

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PROJECT OWNER: I.G.I. POSEDON s.a.



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### **Abbreviations**

<b>Abbreviation</b>	<b>Description</b>
AIS	Automated Identification System
ALT1	Alternative Routing 1
ALT1a	Alternative Routing 1a (proposed)
ALT1b	Alternative Routing 1b
ALT2	Alternative Routing 2
ALT3	Alternative Routing 3
ALT4	Alternative Routing 4
ALT5	Alternative Routing 5
ALT6	Alternative Routing 6
ALT7	Alternative Routing 7
AuTH	Aristotle University of Thessaloniki
C/S-M/S (CS or Station)	Compressor and Metering Station
DESFA	Hellenic Gas Transmission System Operator S.A.
DEPA	Public Gas Cooperation S.A.
DMS	Detailed Marine Survey
ESIA	Environmental and Social Impact Assessment
EPC	Engineering, Procurement and Construction Contractor
EREL	Environmental Research Laboratory, EREL of Demokritos National Research Center
ESMMP	Environmental and Social Monitoring and Management Plan
ESYE	National Statistical Service of Greece
ETA	Environmental Terms Approval
FEED	Front End Engineering Design
GTP	General Town Plan
HCMR	Hellenic Centre of Marine Research
HGG	Hellenic Government Gazette
HMGS	Hellenic Military Geographical Service
HAZID	Hazard Identification and Qualitative Risk Assessment
HAZOP	Hazard and Operability Study
IGME	Institute of Geology and Mineral Exploration
IBA	Important Bird Area
ICSS	Integrated Control and Safety System
IGI	Interconnector Greece - Italy
IMO	International Maritime Organization
ITG	Interconnector Greece - Turkey
KP	Kilometric Position
JMD	Joint Ministerial Decision
LF	Land Fall
MS	Meteorological Station
MD	Ministerial Decision
MEECC	Ministry of Environment, Energy and Climate Change
OTA	Local Governance Organizations (Municipalities, Communities, etc.)
OTE	Hellenic Telecommunication Organization
PD	Presidential Decree
PEIA	Preliminary Environmental Impact Assessment
PPC	Public Power Corporation

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PESIA	Preliminary Environmental and Social Impact Assessment
RMS	Reconnaissance Marine Survey
ROV	Remote Operated Vehicle
SAC	Special Area of Conservation
SCADA	Supervisory Control And Data Acquisition
SPA	Special Protection Area
UXO	Unexploded Ordnance
W/T	Wind Turbines

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## **0 Executive Summary**

The Greek Part of the Offshore Natural Gas Pipeline is part of the Greece – Italy High Pressure Natural Gas Pipeline that will supply Western Europe with natural gas from the Caspian Sea area, the Middle East and Eastern Mediterranean. This project is expected to promote Greece to a key energy player, in the broader region and a natural gas route between East and West. Additionally, this project ensures future provision of Epirus with Natural Gas.

According to L.4001/2011, the project is characterized as of Natural Significance. It is also included on the Regional Plan of Epirus.

The present study covers (i) the Greek offshore part of the Natural Gas Pipeline, of 146km approximately, from the landfall point at the Greek shores of Thesprotia Prefecture, south of Corfu Island, towards Otranto, Italy, and up to the middle of the sea crossing between Greece and Italy; (ii) the Compressor and Metering Stations, which constitute an indispensable operational element of the above mentioned route part; and (iii) the onshore Pipeline, from the landfall point to the Compressor and Metering Stations.

The pipeline will have a 32” diameter and 140bar operation pressure (160bar design pressure). The project will have initially a transportation capacity of 9BCM with a potential of future expansion to 12BCM.

Five (5) near shore (coastal) Alternative Offshore Routes were examined from a technical point of view. These correspond to the relevant onshore parts ending at the five (5) landfall sites (sites “Stamponi”, “Sofas”, “Stavrolimenas”, “Omprela 1” and “Omprela 2”). They all meet with the offshore (deep-water) pipeline OS-A that was qualified during the feasibility study. Alternative offshore routings OS-AA and OS-B refer to the deepest section of the offshore part and, although technically feasible, are not preferable. Alternative offshore routing D technically was rejected since it creates significant navigational and maritime safety issues and on top of that environmental and permitting (e.g. crossing in short width of numerous international cables) issues. The proposed OS-A route keeps the required distance from the wrecks which were discovered during the archaeological survey, therefore no impact is expected to them.

Regarding the Compression and Metering Facilities, eight (8) locations have been examined. These are: C/S-M/S 1, which corresponds to the onshore route ALT4;

C/S-M/S Kalivia, which corresponds to the onshore routes ALT3 and ALT4; C/S-M/S Florovouni, which corresponds to the onshore routes ALT1a and ALT1b; C/S-M/S Variko, which corresponds to the onshore routes ALT1, ALT1b, ALT5 and ALT7; C/S-M/S 2, which corresponds to the onshore routes ALT1, ALT1b, ALT5 and ALT7; C/S-M/S Gouri, which corresponds to the onshore routes ALT2 and ALT6; C/S-M/S 3, which corresponds to the onshore routes ALT1, ALT1a, ALT1b and ALT5; C/S-M/S 4, which corresponds to the onshore routes ALT5, and ALT6.

Nine (9) onshore routings were investigated as alternatives and are illustrated in the maps of scales 1:50.000, 1:30.000 and 1:5.000 included in the annexes. These are: ALT1a (Proposed Route), ALT1b, ALT1 (corresponding to EX2 in the PEIA), ALT2 (corresponding to EX2A in the PEIA), ALT3 (corresponding to KX in the PEIA), ALT4 (corresponding to EX1 in the PEIA), ALT5 (corresponding to EX4A in the PEIA), ALT6 (corresponding to EX4 in the PEIA) and ALT7 (corresponding to EX3 in the PEIA). Routings ALT1a, ALT1b, ALT1, ALT2, ALT5 and ALT6 traverse through Thesprotia and Preveza Prefectures, while ALT3, ALT4 and ALT7 traverse only Thesprotia Prefecture. The Proposed Route ALT1a has a landfall site in “Omprela 2” location, which is situated in the shores of Thesprotia Prefecture.

All investigated routings take into consideration the existing and planned land uses, and under no circumstance do the routings affect any communal or industrial activities in the area. Additionally, investigated routings have no significant impact on the regional flora or fauna, do not endanger biodiversity, and are not engaged with any areas of environmental interest or subject to special environmental protection. No special crossings with significant water flows, natural or artificial, exist. Additionally, due to the small depth of the pipeline’s trench, 2m approximately, no breaking of the underground or surface water flow transfer is expected. Investigated routings cross the existing transport network at selected locations, so as to ensure the unobstructed continuation of transportation.

It is noted that the Project had received the Preliminary Environmental Impact Assessment with the Decision 13021/17.09.10 of the Ministry of Environment, Energy and Climate Change, for the pipeline route from C/S –M/S Variko till the landfall site “Omprela 2” and the relevant offshore route. Then, as recommended by the Local Authorities in front of the ‘Committee on Production and Commerce’ of the Greek Parliament, the broader area of Florovouni was investigated as a new site for the

onshore facilities. This modification, along with the corresponding modifications of the pipeline route, received the 200088/08.07.11 Approval of the Complementary PEIA.

The proposed onshore route (Alt 1a), starting from the proposed location of the Compression and Metering Facilities (C/S-M/S Florovouni) till the landfall point of Omprela 2, was concluded after meetings and contacts with local community representatives, in order to consider, as much as possible, their opinion. The proposed routing of the Natural Gas Pipeline complies with all International Codes of Design and Construction for safe design and construction for both the onshore and offshore section. Considering that this route had already received the Preliminary Environmental Permitting, the (actually completed) Front End Engineering Design, as well as the Detailed Marine Survey, was focused on it. The proposed routing does not cross through settlements, is not engaged with any sort of residential land uses, nor does it affect archaeological sites.

Limited impacts on the natural environment are expected, during construction phase. Onshore, impacts are caused by the increase of air pollutants along the construction works, originated by the transport and construction machinery. These air pollutants will be emitted only during daytime and will present a linear, local, temporary and reversible development. Moreover, limited, local, fully reversible impacts to the flora are expected. Offshore, up to the 25m depth contour, approximately 550m from the shore for ALT1a, mechanical disruption of the seabed shall take place, increasing the suspended particles of the water column. This impact is temporary and reversible. At bigger depths, no impacts are expected caused by the pipeline's placement. Overall, during construction phase, impacts on marine biodiversity are temporary, reversible while all the proper mitigation measures will be taken.

During operation, limited air pollutants and noise emission is expected, originating only from the Compression and Metering Facilities, which will comply with the existing legislation. Negative impacts on the human and natural environment and landscape aesthetics are deemed inconsequential. There is no disruption of the natural habitats. On the contrary, major positive impacts to regional industry, marine environment, tourism and fishing are assessed through the envisaged mitigation measures, mainly the following:

- Provision of Epirus with Natural Gas and boosting of Regional economy, and

- Creation of artificial reef till the depth of 25m, which corresponds to the buried offshore pipeline length and possibilities of mild tourism forms (recreational fishing, diving).

The project is of National Significance and presents strategic benefits for Greece. Considerable development opportunities are created for the Regional, not only local, community and economy; opportunities related to the future Natural Gas availability and its usage in sectors of commerce, energy, manufacturing and industry. This has been provisioned in L.4001/2011. It should be noted that, on the way to a clean energy future, Natural Gas is the most eco-friendly conventional fuel and the cheapest one. Finally, the project poses opportunities for touristic development.

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## 1 PROJECT CHARACTERISTICS

### 1.1 Name and Type of the Project

The present Environmental and Social Impact Assessment (E.S.I.A.) was prepared to cover the needs of the project “Greek Offshore part of the Natural Gas Interconnector Greece – Italy” with the relevant Onshore Facilities. This study covers the following major components of the project:

- The offshore section of the pipeline from the landing point<sup>1</sup>, on the Greek coastline of Thesprotia Regional Entity, passing south of Corfu Island, to the middle of the sea crossing between Greece and Italy, east of Otranto, Italy.
- The Compressor and Metering Station (C.S. - M.S.)<sup>2</sup> of the Project, near the Greek coast at Thesprotia Regional Entity.
- The onshore section of the pipeline from the C.S. - M.S. to the landfall point, in Thesprotia Regional Entity.

Project’s components are complemented by a small block valve station at approximately 600m from the Greek landfall site, necessary for the safety of the natural gas pipeline.

This Project is expected to bring a geopolitical diversification of energy resources, since it will supply the market of Western Europe with Natural Gas from the Caspian Region, Middle East and Eastern Mediterranean reserves. Additionally, through the onshore section, it is intended to provide Epirus Region with natural gas, through EPA (Natural Gas Cooperation) of Epirus that will be created according to Greek Law 4001/2011.

The particular Project (140bar operating and 160 design pressure), is classified in the 1st subsector of the Category A in the 11th group (Transportation of Energy, Fuels and Chemicals, s/n 1, Pipelines of national importance or incorporated in European

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<sup>1</sup> Landfall point is the point where the offshore Natural Gas Pipeline approaches the shore.

<sup>2</sup> Compressor and Metering Facilities (aka C.S.-M.S. or Station) are the facilities for measuring the quantities of Natural Gas and for compressing it, in order to pass through the offshore section.

of National Networks and their supporting facilities)<sup>3</sup>. This means that a full E.I.A. is required by the competent authorities in order to issue the Environmental Terms and grant permission for construction according to Law 4014/2011 (HGG A' 209)<sup>4</sup>.

The project received the 130201/17.09.10 Approval of the P.E.I.A. for Omprela 2-Variko project's components. After the recommendation of the Local Authorities' representatives in front of the 'Committee on Production and Commerce' of the Greek Parliament, the area of Florovouni was investigated for new site of the onshore facilities. This modification, along with the corresponding modifications of the pipeline route, received the 200088/08.07.11 Approval of the PEIA.

According to Law 4001/2011, ar. 176, the project has been characterized as of National Importance and Public Interest. In the following table Table 1.1), the relevant legislation regarding the environmental licensing procedure of the project is presented.

It should be noted that currently, a reformation of the national environmental licensing legislation is under way based on the provisions of L. 4014/2011. Not all the acts provided in L.4014/2011 had been issued by the time of the submission of this study. Consequently, the use of former decisions, still valid, has been made (Law 1650/86, Law 3010/2002, MD 11014/703Φ104/2003).

Project owner should follow up the legislative restructure and meet the new requirements, as they are dictated by the new decisions (e.g. web publishing).

**Table 1.1 Legislative Framework regarding project's Environmental Licensing.**

Relevant Legislation	Legal Framework
<b>L. 1650/86</b> HGG 160A 18/10/86	For the protection of the environment.
<b>L. 3010/2002</b> HGG 91 A 25/4/2002	Harmonization of L. 1650/1986 with Directives 97/11 E.U. and 96/61/E.U. etc.

<sup>3</sup> The same classification stands according to the previous applied JMD 15393/02, too.

<sup>4</sup> The same applies according to the previous applied legislation, i.e. Article 3 of Chapter A of the J.M.D. 11014/703/Φ104/03 (H.G.G. 332/B'/20.03.03) and the provisions of Law 3010/2002 and Law 1650/1986.

Relevant Legislation	Legal Framework
<b>L.4014/2011</b> HGG 209A 21/09/2011	Environmental licensing of projects and enterprises, etc <sup>5</sup>
<b>L. 4001/2011</b> HGG 179 A 22/08/2011	For the operation of Energy Market of Electricity and Natural Gas, Research, Production and transmission lines of Hydrocarbons, etc.
<b>MD 1985/2012</b> (HGG 21/B/13.01.2012)	Classification of public projects and enterprises in categories and subcategories according to art.1 of L.4014/2011.
<b>M.D. 11014/703/Φ104</b> HGG 332B 20/3/2003	Procedure of Preliminary Environmental Impact Assessment (PEIA) and Approval of Environmental Terms (AEPO) according to art.4 of L.1650/1986, as amended by art.1 of L.3010/2002.
<b>M.D. 37111/2021/26.9.03</b> HGG 391/B/29.9.03	Determination of means of public information and participation during the procedure of Approval of Environmental Terms (AEPO) of projects and enterprises according to par 2 of art. 5 of L.1650/86 as amended by par. 2 and 3 of L.3010/02.
<b>JMD 69269/5387/90</b> HGG 678B 25/10/90	Classification of projects and enterprises in categories, contents of EIA, determination of content of EIA etc, based on L.1650/86.

## 1.2 Project Developer

Owner of the understudy project is the “Natural Gas Submarine Interconnector Greece – Italy - POSEIDON S.A.” company, in which D.EP.A. S.A (Greek) and EDISON S.A. (Italian) participate in half.

POSEIDON S.A. headquarters are in 92, Marinou Antipa str, P.C. 141 21, Iraklio, Attica.

Competent Engineers: Mr. Kostopoulos, G. (Technical Director of POSEIDON S.A.), Mr. Manolis, D., economist, Mr. Tyroyiannis, C, civil engineer, and Mrs Galiotou, V., mechanical engineer.

Telephone: (0030) 210-2701216, 210-2701281

<sup>5</sup> Up till the submission of the present study, not all the Presidential Decrees, Ministerial and Joint Ministerial Decisions authorized by L.4014/2011 were issued so as the new law to be fully implemented.

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Fax: (0030) 210-2750249

The E.S.I.A. of the Greek Offshore Part of the Natural Gas Interconnector Greece – Italy, from the coasts of Epirus, south of Corfu and towards Otranto has been assigned to ASPROFOS S.A. technical company, which has also undertaken the performance of the PEIA and Supplementary PEIA of the project. ASPROFOS S.A. belongs to the Broader Public Sector.

ASPROFOS S.A offices are located at 284,El. Venizelou Av. 17675 Kallithea, Tel.: 210-9491600, Fax: 210-9491610.

### **1.3 Study Group**

The preparation of this E.I.A. lasted from August 2008 till the December 2011, taking into account the preparation of the PEIA, since the Owner of the project requested constant environmental monitoring and supervision of the project. Individual tasks were assigned and completed by an interdisciplinary study group of ASPROFOS, consisting of the following members:

1. Spanidis Mark-Philip, Dr. Topographer-Surveyor Engineer
2. Lattas Spyros, Dr Chemical Engineer
3. Protopappa Irene, Dr Geologist - Meteorologist
4. Anastasiou Maria, Oil and Natural Gas Engineer – Technician
5. Koutsoukos Stamatios, Chemical Engineer, M.B.A..
6. Lambrou Anastasia, B.Sc. Civil Engineer, M.Sc. Environmental Protection & Sustainable Development, M.Sc. Energy Protection & Management.
7. Siambekou Christiana, Environmentalist, M.Sc.
8. Stavrinou Konstantinos, B.Sc. Forester
9. Nikolakopoulou Georgia, B.Sc. Environmentalist – Cartographer
10. Hourmouziadis Dimitris, B.Sc. Forester – Environmentalist, M.Sc. Environment and Development

Coordination of the team was performed by Mr. Hourmouziadis Dimitris, B.Sc. in Forestry and Natural Environment, M.Sc. in Environment and Development.

Project Manager: Spanidis Mark-Philip, Dr. Topographer – Surveyor Engineer.

For the needs of the Environmental Licensing of the project, data have been used from the ongoing FEED of the Project, whilst the following studies were, also, prepared:

- Preliminary Environmental Impact Assessment of the Greek Part of the Offshore Section of the Natural Gas Greece- Italy Interconnector pipeline.
- Supplementary Preliminary Environmental Impact Assessment for the Alternative Locations and Optimization of the Pipeline Route, after the recommendation of all local authorities, during the session of the ‘Committee on Production and Commerce’ of the Greek Parliament, in February 2011 (ASPROFOS).
- “Coastal morphology and marine biodiversity of some sites at the NW coasts of Greece (Ionian Sea) where an onshore natural gas pipe is planned” and survey related with the disposal of the water of the hydraulic test, both by Hellenic Center of Marine Research (H.C.M.R.).
- Reconnaissance Marine Survey performed by MMT ab and Detailed Marine Survey performed by Fugro Ltd (RMS and DMS, respectively)
- Air Dispersion Model performed by DIMOKRITOS National Research Center

It is noted that FEED includes numerous special studies including but not limited to Geological Studies, Seismic and Tectonic Studies, Noise diffusion model, Stability studies, Safety Study, etc. The main output of these studies was incorporated in the present Study.

At the same time, contact with the competent Authorities and Services was made (Annex K – Contact with Authorities (Volume III)).

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#### **1.4 Scope and needs covered by the Project**

The proposed Project includes the construction and operation of an Offshore Natural Gas Pipeline crossing the North Ionian and Adriatic Sea and supplying the market of Italy and Western Europe with Natural Gas, originated by Caspian Region, the Middle East and Eastern Mediterranean.

The Project shall have the possibility of a reverse flow (Italy to Greece), for the supply of Greece or other neighboring countries, in case of emergency.

The Interconnector Greece- Italy has been designed in such a way that a future expansion of the Network in Epirus Region would be feasible, with the prospect of completing the onshore high pressure system of northern Greece.

Additionally, the social impact of the project should be noted; since the development of new energy technologies, at the region, shall provide new jobs, while the expansion of the natural gas network in Epirus, will supply the residents with a cheaper and cleaner fuel, in relevance to other conventional fossil fuels (carbon, petrol, etc).

The Interconnector Greece – Italy Project shall contribute to the integrity, transparency and coordination of the European gas market, due to the project's European nature and direct correlation with one main source of Europe for the natural gas supply. Obviously, the European Commission took that into consideration, when the Project was included” among the European interest projects (the highest priority degree recognized by E.U.)

For that reason, in November 2005, an intergovernmental agreement between Greece and Italy was signed. In July 2007, a trilateral intergovernmental agreement between Turkey, Greece and Italy was signed, reasserting the governments' commitment for a timely realization of the Turkish – Greek Pipeline and the completion of transport relevant agreements between EDISON and D.EP.A. This agreement has been ratified by the Greek Parliament (Law 3637/07.02.2008). In August 2007, a Memorandum of Cooperation between Greece and Azerbaijan was signed, asserting the interest of both governments for potential agreements on gas supply of Greece and Italy through the I.G.I., which was ratified by the Greek Parliament with the Law 3638/07.02.2008. In December 2007, a Protocol of Cooperation between Italy and Azerbaijan was signed, which reasserted the

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governments' commitment to support Italy gas supply through the I.G.I.. In June 2008, "I.G.I. POSEIDON S.A." was established, in which D.E.P.A. S.A (Greek) and EDISON S.A. (Italian) participate by 50% each. According to Law 4001/2011, ar. 176, the project has been characterized as of National Importance and Public Interest.

