct will be developed with appropriate disciplinary procedures for breaches.

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
Working Conditions	<ul style="list-style-type: none"> Risk of injuries for workforce as a result of major excavations, tunnelling and working in the vicinity of active roads. 	<ul style="list-style-type: none"> Local: Communities located in the vicinity of construction sites 	<ul style="list-style-type: none"> Develop an HSE management system for the project in accordance with international good practice. The HSE plan will identify risks to worker health and safety and describe the HSE Management System. Good site management practice (training and qualification of staff, appropriate work standards) will be implemented to reduce health and safety risks. Fencing or marking sites where there are open ditches etc to stop people or animals from accidents.

Table 6.3 *Potential Cultural Heritage Impacts and Mitigation Measures related to Pipeline Construction and Pre-Commissioning*

Impact Area	Potential Impact/Source	Area of influence	Potential preventive/mitigation measures
Cultural heritage (known and potential) including “intangible cultural heritage” (ICH)	<ul style="list-style-type: none"> Ground disturbing construction activities including permanent and temporary occupations (i.e. working strip, compressor stations, pipe yards, workforce camps, tunnel portals, landfills/land takes and accesses). 	<ul style="list-style-type: none"> Local, working strip of pipeline (40 m) and associated facilities (new roads, yards, camps) and areas to be occupied by compressor stations, block valve stations and associated permanent facilities. 	<ul style="list-style-type: none"> Cultural Heritage Management Plan (including ICH): Detailed reconnaissance survey of known monuments, ICH and archaeological sites. Implementation of archaeological monitoring and a “chance finds” procedure with special focus on high potential archaeological areas. Avoidance of certain and likely impacts by project redesign for archaeological site, monuments and ICH. Use of low special impact construction techniques where complete avoidance (e.g. re-routing) is not feasible. Removal of resources by rescue excavations and associated studies. ESMP within the ESIA to outline the Cultural Heritage Management Plan.

6.2.2 Operation and Decommissioning

Table 6.4 *Potential Environmental Impacts and Mitigation Measures related to Pipeline Operation and Decommissioning*

Impact Area	Potential Impact/Source	Area of influence	Potential preventive/mitigation measures
Resources and waste	<ul style="list-style-type: none"> Waste and wastewater generated by the compressor station during operation and maintenance. This includes waste generated by pigging operations (tailings, sludge) and during decommissioning 	<ul style="list-style-type: none"> Local, specific distances depend on local conditions 	<ul style="list-style-type: none"> Waste management plan
Water Environment	<ul style="list-style-type: none"> No impacts are envisaged during operation Impacts to aquatic habitats and water quality during decommissioning activities 	<ul style="list-style-type: none"> Impacts to habitats and water quality during decommissioning will typically be localised 	<ul style="list-style-type: none"> Monitoring of water quality – Environmental Monitoring Plan Reinstate channel, banks and riparian vegetation to pre-construction status Audit management and reinstatement Alternative construction techniques to open cut trenching and backfilling (e.g. Horizontal Directional Drilling)
Air Quality and Climatic factors	<ul style="list-style-type: none"> Impacts from air emissions from the compressor station (turbines) Non-routine events such as emergency venting (and depressurisations for maintenance) at the compressor station or pipe failure have a higher potential to reduce air quality. 	<ul style="list-style-type: none"> Local, specific distances depend on local conditions, typically hundreds of meters, but could be up to a kilometre in certain unfavourable meteorological conditions. Greenhouse gases, Global 	<ul style="list-style-type: none"> Maintenance and monitoring Air quality monitoring Location of compressor station away from sensitive receivers Adoption of Best Available Techniques (BAT) for the abatement of air pollutants

Impact Area	Potential Impact/Source	Area of influence	Potential preventive/mitigation measures
Noise and Vibration	<ul style="list-style-type: none"> Impacts from noise emissions during the normal operation of the compressor station (e.g. compressors, turbine engines). Non-routine events such as emergency venting. Noise receptors will include residential population (and sensitive receptors like schools and hospitals), workers, fauna, cultural/historical buildings, etc. 	<ul style="list-style-type: none"> Local, specific distances depend on source of impact, local conditions, and location of sensitive receptors. Compressor noise from 200 m to more than a kilometre in certain unfavourable meteorological conditions. Over a kilometre for noise generated during emergency venting (typically for short periods of time). 	<ul style="list-style-type: none"> Maintenance and monitoring Noise emission monitoring Location of compressor station away from sensitive receivers Modelling of main noise emission sources (generators, compressors) Monitoring of main emission sources (generators, compressors) - Environmental Monitoring Plan Using specific mitigation on noisy equipment (acoustic shielding) Locating noisy equipment (compressors) away from noise sensitive receptors
Biodiversity and Nature Conservation	<ul style="list-style-type: none"> Impact to fauna from the noise emissions from the compressor station Impacts to flora and fauna from the routine maintenance/clearance of the inner safety corridor (maximum 10 m wide) where no deep routed vegetation will be allowed to avoid interference with pipeline. Disturbance during decommissioning phase 	<ul style="list-style-type: none"> Local, RoW (20 m) from 200 m to more than a kilometre in certain unfavourable meteorological conditions in the surroundings of the compressor stations. 	<ul style="list-style-type: none"> Noise emissions, as above Restore pre-construction conditions as far as possible (e.g. re-vegetation of working strip) and maintain vegetation - Vegetation/Landscape Restoration Plan. Monitor impacts on flora and fauna at sensitive locations Environmental and Social Management Plan Biodiversity Action Plan (BAP) to be designed for the life of the project. Action Plans for specific important species (e.g. bear) and habitats/environments to be developed.
Landscape and Visual Impacts	<ul style="list-style-type: none"> Impacts to landscape due to permanent land take for the compressor station and block valve stations. Impacts to landscape from routine maintenance of the RoW. 	<ul style="list-style-type: none"> Local, RoW (20 m) and accesses for maintenance clearance, other specific distances in terms of the permanent structures (block valve and compressor stations) depend on local conditions 	<ul style="list-style-type: none"> See above The Vegetation/Landscape Restoration Plan should pose special attention to areas with high visibility or where special re-vegetation techniques should be established (e.g. slope stabilisation techniques on mountain slopes).

Table 6.5 *Potential Socioeconomic Impacts and Mitigation Measures related to Pipeline Operation and Decommissioning*

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
Displacement of Existing Land Uses, Property and People	<ul style="list-style-type: none"> • Permanent land acquisition/easement during operation • Permanent changes to land uses in particular agricultural land for permanent crop production (e.g. olive trees, fruit orchards, vineyards). 	<ul style="list-style-type: none"> • Local: Owners and users of land along the RoW (20 m) and areas to be occupied by compressor stations and other permanent infrastructures. 	<ul style="list-style-type: none"> • The Livelihood Restoration Action Plan will consider impacts to land during operation and decommissioning and provide for compensation to land owners/users. • Develop and implement a land restoration plans to restore any project land for productive use after decommissioning of the project in line with TAP's Strategy for the Acquisition of Land and Easement and EBRD's PR. • Undertake engagement with the communities along the route as part of the stakeholder engagement plan in line with TAP's Stakeholder Engagement Strategy and EBRD's PR. • Engage a team of Community Liaison Officers (CLOs) to manage and monitor TAP's community relations and restoration plans in line with TAP's Stakeholder Engagement Strategy and EBRD's PR.
Socio-Economic Impacts	<ul style="list-style-type: none"> • Increased government revenues as a result of tariffs on gas transport. • Economic benefits to households and to the local economy as a result of direct/indirect job creation during operation (e.g. compressor station). 	<p>National, regional and local: Authorities</p> <ul style="list-style-type: none"> • Local and regional: Individuals and companies benefitting from employment and procurement opportunities. 	<p>None Required –Authorities will determine priorities for spending government revenues.</p> <ul style="list-style-type: none"> • Implement the Local Content Strategy developed by TAP to maximise local employment throughout the operations phase. • Implement a fair and transparent recruitment process and enhance local skills base through training provided by TAP in line with TAP's Local Content Strategy and the EBRD PR. • Enhance the local skills base through training provided by TAP in line with its Local Content Strategy and Strategy for Social and Environmental Investments. • As far as possible, procure goods from local suppliers through sub-contracts to local firms (subject to availability, quality and cost) and purchasing of goods from local retailers in line with TAP's Local Content Strategy.