It is noted that the initial PEIA was qualifying the route Stamponi-Kalivia, with the Onshore Facilities at Kalivia site. Due to issues raised by the Local Community, the landfall site Omprela 2 was opted and consequently, the route from Omprela 2 to Variko site (location of onshore facilities), was finally approved with the 13021/17.09.10 decision of Ministry of Environment, Energy and Climate Change. In continuance, and following the recommendation of the Local Authorities in front of the 'Committee on Production and Commerce' of the Greek Parliament, the broader area of Florovouni was investigated as a new site for the onshore facilities. This modification, along with the corresponding modifications of the pipeline route, received the 200088/08.07.11 Approval of the PEIA. The overall final pipeline's route and the location of the Onshore Facilities as presented in this study resulted after numerous meetings and contacts with the representatives of local authorities, in order to take into consideration their concerns, as much as possible.

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## 2 NON TECHNICAL SUMMARY

### 2.1 Project Reference

The present study covers:

- The Greek Offshore Section of the I.G.I. Project (approximately 146km in length), which starts from the landfall point in Thesprotia Regional Entity's coasts, Greece, passes south of Corfu Island, heading towards Otranto, Italy, and ends up in the middle of the sea crossing between Greece and Italy.
- The Onshore Facilities (Compressor and Metering Stations), in Thesprotia Regional Entity.
- The Onshore section of the pipeline, from the landfall point (in Thesprotia Regional Entity's coasts), to the Onshore Facilities (C.S - M.S.), which will be connected with the Onshore section of the Interconnector Greece – Italy High Pressure Natural Gas Pipeline.

Project's components are complemented by a small block valve station (of approximately 150m<sup>2</sup>) at approximately 600m from the Greek landfall site, necessary for the safety of the natural gas pipeline.

In the present E.S.I.A. the following project's components were investigated:

A. The landfall site (LF), for which five (5) landfall points are presented (from North to South):

- LF Stamponi
- LF Sofas
- LF Stavrolimenas
- LF Omprela 2
- LF Omprela 1

B. The Compressor and Metering Station (onshore facilities), for which four (4) sites are presented (from North to South). These are the most preferable solutions for each corresponding pipeline route, out of a number of alternative sites for the onshore facilities:

- C/S-M/S Kalivia
- C/S-M/S Florovouni
- C/S-M/S Variko
- C/S-M/S Gouri

C. The onshore pipeline route. For the pipeline route, nine (9) alternative pipeline route axes, in total, are presented. These various axes' alternatives are illustrated in the following table:

**Table 2.1 Pipeline's axis alternatives.**

s/n	Landfall Site	Onshore Facilities Site	Code
1	Omprela 2	Variko	ALT1
2	Omprela 2	Florovouni	ALT1a (qualified)
3	Omprela 2	Florovouni	ALT1b
4	Omprela 2	Gouri	ALT2
5	Stamponi	Kalivia	ALT3
6	Sofas	Kalivia	ALT4
7	Omprela 1	Variko	ALT5
8	Omprela 1	Gouri	ALT6
9	Stavrolimenas	Variko	ALT7

The pipeline shall have a 32" diameter and 140bar operating pressure (160bar design pressure).

Regarding the offshore section of the pipeline, this was concluded after the performance of a Reconnaissance Marine Search (RMS) by MMT ab and a Detailed Marine Search (DMS) by Fugro GeoConsulting sa.

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## 2.2 Routing and Project Location

The offshore routing and the respective onshore routing of the Natural Gas Pipeline have been selected based on the minimum disturbance and the maximum safety of the regional population, the ecosystem's protection, the sea bottom and surface soil morphology, the length minimization and the reinstatement effectiveness. The above mentioned criteria are the same with the ones used for all the installed Natural Gas Pipelines of Greece.

Regarding the Main (Proposed) route, the Offshore Natural Gas Pipeline, starts from "LF Omprela 2" site, of Thesprotia Regional Entity; while the alternative routes start from "LF Stamponi", "LF Sofas", "LF Stavrolimenas" or "Omprela 2" sites (of Thesprotia Regional Entity), or "Omprela 1" site of Preveza Regional Entity. The offshore pipeline crosses Corfu Sea, North Ionian Sea and South Adriatic Sea and ends at the middle of the sea crossing between Greece and Italy, east of Otranto. Regarding the proposed route of the onshore section "ALT1a", from the landfall LF Omprela 2, to the C.S. - M.S. Florovouni, it runs through Thesprotia Regional Entity for the first ~3km (counting from LF Omprela 2), enters Preveza Regional Entity for another ~3km, and then re-entering Thesprotia Regional Entity. Regarding Thesprotia Regional Entity, the Municipality of Igoumenitsa is engaged, whilst for Preveza Regional Entity, Municipality of Parga.

For both sections, the offshore section (146km approx.) and the onshore section, no areas subject to a special environmental protection are engaged or any known archaeological sites are affected. Impacts on the environment, for both inland and marine biodiversity, are insignificant and temporary, whilst the touristic industry will not be affected.

The Compressor and Metering Facilities at Florovouni area shall occupy an area of 9hectares, approximately. The block valve station, necessary for the safe operation of the Natural Gas Pipeline, will occupy an area of 150m<sup>2</sup> at approximately 600m upstream of the Greek landfall.

The geographical location of the project is described in chapter 3.

## **2.3 Investigated Routing Alternatives**

### **2.3.1 Onshore Routings**

From a technical point of view, nine (9) onshore alternative routings were investigated. One of them was qualified as Proposed. Some of the routings are essentially variations of a route axis deriving after further investigation and consultation processes. All routings mentioned above, are constructible and are detailed in chapter 5.

In short, the nine (9) alternative routings are:

#### **Alternative Routing “ALT1” (“Omprela 2” – “Variko”)**

Alternative routing “ALT1” of the onshore section starts from the landfall point “Omprela 2”, southwest of Perdika municipal community, of Igoumenitsa Municipality, in Thesprotia Regional Entity. Heading north-east, it runs parallel to the archaeological site of Dimokastro and, turning east, enters Preveza Regional Entity. At “Agii Pantes” location, it turns north, at the eastern limit of the established recreation park, in “Kastro” location, enters Thesprotia Regional Entity, and crosses the National Road of Parga – Sivota, ending at the onshore facilities, at “Variko” location.”ALT 1” corresponds to “EX2” of the PEIA.

#### **Alternative Routing “ALT1a” (“Omprela 2” – “Florovouni”)**

Alternative routing “ALT1a” of the onshore section starts from the landfall point “Omprela 2”, southwest of Perdika municipal community, of Igoumenitsa Municipality, in Thesprotia Regional Entity. Contrary to ALT1, it passes south of the geological formation of ‘Tris Aderfes’ and heading north-east follows the ALT1 route as far as Variko location. There, instead of ending at the Onshore Facilities at “Variko” location, it continues to “Florovouni” location where the Onshore Facilities location was indicated by the local community. The route crosses the National Road of Parga-Sivota to the east of the corresponding crossing point of ALT1. “ALT 1a” is the route which was approved through the complementary PEIA.

#### **Alternative Routing “ALT1b” (“Omprela 2” – “Florovouni”)**

Alternative routing “ALT1b” of the onshore section starts from the landfall point “Omprela 2”, southwest of Perdika municipal community, of Igoumenitsa Municipality, in Thesprotia Regional Entity. Just like ALT1a, it passes south of the geological

formation of 'Tris Aderfes' and heading north-east follows the ALT1 route as far as Variko location. There, instead of ending at the Onshore Facilities at "Variko" location it continues to "Florovouni" location where the Onshore Facilities location was indicated by the local community.

#### **Alternative Routing "ALT2" ("Omprela 2" – "Gouri")**

Alternative routing "ALT2" of the onshore section starts from the landfall point "Omprela 2", southwest of Perdika. Heading northeast, it runs in parallel to the archaeological site of Dimokastro and turning east, it enters Preveza Regional Entity. At "Agii Pantes" location, it turns east, meets "ALT6" and following its route, ends at the Onshore Facilities at "Gouri" location. This route is a combination of ALT2 and ALT6. "ALT 2" corresponds to "EX2A" of the PEIAS.

#### **Alternative Routing "ALT3" ("Stamponi" – "Kalivia")**

The alternative routing "ALT3" of the onshore section starts from the landfall point "Stamponi", northwest of Perdika, in Thesprotia Regional Entity. Heading north-east, it crosses the National Road of Parga – Sivota, passes through "Granitsa" hill, and then turns eastwards. At "Kalivia" location, it enters Municipal Community of Sivota where the Onshore Facilities are located. "ALT 3" corresponds to "KX" of the PEIA.

#### **Alternative Routing "ALT4" ("Sofas" – "Kalivia")**

Alternative routing "ALT4" of the onshore section starts from the landfall point "Sofas", northwest of Perdika, in Thesprotia Regional Entity. Heading north-east, it crosses the National Road of Parga – Sivota, passes through "Granitsa" hill and, at "Kalivia" location, enters Municipality of Sivota, where the Onshore Facilities are located. "ALT 4" corresponds to "EX1" of the PEIA.

#### **Alternative Routing "ALT5" ("Omprela 1" – "Variko")**

Alternative routing "ALT5" of the onshore section starts from the landfall point "Omprela 1", west of Municipality of Parga, in Preveza Regional Entity. Heading east, it passes through "Perivlepton" hill, where it turns northeast, through "Agii Pantes", where it meets "ALT1" and following its route, ends at "Variko" location, at the onshore facilities. This route is a combination of ALT6 and ALT2. "ALT 5" corresponds to "EX4A" of the PEIA.

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### **Alternative Routing “ALT6” (“Omprela 1” – “Gouri”)**

Alternative routing “ALT6” of the onshore section starts from the landfall point “Omprela 1”, west of Municipality of Parga, in Preveza Regional Entity. Heading east, it passes through “Perivlepton” hill, where it turns northeast, running through “Agi Pantas” and “Pori” locations, and it crosses the National Road of Parga – Sivota, ending at the Onshore Facilities at “Gouri” location. “ALT 6” corresponds to “EX4” of the PEIA.

### **Alternative Routing “ALT7” (“Stavrolimenas” – “Variko”)**

Alternative routing “ALT7” of the onshore section starts from the landfall point “Stavrolimenas”, southwest of Perdika, in Thesprotia Regional Entity. Heading east, it crosses the National Road Parga – Sivota and ends at the onshore facilities, at “Variko” location. “ALT 7” corresponds to “EX3” of the PEIA.

ALT1a alternative has been qualified as the proposed one. In the 130201/17.09.10 approval of the PEIA, the landfall site Omprela 2 had been approved, along with ALT1 axis’s which runs almost identical to the ALT1a axis. Their main difference lies on the onshore facilities area, which has been indicated by the local authorities. On top of that, the ALT1a alternative has gone through an additional environmental prelicensing and has received the 200088/08.07.11 Approval. The modification near the landfall site was investigated in order to minimize the impacts on the environment during construction.

Taking into consideration that the components of this route (location of onshore facilities, landfall point) have obtained the PEIA approval, the FEED and the DMS focused on them.

### **2.3.2 Landfall Sites**

The investigated onshore alternative routings correspond to five (5) landfall sites. The one corresponding to the proposed onshore routing is the ‘Omprela 2’ site. This is one of the most remote sites of Thesprotia Regional Entity.

In short, the five (5) alternative landfalls sites are:

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## **Omprela 2 and Omprela 1**

Omprela 2 landfall (OLF-2) is located at the northern part of 'Omprela' bay whilst Omprela 1 (OLF-1) at the southern part. Omprela bay is a rocky beach with strong presence of boulders and rocks. Sea bottom is sandy with scattered big rocks, mainly in the shallows; many of these rocks are boulders rolled from land to the sea. In the shallow waters, no meadows of *Posidonia oceanica* or *Cymodocea nodosa* are evident, probably due to high hydrodynamics near the coast. DMS conducted revealed that after the depth of 15m some scattered meadows are formed, which become more dense between 20 and 35m.

### **Stavrolimenas**

Stavrolimenas landfall (SLF) is located at Stavrolimenas bay. This is an enclosed bay with sandy beach in the middle, surrounded by almost vertical rocks ending at the sea. Sea bottom is sandy, in the middle of the bay, with angiosperm plants; on each side, vertical rocks are covered with algae. Marine biodiversity is very rich; two species of marine angiosperms were found: clusters of *Posidonia oceanica* and clusters of *Cymodocea nodosa*.

### **Stamponi and Sofas**

Stamponi landfall (PLF-2) and Sofas landfall (PLF-1) sites are located at 'Perdika' bay; the first at rocky area at the northern part, whilst the latter at the southern part, in a section of the beach which is not used. Perdika bay is an open bay with sandy beach in the middle, and rocks on the side. The sea bottom is occupied by plenty of gravels, boulders and small rocks. At shallow waters, small clusters of the angiosperms *Posidonia oceanica* meadows and also *Cymodocea nodosa* were found. However, leaves of *Posidonia* were widely washed up on the shore, a fact that reveals the existence of significant sea meadows in deeper waters. The available regional data propose that solid meadows of *Posidonia oceanica* start at 15-20m depth and stop at 30-35m depth.

### **2.3.3 Offshore Routings**

The offshore corridor of the pipeline was concluded after the performance of RMS by MMT S.A. and DMS by Fugro S.A.. The proposed offshore corridor has small morphological and navigation constraints and is most suitable to correspond to the qualified landfall site of Omprela 2. From the various landfall sites, offshore (coastal)

subsections proceed up till the meeting point with the Proposed Offshore section axis (OS-A).

During the past, another solution starting from Ftelia bay, at the Greek – Albania borders was investigated and rejected for technical reasons.

In Annex C - Photographic documentation of Near Shore DMS (Volume III) representative pictures of the proposed nearshore section (approximately the first 500m and the depth of 25m) are presented. In Annex D - Photographic documentation of Offshore DMS (Volume III), representative pictures of the proposed offshore section (after the depth of 25m) are presented. In Annex E - Photographic documentation of Onshore Sections (Volume III), photographic documentation of the proposed onshore project elements are presented.

## **2.4 Construction Philosophy**

The subject of this study, as it is mentioned above, includes the offshore section (from the middle of the sea crossing between Greece and Italy to the landfall point), the onshore section (from the landfall point to the onshore facilities) and the onshore facilities.

- A. The Offshore Section of the Natural Gas Pipeline, prior to being installed on the sea bottom, will be prepared on barges, as follows:
- 1) Sections of the pipe shall be welded,
  - 2) The weldings will be inspected for quality assurance compliance.
  - 3) The pipeline's seams will be coated with special insulation on the joint of the welding (the pipes that shall be used will be insulated, during their construction, with anticorrosion coating, and, if need be, with concrete to overcome the buoyancy of the seawater and to provide mechanical protection).

After that, it will be laid gradually to the seabed.

The Offshore Section of the Natural Gas Pipeline in water depth of less than approximately 25m, near to the shore, as well as the coastal and Onshore Section,

will be placed in a trench of approximately 2.5m depth and will be covered with sorted filling material.

- B. The Onshore Section of the Natural Gas Pipeline will be placed in a trench of approximately 2m deep. The construction strip will be 32m, in general. In the forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m. After the pipeline's placement, the trench will be covered with sorted filling material and environment will be reinstated.
- C. The Onshore Facilities comprise installations for natural gas measuring, compression and regulation. The CS - MS facilities and the small onshore pipeline section are complementary to the offshore pipeline section but also, necessary for the whole pipeline's operation. CS - MS is sited adjacent to the Onshore Section in an area of ~90.000m<sup>2</sup>. The main installations, which are described in detail in chapter 5, are:
- 1) Five (5) Compression units (4 operational and 1 back up)
  - 2) Two (2) ground floor buildings for the Metering operations, of approximately 300m<sup>2</sup> surface in total
  - 3) One (1) ground floor building, in which the electric and mechanical installations, the control room, the air-conditioning systems, the fireproofing systems etc will be placed, of approximately 1200m<sup>2</sup>.

During the elaboration of the project's basic design, the necessity of a valve station was assessed, near the landfall site without any direct visual contact to the beach. This block valve station occupies an area of ~150m<sup>2</sup> and is located 600m upstream of the Greek landfall. It has minimal to no visual impact and is necessary for the safety of the natural gas pipeline

In Annex G - Photorealistics of Onshore Facilities (Volume III) ,photorealistic illustrations of the Onshore Facilities at the proposed sites, are presented.

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## **2.5 Reinstatement and Protection Measures**

In the areas where the pipeline shall be placed in a trench, that is onshore, at the shore and beach zone, and offshore till approximately 25m depth, the soil shall be reinstated; after pipeline's placement whilst the RoW will be reinstated in its former condition or as otherwise agreed with the land owners and the Project Owner. For the specific offshore section, an artificial reef is proposed, for the improvement of the marine environment.

All necessary measures for soil erosion and landslides will be taken, especially in the areas of steep slopes. Operational safety has been secured through the use of all applicable to the project codes and standards in the design phase, including welding and hydrotesting inspections, anticorrosion measures, SCADA systems, etc.

## **2.6 Conclusions**

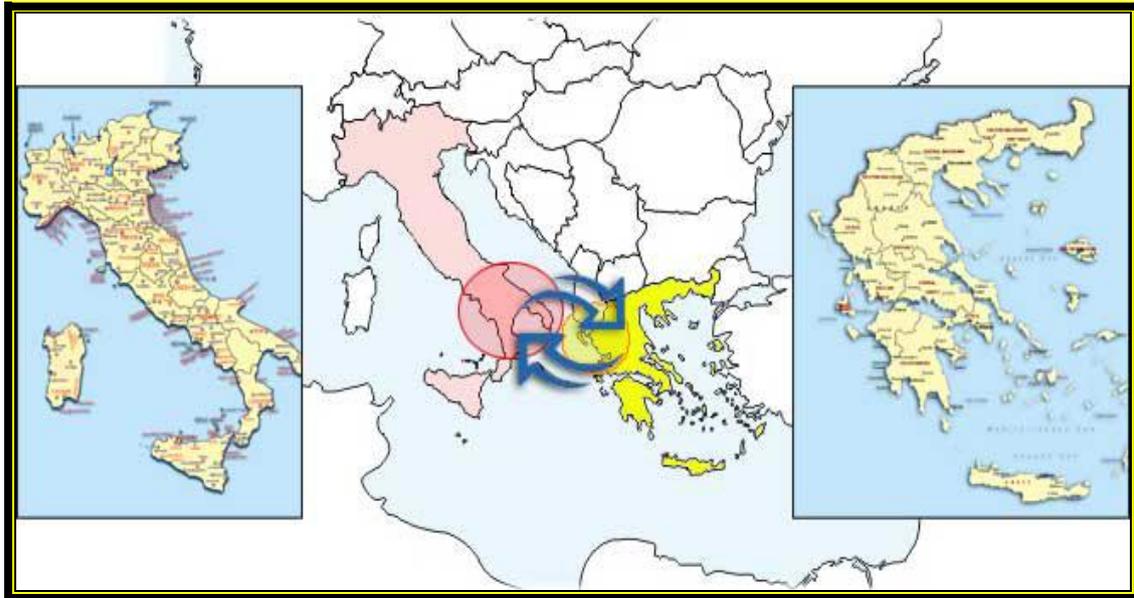
The proposed routing of the Offshore Natural Gas Pipeline, from the Greek coasts of Thesprotia Region, to the middle of the sea crossing between Greece and Italy, east of Otranto, as well as the Onshore facilities, are technically, socially and environmentally feasible.

The present E.S.I.A. of the Greek section of the I.G.I. Offshore Natural Gas Pipeline, investigates all possible impacts on the environment, suggests mitigation measures and concludes and proposes a positive Environmental Assessment and Evaluation of the Project resulting in the Environmental Terms Approval.

### 3 GEOGRAPHICAL LOCATION

The main and alternative routings of the Offshore IGI Natural Gas Pipeline are located on the northwest part of continental Greece, in Epirus Region (Picture 3.1).