Impact Area	Potential Impact/Source	Area of Influence	Potential preventive/mitigation measures
	<ul style="list-style-type: none"> Land use restriction for safety reasons (permanent and semi permanent buildings , such as greenhouses, infrastructures) 	<ul style="list-style-type: none"> Local: Users and owners of land affected by measures to assure the integrity of the pipeline. The construction of structures will be restricted in a corridor of maximum 60 m and the establishment of cluster of houses and/or industrial infrastructure in a corridor of maximum 200 m 	<ul style="list-style-type: none"> Route selection process has aimed to reduce areas of conflict to a minimum. Stakeholder engagement and detailed surveys during detailed design will continue to identify and aim to minimise potential areas of conflict.
Community Health and Safety	<ul style="list-style-type: none"> Safety risks for communities as a result of project operation activities, in particular those related to traffic operations. 	<ul style="list-style-type: none"> Local: communities currently using and living along the roads to be transited by the project vehicles, including mountain roads. Communities along transportation routes 	<ul style="list-style-type: none"> Develop a Community Safety Management Plan to address safety risks for communities, including traffic related risks through Journey Management Plans.
	<ul style="list-style-type: none"> Community severance between people’s homes and infrastructure, family and friends and places of work including agricultural land and in some cases grazing areas 	<ul style="list-style-type: none"> Local: communities located in the vicinity of access roads etc. 	<ul style="list-style-type: none"> Impacts of severance will be mitigated by provision of safe crossing points.
Working Conditions	<ul style="list-style-type: none"> Risk of injuries for workforce as a result of routine project operation activities and maintenance 	<ul style="list-style-type: none"> Local: communities currently using and living along the roads to be transited by the project vehicles, including new access roads. 	<ul style="list-style-type: none"> Develop a HSE management system for the project in accordance with international good practice. The HSE plan will identify risks to worker health and safety and describe the HSE Management System. Good site management practice (training and qualification of staff, appropriate work standards) will be implemented to reduce health and safety risks.

Table 6.6 *Potential Cultural Heritage Impacts and Mitigation Measures related to Pipeline Operation and Decommissioning*

Impact Area	Potential Impact/Source	Area of influence	Potential preventive/mitigation measures
Cultural heritage (known and potential) including “intangible cultural heritage” (ICH)	<ul style="list-style-type: none"> No specific impacts or risks are expected during the operation (land take and earth works limited to construction phase) Ground disturbing removal and restoration activities during decommissioning 	<ul style="list-style-type: none"> Local, RoW (20 m) footprint of associated decommissioning activities 	<ul style="list-style-type: none"> Cultural Heritage Management Plan (including ICH)

The preliminary assessment presented in the tables above has been based on the project information currently available, the baseline information collected to date and the experience gained in similar projects constructed in similar environmental and socioeconomic contexts.

The likelihood, magnitude and significance of the impacts will be further assessed in the PEIA and the detailed ESIA. However the preliminary assessment highlights that construction impacts of a pipeline and associated facilities are typically temporary in nature and localised. These include temporary noise and air emissions from construction machinery, impacts on land use, loss/disturbance of natural habitats (flora and fauna), landscape and temporary impacts to water quality and aquatic habitats during river crossings and near shore marine works. The magnitude and significance of construction impacts will depend on the local conditions. Typically construction impacts can be managed and mitigated efficiently.

The pipeline will be buried and the land will be re-instated to its pre-construction status. The main limitations on land use above the pipeline will be a narrow corridor of maximum 10 m in which the growing of deep rooting trees will be restricted, a corridor of maximum 60 m in which the construction of houses will be restricted and a corridor of maximum 200 m in which the establishment of cluster of houses and/or industrial infrastructure is limited. The preferred route was selected to accommodate these criteria and allows sufficient space also for future developments of neighbouring communities. The operation of the compressor station will generate air emissions and noise and will have an impact on the landscape. The magnitude and significance of these impacts are comparable to those of small co-generation gas power plants. Best practice and mitigation measures will be adopted to minimise operational impacts. Landscape impacts will be managed through the restoration of the original landscape along the pipeline route and through vegetation screening of the permanent structures where required.

7.1 INTRODUCTION

A key outcome of the scoping process is the definition of the Terms of Reference (or ToR) of the detailed ESIA study. The findings of the ESIA study will be presented in the ESIA report (or EIA report in line with Greek Regulations) which will be prepared in compliance with Greek National laws and regulations as well as international standards. As for all previous ESIA steps performed by TAP (Alternative Routes Assessment and Scoping) TAP has selected the more stringent EBRD standards as the international standards benchmark for the ESIA report. As described in *Section 2*, a PEIA report will also be prepared and submitted.

The following sections present the Terms of Reference of the detailed ESIA, which will be performed for TAP. The section is structured as follows:

- Overview of activities to complete the ESIA process;
- Specialist studies;
- Stakeholder engagement;
- Outline structure for the final ESIA report; and
- Provisional schedule for the ESIA process.

7.2 ESIA OBJECTIVES

TAP recognises that comprehensive planning and management of environmental and socio-economic issues are essential to the execution of any successful project and, therefore, intends to fully integrate environmental and socio-economic considerations into the life cycle of the proposed Project.

The purpose of the ESIA is to assess the potential impacts of the project and project-related activities on the environment (including biophysical and socio-economic resources) and, where applicable, to design mitigation or enhancement measures to avoid, remove or reduce negative impacts to the environment.

7.3 ESIA STEPS

Following on from the scoping phase of the project, the ESIA will:

- Update and finalise the technical project description as further engineering details become available, working closely with project engineers to confirm details such as the final layout of associated facilities (in particular compressor station and block valve stations), final locations and layout of temporary infrastructures (pipe yards and worker camps), and construction and operation plans;

- Conduct additional consultation and further refine the scope of the ESIA as necessary;
- Collect additional baseline data through desktop research and field studies to complete a comprehensive description of the environmental, social and cultural heritage conditions;
- Develop mitigation and enhancement measures and elaborate an Environmental and Social Management Plan (ESMP) including an approach for monitoring;
- Report findings in a comprehensive ESIA report.

7.4 *SPECIALIST STUDIES*

To develop a complete understanding of the existing environmental, social and cultural heritage conditions (resources and receptors) in the project area of influence, further desktop, bibliographic and field studies will be carried out as summarised *Appendix D*. Any modelling studies required for the assessment of impacts in the ESIA and an outline of an approximate timeframe of the activities is also reported in *Appendix D*.

7.4.1 *Desktop Studies*

Desktop studies will include additional research to identify existing documentation that contains information relevant to key resources present in the project environment. Potential sources include publicly available literature with relevance to the project site and general area.

Finally, project engineering studies will be reviewed for quantitative information on environmental elements. Studies that may provide useful data could be geotechnical investigations, bathymetric and seabed investigations, process and operations water source investigations, surface water drainage studies, air emission studies and any other studies of relevance.

7.4.2 *Field Studies*

Planned Studies

Primary data will be collected by field studies carried out by environmental, socio-economic and cultural heritage specialists. Specialists with qualifications in the particular resource area and knowledgeable of the local conditions will be assigned. International specialists will be responsible to provide technical guidance and quality assurance.

Determination of Seasonal Variations

For the TAP project primary sampling will be conducted in summer. Within this timeframe, for any particular resource, selection of the specific sampling period will consider:

- when sampling will be most representative of the existing conditions;

- when ‘worst case’ conditions exist (e.g. when noise levels are the lowest, when traffic levels are the heaviest); and
- if seasonal variations would have significant effect on determination of potential impacts and significance

Where relevant and necessary, specific autumn surveys will also be conducted and incorporated in the final version of the ESIA

The specialists will adopt scientifically accredited and recognised sampling methodologies.

7.5 *STAKEHOLDER ENGAGEMENT*

Upon completion of initial scoping consultation and disclosure, the subsequent steps will be undertaken:

- PEIA stage consultation;
- ESIA phase consultation;
- ESIA report disclosure.

7.5.1 *PEIA Stage Consultation*

Engagement activities will be carried out after submission of the PEIA in order to inform local stakeholders about the project design and to understand any issues which may inform the completion of the ESIA and development of mitigation measures for the project. As part of the PEIA process, the Government will consult with authorities including regional authorities. TAP will complement these activities with consultation activities at the municipality and village level alongside social baseline data collection as part of the ESIA.

All feedback related to potential impacts will be considered in the ESIA. The manner in which this feedback influenced the ESIA will be documented.

7.5.2 *ESIA Phase Consultation*

Engagement activities carried out later on in the ESIA Study stage include consultations designed to inform local stakeholders about project design, to obtain their key concerns and high level issues and to inform the development of mitigation for the project. This consultation will enable the ESIA team to refine the ESIA analysis by generating additional feedback on the ESIA approach, key issues and analysis of potential impacts (such as assessment of their relative significance).

Consultation will be carried out with local community leaders and small groups of key stakeholders in the communities, the land of which is located within the 2 km study corridor. These will be undertaken alongside the social baseline study that will be carried out to better understand these stakeholders.

7.5.3 *ESIA Report Disclosure*

The notification of the public hearings will be announced through media and the hearings will be open to the public. 30 days after the ESIA report disclosure, TAP will hold public hearings (dates and locations will be identified and disclosed in advance).

Comments and suggestions made at the public hearings will be considered during finalisation of the ESIA report.

7.6 *TENTATIVE TABLE OF CONTENT OF PEIA*

An outline of the proposed structure of the PEIA report is provided in *Table 7.1*.

Table 7.1 *Tentative PEIA Report Structure*

<i>Section</i>	<i>Title</i>
1	Name and Type of Development
2	Non Technical Summary
3	Project Definition
4	Baseline Environmental Description
5	Project Description
6	Identification and Assessment of Alternatives
7	Assessment and Mitigation of Impacts
8	Env&Soc Management and Monitoring Plan
9	Public Consultation
10	Safety Measures
11	References
12	Annexes
	Annex 1 – Map and Drawings
	Annex II – Baseline Environmental Information
	Annex III – Project Schedule
	Annex IV – Stakeholder Engagement Plan
	Annex V - Matrix of communication with Authorities and Organisations – Correspondence
	Annex VI – Scoping Questionnaire
	Annex VII – Photos of the Area
	Annex VIII – VOC emissions dispersion modelling

An outline of the proposed contents of the ESIA report is provided in *Table 7.2*. The content may alter during the evolution of the project or based on the findings of on-going consultation, however it is anticipated that the contents of the ESIA report will accord broadly within the suggested framework.

Table 7.2 *Tentative ESIA Report Structure*

<i>Chapter Number</i>	<i>Contents Heading</i>	<i>Explanatory Note</i>
	Front Piece	Title page, acknowledgements, authors and contributors, table of contents (including lists of figures, tables, and maps)
	Executive Summary	Summary of the entire ESIA report.
1	Introduction	This <i>Chapter</i> will outline the development and structure of the ESIA report including the background, scope, terms of reference and declaration.
2	Project Justification	This <i>Chapter</i> will include discussion of the Project background, objectives, need for the project, value of the project, envisioned sustainability, alternatives considered (including no project alternative), development options considered and site selection.
3	Legislative and Policy Framework	This <i>Chapter</i> will outline the policy, legal and institutional framework within which the ESIA has been conducted. National regulations will be summarised along with relevant international agreements and conventions to which Greece is party, as well as applicable international best practice guidelines and project standards.
4	Project Description	This <i>Chapter</i> will provide a concise description of the project and its geographical and temporal context. It will include a site description, an overview of the Pipeline Project design and details of project inputs and outputs.
4	Description of the Environment	This <i>Chapter</i> will summarise the available baseline data on the environmental and social resources and receptors within the Project Study Area. It will be based on both primary and secondary data sources and will consider changes in the baseline condition without the development in place.
5	Consultations and Disclosure	This <i>Chapter</i> will present the results of consultation undertaken as part of the ESIA, plus plans for future consultation. It will identify key project stakeholders and present their feedback on the TAP Project.
6	Associated and Potential Impacts	This <i>Chapter</i> will summarise the predicted positive and negative impacts of the Project. Cumulative impacts will be assessed as appropriate.
7	Mitigation and Residual Impacts	This <i>Chapter</i> will outline general and specific mitigation measures to reduce, remove or avoid negative impacts to environmental and social receptors. Any residual impacts (post mitigation) will be outlined.

<i>Chapter Number</i>	<i>Contents Heading</i>	<i>Explanatory Note</i>
8	Environmental and Social Management Plan (ESMP)	The ESMP will draw together the possible mitigation measures; group them logically into components with common themes; define the specific actions required and timetable for implementation; identify training needs, institutional roles and responsibilities for implementation; and estimate the costs of the measures.
9	Conclusion	This <i>Chapter</i> will summarise conclusions that are made based on the assessment as well as outline any further recommendations.
	<i>Bibliography and References</i>	All references made in the report and documents drawn upon during the course of the assessment
	Annexes	These will include technical annexes with details of specific technical surveys, the bibliography and list of acronyms.

7.8 PROVISIONAL SCOPING, PEIA AND ESIA SCHEDULE

A provisional schedule for the ESIA is provided in *Table 7.3* below.

Table 7.3 *ESIA and Stakeholder Consultation Schedule*

<i>Activity</i>	<i>Timing</i>	
	<i>Start</i>	<i>Finish</i>
Submission of Scoping Report		June 2011
Route Refinement Disclosure and Scoping Validation	June 2011	July 2011
Submission of Final PEIA to Authorities		July 2011
PEIA Consultation (estimate)	September 2011	February 2012
ESIA Specialist Field Surveys	June 2011	October 2011
ESIA Phase Consultation (including house hold surveys)	September 2011	October 2011
Submission of Final ESIA to Authorities		Approximately 2 months following the approval of the PEIA
ESIA Consultation (estimate)	May 2012	October 2012

8.1 INTRODUCTION

TAP considers consultation and engagement with stakeholders an integral part of the Environmental and Social Impact Assessment (ESIA) process. To support the realisation of the Greek section of the proposed *Trans-Adriatic Pipeline*, TAP has developed Stakeholder Engagement Strategy, the overall aim of which is to ensure that a consistent, comprehensive, coordinated and culturally appropriate approach is taken for stakeholder consultation and disclosure. The approach taken by TAP is in full compliance with Greek EIA Regulations, EBRD Performance Requirements, as well as relevant policies of the IFC and World Bank.

TAP intends to undertake a process of stakeholder engagement throughout the project planning, construction, operation and decommissioning phases. The plan for this engagement, including identification of stakeholders (i.e. people and organisations who have a role in the project or could be affected by the project activities or who are interested in the project) and disclosure of information, consultation, and handling of suggestions, comments and concerns, is documented in the Greece Stakeholder Engagement Plan. This plan will be updated as required as the project progresses.

In *Section 8.2* presents an overview of stakeholder engagement phases planned throughout the project life cycle. The engagement activities planned during the scoping phase are further detailed in *Section 8.3*.

8.2 STAKEHOLDER ENGAGEMENT PHASES FOR TAP PROJECT

8.2.1 Overview

To fulfil the objectives of stakeholder engagement, the TAP Project has developed a plan for engagement with stakeholders throughout the Project life-cycle. The plan lays out a process for consultation and disclosure through five stages, each having slightly different objectives. These stages are described in *Table 8.1*.

Table 8.1 ESIA Stakeholder Engagement Phases

<i>Phase</i>	<i>Objective</i>	<i>Status as of May 2011</i>
<i>Alternatives Assessment</i>	To introduce the Project and identify environmental, social and cultural heritage sensitivities that should be taken into account in selecting the preferred route.	<i>Completed</i>
<i>Scoping Disclosure and Consultation</i>	To provide further detail on the project and an opportunity for stakeholders to provide feedback on the scope, approach and key issues that will be addressed during the ESIA as well as the plans for future engagement activities.	<i>On-going</i>
<i>ESIA Phase Consultation</i>	Stakeholder engagement during the ESIA phase will have two objectives: maintain the relationships developed during the previous stages; and ensure all stakeholder issues have been identified and taken on board by the Project. TAP will revisit national and regional authorities and engage with affected communities along the chosen pipeline route. All stakeholders will be provided with a project update and an opportunity to comment, express any concerns and discuss issues.	<i>On-going</i>
<i>ESIA Disclosure</i>	To present the draft ESIA report and invite stakeholders to comment on the document. Information on the project impacts will be presented along with the mitigation measures designed to minimise or enhance positive ones. This will allow the project to maintain the relationships developed during the previous stages; and ensure all stakeholder issues have been identified and taken on board by the Project.	<i>Planned</i>
<i>Project execution (construction, operation and decommissioning)</i>	To continue engaging with stakeholders throughout the project lifecycle. The methodology for this will be developed and finalised using the information compiled during the ESIA process.	<i>Planned</i>

8.2.2 Pre-scoping Consultation

Stakeholder engagement to support route selection for the TAP Project in Greece was undertaken between October 2010 and May 2011 and included a series of consultation meetings along the pipeline route in November-December 2010 and February - March 2011. The overall objectives of stakeholder engagement during the alternative route selection process were to: i) introduce the proposed project to stakeholders; and ii) gather information pertinent to the route selection process.

Engagement with local authorities and selected communities along the route alternatives helped to gather information on social, environmental and cultural heritage sensitivities. Moreover, when presenting the proposed project to stakeholders, the team was also able to gain an understanding of how the local population and other stakeholders viewed the project and whether they had any preferences in route. After completion of the route refinement process, the base case was selected (see *Section 3*).

Disclosure of the selected route will be undertaken alongside the disclosure of the scoping report.

8.3.1

Objectives

The objective of engagement during the scoping phase is to provide further detail on the project and an opportunity for stakeholders to provide feedback on the scope, approach and key issues that will be addressed during the ESIA study phase as well as the plans for future engagement activities.

The main emphasis of the scoping phase engagement is to present the project to government agencies, NGOs and other key groups as well as to community leaders. These organisations are listed in *Table 8.2* below. Information will also be disseminated to local communities and to the general public and channels will be opened to receive their feedback.