**Picture 3.1 Greece - Italy Connection.**



The onshore routings lay either within Thesprotia Region or within, both, Thesprotia and Preveza Regions<sup>6</sup> (Picture 3.2 and Picture 3.3). The onshore section of the study area, consists of hilly and semi hilly areas, as well as valleys; which are covered mostly by forestial lands (including bushlands and shrublands) and grasslands. According to Hellenic Military Geographical Service (H.M.G.S.), the highest peak, of 809m, lays at the southeastern boundary of the study area, at “Logara” location, northeast of Agia. The only river with, presumably, constant flow is the “Perdika” river, which ends at Karavostasi bay.

From the landfall points, the pipeline heads southwest to the Ionian Sea, between Corfu and Paxi Islands, for 41km approximately. After that, in a distance of 30km, approximately, from the west coast of Corfu its direction changes to northwest. The said offshore pipeline, from the landfall points to the middle of the sea crossing

<sup>6</sup> According to the new administrative framework the term ‘Prefecture’ has been replaced by the term ‘Administrative Region’, ‘Region’, or ‘Regional Entities/ Community’. The prefectural authorities were redistributed according to their area of competence, competence and other administrative criteria. However, since no official translation exists, the term Region is used do describe the former term Prefecture.

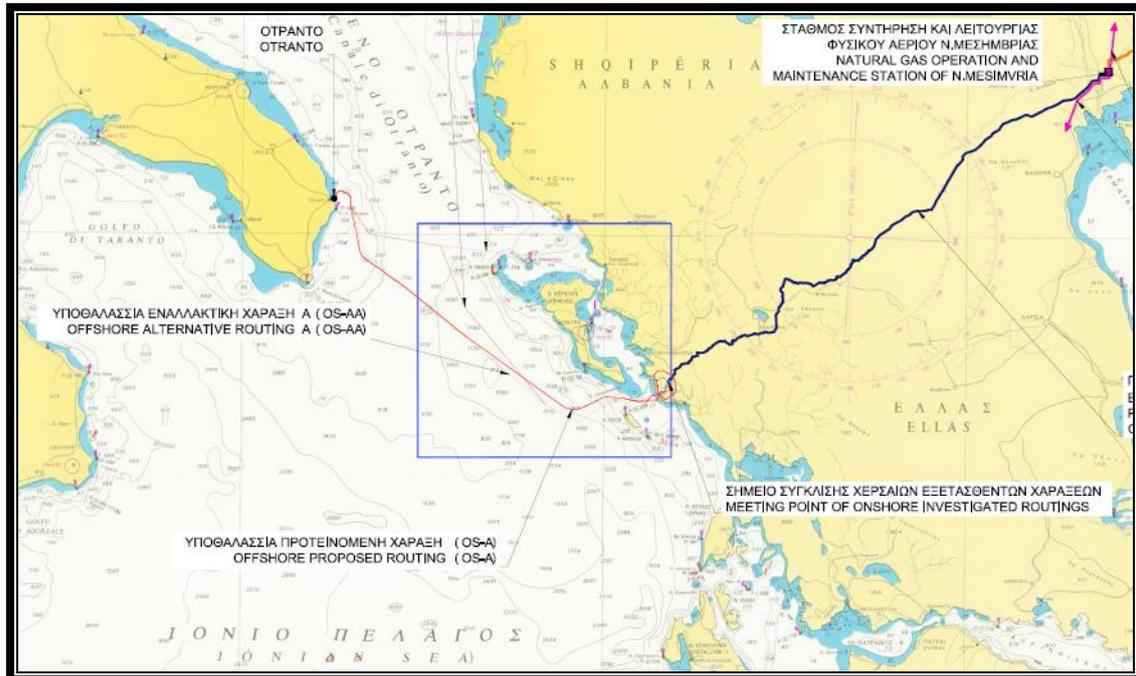
between Greece and Italy, has a length of 146km, approximately, and consists part of the offshore section of the I.G.I. project, connecting Otranto-Italy, to the coast of Epirus-Greece, having a total length of approximately 205km.

Alternative routings ALT1, ALT1a, ALT1b, ALT2, ALT5 and ALT6 lay within both Regions of Thesprotia and Preveza whilst alternative routing ALT3, ALT4 and ALT7 lay entirely in Thesprotia Region.

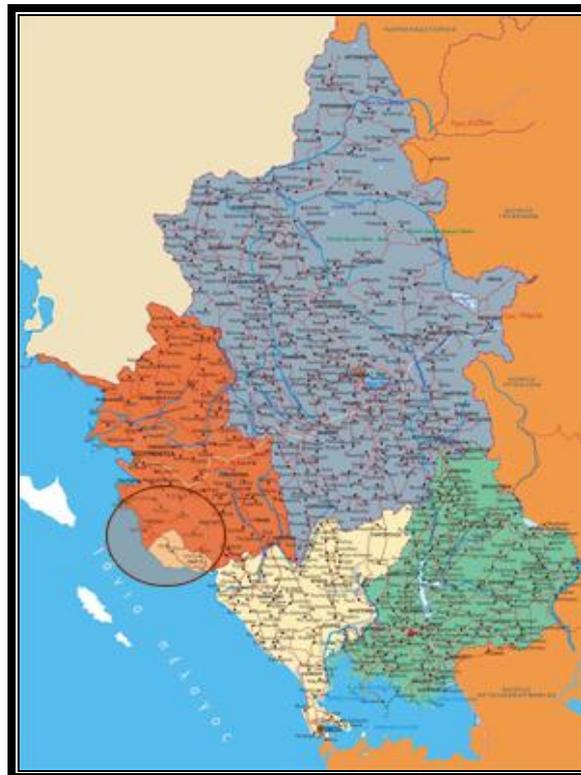
ALT1, ALT1a, ALT1b and ALT2, start from landfall "Omprela 2" of Perdika municipal community, in Thesprotia Region, south of Prapa-Mali beach. ALT3 starts at the landfall point at "Stamponi" site, of Perdika municipal community, and for its most part runs within Perdika's area, while for a small part in Sivota municipal community. "ALT4" starts from the landfall at "Sofas" site, of Perdika municipal community and for its most part runs within Perdika's area, while for a small part in Sivota municipal community, similar to ALT3. ALT5 and ALT6 start from landfall "Omprela 1" of Parga Municipality, in Preveza Region, south from Prapa-Mali beach. ALT7 starts from the landfall at "Stavrolimenas" site, at Stavrolimenas beach of Perdika municipal community, running entirely within Perdika's area.

The landfall sites of alternatives ALT1, ALT1a, ALT1b, ALT2, ALT5 and ALT6 are rocky; while inland there are agricultural areas, mainly olive groves. Alternative routing ALT3 ends at a rocky coastline, approximately 200m north of Sofas beach, while inland there are mainly bushlands. Alternative routing ALT4 ends at a non-sandy site, at the south part of Sofas beach, a beach of 215m length and 20m width approximately, while inland there are mainly agricultural areas. ALT7 ends at Stavrolimenas beach. This beach is a well defined, not organized, with a length of 80m and width of 12m, approximately, and sharp cliffs on each side; inland there are evergreen broadleaved bushlands.

**Picture 3.2 Project location.**



**Picture 3.3 Study Area in Epirus Region, Greece.**



All investigated routings connect the different landfall sites with the Onshore Facilities. For each routing, various locations for the Onshore Facilities were

investigated and the most appropriate one is proposed. Onshore Facilities are estimated to cover an area of 90.000m<sup>2</sup>, approximately. The main facilities, including natural gas compression, metering and regulating arrays, consist of ground floor buildings of approximately 4.500m<sup>2</sup>, in total.

Land morphology of ALT1 comprises mainly of semi-hilly areas and valleys, with “Perdikorahi” peak, at 449m, being the highest one. ALT1 neighbors the archaeological site of Dimokastro and the recreation park in Kastro area. Vegetation coverage is mainly agricultural (especially in the valley downside of “Perdikorahi”), thick bushlands of yews and grasslands with *Phlomis fruticosa* and *Euphorbia* sp co-dominance. Aetofolias, Pori and Rethi are the main watercourses, which according to H.M.G.S. maps, present torrential flow. AF alternative sites for the Onshore Facilities were investigated:

- at “Perdikorahi” area; (C/S-M/S Variko) within bushland
- at “Perdikorahi” area; (ALT1-B), within agricultural land
- at “Agii Pantes” area; (ALT1-A) within agricultural lands

of which the first one at Variko site is proposed (C/S-M/S Variko). The length from the landfall to the Onshore Facilities is approximately 7km.

ALT1a, from the landfall “Omprela 2” to “Variko” location, follows, essentially, the same routing as ALT1. From then on it turns north east ending at the Onshore Facilities of “Florovouni” site. It crosses mainly hilly and semi-hilly areas, of thick bushlands of yews and olive groves, while neighboring with the archaeological site of Dimokastro and the recreation park at “Kastro”. Highest peak is that of “Trigona” at 670m, and the main watercourses are Pori and Rethi. The length from the landfall to the Onshore Facilities is approximately 8km.

ALT1b, from the landfall “Omprela 2” to “Variko” location, follows, essentially, the same routing as ALT1. From then on it turns east, ending at the Onshore Facilities of “Florovouni” site. It crosses mainly hilly and semi-hilly areas, of thick bushlands of yews and olive groves, while neighboring with the archaeological site of Dimokastro and the recreation park at “Kastro”. Highest peak is that of “Trigona” at 670, and the main watercourses are Pori and Rethi. The length from the landfall to the Onshore Facilities is approximately 9km.

ALT2, from the landfall “Omprela 2” to “Agií Pantés” location, follows the same routing as ALT1, and from then on the routing of ALT6, ending at the Onshore Facilities of “Gouri” site. It crosses mainly hilly and semi-hilly areas, of thick bushlands of yews and olive groves, while neighboring with the archaeological site of Dimokastro and the recreation park at “Kastro”. Highest peak is that of “Perdikorahi” at 449, and the main watercourses are Pori and Rethi. The length from the landfall to the Onshore Facilities is approximately 6.5km.

Land morphology of the ALT3 comprises, almost entirely, of hilly areas, with “Granitsa” peak, at 607m, being the highest one, and no significant watercourse. ALT3 runs mainly through grasslands and for a small part, through evergreen broadleaved bushlands. For the Onshore facilities, a site at “Kalivia” location is proposed, laid in grassland (C/S-M/S Kalivia). The length from the landfall to the Onshore Facilities is approximately 4.5km.

Land morphology of ALT4 comprises, almost entirely, of hilly areas, with “Granitsa” peak, at 607m, being the highest one, and no significant watercourse. ALT4 runs mainly through grasslands with *Phlomis fruticosa* and *Euphorbia* sp co-dominance, while areas of agriculture, forest and evergreen broadleaved bushlands, are also present. For the Onshore facilities, two sites were investigated, one at “Perama” (ALT4-A) location and the second one at “Kalivia” location (C/S-M/S Kalivia), laid in grassland, which is proposed. The length from the landfall to the Onshore Facilities is approximately 4km.

ALT5, from the landfall “Omprela 1” to “Agií Pantés” location, follows the same routing as ALT6, and from then on the routing of ALT1, ending at the Onshore Facilities, at “Variko” site. It crosses semi-hilly areas and valleys, of agricultural lands, while neighboring with the recreation park at “Kastro”. Highest peak is that of “Perdikorahi” at 449m, and the main watercourses are *Aetofolias*, Pori and Rethi. The length from the landfall to the Onshore Facilities is approximately 7.8km.

Land morphology of ALT6, comprises mainly of hilly and semi-hilly areas, with “Perdikorahi”, at 449m, being the highest peak. Vegetation coverage is mainly oak forests and olive groves, while evergreen broadleaved bushlands and grasslands are present, in lower percentage. Pori and Rethi are the main watercourses, which according to H.M.G.S. maps present torrential flow. Two alternative sites for the Onshore Facilities were investigated:

- at “Gouri” area (C/S-M/S Gouri), within agricultural land
- at “Perivlepton” area (ALT6-A) within forest

of which the one at “Gouri” site is proposed. The length from the landfall to the Onshore Facilities is approximately 7km.

Land morphology of ALT7 comprises mainly of semi-hilly areas and valleys. Highest peak is “Perdikorahi”, at 449m, while the only river, of constant flow, in the whole study area, is the Perdika River running parallel to ALT7. Vegetation coverage is mainly grasslands and, in lower percentage, forests and agricultural lands. Two alternative sites for the Onshore Facilities were investigated:

- at “Perdikorahi” area (C/S-M/S Variko) within bushland
- at “Perdikorahi” area (ALT7-A), within agricultural land

of which the first one at “Variko” site is proposed. The length from the landfall to the Onshore Facilities is approximately 4.7km.

## 4 ENVIRONMENTAL AND SOCIAL BASELINE DESCRIPTION

### 4.1 General

All five investigated landfall sites at the Greek shores of Thesprotia and Preveza Prefectures lay on the north Ionian Sea, along the coastline of northwest continental Greece (Picture 4.1).

**Picture 4.1 Geographical Location of the Broader Study Area.**



Published information regarding marine flora and fauna of the broader coastal region of Ionian Sea, refer to specific areas. More precisely, most of the available data refer to Corfu Sea, and areas of Central and South Ionian Sea, i.e. Amvrakikos and Patraikos Bay, Zakynthos, Cephalonia and Lefkada<sup>7</sup>. Extensive researches in bigger depths of the Ionian Sea (depth >300m) have been performed, mainly due to fishing interests<sup>8</sup>. At several sites, it has been reported<sup>9</sup> that *Posidonia oceanica* is an important element of the Ionian marine vegetation. Rich fishing ranges exist in several coastal and pelagic areas of the Ionian Sea.

The description of the marine environment, at the landfall sites, was performed by H.C.M.R. and is presented in the study: "Coastal morphology and marine biodiversity of some sites at the NW coasts of Greece (Ionian Sea) where an onshore natural gas pipe is planned" which was prepared for the needs of the PEIA. Existing data from previous programs (i.e. INTERREG II – IONION) as well as field observations taken on October 2008 were used. The description of the coastal morphology includes the zone from Parga to Sivota (Picture 4.1), focusing on the investigated landfall sites of the pipeline. In these locations, observations and sampling of benthic organisms were made. In the scope of the Environmental and Social Impact Assessment, for the determination of mitigation measures of potential impacts to the marine environment, during construction and operation, of the approved in the PEIA elements of the project, as well as for the management of the hydrotesting water, HCMR performed a separate study, complementary of the above mentioned one, performing additional field surveys in February 2012 (see Annex I – HCMR Study (Volume III))

In addition, a Detailed Marine Survey of the qualified, in the preliminary environmental licensing process, pipeline route was performed in order to provide more specific and detailed data regarding marine geomorphological conditions and biodiversity along. At the same time, the DMS and the on-site visit and diving by underwater archaeologists investigated the possibilities of marine antiquities along nearshore and offshore pipeline route.

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<sup>7</sup> For example, Berazi & al (2005) have published data for the population status of common dolphin and bottle nose dolphin, at East Ionian Sea, referring to data deriving from ship routes in the marina area south of Lefkada.

<sup>8</sup> Sioulas (2001)

<sup>9</sup> Stergiou & al (1997)

It is repeated that the above mentioned specialized studies were prepared for the preliminary environmentally licensed project's components.

It is noted that during the preparation of the FEED, the preliminary environmental approved landfall site OM2 has been slightly relocated by 24.92m (referred to as OM<sup>3</sup>.2 in the FEED documents). Specifically, the coordinates of OM<sup>3</sup>.2 are 180414, 4358694 while the coordinates of OM2 are 180390, 4358701. Both sites are in the same bay. Essentially, there is no difference between the two landfall sites and consequently they have been perceived as one and the same for the purpose of this ESIA. In addition, a rerouting has taken place just before the landfall site, at the area of 'Tris Aderfes' (3 Sisters). This has been performed, also during the FEED for optimization of the route. The above minor rerouting of the preliminary approved route do not have any additional impact to the natural or social environment in comparison to the approved through the Preliminary EIA procedure route and the environment data in the relevant areas were included in the investigation area of the approved PEIA. It is stressed out that these modifications were resulted during the FEED phase of the project and after the promotion of the route Omprela 2 – Florovouni, so as to address the requests of the local community.

## **4.2 Methodology**

### **4.2.1 Structure**

The description of the baseline has the following main objectives:

- identify the key environmental, social and socioeconomic conditions in areas potentially affected by the Project and highlight those that may require specific mitigation measures;
- describe and where possible quantify their characteristics (nature, condition, quality, extent, etc);
- provide data to aid the prediction and evaluation of possible impacts

Environmental and social baseline description is structured as follows. Whenever applicable, a distinction between onshore and offshore section is provided.

- Physical – Abiotic Environment, including geology and soils, land, hydrology and hydrogeology, surface and ground water resources, air, noise, vibration, light and other forms of radiation.
- Biological – Biotic Environment, including aquatic and terrestrial habitats, flora and fauna, biodiversity, protected areas and ecosystem values.
- Socioeconomic Environment, including demography, employment, education, infrastructure, archaeology, etc.

When necessary, the onshore and offshore sections are examined separately.

#### 4.2.2 Study Area

Typically, the study area would cover a buffer zone of 1.5km around the project's components. However, in order to investigate all alternatives of the project and assess the impacts of each one, most of the times a larger study (investigated) area was chosen. This was chosen in order to avoid omitting any significant parameter that could be outside the strict project's study area but still it could be affected by the project. Thus, it is envisaged that all necessary data for the decision making are presented. The following table presents the study area for each topic.

Data were collected from available literature and scientific journals, published data from governmental bodies, and various studies prepared for the PEIA and the present ESIA of the project. The data are supported by various field trips performed by the environmentalists of the study team (September 2009, February and March 2011).

**Table 4.1 Study area of Baseline topics.**

Baseline topic	Study area
<i>Physical Environment – Abiotic Factors</i>	
Geology (including hydrogeology)	Broader than the typical study area, to investigate all alternatives.
Seismicity	Broader than the typical study area, to investigate all alternatives.

Baseline topic	Study area
Soil and Morphology	Broader than the typical study area, to investigate all alternatives.
Climatology	Available data from Meteorological Stations of Ioannina (Lon 20°49'10", Lat 39°41'48", 483.36m), Preveza (Lon 20°45'04", Lat 38°57'28", 15m) and Corfu (Lon19°55'0", Lat 39°37'0", 1.13m)
<i>Physical Environment – Biotic Factors</i>	
Flora	Broader than the typical study area, to investigate all alternatives. Offshore flora was investigated through diving in selected sites by marine specialists.
Fauna	Broader than the typical study area, to investigate all alternatives. Offshore fauna was investigated through diving in selected sites by marine specialists.
Protected Areas	Broader than the typical study area, to investigate all alternatives and possible interactions.
<i>Social Environment</i>	
Demographics	Regional level
Employment	Regional level
Economy	Regional level
Land Uses	Broader than the typical study area, to investigate all alternatives.
Infrastructure	Broader than the typical study area, to investigate all alternatives.
Cultural heritage	Broader than the typical study area, to investigate all alternatives.

#### 4.2.3 Annexes

In the Annex Section, relevant supporting material is presented. This should be taken as an indispensable part of the present EIA. The following table summarizes the annexes.

**Table 4.2 Table of Annexes.**

<b>s/n</b>	<b>Name of Annex</b>	<b>Title of file</b>	<b>Scale</b>	<b>Sheets</b>
<b>A</b>	<b>Maps</b>			
A.1	7240-AU-OM-01	Project Location Map	1:1.750.000	1
A.2	7240-AU-OM-02	Offshore Recording Plans	1:100.000	2
A.3	7240-AU-ON-01	Onshore Overview Map	1:50.000	1
A.4	7240-AU-LU-01	Land Uses Map	1:30.000	1
A.5	7240-AU-LU-02	Onshore Recording Plans	1:5.000	6
A.6	7240-AU-VM-01	Vegetation cover map	1:30.000	1
A.7	7240-AU-GM-01	Geological Formations Map	1:50.000	1
A.8	-	Alignment Chart Near Shore (KP0.0 to KP0.8)	1:2.500 & 1:500	1
<b>B</b>	<b>Plot Plans</b>			
B.1	IGI-402-20-PL-DWG-003	Alignment Sheets	1:1.000	17
B.2	IGI-506-21-CI-DAL-001	Compressor and Metering Station General Layout	1:500 & 1:1.000	
B.3	IGI-508-21-PI-DPP-001	Compressor and Metering Station General Plot Plan	1:750	
B.4	IGI-508-21-PI-DPP-002	Plot plan Sections A-A and B-B	1:750	
B.5	IFI-407-10-PL-DWG-001	Beach Valve Station General Arrangement	NTS	
<b>C</b>	<b>Photographic documentation of Near Shore DMS</b>	J35002-RES4a-GR(2)		
<b>D</b>	<b>Photographic documentation of Offshore DMS</b>	J35002_RES2_10(2)		
<b>E</b>	<b>Photographic documentation of Onshore Sections</b>			
E.1	Aerial Images of Qualified Components	IGI-402-20-PL-RPT-001		
E.2	Geological and Tectonic Documentation	IGI-305-26-HS-RPT-001		
E.3	On-site Visit	Photographic Documentation		
<b>F</b>	<b>Representative Shore Crossing Pictures</b>	Representative Shore Crossing Photos		
<b>G</b>	<b>Photorealistic for the onshore facilities</b>			
<b>H</b>	<b>Air emission model</b>			
<b>I</b>	<b>HCMR study</b>	1. Environmental Impacts and Response Measures of Installation and Operation of Natural Gas Pipeline 2. Underwater Survey to Determine Location of Hydraulic Test Water		
<b>J</b>	<b>Sample Locations of Offshore Geotechnical Investigation</b>	J35002-RES3(0)		
<b>K</b>	<b>Contact with Authorities</b>			
K.1	ESIA Correspondence			
K.2	Supplementary PEIA Approval Correspondence			
K.3	PEIA Approval Correspondence			
<b>L</b>	<b>Supplementary PEIA Drawings</b>	Plot Plan (7240-AU-OM-01)	1:5.000	
<b>M</b>	<b>PEIA Drawings</b>	Plot Plan (8089-000-00-AU-01)	1:50.000	

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## **ABIOTIC ENVIRONMENT**

### **4.3 Geology**

#### **4.3.1 General**

Study area belongs to the geological background of outer zoning and specifically at the Ionian Zone, which covers the largest part of Western Greece. Main feature of this zone is the constant sedimentation from Triassic to Miocene periods. Sedimentation of the pro-orogenic period is mainly biochemical, of neritic characteristics, until the Middle Jurassic (Limestones of Pantokratora) and from then on with pelagic characteristics (Limestones of Sinion and Vigla.). During synorogenic period, sedimentation at Upper Eocene becomes clastic with typical flysch deposition. Sedimentation alteration during Middle Jurassic and Upper Eocene takes place with transitional layers, often of great thickness (100m). At Middle Jurassic, transitional formations expressed through special bedrock phases, such as:

- Reddish, nodular limestones with ammonites (Ammonitico Rosso phase).
- Clayey schists with Posidonia Oceanica.
- Siliceous schists.

The alpine cycle sedimentation is completed at the end of Oligocene – start of Miocene, with the sandstone flysch deposition. Next, the post-alpine formations include layers deposited inconsistently upon the orogenied alpine structure and in the study area these are marine clastic sediments of marls, clays and conglomerates. These sediments have been deposited upon neotectonic trenches, created after alpine cycle's orogenesis. Main characteristic of the Neogene (Miocene), marine sediments for all Mediterranean basin is the salinity crisis, that took place during Messinian, with the deposition of evaporites within closed basins, of various thickness from 5m to 500m.

#### **4.3.2 Stratigraphy of the Study Area**

Geological formations' stratigraphy of the area crossed by the routings is provided by Bizon, G., in the scope of the geological cartography of "Parga's Sheet" of I.G.M.E., prepared by geologists Perrier, R. and Koukouza, S. (1969). The stratigraphy from younger to older formation is as follows:

- **POST-ALPINE SEDIMENTS**

1. **Quaternary**

Al: Recent Deposits: Deposits of rivers, swamps or lakes.

Sc: Talus and lateral screes of slopes

Tr: Terra Rossa: Red sandy clays, inside limestones' cavities.

2. **Pliocene**

Pl: Blue clays and conglomerates of terrestrial phase that include a thick layer of gypsum. In the lower part, conglomerates of various cohesion occur (Lower Marine Pliocene).

3. **Miocene (Vindobonian)**

Ms: Series of blue marls with big thickness and foraminifera. Thick layers of misarranged, polygenic, calcareous breccia occur in the base of the formation. In Parga's area, lots of horizons with the characteristic fauna of Elvetio were found. In Strelia's area, Tortonio was found. North of Sarakiniko, gypsum horizons occur, within marls.

4. **Messinian**

G: Gypsum: with the term gypsum, a series of evaporites deposited during Messinian period within closed and shallow marine basins of Mediterranean, is meant. Within such basins the evaporation of sea water was bigger than their supply with freshwater. This process resulted in evaporites deposition, such as sulphur gypsum salts ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ), anhydrite ( $\text{CaSO}_4$ ) in alternation with halide, like sylvine (KCl), karnallite ( $\text{KMgCl}_3 \cdot 6\text{H}_2\text{O}$ ) and mineral salts of alitis (NaCl). Under pressure, evaporites are layers susceptible to phenomena of diapirism.

- **ALPINE SEDIMENTS**

1. **Oligocene – Lower Miocene**

3Fim<sub>2,3</sub>: Flysch, with alternations of marls, sandstones and clayey schists.

2. **Paleocen – Eocene**

E,K: Lithographic limestones, bedded with cherts; microbreccia at base.

### **3. Upper Cretaceous (Senonian)**

K<sub>8s</sub>: Microbreccia, unbedded limestones with fragments of Rudists.

### **4. Upper Lias – Upper Jurassic**

J<sub>7-8</sub>: Schist with Posidonias. Alternations of red cherts with silic clays.

### **5. Upper Jurassic – Senonian**

J<sub>s</sub> - K<sub>8i</sub>: Limestones of Vigla. Sub-lithographic, thin-bedded with intercalations of cherts and green clays.

### **6. Lower Jurassic – Lias**

J<sub>k</sub>: Limestones and dolomites of Sinion and Pantokratora. In the upper parts limestones of Sinion occur, which are fine-grained, white with radiolarian and cherts in thick banks. In the lower parts limestones of Pantokratora occur, which are gravelly, white, unbedded with fragments of seaweeds. Dolomites are unbedded and grey colored.

### **7. Triassic**

tb: Triassic Breccia with elements of crystalline and of cavities black coloured limestones and bluish coloured dolomites, with connective material easily pulverized, originated from gypsum washing.

#### **4.3.3 Description of Geological Formations along the Routings.**

Analytical description of the geological formations crossed by the investigated routings, per mileage, is included in the following tables.

## Alternative Routing ALT1

**Table 4.3 Description of Geological Formations along Alternative Routing ALT1.**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	0.724	0.724	Limestones and dolomites of Sinion and Pantokratora.
2	0.724	1.643	0.919	Talus and lateral scree of slopes
3	1.643	1.755	0.112	Triassic Breccia
4	1.755	1.961	0.206	Talus and lateral scree of slopes
5	1.961	3.688	1.727	Triassic Breccia
6	3.688	4.214	0.526	Limestones and dolomites of Sinion and Pantokratora.
7	4.214	4.655	0.441	Limestones of Vigla
8	4.655	5.242	0.587	Talus and lateral scree of slopes
9	5.242	5.472	0.230	Recent Deposits
10	5.472	5.756	0.284	Talus and lateral scree of slopes
11	5.756	5.991	0.235	Limestones of Vigla
12	5.991	6.409	0.418	Series of blue marls with big thickness and foraminifera.
13	6.409	6.928	0.519	Talus and lateral scree of slopes

For Alternative Routing ALT1, the Onshore Facilities proposed location is at K.P.0+000, at "Variko" site.

## Alternative Routing ALT1a

**Table 4.4 Description of Geological Formations along Alternative Routing ALT1a.**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	2.102	2.102	Limestones and dolomites of Sinion and Pantokratora.
2	2.102	2.626	0.524	Talus and lateral scree of slopes
3	2.626	2.738	0.112	Triassic Breccia
4	2.738	2.944	0.206	Talus and lateral scree of slopes
5	2.944	4.771	1.827	Triassic Breccia
6	4.771	5.327	0.556	Limestones and dolomites of Sinion and Pantokratora.
7	5.327	5.798	0.471	Limestones of Vigla
8	5.798	6.385	0.587	Talus and lateral scree of slopes
9	6.385	6.645	0.260	Recent Deposits
10	6.645	6.929	0.284	Talus and lateral scree of slopes
11	6.929	7.175	0.246	Limestones of Vigla
12	7.175	7.591	0.416	Series of blue marls with big thickness and foraminifera.
13	7.591	7.795	0.204	Limestones and dolomites of Sinion and Pantokratora.
14	7.795	8.187	0.392	Talus and lateral scree of slopes

For Alternative Routing ALT1a, the Onshore Facilities proposed location is at K.P.0+000, at “Florovouni” site.

### Alternative Routing ALT1b

**Table 4.5 Description of Geological Formations along Alternative Routing ALT1b.**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	2.304	2.304	Limestones and dolomites of Sinion and Pantokratora.
2	2.304	3.828	1.524	Talus and lateral scree of slopes
3	3.828	3.940	0.112	Triassic Breccia
4	3.940	4.128	0.188	Talus and lateral scree of slopes
5	4.128	5.855	1.727	Triassic Breccia
6	5.855	6.381	0.526	Limestones and dolomites of Sinion and Pantokratora.
7	6.381	6.822	0.441	Limestones of Vigla
8	6.822	7.409	0.587	Talus and lateral scree of slopes
9	7.409	7.639	0.230	Recent Deposits
10	7.639	7.923	0.284	Talus and lateral scree of slopes
11	7.923	8.158	0.235	Limestones of Vigla
12	8.158	8.574	0.416	Series of blue marls with big thickness and foraminifera.
13	8.574	8.778	0.204	Limestones and dolomites of Sinion and Pantokratora.
14	8.778	9.242	0.464	Talus and lateral scree of slopes

For Alternative Routing ALT1b, the Onshore Facilities proposed location is at K.P.0+000, at “Florovouni” site.

### Alternative Routing ALT2

**Table 4.6 Description of Geological Formations along Alternative Routing ALT2.**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	1.082	1.082	Limestones and dolomites of Sinion and Pantokratora.
2	1.082	2.018	0.936	Flysch. Alternations of marls, sandstones and clayey schists.
3	2.018	3.073	1.055	Triassic Breccia
4	3.073	3.663	0.590	Limestones and dolomites of Sinion and Pantokratora.
5	3.663	4.316	0.653	Limestones of Vigla
6	4.316	4.900	0.584	Talus and lateral scree of slopes
7	4.900	5.165	0.265	Recent Deposits
8	5.165	5.463	0.298	Talus and lateral scree of slopes
9	5.463	5.703	0.240	Limestones of Vigla
10	5.703	6.172	0.469	Series of blue marls with big thickness and foraminifera.

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
11	6.172	6.593	0.421	Talus and lateral scree of slopes

For Alternative Routing ALT2 the Onshore Facilities proposed location is at K.P.0+000, at "Gouri" site.

### Alternative Routing ALT3

**Table 4.7 Description of Geological Formations along Alternative Routing ALT4**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	4.489	4.489	Limestones and dolomites of Sinion and Pantokratora.

For Alternative Routing ALT3, the Onshore Facilities proposed location is at K.P.0+000, at "Kalivia" site.

### Alternative Routing ALT4

**Table 4.8 Description of Geological Formations along Alternative Routing ALT4.**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	3.925	3.925	Limestones and dolomites of Sinion and Pantokratora.

For Alternative Routing ALT4 the Onshore Facilities proposed location is at K.P.0+000, at "Kalivia" site.

### Alternative Routing ALT5

**Table 4.9 Description of Geological Formations along Alternative Routing ALT5.**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	0.729	0.729	Limestones and dolomites of Sinion and Pantokratora.
2	0.729	1.648	0.919	Talus and lateral scree of slopes
3	1.648	1.760	0.112	Triassic Breccia
4	1.760	1.966	0.206	Talus and lateral scree of slopes
5	1.966	4.418	2.452	Triassic Breccia
6	4.418	5.251	0.833	Limestones and dolomites of Sinion and Pantokratora.
7	5.251	5.388	0.137	Limestones of Vigla

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
8	5.388	5.842	0.454	Series of blue marls with big thickness and foraminifera.
9	5.842	6.113	0.271	Limestones and dolomites of Sinion and Pantokratora.
10	6.113	6.415	0.302	Series of blue marls with big thickness and foraminifera.
11	6.415	6.572	0.157	Limestones and dolomites of Sinion and Pantokratora.
12	6.572	6.734	0.162	Talus and lateral screes of slopes
13	6.734	7.808	1.074	Blue clays and conglomerates of terrestrial phase

For Alternative Routing ALT5 the Onshore Facilities proposed location is at K.P.0+000, at “Variko” site.

### Alternative Routing ALT6

**Table 4.10 Description of Geological Formations along Alternative Routing ALT6.**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	1.220	1.220	Limestones and dolomites of Sinion and Pantokratora.
2	1.220	2.156	0.936	Flysch. Alternations of marls, sandstones and clayey schists.
3	2.156	3.633	1.477	Triassic Breccia
4	3.633	4.466	0.833	Limestones and dolomites of Sinion and Pantokratora.
5	4.466	4.603	0.137	Limestones of Vigla
6	4.603	5.057	0.454	Series of blue marls with big thickness and foraminifera..
7	5.057	5.328	0.271	Limestones and dolomites of Sinion and Pantokratora.
8	5.328	5.630	0.302	Series of blue marls with big thickness and foraminifera.
9	5.630	5.787	0.157	Limestones and dolomites of Sinion and Pantokratora.
10	5.787	5.949	0.162	Talus and lateral screes of slopes
11	5.949	6.927	0.978	Blue clays and conglomerates of terrestrial phase

For Alternative Routing ALT6 the Onshore Facilities proposed location is at K.P.0+000, at “Gouri” site.

## Alternative Routing ALT7

**Table 4.11 Description of Geological Formations along Alternative Routing ALT7**

s/n	From K.P.	To K.P.	Route Length (km)	Geological Formations
1	0.000	0.729	0.729	Limestones and dolomites of Sinion and Pantokratora.
2	0.729	1.045	0.316	Talus and lateral screes of slopes
3	1.045	1.807	0.762	Limestones and dolomites of Sinion and Pantokratora.
4	1.807	2.957	1.150	Triassic Breccia
5	2.957	3.111	0.154	Recent Deposits
6	3.111	3.465	0.354	Limestones of Vigla
7	3.465	3.690	0.225	Blue clays and conglomerates of terrestrial phase
8	3.690	4.322	0.632	Recent Deposits
9	4.322	4.525	0.203	Blue clays and conglomerates of terrestrial phase
10	4.525	4.615	0.090	Recent Deposits
11	4.615	4.759	0.144	Limestones of Vigla

For Alternative Routing ALT7 the Onshore Facilities proposed location is at K.P.0+000, at “Variko” site.

### 4.3.4 Geological description of the compressor station area

The region of the compressor station area from geomorphological point of view is a small intermountainous depression of triangle shape that has been captured by a large stream known as “Aetopholias Rema”. The stream as drifts to the west down cuts the limestone bedrock having as a result the formation of an E-W trending corridor-canyon. The central part of the depression is filled up with surficial terra rossa deposits the thickness of which is not more than few meters. Nowadays, the stream drains the depression and takes away the surficial deposits. The exposures of the Pantokrator Limestones to the south of the depression consist of medium to thick-bedded limestones, whereas to the north of the depression, they pertain medium- and at some parts thin-bedded limestones. Broadly speaking, the limestone dips at gentle angles, approximately 25°, towards NNW.

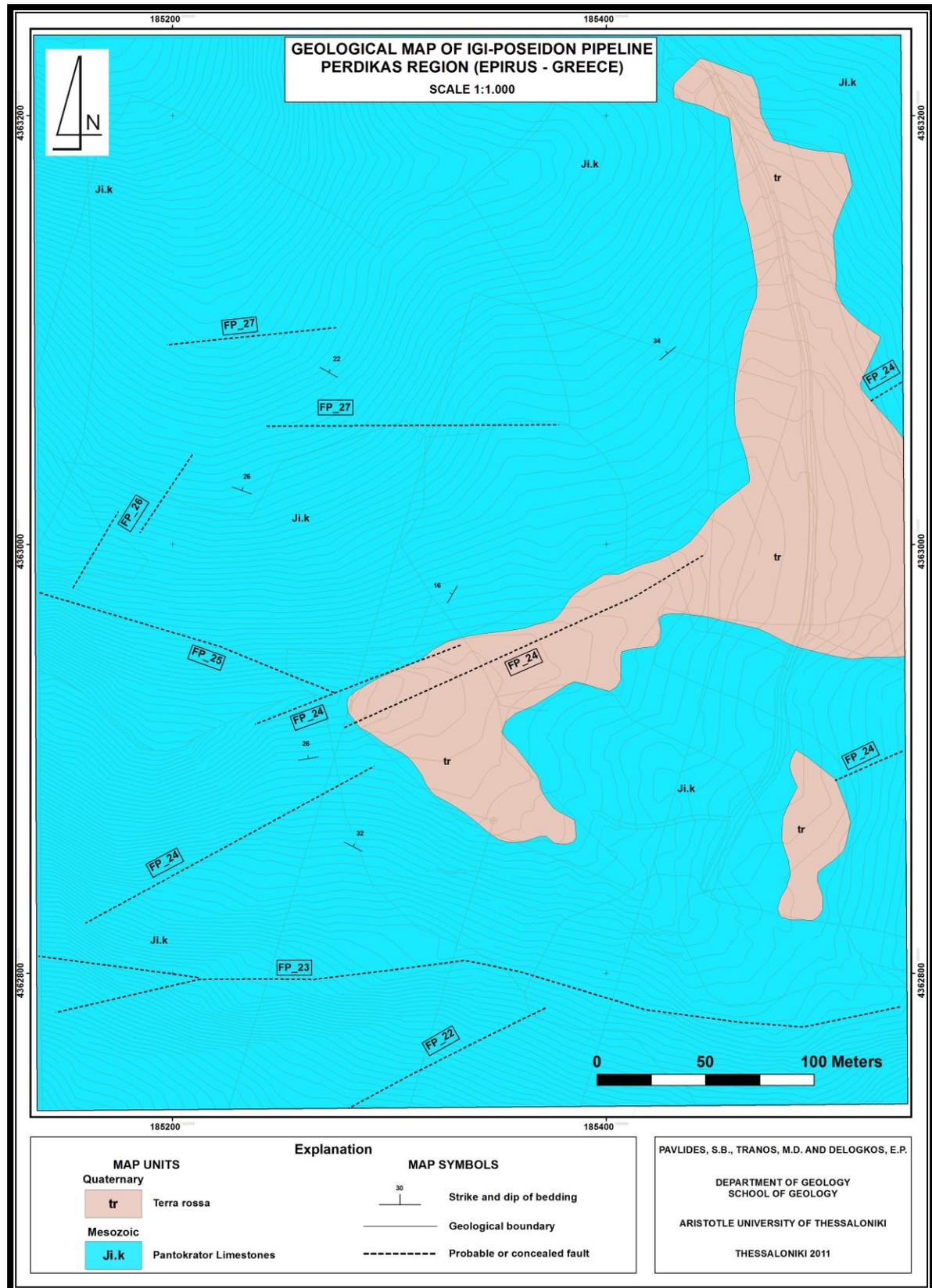
In the investigated area, the faults strike E-W, ENE-WSW and NNW-SSE and dip at high angles. They normally form fracture zones the width of which is not more than few meters. Within these zones closely spaced array of discontinuities is the dominant feature. In particular, the faults are presented on the geological map (Picture 4.2). The faults labeled FP\_22 - FP\_27. The fault labeled FP\_23 seems to

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correspond to a large tectonic structure striking EW that controls the drift of the “Aetopholia Rema”. All the faults, however, have a length that does not exceed the few hundred meters.