Table 8.2 *Key Stakeholder Groups for Scoping Phase Engagement*

Stakeholder Group	Stakeholder
National Government Stakeholders	Ministry of Environment – Directorate of Town Planning Ministry of Environment – Directorate of Environmental Planning Ministry of Development Ministry of Foreign Affairs Ministry of Defense – General Army/Navy/Air Force Staff Ministry of Agricultural Development Ministry of Culture – Ephorates of Antiquities Klimatologio S.A.
NGOs and Other interested parties	NGOs (national, regional/local) PPC – National and Regional offices HSTO (DESMHE) Egnatia Odos S.A. Community Groups Community Based Organizations (CBOs) Academic and Research Organisations Media <i>Others tbd</i>
Regional Government Stakeholder	Regional Administration of West Macedonia Regional Administration of Central Macedonia <ul style="list-style-type: none"> • Heads of Regions • Regional Councils • Regional Environmental Agencies (REAs) • Regional Road Directorates • Regional Forests Directorates • Regional Immovable Property Registration Office (IPROs) •
Local stakeholders	Municipality of Chalkidona Municipality of Alexandreia Municipality of Naousa Municipality of Edessa Municipality of Skydra Municipality of Amyntaio Municipality of Pella

Stakeholder Group	Stakeholder
	Municipality of Eordea
	Municipality of Kastoria
	Municipality of Nestorio
	Municipality of Orestida
	Heads of Villages within the 2 km corridor (39 villages)
	General Public

The complete list of stakeholder groups, individual organisations and communities is presented in *Appendix C*.

8.3.2 Stakeholder Engagement Activities

Overview

Stakeholder meetings are planned in Athens as well as in the regions to facilitate the participation of all concerned stakeholders, in particular heads of villages travelling from remote areas. A tentative schedule for these meetings is shown in *Table 8.3*.

Specific activities to disclose information and seek comments from different stakeholder groups are summarised in the subsequent sections.

Table 8.3 *Scoping Meetings*

Date	Type of Engagement	Venue
Week of 20 th June 2011	<ul style="list-style-type: none"> One to one meetings with National Government stakeholders Scoping Meeting with NGOs and other interested parties 	Athens
Week of 27 th June 2011	<ul style="list-style-type: none"> Face to face meetings with regional authorities 	West Macedonia / Central Macedonia Regional offices
Week of 27 th June 2011	<ul style="list-style-type: none"> 4 / 5 regional scoping meetings (Municipal Authorities, Heads of Villages and local NGOs) 	Major cities along the route (e.g. Kastoria, Ptolemeida)

Engagement with National Government Stakeholders

National government agencies have expressed a preference for one to one meetings with the TAP Project to discuss the project and the scoping report. Consequently it is planned to send this document (ESIA Scoping Document, ESD) to national government stakeholders with a covering letter inviting them to a one to one meeting with TAP.

Both the letter and the ESD will be sent 15 days before the date of each of the proposed one to one meeting.

Engagement with NGOs and Other Organisations

A letter disclosing the selected route and the ESD will be sent to NGOs and other interested parties inviting them to participate in a scoping meeting in

June. National-level NGOs will be invited to a scoping meeting to be held in Athens, while regional NGOs will be invited to one of the scoping meetings to be held in the regions.

Both the ESD and the letter will be sent 15 days in advance of the scoping meeting to allow an in-depth review of the document during the meeting.

At the scoping meeting, it is planned to provide a presentation of the project and of the scoping report prior to opening the meeting to questions and comments. Participants will be able to pose the questions or raise the issues as well as to submit follow-up questions and comments during the meeting through comments sheets or subsequently send them by post or through the Project web site.

Engagement with Regional and Municipal Authorities and Heads of Local Communities

Municipal and local government stakeholders will be invited together to participate in one of the four regional scoping meetings to be organised by TAP. In preparation for the meetings, TAP will send the ESD to all Municipal and Local Community Authorities, with a covering letter inviting them to the scoping meeting in their respective regions. The letter will also advise them of updates on the Project, including the selection of a preferred route and the status of the PEIA.

Regional heads will be sent the ESD and a covering letter requesting face to face meetings during the same week as the wider regional scoping meetings are held.

Both the letter and the ESD will be sent 15 days before the date of the relevant scoping meeting.

Engagement with Local Communities

TAP/ENT is committed to continue engaging and consulting with relevant communities along the chosen pipeline route to ensure that the project is fully explained to local communities and that their concerns and views on the Project are heard and taken into account.

During scoping, the main channel of communication will be the Heads of Villages. Heads of Villages will participate in the regional scoping meetings representing their constituencies and as such will have a role to play in further disseminating information on the project and in making accessible copies of the ESD for the individual stakeholders.

For this purpose a shorter leaflet and accompanying poster with information about the ESIA Scoping Process and the feedback mechanism will be distributed to all Villages Heads during the regional scoping meetings for onwards distribution to communities (see above). Villages Heads will

officially be asked to put up the poster and the leaflets in an accessible place in each village or town (i.e. communal premises, school building). In addition notice will be provided in local media the week before and after the regional meetings to make sure all community members and other interested parties locally are informed about the Project and the ESIA Scoping process as well as the mechanism to provide comments on the Project.

Further consultation will be carried out with local community members including vulnerable populations and gender groups during the ESIA study phase. Moreover, all communities will be invited to participate in open public hearings during disclosure of the final ESIA report when information on the project impacts will be presented along with the mitigation measures designed to avoid or minimise them.

At the meetings information regarding the mechanism to provide feedback to the Project will be explained. TAP has envisaged a process that allows stakeholders to submit their comments and suggestions in writing to TAP after the public meetings have taken place.

In this regard, TAP would like to invite all stakeholders involved in the scoping process, including local communities and the general public, to submit in writing their comments and suggestion concerning the Greek section of the Trans Adriatic Pipeline (TAP) until 15th August 2011.

Appendix B presents a standard form to facilitate the submission of comments and suggestions in both English and Greek. Participants to the scoping meetings as well as the general public interested in the project will be invited to submit comments either by post or e-mail to the following address:

Trans Adriatic Pipeline AG – Greece (Branch Office)

21st Floor, Athens Tower, 2-4 Messogion Ave.,11527

Athens, Greece

Phone: + 30 210 7454613

Fax: + 30 210 7454300

www.trans-adriatic-pipeline.com

esia-comments@tap-ag.com

General Public

A notice will be published in national newspapers to ensure that interested parties and the general public outside the direct area along the pipeline route are informed about the Project and the scoping process. The notice will describe channels through which further information could be requested or feedback provided to the Project.

The Scoping Document will also be published on the Project website. Other contact information for submitting the comments (as presented above) will also be provided.

Engagement with Stakeholders along Routes not Selected

TAP will inform stakeholders along routes which have not been selected on the conclusion of the route selection process. All stakeholders engaged with to date along routes not selected will be written to advising them as to the preferred route and a summary of the reasons resulting in the preferred route. The letter will provide contact information and offer to discuss any questions or concerns stemming from the route selection process.

8.4

GRIEVANCE MECHANISM

In accordance with international best practice, a grievance mechanism has been established through which any person or organisation can contact the Project to ask a question or raise a concern. The grievance mechanism is detailed in the Stakeholder Engagement Plan for the Project and accords with EBRD standards. The grievance mechanism has been designed to be open and accessible to all, to suit the varying cultural needs of all potential stakeholders, and addresses grievances in a fair and transparent manner. All grievances are recorded and responded to promptly before being closed.