Along the road side next to the compression station area discontinuities exist. Specifically five sets of discontinuities (D1, D2, ..., D5) except the bedding of the limestone exist.

Picture 4.2 Geological map of Perdika region.



#### 4.3.5 Tectonic Data

The faulting of the region is approached by satellite interpretation and field observation of the exposed fault surfaces. The latter is the most reliable since directly gives indexes about the fault pattern and the fault activation in the region. The satellite interpretation implies that the main strike of the faults trends NE-SW to ENE-WSW. On the other hand, field observations suggest that the faults of the region could be grouped in three main groups concerning their strike: (a) the faults striking WNW-ESE, (b) the faults striking NWSE and (c) the faults striking NE-SW.

The WNW-ESE striking faults dip mainly to the SSW at angles varying from 50° up to 70° and having as a mean value 107°-63° SSW or 197°-63°. These faults are extensional faults that have been activated with left-lateral oblique-normal to normal displacements that define a subvertical compression and NNE-SSW subhorizontal extension. However, some of these faults have been found previously to activate as strike-slip faults. It is noted that the tilting of the post-alpine sediments towards the NNE could be possibly attributed to the activation of these faults.

The NW-SE striking faults present a quite complicate geometry concerning the degree of the dip and dip direction. In the published geological maps, the main NW-SE striking faults that run parallel to the mountain chains have been mapped and interpreted as reverse faults. These faults, which have been mapped at their larger length as covered or probable ones, dip to the NE at various angles and thrust the alpine rocks over the Miocene and the Pliocene sediments.

Therefore, what we can state from our investigation for these faults is that: (a) they present various dips towards either NE or SW; (b) their kinematics is complicate; (c) there is no any clear and robust observation of their trace in case this is between the alpine rocks and the Miocene and Pliocene sediments, (d) the faults dipping towards SW are normal faults, (e) no reverse fault within the Miocene and Pliocene sediments, but only few high-angle normal faults were observed, (f) a few observations of the contact between the alpine rocks and the Miocene marls suggest that the contact surfaces dip at high angles towards the alpine rocks.

Thus, our observations about these faults allow us to suggest the following: (a) they do not form linear, continuous and of constant trend traces, (b) the tectonic contacts between the Miocene and Pliocene sediments and the alpine rocks were reverse faults that dip at medium to high-angles towards NE, (c) these reverse thrusts sealed

entirely by the ongoing deposition of the Miocene and Pliocene sediments, and (d) the uplift of the region due to the ongoing compression of the region caused a further tilting to the post-alpine sediments and to the reverse faults. Due to this tilting, the already existed reverse faults became steeper for about 25°.

The third fault group includes faults that dip mainly towards NW at high angles. These faults, cross-cutting the mountain chains, indicate left-lateral oblique normal movements that define a NW-SE extension. However, we should mention that these faults are not km-long faults, but rather smaller discontinuous faults.

Conclusively, our satellite and field observations about the faulting of the region suggest that the exposed faults in the region are not so impressive and big and the landscape is still the result of the orogenic processes that took place in the Miocene times. Afterwards, relatively small and discontinuous faults have been observed to be activated in the region along the pipeline and these faults are not km-long faults in order to be related with strong earthquakes. To this, the historical and recorded seismic activity of the broader region also advocates (Papazachos et al. 2001; Kiratzi and Louvari, 2003; Baskoutas et al. 2011).

The faults shown on the geological corridor of the proposed pipeline (see Figure 4.1) will be described as follows:

#### **F<sub>P1</sub>**

This NNW-SSE fault has been mapped as probable fault because its trace on the Earth's surface could not be seen due to intense vegetation and the erosional slope material that covers the contact. There are not any stratigraphic or morphotectonic criteria to be considered as an active fault and its total length should not exceed 3.5 km.

#### **F<sub>P2</sub>**

This NNW-SSE striking fault has been almost vertical, thrust dipping towards ENE. Apart this, there are no any stratigraphic or geomorphologic criteria to allow us to characterize this fault as active one.

#### **F<sub>P3</sub>**

This NNW-SSE striking fault has been mapped as probable thrust. The length of the fault is estimated to be as long as 1.2 km.

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**F<sub>P</sub>\_4**

This NE-SW fault has been mapped as certain extensional fault the total length is less than 1.5 km.

**F<sub>P</sub>\_5**

This NW-SE striking fault has been mapped as probable fault. The fault line total length is estimated to be less than 2 km.

**F<sub>P</sub>\_6**

This almost N-S striking fault has been mapped as probable normal fault. The total length of the fault is less than 1.5km.

**F<sub>P</sub>\_7**

This NNW-SSE striking fault has been also interpreted as a vertical.

**FP\_8**

This N-S striking fault has been mapped as probable. Its length is less than 2km.

**F<sub>P</sub>\_9**

This is a low-angle thrust that carries Triassic breccias and their overlying carbonate rocks over the Tertiary flysch.

**F<sub>P</sub>10**

This NW-SE striking fault has been mapped as probable fault beneath the alluvial sediments. Its total length is no more than 1.2 km and although no any fault surface could be seen in the field.

**F<sub>P</sub>\_11**

This NE-SW striking fault has been mapped as probable fault. Its length is less than 800 m.

**F<sub>P</sub>\_12**

It is a NE-SW striking probable fault the total length of the fault zone is almost 3 km.

**F<sub>P</sub>\_13**

It is the overthrust that carries the carbonate rocks of the Pantokrator Formation over the Tertiary flysch.

#### **F<sub>P</sub>\_14**

This fault trends NE-SW dips towards NW. The total length of this fault zone is about 3 km and its width is about 100 m. The fault can be easily observed in the field and the satellite images.

#### **F<sub>P</sub>\_15 & F<sub>P</sub>\_16**

These faults could be considered as strands of the FP\_14 fault since they have common strike and dip direction with the latter.

#### **F<sub>P</sub>\_17**

A small probable ENE-WSW striking fault.

#### **F<sub>P</sub>\_18**

Small ENE-WSW striking fault that dip towards NNW. Its length does not exceed 500 m.

#### **F<sub>P</sub>\_19**

It is a well expressed fault. The fault striking NE-SW and dipping to the NW has a length less than 1 km and it forms along with FP\_14 a fault zone of length of about 3 km that has been described in the description of FP\_14.

#### **F<sub>P</sub>\_20**

A small fault of length no more than 250 m that strikes NNE-SSW and dips to the WNW.

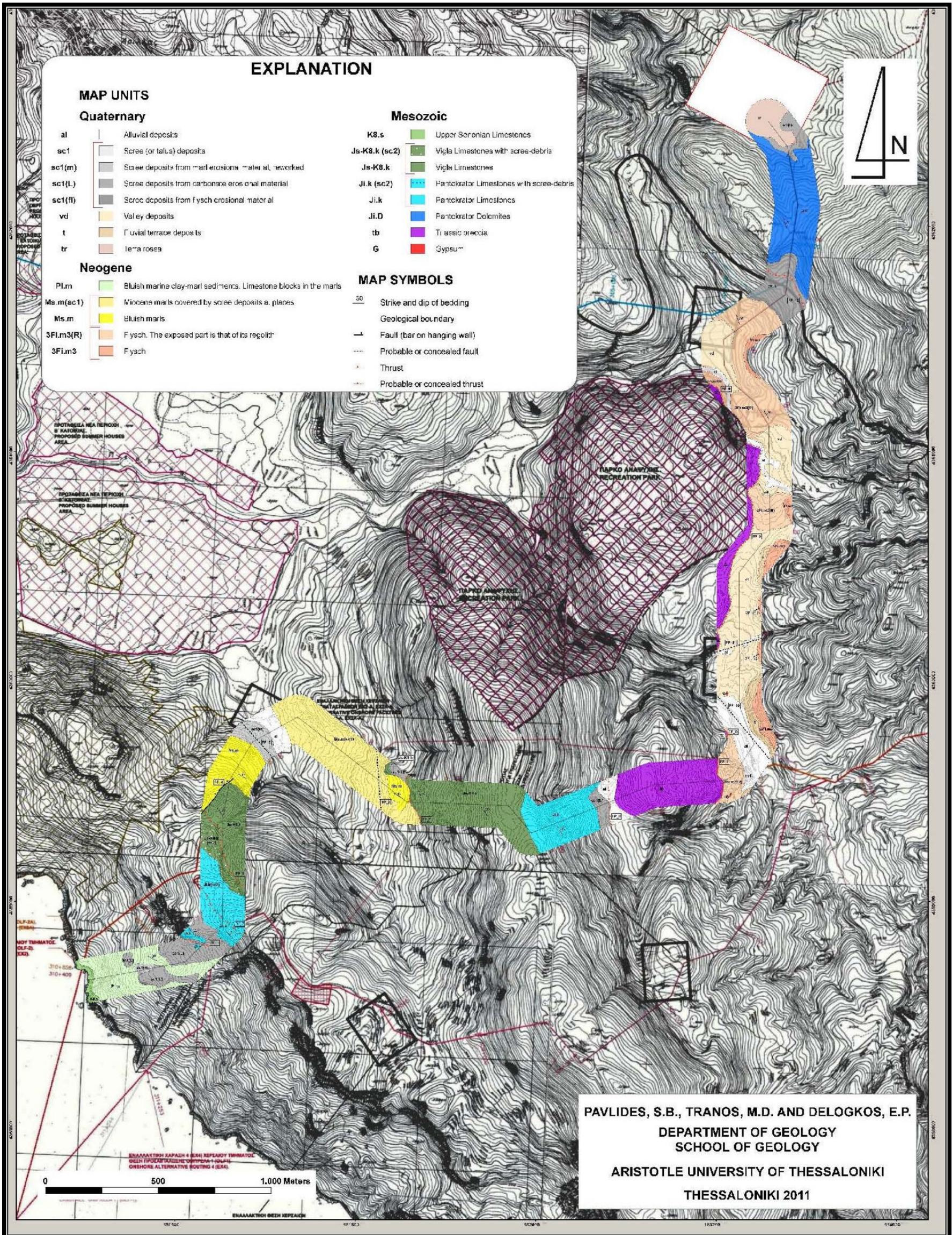
#### **F<sub>P</sub>\_21 & F<sub>P</sub>\_22**

Small NE-SW striking antithetic faults. Their length is not more than few hundred meters.

#### **F<sub>P</sub>\_23**

These probable faults striking E-W and dipping to the North.

Figure 4.1 Geological corridor along the proposed pipeline route.



### Displacements

In addition, the potential kinematic triggering of slope instability due to active faults is not considered in the present work because the neotectonic faults we have mapped in the wider area are of length of less than 2 km and thus no any significant seismic activity could be caused by such faults. Indeed, taking into account, the well accepted empirical relationships of earthquake magnitude versus the fault length (see Table 4.12) the surface rupture length of 2 km generally yields magnitudes of the order of 5.5. In particular, the relationships of Table 2 calculate for 2 km length magnitudes of 5.3, 5.5, 5.8 and 4.3 respectively. Such magnitudes, however, cannot produce or can generate very limited surface effects not necessarily co-seismic as mentioned by Pavlides and Caputo (2004).

According to them the maximum vertical displacement should be limited to 1-2 cm and therefore it could be disappeared very shortly after its formation. Generally, it is not expected significant ground deformations from such fault lengths. Thus, surface rupture lengths of only 1–1.5 km could not be distinguished when cross an inhabited or densely vegetated regions and co-seismic features remain undetected during a field survey. Indeed, our field investigation supports this conclusion, since nowhere we have observed morphotectonic features associated with recent seismic activity.

The following table illustrates the empirical relationships between the magnitude of the earthquake and the seismogenic fault that can cause this earthquake.

**Table 4.12 Empirical relationships between magnitude and seismogenic faults.**

S/N	EMPIRICAL RELATIONSHIPS	
1	Wells & Coppersmith (1994)	$M_w = 4,86 + 1,32\log (SRL)$
2	Ambraseys & Jackson (1998)	$M_s = 5,13 + 1,14\log (L)$
3	Pavlides & Caputo (2004)	$M_s = 0,9\log (SRL) + 5,48$
4	Papazachos al. (2004)	$\log L = 0,50M - 1,86$
M or $M_w$ = Moment Magnitude, SRL = Surface Rupture Length (km), $M_s$ = Surface Wave Magnitude and L = Subsurface Fault Length (km)		

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### **4.3.6 Geological Conditions at Landfall Sites**

#### **Landfall Site “Stamponi”**

Landfall site “Stamponi” is structured by Jurassic limestones. These limestones comprises of cohesive rock formations, without instability phenomena. No geotechnical problems are expected, during construction or operation phase.

In comparison to the neighboring site of “Sofas” and due to the morphology of the coast line, excavation works achieving mild gradient’s for the pipeline’s trench will be required. In any case, these works will be temporary and the landscape will be fully reinstated.

#### **Landfall Site “Sofas”**

Landfall site “Sofas” is structured by Jurassic limestones, triadic breccia and dolomites. These limestones comprise of cohesive rock formations, without instability phenomena. No geotechnical problems are expected, during construction or operation phase.

#### **Landfall Site “Omprela 2”**

Landfall site “Omprela 2” is structured by talus and lateral screes of slopes. Indications of limestones of Senonio are also present. In the region, instabilities exist, which can be addressed with special construction measures.

#### **Landfall Site “Stavrolimenas”**

Landfall site “Stavrolimenas” is structured by Jurassic schists with alternations of cherts and silic clays. No geotechnical problems are expected, during construction or operation phase.

#### **Landfall Site “Omprela 1”**

Landfall site “Omprela 1” is structured by blue clays and conglomerates, and coincides with the fault’s trace.

The area is characterized by steep morphology and the presence of numerous landslides horseshoes, of varying size. Many of these are old and discerned mainly from aerial images. On site investigation brought into light a 2-3m leap of these horseshoes, active up today. Additionally, in the investigated area, faults of horizontal

displacement exist, according to the study prepared by I.G.M.E. for the area during the previous phase of PEIA.

Another fact reasserting the extensive area's instability is the displacement of the Miocene sediments, laid on top of clays and conglomerates, in such extent as not to be able to distinguish their stratification. The area's general instability is reasoned, also, by the hydrogeological behavior of the existing formations.

Underground water presence is impressive, mainly at small depths, which is proved by the existence of hydrophilous vegetation, like reeds.

In general, at "Omprela 1" site, significant geotechnical problems should be expected during construction and operation phase. Extensive and detailed studies are required to fully understand geology and soil behavior of the site, during a seismic event or activation of existing faults, in order to verify feasibility and safety of the Pipeline. In any case, extensive works in the broader region will be required, which would cause very significant impacts on the landscape, some of them being permanent.

#### 4.3.7 Geological Conditions at the Onshore Facilities (C/S-M/S)

The following table illustrates the geological formations upon which the various alternatives of the Onshore Facilities for the Compressor and Metering Station are located.

**Table 4.13 Geological formations of Onshore Facilities (C/S-M/S) sites.**

s/n	C/S-M/S Code	Corresponding Routing(s)	Geological Formation
1	C/S-M/S 1	ALT4	Limestones and Dolomites of Sinion and Pantokratora covered by layer of clay.
2	C/S-M/S Kalivia	ALT3, ALT4	<ul style="list-style-type: none"> <li>• 35% on Limestones and Dolomites of Sinion and Pantokratora.</li> <li>• 65% Terra Rossa</li> </ul>
3	C/S-M/S Florovouni	ALT1a, ALT1b	Limestones and Dolomites of Sinion and Pantokratora.
4	C/S-M/S Variko	ALT1, ALT1b, ALT5, ALT7	Limestones and Dolomites of Sinion and Pantokratora.

s/n	C/S-M/S Code	Corresponding Routing(s)	Geological Formation
5	C/S-M/S 2	ALT1, ALT1b, ALT5, ALT7	<ul style="list-style-type: none"> <li>• 50% on Limestones and Dolomites of Sinion and Pantokratora.</li> <li>• 50% on Talus and lateral scree of slopes</li> </ul>
6	C/S-M/S Gouri	ALT2, ALT6	<ul style="list-style-type: none"> <li>• 80% on Limestones and Dolomites of Sinion and Pantokratora.</li> <li>• 20% on Terra Rossa</li> </ul>
7	C/S-M/S 3	ALT1, ALT1a, ALT1b, ALT5,	Triassic breccia
8	C/S-M/S 4	ALT5, ALT6	<ul style="list-style-type: none"> <li>• 50% on Limestones and Dolomites of Sinion and Pantokratora.</li> <li>• 50% on Triassic breccia</li> </ul>

#### 4.3.8 Geotechnical Conditions

The data of the chemical composition of the soil are expected by the investigation works. Four (4) boreholes have been performed at the station site, six (6) boreholes along the onshore pipeline route and two (2) boreholes in the landfall area.

- **Compressor and Metering Station (Florovouni)**

Four (4) boreholes have been performed at the compressor station area: one (1) to a depth of 10m, two (2) to a depth of 20m and one (1) to a depth of 30m. Roughly, the retrieved samples consisted of a top layer of red/brown clay with a thickness varying between 1m to 10m. The clay becomes stiffer along the depth of the borehole and contains some gravel and limestone. Under this layer, a layer of heavily fractured limestone was found intruded by red clay in some of the fractures / voids. This layer lasted to the full depth of the boreholes.

Both the finding of the limestone layer as well as the clay deposits are in accordance with the Geological and Tectonic Study. This study mentions the presence of limestone bedrock together with surficial terra rossa (red clay) deposits having a thickness not more than a few meters.

- **Onshore Pipeline Route**

Six (6) boreholes have been performed along the pipeline route, excluding the landfall area.

Between KP 6.0 and KP 7.7, three (3) boreholes of 15m each have been performed: marls and CLAY overlain by a 1m to 1.5m thick layer of disturbed local soil.

At approximately KP 4.0, one (1) borehole of 15m has been performed: CLAY overlain by a 5m thick layer of disturbed local soil; below 10m bedrock (LIMESTONE).

Near the road crossing (Perdika – Parga) at approximately KP 2.5, two (2) boreholes of 10m each have been performed: white/grey/brown loose SAND and carbonate GRAVEL, eroded material of the limestone bedrock.

- **Landfall (Omprela 2)**

Two (2) boreholes have been performed on the landfall at Omprela 2: one (1) to a depth of 27m and one (1) to a depth of 30m (see Table 4.14). The first 20m of the 27m borehole consisted of SAND and CLAY with cobbles. A layer of good quality LIMESTONE was encountered between 2m and 4m same as between 7m and 7.5m. After a depth of 20m the soil consists of very stiff blue clay stone. This layer continued to the full depth of the borehole.

The first 20m of the 30m second borehole consisted mainly of sand with gravel followed by a layer of medium to stiff clay between 20m and 25m. After a depth of 25m the soil consists of very stiff blue clay stone similar to the 27m borehole. This layer also continued to the full depth of the borehole.

**Table 4.14 Landfall site boreholes location.**

Location	Easting (m)	Northing (m)	Ground Elevation*
G-BH-LFG-01	439419.81	4352715.00	94.42
G-BH-LFG-02	439368.72	4352677.68	77.82

\* Heights relative to Piraeus National Vertical Datum (MSL). Lowest Astronomical Tide is - 0.15m below Piraeus National Vertical Datum (MSL) at Omprela

The presence of the blue clay corresponds to the findings of the Geological and Tectonic study. This finding indicates the possible presence of limestones conglomerates, a fact that explains the finding of limestones in the 27m borehole.

#### **4.3.9 Geotechnical behavior of the geological formations**

In general, the following are presented regarding the geotechnical behavior of the various geological formations.

##### Limestones

Limestones are rocks with good to high resilience and do not present any problem during foundation of any kind. Additionally, they do not suffer from weathering (especially marbles) and so they do not create unstable or of low resistance zones above their healthy mass; rock's cracking, their orientation and their surface layering have important role.

In slope sites, limestones are solid formations, conditionally they are not multi-cracked, the discontinuities orientation (cracks – layers) is not unfavorable to the slope's orientation and the angle of friction along the discontinuities is small.

Limestones behavior towards certain major technical projects changes significantly when the formation is karstic. Here, it should be noted that calcification is a slow process. The rock, if suffered by karstification, presents problems caused by existing cavities or hollows and not by limestones' degradation during a project's life span. In the overall limestones' behavior, their regular filling with clay materials has a significant role, since it decreases their resilience.

##### Conglomerates – Sandstones

When solid, these rocks behave favorably. Their resilience is strong and no problems are created to foundations; their slopes are stable even in vertical gradient. Problems arise when these rocks are loosened. Their loosening depends on the nature of the gravels' (conglomerates) or grains' (sandstones) binding material of these rocks. This binding material can be silica (quartz), clayey, or calcite.

When it is clayey, of "low behavior" clay, the rocks cohesiveness can be reduced through water contact. This results in the decrease of the rocks' resilience or even their total loosing. When the binding material is calcite, their dilution by water and the consequent loosing is feasible. Additionally, inner erosion is possible, if the water table is high. Rocks with calcite binding material is of higher resilience than those with clayey binding material.

Finally, it should be noted that conglomerates and sandstones, more often than not, do not stand alone but in layers' succession with marls, siltstones, etc., that is with rocks of lower resilience. The succession of materials of different resilience could cause different subsidences.

#### Pleistocene sediments – Alluvial deposits

Their behavior depends upon the nature of the materials that form them (clay, silt, sandgravels, and gravels), these materials' thickness and the water table's level, in combination to the technical project planned on the formations. Issues of insufficient stability deteriorate when the following conditions apply individually or accumulatively:

- Presence of clayey marls with large concentration of thick clay
- Formation layers, dipping in the same direction as the slope or the excavation
- Not sufficient drainage of natural slopes and sloppy surfaces
- Water presence inside the formations of sandstone or conglomerates and creation of slip planes on top or beneath clayey layers.

The most common land sliding movements that are developed in the aforementioned formations and cause risks for the investigated area, especially after a seismic events or excavations, include:

- *Landslides (creeps, etc.)*

In their manifestation, two factors, mainly, contribute: i) the often dipping in the same direction as the slope discontinuity surfaces (fractures, faults) and ii) the presence of dense network of crossing ruptures in combination to weathering factors, slopes' grade, etc.

- *Rock falls*

Rock falls can only happen in areas of steep morphological features. Rock falls' manifestation is probable in sites where carbon or conglomerates parts lay on top of clayey and marls crossings.

Based on what described previously, an indication of the classification and the most suitable excavation methods for each formation along the investigated routing is presented in Table 4.15.

**Table 4.15 Excavation Classification.**

	Description of Geological Formation	Classification	Excavation Method
1.	Limestones	Rock	Explosives (under conditions) or mechanical excavation
2.	Neogene (in the whole of their mass)	Semi Rocks to Earthen	Ripper or mechanical excavation
3.	Conglomerates (cohesive) parts of Plistocene and Paleogene formations	Semi Rocks to Rock	Ripper or mechanical excavation
4.	Clay, marls, sands, parts of Plistocene formations	Earthen	Mechanical excavation
5.	Recent deposits, lateral slopes' screes, coastal deposits	Earthen	Mechanical excavation

The following table (Table 4.16) presents the suggested, based on the geological and technical data, slopes' grade per geological bed, as well as the maximum slopes' length that can be applied for future excavations. In case that the suggested slope's gradient and the geomorphology of the slope lead to a slope's length bigger than the allowed one (as illustrated in the following table) it is necessary a berm of 1-1.5m width to intervene, with runoff gradient 1% and drainage trench at the inner side.

**Table 4.16 Suggested Gradient and Maximum Allowed Length of Slopes.**

	Description of Geological Formation	Slopes Gradient (Suggested)	Maximum Slopes' Length (m)
1.	Limestones	1:2 - 1:3	15 - 25
2.	Neogene (in the whole of their mass)	1:1 - 2:1	15
3.	Conglomerates (cohesive) parts of Plistocene formations	1:2 - 1:3	15 - 25
4.	Clay, marls, sands, parts of Plistocene formations	1:1 - 3:2	12 - 15
5.	Recent deposits, lateral slopes' screes, coastal deposits	1:1 - 3:2	10 - 15

Note 1: Relation 1:2 means 1: horizontal, 2: vertical

Note 2: In case of high aquifer, layers of same direction as the slope, considerable faults presence and rocks' mass fragmentation, reduce the technical characteristics of the formations and consequently it is deemed necessary to reduce gradient and length of slopes.

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#### **4.3.10 Description of the Hydrogeology of the Area**

Ground water can be present in various depths, depending on the aquifer's structuring. In general, geological formations of the investigated area are classified in 3 basic categories depending on the manner that water circulates within their body.

- **Granular or micro-permeable formations**

Under this category fall the geological formations that are cohesive or loose but their mass presents porosity. In that case, water can primarily circulate through the pores. This category includes alluvial deposits and formations (sands, conglomerates, screes), pliocene formations, and sandstones.

- **Fractured or macro-permeable formations**

Under this category fall the rocks with no porosity but allow water circulation through their discontinuity network. In that case, water can pass through any discontinuity that exists in the rock's body. This category includes limestones and generally weathered zones of every geological formation. Water movement in fractured rocks is made towards certain directions and not all the area of the rock, unless the formation is much fractured and behaves as macro-permeable formation.

- **Waterproof or impermeable**

These are formations that do not allow water percolation, such as schists with tectonic alteration, marls, marley sandstones, clay and detailed phases of dilluvial and alluvial deposits.

In Hydrogeology, for practical reasons, lithographic formations are divided in the following groups:

- Permeable, when permeability is higher or equal to  $10^{-5}$ m/s.
- Semi-permeable, when permeability ranges  $10^{-5}$ - $10^{-7}$ m/s.
- Impermeable, when permeability is lower than  $10^{-7}$ m/s.

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#### **4.3.11 Hydrogeological Conditions along the Onshore Routings**

##### **Alternative Routing ALT1**

The biggest part of the routing traverses macro-permeable limestone formations, thus, no problem is expected caused by high aquifer. Near the landfall site “Omprela 2” high aquifer is evident through the hydrophilic vegetation and a spring.

##### **Alternative Routing ALT1a**

Exactly as in ALT1, the biggest part of the routing traverses macro-permeable limestone formations, thus, no problem is expected caused by high aquifer. Near the landfall site “Omprela 2” high aquifer is evident through the hydrophilic vegetation and a spring.

##### **Alternative Routing ALT1b**

As previously, the biggest part of the routing traverses macro-permeable limestone formations, thus, no problem is expected caused by high aquifer. Near the landfall site “Omprela 2” high aquifer is evident through the hydrophilic vegetation and a spring.

##### **Alternative Routing ALT2**

The routing traverses macro-permeable formations (limestones), permeable formations (talus and lateral slopes’ screes), impermeable (clays, marls, gyps and evaporites) and semi-permeable (flysch). Generally, along limestone formations high aquifer is not expected. Near the landfall site “Omprela 2” high aquifer is evident through the hydrophilic vegetation and a spring.

##### **Alternative Routing ALT3**

The routing traverses mainly macro-permeable limestone formations, thus, no problem is expected caused by high aquifer.

##### **Alternative Routing ALT4**

The routing traverses mainly macro-permeable limestone formations, thus, no problem is expected caused by high aquifer.

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### **Alternative Routing ALT5**

The routing traverses macro-permeable formations (limestones), permeable formations (talus and lateral slopes' screes), impermeable (clays, marls, gyps and evaporites) and semi-permeable (flysch). Generally, along limestone formations high aquifer is not expected; high aquifer is expected along the screes near the landfall "Omprela 1", resulting in possible construction problems.

### **Alternative Routing ALT6**

The routing traverses macro-permeable formations (limestones), permeable formations (talus and lateral slopes' screes), impermeable (clays, marls, gyps and evaporites) and semi-permeable (flysch). Generally, along limestone formations high aquifer is not expected; high aquifer is expected along the screes near the landfall "Omprela 1", resulting in possible construction problems.

### **Alternative Routing ALT7**

The routing traverse mainly macro-permeable limestone formations, thus, no problem is expected caused by high aquifer.

## **4.4 Seismicity**

### **4.4.1 General**

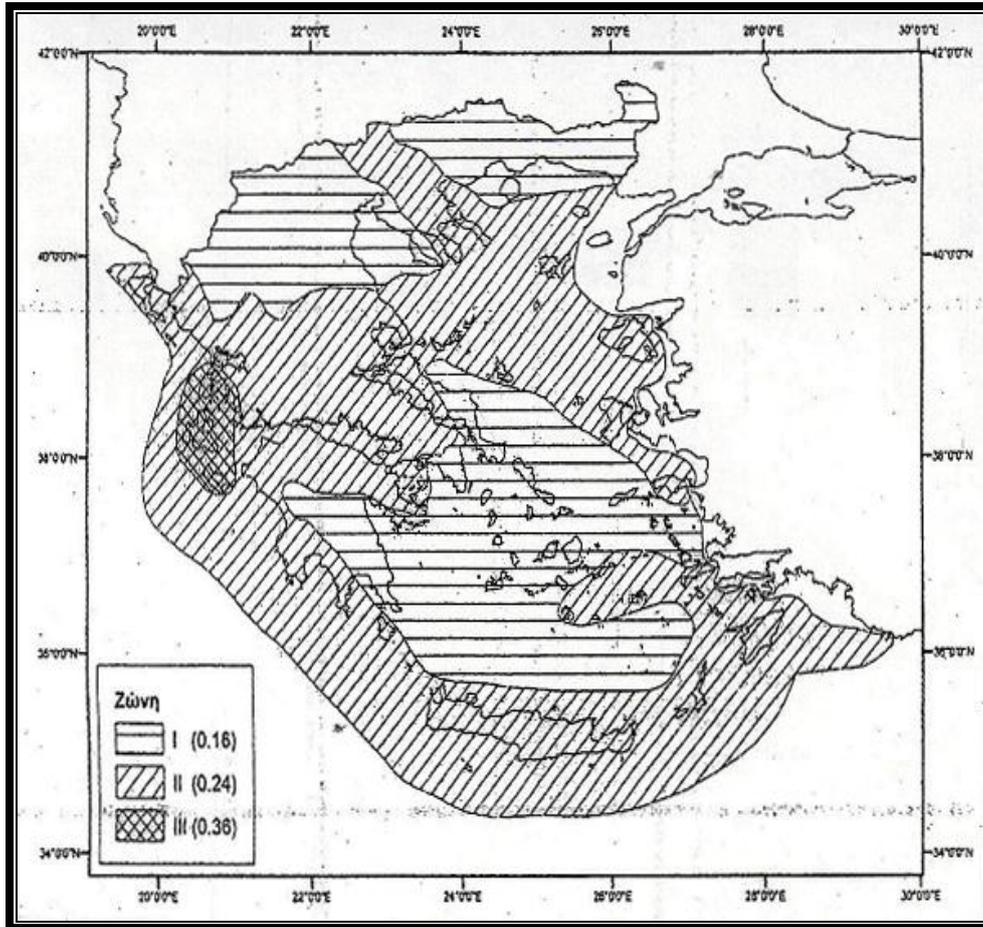
The investigated area is characterized as an area of medium seismicity. At sequence data from historical seismicity are presented.

For the seismic design of the Project the following studies were prepared:

- Seismological Study - Greece Onshore section.
- Geologic and Tectonic Study for the Greek Onshore Section

According to the Seismic Risk Zone map of Greece (see Picture 4.3) the investigated area is classified as II (class of medium seismic risk) with Seismic Soil Acceleration  $A = 0,24 g$ .

**Picture 4.3 Seismic Risk Zoning Map of Greece.**



#### 4.4.2 Historical Data

For the historical seismicity the catalogue of Papazachos et al 2000, Papazachos and Papazachou 2003, in which information on earthquakes from 500 BC until 1999 AD is contained, was used. This catalogue reports information for historical events for the whole area of Greece. The magnitude is reported in moment magnitude scale ( $M_w$ ) while the depths of events are reported as shallow (n) (<60km) and intermediate (i) only. The magnitude errors are estimated as  $\sim 0.35$  and in some cases  $\sim 0.5$ . Location errors are estimated as 20km while in some cases could be 30km or 50km (Papazachos and Papazachou 2003).

Based on the historical data of the catalogue mentioned, a map with the distribution of epicenters of historical earthquakes was prepared for distance of 1 degree or  $\sim 111$  km around the study area (Picture 4.4). This map gives a first image of seismicity distribution, although the epicenter location is not so accurate. As it can be observed,

very close to the area under study there have been one strong historical earthquake (1823, (6.3), VIII). Besides this, a lot of historical earthquakes are located close to known seismically active regions, like Corfu, Paxoi Lefkada, Cephalonia islands and broader Epirus region. The following are reported for some historical events in the study area.

- 1823, June 19, 39.4o, 20.3o E, h = n, M=(6.3), Epirus, Sagiada (VIII)

The earthquake destroyed 2000 houses in Epirus; the town of Sagiada was heavily damaged.

- 1732, November, 39.5o, 20.1o E, h = n, M=6.5, Corfu, (VIII)

A sufficiently violent shock, associated with sound from the side of the coast, was felt in Corfu where the sea seemed to swell.

- 1743, February 20, 39.2o, 20.1o E, h = n, M=7.1, Corfu, (VIII)

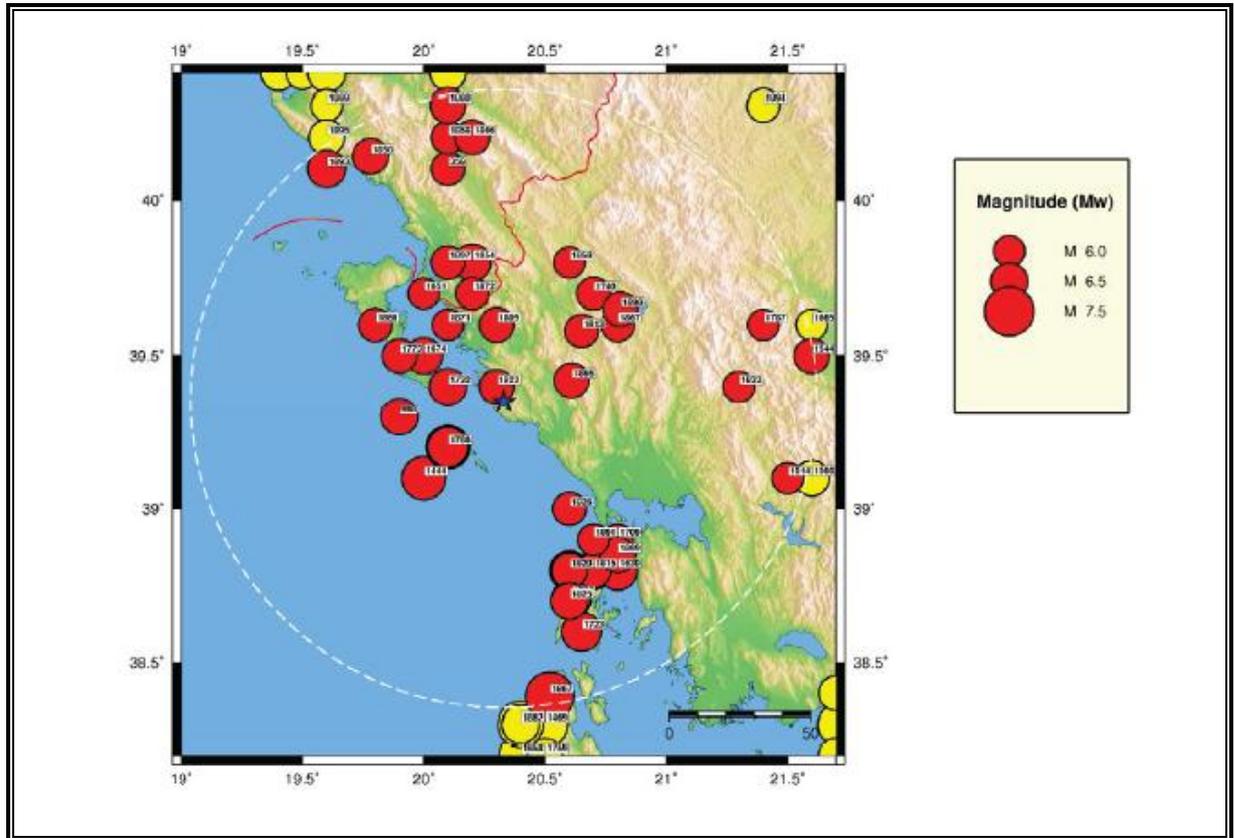
The earthquake caused damage in Corfu.

- 1786, February 5, 39.2o, 20.1o E, h = n, M=(6.8), Corfu, (IX)

The earthquake destroyed a large part of the city and killed 126 people while the number of injured was larger.

Here it should be stressed out again, that the historical data are based in macro seismic observations and not in instrumental recordings, accordingly the data are not complete and contain obscurities and inaccuracies. Usually the intensity has been overestimated, due to the limited resistance of buildings; consequently, the conclusions could differ with the intensity results for earthquakes that occur today.

**Picture 4.4 Epicentres of historical earthquakes within 1 degree distance around the study area, M>6.**



The following table (Table 4.17) lists historical earthquakes in a 1° distance (~111km) of M>6, around the study area. Magnitudes in parentheses denote larger errors in magnitude estimation (~0.5), while brackets denote uncertainty in occurrence of event.

**Table 4.17 List of historical earthquakes in 1 degree distance (~111km, M>6) around the study area.**

Year	Month/Day/Hour	Latitude	Longitude	Depth	Magnitude Mw	City	Intensity MM
358	0000000000,00	40,100	20,100	n	6,2	Argyrocastro	VIII
968	1222000000,00	39,300	19,900	n	6,6	Corfu	VI
1153	0000000000,00	39,800	20,100	n	6	Burtint ,Albania	VIII
1444	7000000000,00	39,100	20,000	n	7,1	N.Ionian Sea	
1514	0000000000,00	39,100	21,500	n	6	Pindos	VIII
1544	4240000000,00	39,500	21,600	n	6,4	Pili, Trikala	VIII
1577	0000000000,00	38,800	20,600	n	6,2	Lefkada	VIII
1612	5260700000,00	38,800	20,800	n	6,5	Lefkada	VIII
1613	1012000000,00	38,800	20,800	n	6,4	Lefkada	VIII

Year	Month/Day/Hour	Latitude	Longitude	Depth	Magnitude Mw	City	Intensity MM
1625	628000000,00	38,800	20,700	n	6,6	Lefkada	IX
1630	702000000,00	38,800	20,800	n	6,7	Lefkada	IX
1651	226000000,00	39,700	20,000	n	6	Corfu	VII
1666	1100000000,00	39,600	19,800	n	6,2	Corfu	VII
1674	1160000000,00	39,500	20,000	n	6,5	Corfu	VIII
1704	1122000000,00	38,800	20,700	n	6,3	Lefkada	IX
1709	0000000000,00	38,900	20,800	n	6	Vonitsa	VIII
1722	605000000,00	38,700	20,600	n	6,4	Lefkada	VIII
1723	222020000,00	38,600	20,650	n	6,7	Lefkada	VIII
1732	1100000000,00	39,400	20,100	n	6,5	Corfu	VIII
1740	204000000,00	39,700	20,700	n	6,2	Ioannina	VIII
1743	220000000,00	39,200	20,100	n	7,1	Corfu	VIII
1769	1012180000,00	38,800	20,600	n	6,7	Lefkada	IX
1773	500000000,00	39,500	19,900	n	6,3	Corfu	VIII
1783	323050000,00	38,710	20,610	n	6,7	Lefkada	X
1786	205000000,00	39,200	20,100	n	6,8	Corfu	IX
1787	619030000,00	39,600	21,400	n	6	Pili	VII
1809	504000000,00	39,600	20,300	n	6,3	Ipeiros	VIII
1813	1210130000,00	39,580	20,650	n	6,2	Ioannina	IX
1815	0000000000,00	38,800	20,700	n	6,3	Lefkada	VIII
1820	221000000,00	38,800	20,600	n	6,4	Lefkada	IX
1823	619000000,00	39,400	20,300	n	6,3	Epiros, Sagiada	VIII
1825	119114500,00	38,700	20,600	n	6,5	Lefkada	X
1826	126000000,00	39,000	20,600	n	6,2	Preveza	VII
1833	629000000,00	39,400	21,300	n	6,0	Arta	VIII
1854	730013000,00	39,800	20,200	n	6,5	Delvino, Albania	VII
1858	405000000,00	39,800	20,600	n	6	Ioannina	VIII
1858	920000000,00	40,200	20,100	n	6,2	Delvino, Albania	IX
1858	1010093000,00	40,140	19,780	n	6,4	Chimara, Albania	IX
1860	410000000,00	40,300	20,100	n	6,3	Tepeleni, Albania	VIII
1866	1204000000,00	40,200	20,200	n	6,3	Argirokastro, Alb.	IX
1867	127000000,00	39,600	20,800	n	6,2	Ioannina	VIII
1867	204041900,00	38,390	20,520	n	7,4	Cephalonia	X
1869	1228000000,00	38,850	20,800	n	6,4	Lefkada	X
1871	409000000,00	39,600	20,100	n	6	Corfu	VII
1872	211200000,00	39,700	20,200	n	6,1	Sagiada	IX
1891	627000000,00	38,900	20,700	n	6	Preveza	VII
1893	614000000,00	40,100	19,600	n	6,6	Chimara, Albania	IX
1895	514000000,00	39,420	20,610	n	6,3	Epiros	X
1897	117000000,00	39,800	20,100	n	6,2	Divre, Albania	IX
1898	731054000,00	39,650	20,810	n	6,3	Ioannina	VIII