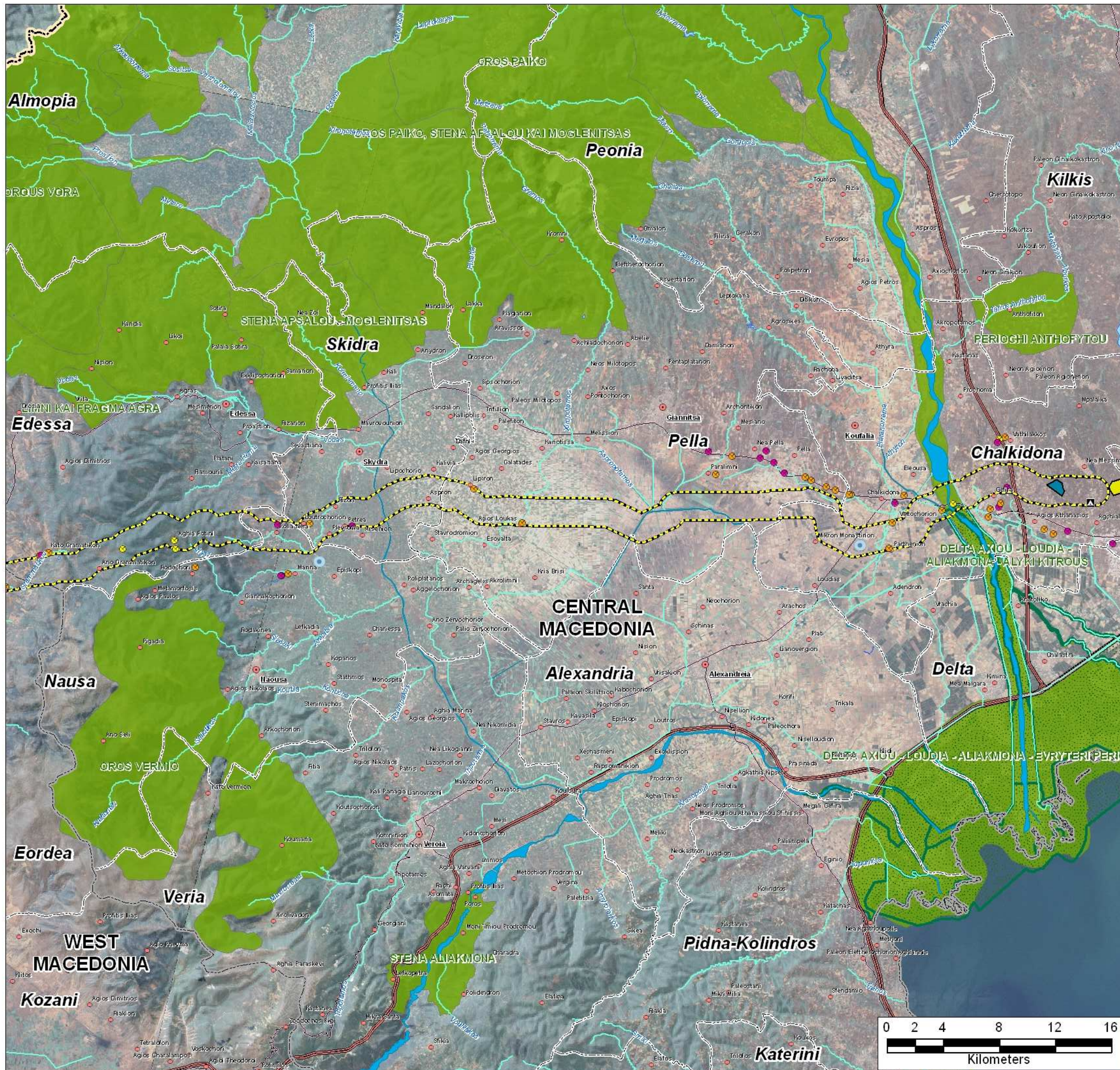
The grievance mechanism is part of TAP's broader process of stakeholder engagement and quality and compliance assurance. While TAP is committed to avoid grievances through its dedication to a good overall stakeholder engagement process, the Project is aware that grievance and complaints will occur and need to be addressed in good faith through a transparent and impartial process.

Details on the grievance process, including grievance forms, are available on the Project website.



Appendix A

Maps



Legend

	Base Case	Main Hydrology
	Logistic	Main Rivers
	Compressor Station (preferred)	Rivers
	Compressor Station (alternative)	Lakes
	Pipeyard	Protected Areas
	Camp Site	Natura 2000
		National Parks
Administrative Boundaries		
	National Boundaries	
	Regional Boundaries	
Municipal Boundaries		
	Municipalities	
Settlements		
	Capital Cities	
	Other Settlements	
Roads		
	Motorway	
	Major Road	
Cultural Heritage Sites		
	Archeological Site	
	Monument	
	Intangible Cultural Heritage Sites	


REFERENCE DRAWINGS:

DOCUMENT TITLE:	DOC. NO.:
ESIA Scoping Report Greece	GAL00-ERM-900-Y-TAE-0001



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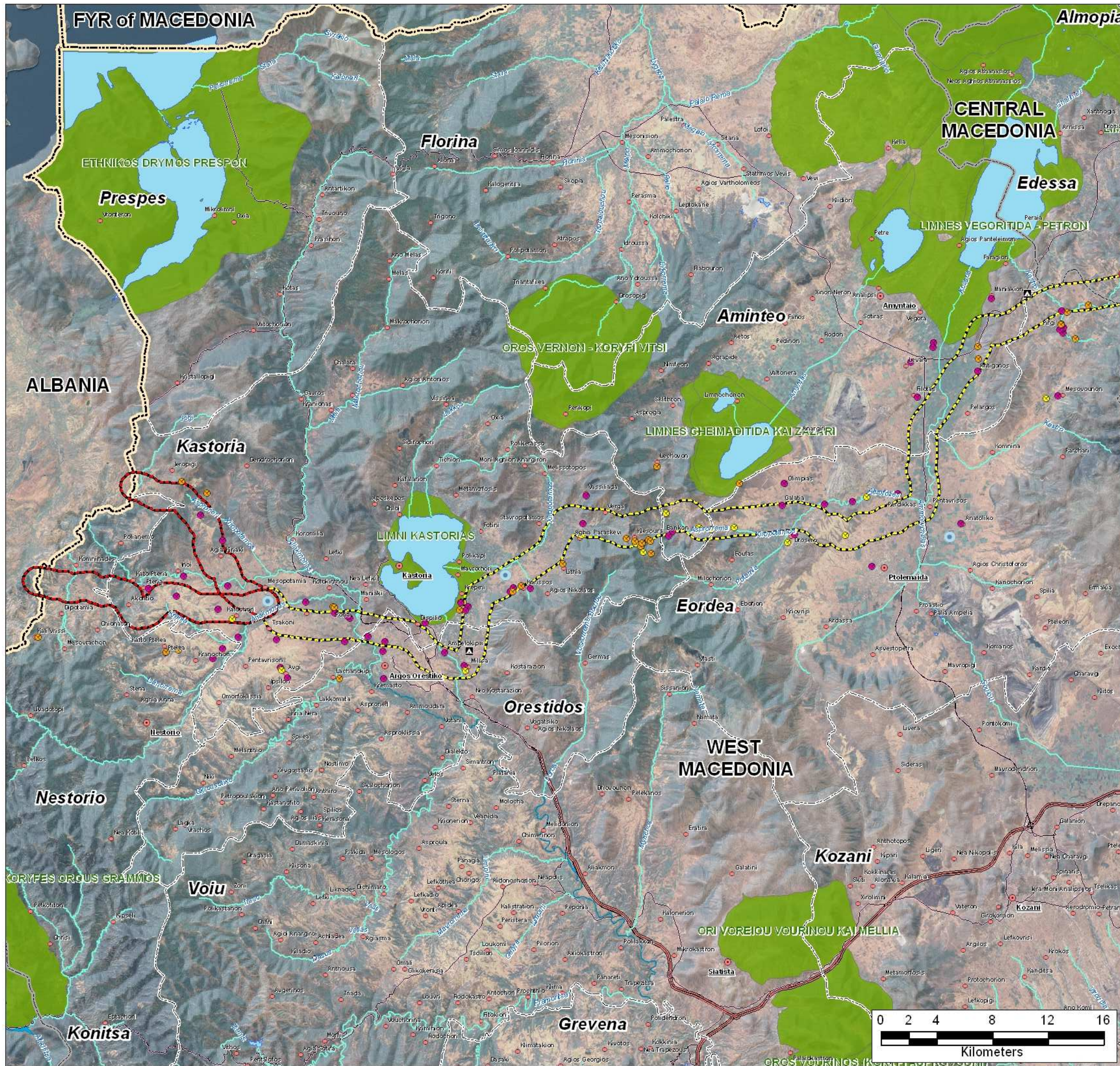
CLIENT: **Trans Adriatic Pipeline**



PROJECT: **Trans Adriatic Pipeline (TAP) Front End Engineering Design (FEED)**

DRAWING TITLE: **Environmental, Socio-Economics and Cultural Heritage Baseline**

SCALE:	PROJECT:	DRAWING NO.:	SHEET OF
1:275,000	0131983	1	1 / 2



Legend

- Base Case**: Yellow dashed line with black border
- Alternatives**: Red solid line
- Protected Areas**:
 - Natura 2000: Green shaded area
 - National Parks: Blue shaded area
- Logistic**:
 - Pipeyard: Blue circle
 - Camp Site: Black triangle
- Administrative Boundaries**:
 - National Boundaries: Dotted line
 - Regional Boundaries: Solid line
 - Municipal Boundaries: Dashed line
- Settlements**:
 - Capital Cities: Red circle with black border
 - Other Settlements: Red circle
- Roads**:
 - Motorway: Red double line
 - Major Road: Black solid line
- Cultural Heritage Sites**:
 - Archeological Site: Purple circle
 - Monument: Orange circle
 - Intangible Cultural Heritage Sites: Yellow circle
- Main Hydrology**:
 - Main Rivers: Blue line
 - Rivers: Light blue line
 - Lakes: Light blue area


REFERENCE DRAWINGS:

DOCUMENT TITLE:	DOC. NO.:
ESIA Scoping Report Greece	GAL00-ERM-900-Y-TAE-0001



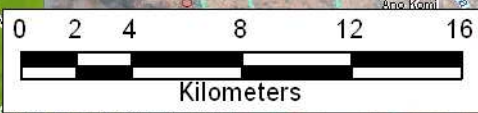
OB	31/05/2011	Accepted	SIP	MTV	ASM
REV	DATE	ISSUE, SCOPE OF REVISION	PREP.	CHECK	APPR.

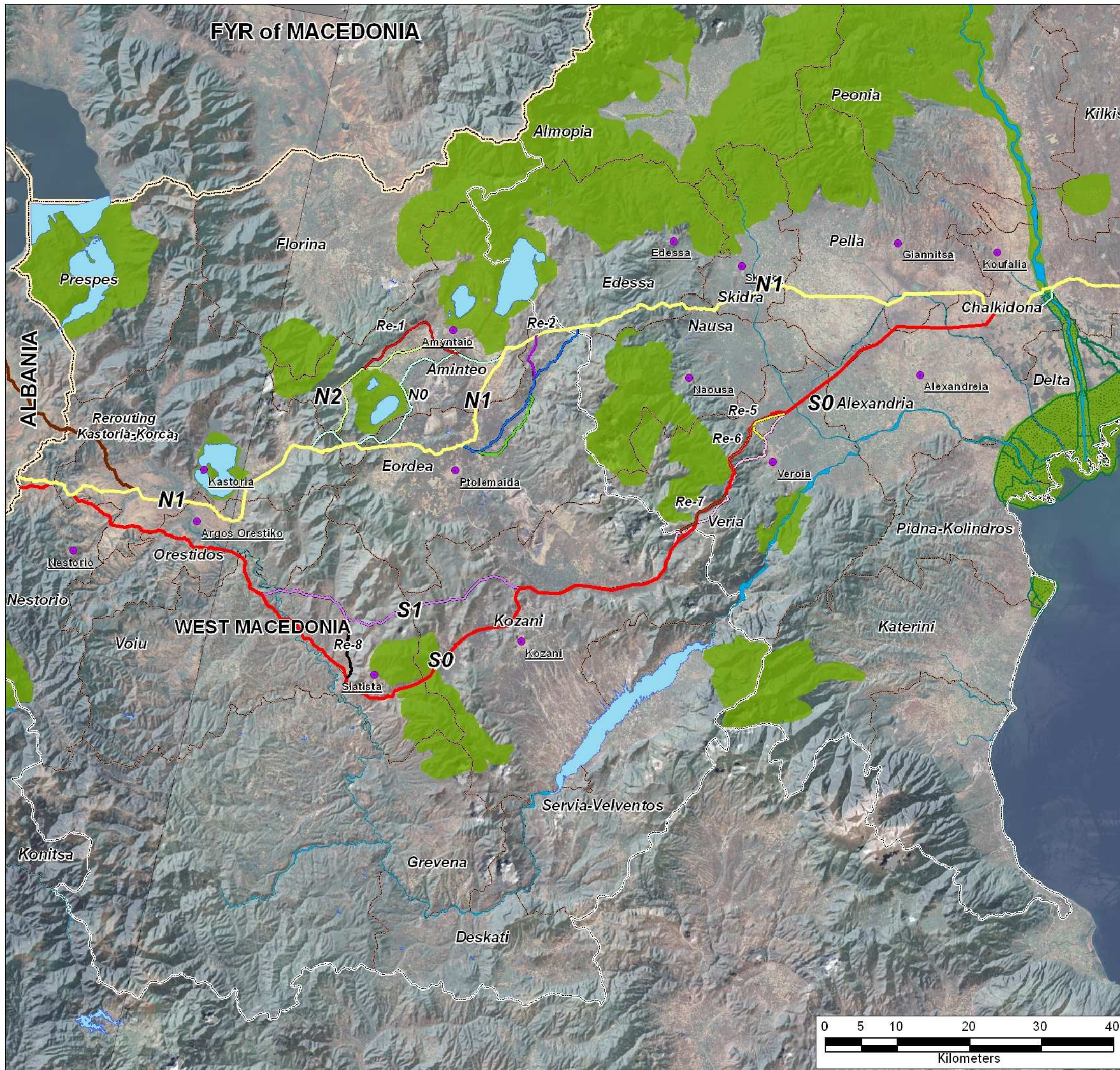
CLIENT: **Trans Adriatic Pipeline**



PROJECT: **Trans Adriatic Pipeline (TAP)
Front End Engineering Design (FEED)**

DRAWING TITLE: Environmental, Socio-Economics and Cultural Heritage Baseline			
SCALE:	PROJECT:	DRAWING NO.:	SHEET OF
1:275,000	0131983	1	2 / 2





Legend

Administrative Boundaries

- National Boundaries
- Regional Boundaries
- Municipal Boundaries

Settlements

- Capital Cities

Protected Areas

- Natura 2000
- National Parks

Main Hydrology

- Main Rivers
- Lakes

Alternatives

- N0 North-0 Alternative
- N1 North-1 Alternative
- N2 North-2 Alternative
- S0 South-0 Alternative
- S1 South-1 Alternative

REFERENCE DRAWINGS:

DOCUMENT TITLE:	DOC. NO.:
ESIA Scoping Report Greece	GAJD0-ERM-000-YTAE-0001



OB	31/05/2011	Accepted	SIP	MTV	ASM
REV	DATE	ISSUE, SCOPE OF REVISION	PREP.	CHECK	APPR.

CLIENT: **Trans Adriatic Pipeline**

PROJECT: **Trans Adriatic Pipeline (TAP)
Front End Engineering Design (FEED)**

DRAWING TITLE: TAP Alternative Routes in Greece			
SCALE:	PROJECT:	DRAWING NO.:	SHEET OF:
1:535,000	0131983	2	1 / 1



Appendix B
Comments Form



Appendix C
Stakeholders List

CONTENTS

<i>1</i>	<i>NATIONAL GOVERNMENT STAKEHOLDERS</i>	<i>2</i>
<i>2</i>	<i>REGIONAL AND LOCAL GOVERNMENT STAKEHOLDERS</i>	<i>3</i>
<i>3</i>	<i>NGOS AND OTHER INTERESTED PARTIES (NATIONAL & REGIONAL)</i>	<i>5</i>

Stakeholder Group(s)	Departments/ Position
Ministry of Environment, Energy & Climate Change	Deputy Minister for Energy issues Director, Ministry of the Environment Deputy Director, Ministry of the Environment Special Environmental Service Directorate of Environmental Planning Directorate of Atmospheric Pollution and Noise Directorate of Natural Environment
Ministry of Defence	
Ministry of Culture	Director of Prehistoric and Classical Antiquities Office of Large Projects
Ministry of Regional Development and Competitiveness	General Secretary of Investments
Ministry of Infrastructure, Transport and Networks	General Secretary
Ministry of Foreign Affairs	Secretary General for International Economic Relations & Development Cooperation
Public Power Corporation	Mines Engineering and Development Department PPC Lignite Centre of West Macedonia - Ptolemaida High Voltage Power Lines Department
KTHMATOLOGIO (Hellenic Cadastre)	Planning and Investment Department General Manager
Egnatia Highway S.A. Regulatory Authority for Energy	
DESFA - Natural Gas System Operator	Managing Director Technical Departments (identified by the Managing Director)
Inspectorate of Mines North Greece	Director of Inspectorate of Mines North Greece and Engineers (Thessaloniki)
Institute of Geological and Mineral Exploration	

Table 2.1 *Regional, Municipal and Settlement Level Authorities*

Region	Municipality	Settlement
Central Macedonia	Alexandreia	N/A
	Chalkidona	Nea Mesimbria
		Gefira
		Valtochorion
		Parthenion
		Mikron Monastirion
	Naousa	Polla Nera
	Edessa	Agia Fotini
		Ano Grammatikon
		Kato Grammatikon
	Skydra	Kalivia
		Aspron
		Petrea
		Plevroma
		Rizon
Loutrochorion		
Pella	Agios Loukas	
	Liparon	
Western Macedonia	Nestorio	N/A
	Eordea	Mesovounon
		Anatoliko Eordeas
		Perdikas
		Galatia
		Droseron
	Kastoria	Klesoura
		Verga
		Korissos
		Dispilio
		Poria
		Chiliodentro
		Tsakoni
		Mesopotamia
		Oik. Pallinostounton
		Kalochori
	Agia Kiriaki	
	Akontion	
	Pteria	
	Er. Kato Pterias	
Lithia		
Orestida	Militsa	
	Ampelokipoi	
Amyntaio	Varikon	

Table 2.2 *List of Participants for Regional Consultation Meetings*

Authority

Region
Head of Regional Council
Directorate of Environment and Spatial Planning
Directorate of Planning and Development
Directorate of Public Projects
Directorate of Land Reclamation Works
Directorate of Agricultural Development
Forest Directorate
Directorate of Technical Services

Municipality
Mayor/ Head of the Commune
Urban Planning Department

Local Community
Heads of Villages within 2 km corridor of preferred route
Secretaries of Local Councils

NGOs/Civil Society
Local NGOs
Other interested parties

Note: Public Meetings and Focus Groups Discussions will be carried out in the ESIA phase in addition to the above

The lists of NGOs, Universities and other interested parties to be included in Stakeholder Engagement activities going forward will continue to be developed as the ESIA process progresses.