### Modern Seismic Data

The modern seismic data period for Greece starts at the early years of the previous century. At that time the first instruments were installed from the Geodynamic

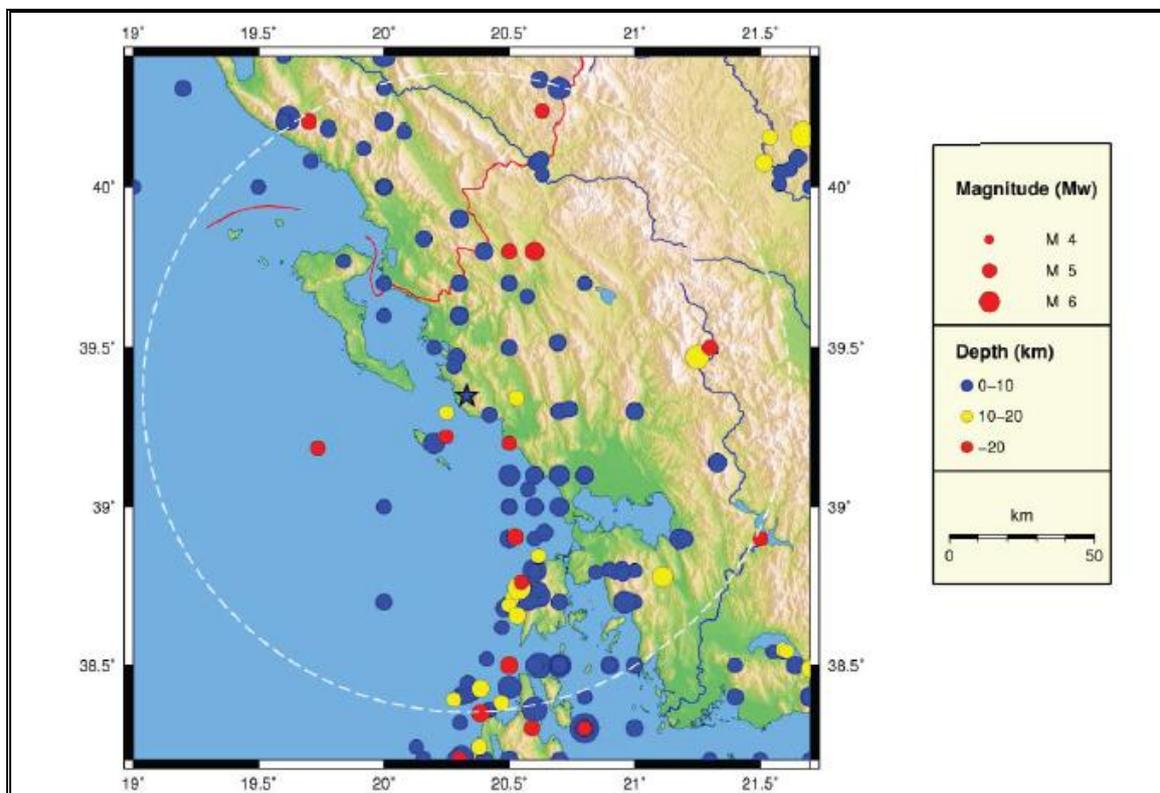
Institute of National Observatory of Athens (GI-NOA) and since then GI-NOA is responsible for seismicity monitoring in Greece.

In Table 4.18 the catalogue of earthquakes within one degree of distance around the study area and having magnitude larger than or equal to 6.0, are presented.

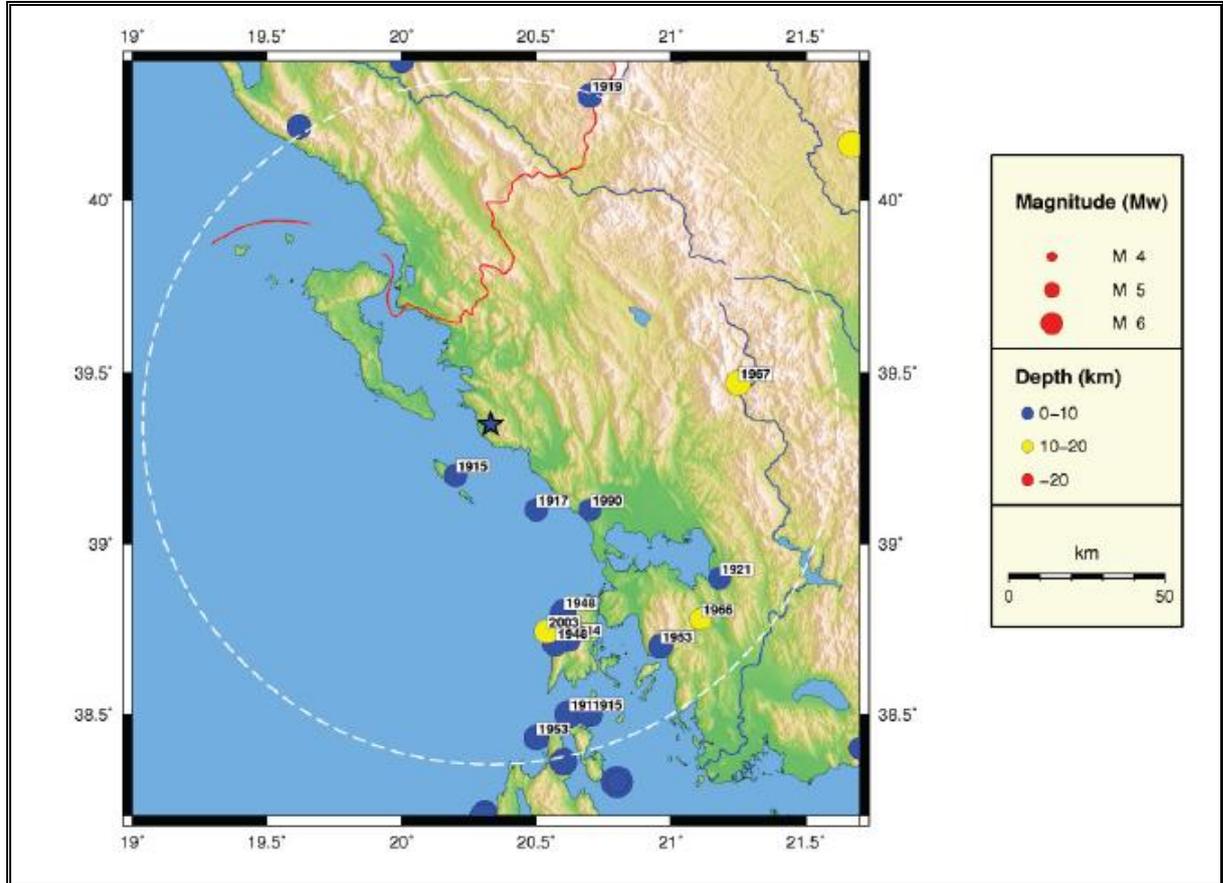
In Picture 4.5 and Picture 4.6 two seismicity maps are presented. The presented magnitude range per figure is  $M_w > 5.5$  and 6.0 respectively. From these figures we can observe the following:

- there is no significant ( $>6$ ) earthquake close to the study area (less than ~15 - 20km). Strong events are located close to Paxoi islands as well as close to Lefkada island. There is no strong event inland, in Epirus, for this time period.
- smaller magnitude events exist closer to the study area, these events have in general shallow depths  $< 20$ km
- The strongest earthquake closer to the study area was the 1915 event (19 August,  $M=6.1$ , VII s/n 5 of table) at a distance of 15km from pipeline's axis at the coast and 20km from pipeline's Facility area.

**Picture 4.5 Epicentres of modern data within 1degree distance around the study area ( $M_w > 5$ , 1900-2009).**



**Picture 4.6 Epicentres of modern data within 1 degree distance around the study area (Mw>6, 1900-2009).**



**Table 4.18 List of earthquakes within 1 degree of distance around the study area with Magnitude  $\geq$  of 6.0Mw.**

s/n	YEAR	MMDD/HHMMSEC	LATITUDE	LONGITUDE	DEPTH	Mw
1	1914	1127143946	38,72	20,62	0	6,3
2	1915	807150403	38,5	20,62	0	6,7
3	1915	810020249	38,5	20,7	0	6,1
4	1915	811091043	38,5	20,7	0	6,4
5	1915	819064216	39,2	20,2	0	6,1
6	1917	523054627	39,1	20,5	0	6,1
7	1919	1222234106	40,3	20,7	0	6,3
8	1921	913085953	38,9	21,18	0	6
9	1948	422104245	38,71	20,57	0	6,5
10	1948	630122113	38,8	20,6	0	6,4
11	1953	809074107	38,43	20,5	0	6,4
12	1953	1021183952	38,7	20,96	0	6,3
13	1966	1029023925	38,78	21,11	17	6
14	1967	501070902	39,47	21,25	12	6,4
15	1990	616021620	39,1	20,7	0	6
16	2003	814051455,3	38,744	20,539	11	6,3

#### 4.4.3 Seismic hazard calculation

The seismological study using various statistical methodologies, parameters quantifying seismic hazard, were computed the maximum expected earthquake magnitude for the area and the expected peak ground acceleration, velocity at 0,2 sec and 0,1 sec for various return periods.

The results are given in the following Tables:

**Table 4.19 Estimation of maximum expected magnitude.**

M	Time	Mean return period	Most probable magnitude in T years	Annual number of earthquakes larger than M
5	1	1	5,1	1,38
5,5	25	2	6,5	0,41
6	50	8	6,7	0,12
6,5	75	28	6,9	0,04
7	100	95	7	0,01

**Table 4.20 Probability that magnitude M or larger will occur in T years.**

M,T	10	20	50	100
5	100%	100%	100%	100%
5,5	98%	100%	100%	100%
6	70%	91%	100%	100%
6,5	30%	51%	83%	97%
7	10%	19%	41%	65%

**Table 4.21 Magnitude with probability of exceedance P in T years.**

P,T	10	20	50	100
10%	7,0	7,3	7,7	7,9
20%	6,7	7,0	7,3	7,6
40%	6,4	6,6	7,0	7,3
50%	6,2	6,5	6,9	7,2
60%	6,1	6,4	6,8	7,1
80%	5,9	6,2	6,5	6,8
90%	5,7	6,0	6,4	6,7

The peak ground acceleration, velocity, spectral acceleration at 0.2 and 1.0 sec were used as seismic hazard quantities. Hazard was calculated, for the geographical area with latitude 39.1° - 39.58° and longitude 20.1° - 20.58°. The computations were made on a grid with 0.1 degrees step. The calculations of the seismic hazard were done for four return periods 95, 475, 949 and 2475 years, (e.g. probability of exceedance 10% in 10 years, 10% in 50 years, 10% in 100 years and 2% in 50 years) and for rock soil type. The final results are given in the following table.

**Table 4.22 Seismic hazard.**

	Return Period				
	95	475	950	2475	
PGA	0,14	0,25	0,31	0,39	Mean
g	0,08	0,13	0,15	0,2	5%
	0,13	0,25	0,3	0,37	50%
	0,19	0,32	0,39	0,5	95%
SA 0,2sec	0,35	0,61	0,73	0,92	Mean
g	0,21	0,34	0,4	0,51	5%
	0,31	0,56	0,68	0,85	50%
	0,48	0,79	0,97	1,24	95%
SA 1,0sec	0,13	0,21	0,25	0,32	mean
g	0,06	0,11	0,13	0,18	5%
	0,09	0,15	0,18	0,24	50%
	0,17	0,27	0,32	0,41	95%
PGV	7	13	15	20	mean
cm/sec	5	8	10	13	5%
	8	14	17	22	50%
	9	15	19	25	95%

#### 4.4.4 Seismic Risk of Soils

According to the Greek Anti-Seismic Regulation (table 2.5 of paragraph 2.3.6 of the Regulation), soils of the area of the proposed routing are classified as follows:

- Limestones, marls, sandstones, quartzites, cohesive conglomerates, marley sandstones, are Category A.
- Non cohesive and non healthy rocky formations are Category B.
- Cohesive pliocene formations are Category B.
- Loose pliocene sandgravel and aggregate alluvial deposits are Category B or C.
- Olocene formations are Category B or C.

Based on the data arising from the interpretation of the Greek Seismic map and the geological maps of the investigated areas, the following table presents seismic parameters of the regional formations.

**Table 4.23 Seismic parameters.**

Description of Geological Formations		Longitudinal Seismic Waves' Speed Up=m/s	Average Density of Geological Formations p=g/cm <sup>3</sup>
1.	Recent to contemporary formations. Deposits of rivers, talus, lateral scree, fan.	300 – 1.400	1,8 – 2,0
2.	Old deposits, lateral scree of pliocene	1.300 – 2.000	2,0 – 2,5
3.	Clayey marls, clays, silt, sandstones, neogene conglomerates of pliocene	1.800 – 3.500	2,2 – 2,7
4.	Limestones	4.300 – 6.000	2,5 – 2,9

## 4.5 Soil and Morphological Conditions

### 4.5.1 Coastal Part

Presented data derive from the study: “**Coastal morphology and marine biodiversity of some sites at the NW coasts of Greece (Ionian Sea) where an onshore natural gas pipe is planned**” prepared by H.C.M.R..

The shores of the investigated area present geological formations of the Ionian Zone, with limestones of Mesozoic age. The south part of the investigated area has molassic type marls, sandstones and conglomerates of Mesozoic age, mainly. Rocks' type, rocks' resilience to mechanical weathering and corrosion, as well as the existing tectonic data and the river network are the critical factors that shaped the areas' relief.

The coastline presents an intense relief at the southern part of the investigated area and a smoother one at the northern part with the presence of a river, discharging at “Karavostasi” beach, and small torrents. In the area, relatively steep slopes are present, even higher than 15%. Regarding slopes direction, west and southwest directions are the majority followed by east directions.

From Autumn till Spring, NW, S and SE winds, of 3-5m/s speed, prevail, while in Summer the area is affected only by NW winds of 3-4m/s speed. Biggest waves in Autumn have 0.6-0.8m height and NW, S, SW direction; in Winter 0.8-0.9m height and NW direction, in Spring 0.6-0.8m and NW direction, and in Summer 0.5-0.6m and NW direction.

## Landfall “Omprela 2” (Alternative Routings ALT1, ALT1a, ALT1b, ALT2)

In the area of landfall “Omprela 2” (Picture 4.7 and Picture 4.8) fallen rocks along the coast exist. Additionally, a sandy beach of 40-60m long and 5-10m width is formed of medium and coarse sand. The mechanical erosion of the fallen rocks by the waves is evident.

**Picture 4.7 Overview Picture of Landfalls "Omprela 1" and "Omprela 2".**



**Picture 4.8 Details of Landfalls "Omprela 1" and "Omprela 2".**

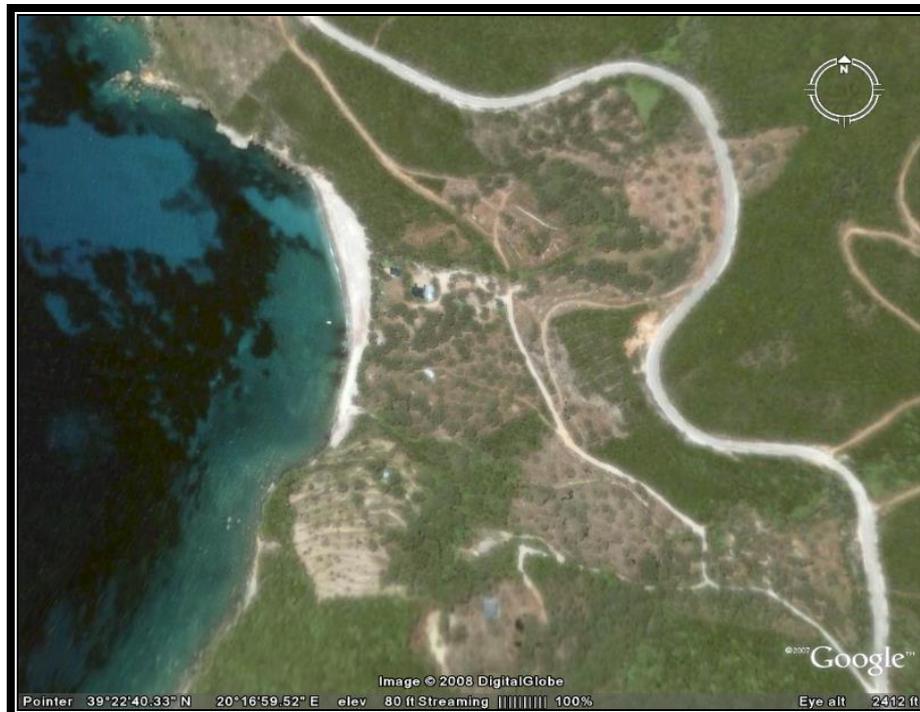




### Landfall “Stamponi” (Alternative Routing ALT3)

North of the Arilla bay, an extensive zone of rocky shores exist, leading to the depository beach of Perdika (Sofas) (Picture 4.9). This beach has 250m length and 10-25m width. 200m from the end of the beach and to the North lays the landfall of ALT3, at “Stamponi” location. Details are illustrated in Picture 4.10.

Picture 4.9 Overview Picture of Landfalls "Sofas" and "Stamponi".



**Picture 4.10 Details of "Stamponi" Landfall.**



#### **Landfall "Sofas" (Alternative Routing ALT4)**

At the southern part of Perdika's beach ("Sofas" location), where the landfall of ALT4 lays, rounded rocks exist, at a small torrent's fan. The rest of the beach is composed by sand and gravels (Picture 4.9 and Picture 4.11). This beach is entirely secluded, fenced and the camping "Sofas" operates there.

**Picture 4.11 Details of "Sofas" Landfall.**



#### **Landfall "Omprela 1" (Alternative Routings ALT5 and ALT6)**

In the area of landfall "Omprela 1" intense to steep relief exists, with high gradient. The area is generally accessed with difficulty. Rockfalls from the slopes end up on the beach, consisting its main feature. Rock formations are mainly clay-sandstones and conglomerates of Mesozoic age, suffering mechanical erosion and even though

the beach could be classified as steep rocky ones, beaches of small length (40-80m) and medium width (5-8m) are formed (Picture 4.7 and Picture 4.8).

### **Landfall “Stavrolimenas” (Alternative Routing ALT7)**

Stavrolimenas bay is characterized by a deposited sand-gravel beach (Picture 4.12). The beach is 80m long and 10-12m wide. Behind the beach a very small depository field is formed, without the presence of water source. Beach access is relatively difficult. Anthropogenic activity is limited, relating to the depository field mentioned above and some scattered residents (in initial phase).