Table 3.1 *Preliminary List of Relevant NGOs, Greece*

	Name of the Organisation
1.	ARCTUROS
2.	Callisto – environmental organisation for wildlife and nature
3.	Club of the Friends of the Environment Group Kastoria
4.	Greenpeace Greece
5.	Hellenic Ornithological Society
6.	Hellenic Society for the Protection of Environment and Cultural Heritage
7.	MEDITERRANEAN SOS Network
8.	Pan-Hellenic Network of Ecological Organizations (ΠΑΝΔΟΙΚΟ)
9.	Pindos Perivallontiki
10.	WWF Greece

Table 3.2 *Universities and Research Centres*

	Name of the Organisation
1.	National Polytechnic University
2.	Aristotle University of Thessaloniki
3.	University of Ioannina
4.	Greek Biotope / Wetland Centre
5.	Hellenic Centre for Marine Research - Institute of inland waters
6.	National and Kapodistrian University of Athens
7.	Laboratory of Environmental Research of National Centre of Scientific Research 'DEMOKRITOS'

Table 3.3 *Other Interested Parties*

	Name of the Organisation
1.	EBRD - European Bank for Reconstruction and Development
2.	Hunting Federation of Macedonia and Thrace (ΚΟΜΑΘ)



Appendix D
ESIA Action Plan

Table 1.1 Environmental Desk-top, Field and Modeling Activities

Resource	Approach	Parameters	Period
Surface, Ground Water and Hydrobiology	<p><i>Desk:</i></p> <ul style="list-style-type: none"> Bibliographical/desk based literature review Remote sensing interpretation using aerial photographs or satellite imagery. 	<p>(i) Surface Water: The following data will be collected: <u>River morphology and channel descriptions</u></p> <p><u>Water Quality</u> – physico-chemical parameters</p>	<p>(i) Preferred Timing of field surveys: Spring (early May) and late summer (September).</p> <p>(ii) Preferred Timing of field surveys: End of May - June</p>
	<p><i>Field study:</i></p> <p>(i) Sampling and analysis of selected main crossings of permanent rivers, streams, creeks, channels.</p> <p>(ii) Collect groundwater samples from selected existing wells within 500 m from the selected route</p> <p>(iii) Hydrobiology – collect macrozoobenthos and phybenthos (diatoms)</p>	<p><u>Sediment Quality</u> (for potentially contaminated rivers only). - physico-chemical and biological parameters</p> <p>(ii) For groundwater: physico-chemical parameters</p> <p>(iii) qualitative and semi-quantitative analysis of macrozoobenthos and phytobenthos</p>	<p>(iii) Preferred Timing of field surveys: End of May - June</p>
	<p><i>Output:</i></p> <ul style="list-style-type: none"> Mapping of air quality sensitive receivers (the scale of cartography will range from 1:5,000 – 1: 50,000) Characterisation of baseline water quality at survey locations Characterization of river morphology and biological communities. 		

Resource	Approach	Parameters	Period
Vegetation & Flora	<p><i>Desk:</i></p> <ul style="list-style-type: none"> • Bibliographical search; and • desk top/GIS data elaboration • Remote sensing analysis: <p><i>Field study:</i></p> <p>Survey of the terrestrial environment to describe the existing habitat type and identify flora species of interest. Surveys will focus primarily on areas of ecological and conservational interest.</p> <p>Specific field surveys will also have be conducted for the Appropriate Assessment on Natura 2000.</p> <p><i>Output:</i></p> <ul style="list-style-type: none"> • Flora species list and distribution • Vegetation map: the scale of cartography will range from 1:5,000 – 1: 50,000. • Characterisation of vegetation and flora at survey locations • Aquatic and riparian flora characterisation including species, conservation status and interest. 	<ul style="list-style-type: none"> • Vegetation and flora surveys will focus on species of conservation interest and priority habitats • Endangered and other endemic/important species under Greek, EU and Council of Europe • Aquatic and riparian flora 	<p>Timing of field surveys: May - late July</p> <p>Aquatic: May and early September</p>

Resource	Approach	Parameters	Period
Fauna & Habitats	<p><i>Desk:</i></p> <ul style="list-style-type: none"> • Bibliographical search; • desk top/GIS data elaboration, and • Remote sensing analysis: <p><i>Field study:</i></p> <p>Survey of the terrestrial environment to describe the existing habitat type and identify fauna species of interest. Surveys will focus primarily on areas of ecological and conservational interest.</p> <p>Aspects to be identified:</p> <ul style="list-style-type: none"> • Habitat types • Fauna species list and distribution • Sensitive habitats <p>Specific field surveys will also have be conducted for the Appropriate Assessment on Natura 2000.</p> <p><i>Output:</i></p> <ul style="list-style-type: none"> • Fauna species list and distribution. • Species distribution along the route (on the Habitat Map): the scale of cartography will range from 1:5,000 – 1: 50,000, corridor width 500 m. • Characterisation of fauna and habitats at survey locations • A catalogue of animal signs/tracks and species field pictures. • Location of sites of interest along the route (based on availability) such as: breeding areas, mammal burrows, small wetlands ponds, etc... 	<p>Vertebrates, particularly focusing on species of interest, including:</p> <ul style="list-style-type: none"> • Priority fauna species (bear, wolf, otter, terrestrial turtle and <i>Spermophilus citellus</i>) • Nesting Birds • Fish • Amphibians, • Reptiles, • Small mammal 	<p>Timing of field surveys:</p> <ul style="list-style-type: none"> • Priority fauna species (bear, wolf, otter): June-July. Tracks and other indirect presence signals. • Nesting birds: Late May late June. • Fish: May and August. • Amphibians, reptiles, small mammals: May and Aug-September.

Resource	Approach	Parameters	Period
Air	<p><i>Desk:</i></p> <ul style="list-style-type: none"> Bibliographical and desk based literature review <p><i>Field Study:</i></p> <ul style="list-style-type: none"> A specialist will conduct a study to determine the status of local air quality using existing monitoring data or by conducting measurements. Air quality sampling, using diffusion tubes, at villages near proposed Compressor Station locations over a minimum of four weeks. <p><i>Output:</i></p> <ul style="list-style-type: none"> Mapping of air quality sensitive receivers (the scale of cartography will range from 1:5,000 – 1: 50,000) Characterisation of baseline air quality at proposed compressor station site Modeling of emission dispersion from compressor operation only. 	<p>Parameters to be measured will include:</p> <ul style="list-style-type: none"> Oxides of nitrogen (NO_x) Sulphur dioxide (SO₂) Hydrocarbons (VOC_s). Carbon Monoxide (CO) 	<ul style="list-style-type: none"> Timing of field surveys: June-July Timing of Modeling: May

Resource	Approach	Parameters	Period
Noise & Vibration	<p><i>Desk:</i></p> <ul style="list-style-type: none"> Bibliographical and desk based literature review. <p><i>Field Study:</i></p> <ul style="list-style-type: none"> A specialist will conduct a study of ambient noise levels. The study will identify locations of sensitive receptors. Both short term and long term measurements are to be collected. Measurements are to be taken continuously during the day and the night time (24 hours) at villages near proposed Compressor Stations locations. Moreover, hourly measurements at villages close to the selected pipeline route other project features (accesses, pipe yards, etc.) that may be impacted temporarily by construction activities. <p><i>Output:</i></p> <ul style="list-style-type: none"> Mapping of noise sensitive receivers (the scale of cartography will range from 1:5,000 – 1: 50,000) Characterisation of baseline noise levels at proposed compressor station site Modeling of noise emissions anticipated from compressor operation 	<ul style="list-style-type: none"> Acoustical measurements using a Type I or Type II integrating sound level meter monitoring the slow response, A-weighted, equivalent sound pressure level (Leq) at selected location 	<ul style="list-style-type: none"> Timing of field surveys: May-June Timing of Modeling: May-June
Light Pollution	<ul style="list-style-type: none"> Identify sources of light emissions, potential sensitive receptors and view points 	<ul style="list-style-type: none"> Light emissions and potential sensitive receivers 	N/A

Resource	Approach	Parameters	Period
Soil & Geology	<p><i>Desk:</i></p> <ul style="list-style-type: none"> Bibliographical/desk based literature review, including project information Remote sensing interpretation using Soil maps (1:50,000 or similar) and aerial photographs or satellite imagery. <p><i>Field study (soil)</i></p> <ul style="list-style-type: none"> The soil specialist will undertake study of: <ul style="list-style-type: none"> soil physico-chemical characteristics; existing soil contamination; Economic value of soil types <p><i>Output</i></p> <ul style="list-style-type: none"> Geological/hydro geological cartography to 1: 50,000 scale along the selected corridor (500 m wide) and other project features (accesses, pipe yards etc.). 	<ul style="list-style-type: none"> Soil types State of the agricultural surfaces; Characterization of the agricultural productivity Major characteristics of soil profile Soil contamination (only for screening purposes) Land Ownership: private, state, communal and not distributed; <p>Investigation will include analysis of soil samples of upper layers of soil at locations with agricultural land use and areas of potential soil contamination. The soil specialist will also conduct visual assessment of soils for fertility parameters.</p>	<ul style="list-style-type: none"> Timing of field surveys: May - June

Resource	Approach	Parameters	Period
Landscape	<p><i>Desk:</i></p> <ul style="list-style-type: none"> • GIS desk top analysis to assess landscape quality width. Special attention will be given to: <ul style="list-style-type: none"> - Compressor and block valve stations locations - Areas of high landscape value (mountain areas, forested areas, etc.) • 3D simulations on the Compressor Stations to include: <ul style="list-style-type: none"> - View sheds analyses - 3D simulation <p><i>Field</i></p> <p>Visual assessment during corridor survey</p> <p><i>Output.</i></p> <ul style="list-style-type: none"> • Mapping of landscape quality (the scale of cartography will range from 1:5,000 – 1:50,000) • Characterisation of landscape within areas of high landscape value • 3D Model of compressor station 	<ul style="list-style-type: none"> • Location of visual sensitive receivers • Characterisation of landscape where permanent structures will be located 	<ul style="list-style-type: none"> • Timing of field surveys: end of May - June • Timing of Modeling: June

Table 1.2 Cultural Heritage Desk-top and Field Survey Activities

Resource	Approach	Parameters	Period
Cultural Heritage Resources	<p><i>Desk:</i></p> <ul style="list-style-type: none"> • Bibliographic search • Identification/mapping of areas of high archaeological potential <p><i>Field :</i></p> <ul style="list-style-type: none"> • Field visual survey <p><i>Output.</i></p> <ul style="list-style-type: none"> • Characterisation of CH elements • The scale of cartography will range from 1:5,000 – 1: 50,000. 	<ul style="list-style-type: none"> • Monuments, buildings and above ground structures of cultural interest • Intangible Cultural Heritage (ICH) • Archaeological sites 	<ul style="list-style-type: none"> • Timing of field surveys: June

Table 1.3 Socioeconomic Desk-top and Field Survey Activities

Resource	Approach	Parameters	Period
Traffic and Transport	<p><i>Desk:</i></p> <ul style="list-style-type: none"> • Desk based review of existing information on regional transport network, including rural roads • Description of the current status of vehicle traffic on the roads affected by the project and assessment of the integrity of Project transportation routes. <p><i>Field:</i></p> <ul style="list-style-type: none"> • The social experts deployed in the field will identify major junctions and key areas where project traffic could become an issue related to the following: <ul style="list-style-type: none"> – community health and safety – congestion and flow – impacts to cultural heritage • The field study will be based on both interviews and observations (including traffic counts) <p><i>Output.</i></p> <ul style="list-style-type: none"> • Municipal and Village profiles • Findings report on traffic flow on roads and at major junctions. 	<ul style="list-style-type: none"> • Traffic characterisation: current usage patterns and volumes • Structural properties (load limits, traffic volume limits) • Functionality (condition of road surface) • Transportation practices • Access routes 	<ul style="list-style-type: none"> • Timing of field surveys: June

Resource	Approach	Parameters	Period
Demographics and Population	<p><i>Desk:</i></p> <ul style="list-style-type: none"> • Bibliographical and desk based literature review. • Review of official INSTAT data. • GIS / Cartography desk top analysis to assess settlement size and distribution, • Review of data gaps and updating information as appropriate. <p><i>Field :</i></p> <ul style="list-style-type: none"> • A team of social specialists will conduct a survey to determine the general socioeconomic characteristics of the study area including demographics and population trends. • Household Survey to collect qualitative data including data on population and demographics. <p><i>Output.</i></p> <ul style="list-style-type: none"> • Commune and Village profiles • Sample quantitative assessment of key population characteristics 	<ul style="list-style-type: none"> • Settlement patterns and mapping • Population size of settlements within 2 km corridor and area around installations. • population trends • in and out migration • Gender and age structure • Religious and ethnic diversity, including minorities • Vulnerable Groups (i.e. women, elderly, etc) • Education and literacy levels 	<ul style="list-style-type: none"> • Timing of field surveys: September/October

Resource	Approach	Parameters	Period
Land Use and Development	<p><i>Desk:</i></p> <ul style="list-style-type: none"> • Bibliographic search • GIS desk top analysis of land use (CORINE, Land Sat images) <p><i>Field:</i></p> <ul style="list-style-type: none"> • The teams of social specialists deployed in the field will ground truth GIS based information on land uses. This will be undertaken on a sample basis only • The teams will assess community dependency on natural resources, including water and land, through results of focus groups and interviews with key informants, including heads of municipalities and villages. <p><i>Output:</i></p> <ul style="list-style-type: none"> • Sample qualitative and quantitative assessment of land tenure structure within the 2 km corridor and area around installations. • Understanding of land use within 2 km corridor and areas around installations • Mapping of land use scale of cartography outputs will range between 1: 5,000 and 1:50,000 	<ul style="list-style-type: none"> • Land use • Land ownership and tenure • Traditional land titles • Spatial planning and development • Use and dependency on natural resources, including land for agriculture and pasture. • Specific study on forestry as an economic resource on relevant areas 	<ul style="list-style-type: none"> • Timing of field surveys: September/October

Resource	Approach	Parameters	Period
Socio-Cultural Institutions and Government Administration	<p><i>Desk:</i></p> <ul style="list-style-type: none"> Review of existing desk based (secondary) information on the structure of socio-cultural institutions and administrations <p><i>Field:</i></p> <ul style="list-style-type: none"> As part of the overall socioeconomic survey and stakeholder engagement activities the field teams will assess the presence and structure of social institutions through interviews and focus groups. <p><i>Output:</i> Profile of administrative and community institutions</p>	<ul style="list-style-type: none"> Government structures Presence and role of other institutions (NGOs/CBOs) Social organisations and institutions Social networks, power hierarchies and support structures Role of women Leadership patterns Safety, security, law and order 	Timing of field surveys: September/October

Resource	Approach	Parameters	Period
Livelihoods and Micro-Economy	<p><i>Desk:</i></p> <ul style="list-style-type: none"> Review of existing desk based information on the local economy and livelihoods including unemployment and employment structures <p><i>Field:</i></p> <ul style="list-style-type: none"> The social teams deployed in the field will assess the means of livelihood and income for all communities within the 2 km corridor and areas around installations. The assessment will be done through qualitative methodologies (focus groups and interviews with key informants). Quantitative data will be collected if a household survey is undertaken. Information on alternative livelihood options due to economic resettlement will be investigated. <p><i>Output:</i></p> <ul style="list-style-type: none"> Municipal and Village profiles Qualitative assessment of household livelihoods and income Qualitative assessment of employment structure Qualitative assessment of alternative livelihoods 	<ul style="list-style-type: none"> Livelihood and economic profile Economic importance of key sectors: tourism, logging, agriculture etc Income distribution Occupation and employment structure including proponent's employment plan Vulnerability and subsistence economy Opportunities for alternative livelihood activities 	<ul style="list-style-type: none"> Timing of field surveys: September-October

Resource	Approach	Parameters	Period
Social Infrastructure	<p><i>Desk:</i></p> <ul style="list-style-type: none"> Review of existing desk based information on infrastructures <p><i>Field:</i></p> <ul style="list-style-type: none"> The field survey teams will visit all settlements within the 2 km corridor and the areas around installations to assess the situation vis a vis social infrastructure and to collect relevant data to develop the municipal and village profiles. The teams will use a combination of observation techniques and interviews with key informants to locate infrastructures and areas of interest. <p><i>Output:</i></p> <ul style="list-style-type: none"> Municipal and Village profiles List of sites of cultural and religious significance (<i>see</i> Cultural heritage survey) Mapping of sites. Scale of cartography outputs will range between 1: 5,000 and 1:50,000 	<ul style="list-style-type: none"> Settlements Key man made features Economic, culture and historical sites Recreational facilities (nature and location) Cultural and religious facilities/ sites (nature and location) Cultural traditions Sites of cultural and religious significance Education and health resources (nature and location) Utilities (i.e. water, electricity, telecommunications, etc) 	<ul style="list-style-type: none"> Timing of field surveys: September-October

Resource	Approach	Parameters	Period
Community Health	<p><i>Desk:</i></p> <ul style="list-style-type: none"> Review of existing desk based information on the health status and resources of local communities <p><i>Field:</i></p> <ul style="list-style-type: none"> The social teams deployed in the field will assess the health status and health resources available to communities located within the 2 km corridor and areas around installations. The assessment will be done through a combination of qualitative methodologies (focus groups and interviews with key informants like doctors and nurses) and quantitative methods <p><i>Output:</i></p> <ul style="list-style-type: none"> Health Profile of the Villages and Municipality Review of health care resources High level health capacity review 	<ul style="list-style-type: none"> Community health status Health determinants Community health needs and concerns of host communities Health Care resources 	<ul style="list-style-type: none"> Timing of field surveys: September - October