**Picture 4.12 Details of Landfall "Stavrolimenas".**



### **4.5.2 Onshore Part**

The onshore part of the investigated area consists of hilly and semi-hilly area, as well as valleys covered mainly by forestial areas (bushlands and shrublands) and grasslands (Table 4.24 – Annex A – Maps (Volume II), Map 7240-AU-VM-01). Based

on the Hellenic Military Geographical Service (H.M.G.S) data, highest summit is located on the south-eastern border of the area, at “Logora” location, north-east of Agia, with an altitude of 809m. Other summits, which are significant for the Project either due to their location or their height, are: “Trigona” (659m), “Tsouka” (636m), “Spithari” (531m), “Milokorfi” (378m), “Arillas” (345m), “Dimokastro” (227m) and “Anemovori” (114m). The only river of constant flow is the “Perdika” river, which discharges at Karavostasi bay, while all the other water courses are of torrential or irregular flow. Indicatively, the followings courses are mentioned: “Megalo Pori”, “Rethi”, “Aitofolias”, “Kokinomaliorema”, “Souha”. Within the investigated area, no lands covered constantly or periodically by surface waters (lakes, ponds, marshes) exist. From a phytosociological point of view, the investigated area belongs to Mediterranean Vegetation Zone of evergreen broadleaved bushes (*Quercetalia ilicis*).

**Table 4.24 Vegetation Type and Area.**

Vegetation Type	Area (m <sup>2</sup> )	Areal Percentage (%)	Circumference* (m)
Forest	23560531,41	24,12	94925,07
Forestial Area**	30507898,79	31,24	132554,34
Grassland	28902497,26	29,59	60611,93
Agricultural Land	12308693,20	12,60	88027,91
Rocky Areas	459548,16	0,47	4107,46
Residential Area	1921726,13	1,97	13852,57
<b>Total</b>	<b>97660894,94</b>	<b>100,00</b>	<b>394079,27</b>

\* length of verge strip  
\*\* Forestial lands refer to bushlands, shrublands, and generally areas of medium vegetation, and/ or slopes. Greek legislation classify them as forestial (not forests), in order to include them in the relevant special legislation, due to their protective role. Areas of mosaic vegetation with forestial Agricultural vegetation may also be included.

Alternative Routings ALT1, ALT1a, ALT1b, ALT2, ALT5 and ALT6 traverse the southern part of the investigated area, NW of Agia, where steeper gradients dominate, ending at landfalls of “Omprela”. Most significant summits traversed are “Perivlepton” (489m) for routings ALT1, ALT1a, ALT1b and ALT5 and “Spithari” (531m) for routings ALT2 and ALT6, while significant water courses are “Megalo Pori”, Aetofolia and “Rethi. Alternative Routings ALT3 and ALT4 traverse the northern part of the investigated area, northwest of Perdika; an area of high altitudes but gentle slopes, ending at Landfalls “Stamponi” and “Sofas”, respectively, in Perdika bay. Highest summits are “Tsouka” (636m) and “Folea” (527m), while the

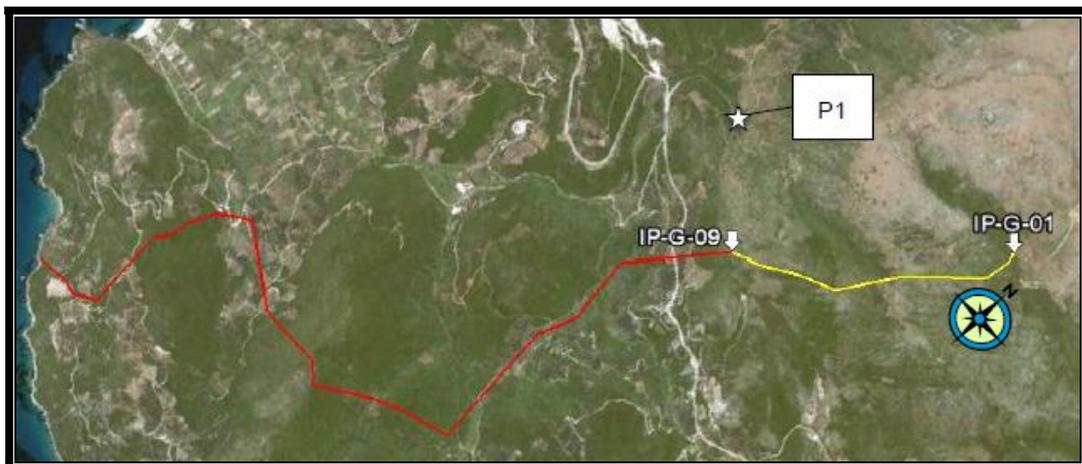
closest water course is “Souha”. Alternative Routing ALT7 traverses the central part of the investigated area, south of Perdika, where lower altitudes and gentle slopes are dominant, ending at “Stavrolimenas” bay. Important summits are “Trigona” (659m) and “Perdikorahi” (449m), while the courses of “Aitofolia” and “Kokinomaliorema” are close to the route

Based on the alignment sheets and the field visits performed by the engineering team the following morphological data are presented.

For the first section (Section 1), approximately 2km long, the topography of the proposed pipeline route can be characterized as follows, starting from the compressor station in downstream direction:

- Upward slope between KP 0 and KP 130, average angle is 14 degrees;
- A plateau is present between KP 130 and IP-G-08;
- Downward slope between IP-G-08 and IP-G-09, maximum angle is 19 degrees;
- Vegetation consists mainly of bushes, varying from light to very dense;

**Picture 4.13 Section 1 (KP 0.000 - KP 1.898).**



**Picture 4.14 Picture from P1 (183442.76, 4362562.02, Eastern Direction).**



The second section (Section 2), approximately 2.4km long, runs from IP-G-09 to IP-G-13, and can topographically be characterized as follows, starting from IP-G-09 in downstream direction:

- Downward slope between IP-G-08 and IP-G-09, maximum angle of 22 degrees;
- Crossing of a dirt road;
- Crossing of several olive groves;
- Crossing of an asphalt road;
- Crossing of a power line;
- Pipeline runs through a flat area between IP-G-10 and IP-G-13.

**Picture 4.15 Section 2 (KP 1.898 - KP 4.254).**

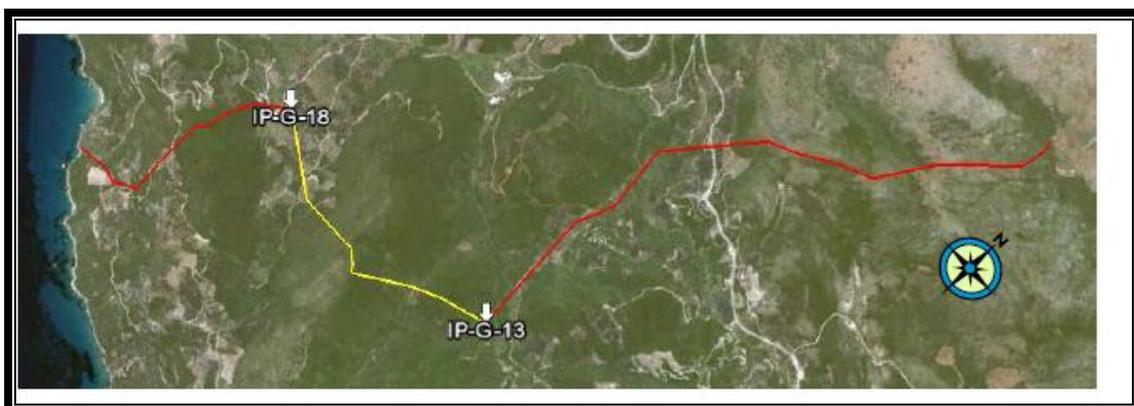


The third section (Section 3), approximately 2.2km long, runs from IP-G-13 to IP-G-18, and can topographically be characterized as follows, starting from IP-G-13 in downstream direction:

- Upward slope of 21 degrees between IP-G-13 and IP-G-14;
- Small valley in between 2 hills;
- Upward slope of 27 degrees to an altitude of 370m between IP-G-14 and IP-G-15;
- Downward slope of 25 degrees between IP-G-16 and IP-G-17
- Downward slope of 11 degrees through a valley between IP-G-17 and IP-G-18

This section is characterized by the steepest slope in the entire pipeline route. The hills are covered with dense bushes and in between the hills there is a small olive grove that needs to be crossed. An elevation drop of approximately 100m is present in the valley between IP-G-17 and IP-G-18

**Picture 4.16 Section 3 (KP 4.254 - KP 6.408)**



The last section (Section 4), approximately 1.7km long, runs from IP-G-18 to OM-2<sup>10</sup>, and can topographically be characterized as follows, starting from IP-G-18 in downstream direction:

- 2 dirt road crossings between IP-G-18 and IP-G-19;
- Crossing of a power line between IP-G-18 and IP-G-19;
- Upward slope starting between IP-G-18 and IP-G-19, average angle of 22 degrees;
- Z-bend at the top of the slope to save olive groves;
- Downward slope after olive groves, average slope 17 degrees, maximum slope 28 degrees
- Pipeline reaches landfall point aligned parallel to the offshore pipeline

**Picture 4.17 Section 4 (KP 6.408 - KP8.165).**



## 4.6 Oceanographic Conditions

Meteo-Oceanographic data relevant to the design of the offshore pipeline are extracted from the Metocean Design Parameters Report and the Design Basis

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<sup>10</sup> It is noted that the proposed landfall site is slightly relocated, by 24.92m, from the approved in the preliminary stage landfall site. Specifically, the coordinates of the proposed landfall site are 180414, 4358694 while the coordinates of the approved in the PEIA stage are 180390, 4358701. Both sites are in the same bay. Essentially, there is no difference between the two landfall sites and consequently they have been perceived as one and the same for the purpose of this ESIA.

Memorandum of INTECSEA and IGI Poseidon. The metocean data is provided for a series of output locations along the proposed pipeline route. Figure 4.2 provides an overview of the output locations.

**Figure 4.2** Meteocean study output locations along the qualified offshore route.



## 4.6.1 Geology

### 4.6.1.1 Nearshore part

#### 4.6.1.1.1 Bathymetry for nearshore part

Oceanographical data are presented from submarine nearshore hydrographic and geophysical survey.

The bathymetry along the proposed pipeline route is described as follows:

**Table 4.25** Bathymetry data relevant to section investigated during the neashore survey.

Minimum depth along the proposed route:	3.7 metres at KP 0.027
Maximum depth along the proposed route:	40.2 metres at KP 0.700
Maximum gradient along the proposed route:	13° from KP 0.368 to KP 0.372
Depth range along the proposed pipeline corridor:	2.1 metres (north side) to 49.0 metres (southwestern side)
Maximum local gradient:	15.9° (100 metres southward from KP 0.420)

From the shoreline at approximately KP 0.000 to KP 0.368 (water depth 13 metres), the seabed deepens towards south-west with a gradient of 2.0°. In this part of the survey corridor, to the south of the proposed route, the bathymetry shows the presence of several channels, less than one meter deep. These channels are probably the continuation of several incisions visible on the mountain along the shoreline.

From KP 0.368 (water depth 13 metres) to KP 0.477 (water depth 21 metres), the proposed route intersects an elongated ridge orientated NW-SE that crosses the entire survey corridor. The detailed gradients of the seabed along this section of the route are shown in Table 4.26

From KP 0.477 (water depth 21 metres) to the end of the survey corridor (KP 0.700, water depth 40.2 metres), the seabed deepens with an average gradient of 5.1°.

**Table 4.26 Gradient Details from KP 0.368 to KP 0.477.**

KP	Gradient	Water Depth (m)
0.368 to 0.372	13°	13 to 13.7
0.372 to 0.426	2.2°	13.7 to 16.1
0.426 to 0.430	11°	16.1 to 17
0.430 to 0.452	2.7°	17 to 17.5
0.452 to 0.463	5.7°	17.5 to 18.7
0.463 to 0.470	4.1°	18.7 to 19
0.470 to 0.477	11.3°	19 to 21

#### **4.6.1.1.2 Seabed nearshore part**

From the shoreline, approximately KP 0.000 to KP 0.070 the route crosses an area with scattered rocky boulders lying on sand.

From KP 0.070 to KP 0.360 the route crosses a sandy area. In this part of the survey corridor, to the south of the proposed route, the bathymetry shows the presence of several channels, less than one meter deep, with ripple marks. Furthermore, around KP 0.330 several rocky boulders were detected both in the northern and in the southern part of the survey corridor. The dimensions of the boulders are less than one meter in height and about three metres in width; more details are presented in Table 4.27

From KP 0.360 to KP 0.474 the proposed route intersects an elongated mound orientated NW-SE that crosses the entire survey corridor. Over the elongated ridge, the data show the presence of seagrass (*Posidonia Oceanica*) growing over a thin layer of sand deposited over the ridge itself. In particular, UVC data show extensive meadows with some sand patches and rocky outcrops. In the southern part of the survey corridor, as shown in the seismic data, the layer of sand becomes thicker and the *Posidonia Oceanica* becomes very tall and widespread.

From KP 0.474 to KP 0.620 data show the presence of meadows of tall seagrass (*Posidonia Oceanica*) that form an extensive mat orientated north-west to south-east on sand. The condition of *Posidonia Oceanica* worsens as depth increases: the *Posidonia Oceanica* becomes sparse, short and in some areas is seen to be dead. There is no *Posidonia Oceanica* at a depth greater than 35.5 metres, and the seafloor comprises sand.

Beyond KP 0.620 the seafloor is characterized by the presence of ripple marks.

Some trawl / anchor scars were detected in this area.

No magnetic targets were detected during the magnetometer survey.

**Table 4.27 Boulder details.**

s/n	Easting [m]	Northing [m]	Height (m)	Offset from PPR(m)
1	438 685.40	4 352 765.47	1.1	249.0 NNW
2	438 702.68	4 352 755.57	<0.5	235.7 NNW
3	438 708.76	4 352 728.82	0.5	208.3 NNW
4	438 730.55	4 352 697.44	<0.5	173.0 NNW
5	438 800.14	4 352 665.65	0.5	127.2 NNW
6	438 778.61	4 352 647.21	<0.5	113.7 NNW
7	438 803.47	4 352 650.62	1	111.8 NNW
8	438 827.26	4 352 628.57	0.6	85.2 NNW
9	438 829.51	4 352 625.22	0.5	81.5 NNW
10	438 830.51	4 352 622.35	0.6	78.4 NNW
11	438 833.07	4 352 609.24	1.3	65.1 NNW
12	438 840.02	4 352 608.57	1	62.9 NNW
13	438 837.58	4 352 601.37	0.8	56.4 NNW
14	438 840.95	4 352 602.00	0.8	56.4 NNW
15	438 852.07	4 352 601.94	0.5	53.9 NNW
16	438 834.76	4 352 578.97	1.2	35.1 NNW
17	438 883.46	4 352 532.15	0.5	20.9 SSE
18	438 901.50	4 352 537.50	0.6	19.5 SSE
19	438 884.19	4 352 524.88	0.4	28.2 SSE
20	438 907.00	4 352 532.00	0.5	26.1 SSE
21	438 891.09	4 352 518.65	0.6	35.7 SSE

s/n	Easting [m]	Northing [m]	Height (m)	Offset from PPR(m)
22	438 902.52	4 352 496.46	0.7	59.8 SSE
23	438 912.39	4 352 460.87	1.1	96.7 SSE
24	438 913.86	4 352 453.40	1	104.3 SSE
25	438 921.38	4 352 452.46	<0.5	106.8 SSE
26	438 914.66	4 352 447.93	0.8	109.8 SSE
27	438 914.35	4 352 444.75	0.7	112.9 SSE
28	438 925.18	4 352 443.89	1.7	116.0 SSE
29	438 930.99	4 352 440.28	1.2	120.7 SSE
30	438 961.70	4 352 429.72	1	137.6 SSE
Geodetic Datum: WGS84 (ETRF1989), Grid: UTM Zone 34N (CM21°E)				

#### 4.6.1.1.3 Sub-Seabed nearshore part

##### Unit A

Unit A is characterized by stratified internal reflections, where visible, and it is composed of fine to medium sand, as confirmed by borehole. The base of this unit corresponds to an unconformable surface, probably of Quaternary age, caused by sea level oscillations during that period.

The thickness of the unit along the proposed pipeline route ranges between 0 metres at KP 0.000 to approximately 20 metres at KP 0.600. At KP 0.760, borehole detected the base of this unit at 6.6 metres. At the location of boreholes (KP 0.179 and KP 0.308 respectively) the base of Unit A was not detected.

##### Unit B

Unit B is characterized by a semi-transparent acoustic facies that could be interpreted as the Bedrock. At KP 0.760 Unit B was detected with a thickness of 3.4 metres and it is composed of limestone.

#### 4.6.1.1.4 Shallow Geohazards and Installation Constraints

- **Assessment of Biological Community Constraints**

From KP 0.360 to KP 0.474, an elongated mound with the presence of seagrass (*Posidonia Oceanica*) growing over a thin layer of SAND was detected. From KP 0.474 to KP 0.620 the meadows of tall *Posidonia Oceanica* form an extensive mat.

Notes on *Posidonia Oceanica*:

Posidonia Oceanica is a marine plant (phanerogam) that grows only in the Mediterranean Sea and around the southern coasts of Australia. Posidonia Oceanica lives in a narrow coastal strip, normally on beds of soft sediment, at depths of between 5 and 40 to 50 meters, depending on water clarity. It is a true plant, in that it can bear flowers and disperse seeds. However, flowering is quite rare with less than one flower found per 10 square metres per year. Its shoots, which are able to live for at least 30 years, are produced at a slow rate from rhizomes which grow horizontally by only 1 to 6 centimeters each year. Over centuries the rhizomes form mats which rise up into reefs that help to trap sediment and mediate the motion of waves, thus clarifying the water and protecting beaches from erosion.

Its role is very important for the local ecosystems since many other species find their nutrients and shelter in Posidonia meadows. This rich ecosystem is protected under the EU Habitats' Directive.

- **Slope Stability**

A maximum seabed gradient along the route of 13° occurs between KP 0.368 and KP 0.372.

- **Shallow Gas**

No shallow gas has been observed within the available data.

No anomalous seismic reflections, indicative of shallow gas accumulations that would represent a hazard to construction, are seen along the pipeline route.

- **Faulting**

No shallow fault systems have been detected by the records.

#### **4.6.1.2 Offshore part**

##### **4.6.1.2.1 Seabed Features and Sub-seabed Conditions from KP 000.469 – KP 16.000**

Between KP 000.469 and KP 001.118 basement rock is expected to be encountered at depth greater than 10 ms. The bathymetry shows a dipping slope to the west between 20 metres and 60 metres LAT.

Between KP 001.118 and KP 006.383 a sequence of sedimentary deposits are observed on the sub-bottom profile data including chaotic type deposits and an infill deposit within a small basin probably of tectonic origin.

Between KP 004.000 and KP 006.383 the side scan sonar shows a mottled appearance with low to high reflectivity. The higher reflectivity areas can be generally related to small topographic highs on the sub-bottom profile and multibeam echo sounder data.

Between KP 006.383 and KP 008.040 the side scan sonar and bathymetry data shows this area to be very irregular with rock outcrops at seabed. On sub-bottom profile data the basement rock seem to outcrop or occurs at a maximum depth of 10 ms below the seabed. The side scan sonar mosaic shows high reflectivity in this area due to basement rock possibly exposed and thin overlay of coarse sediments.

At KP 7.520 the rock outcrop can be expected at seabed. On the sub-bottom profiler data the basement rock seems to outcrop or occurs at an approximate depth of 2.5 metres below the seabed.

Between KP 008.040 and KP 008.913 the seabed is dipping to the west-south-west between 65 metres and 76 metres LAT. At KP 008.913 the basement rock is displaced by a fault clearly identified on sub-bottom profile data and visible on multibeam data where the seabed deepens from 76 metres at KP 008.913 to 81 metres at KP 009.040.

Between KP 008.040 and KP 009.500 a series of rounded high reflectivity patches are observed on the side scan sonar data. These features have little to no relief, dimensions and spatial distribution is presented. They possibly represent seabed scour.

Between KP 009.040 and KP 015.885 the seabed gradually deepens from 81 metres to 105 metres LAT. The multibeam echo sounder data shows a relatively flat featureless seabed. The sub-bottom profile data shows a thick sequence of sediments overlay an erosion surface. Most of the sequence looks to be cross bedded with sub parallel to dipping reflectors.

From KP 016.000 a series of depressions are observed on the data which are approximately up to 20 metres diameter and 2 metres depth. Where a sub-bottom

profile line cross one of them a reflection hyperbolae is visible directly under the depression indicating possible hard strata.

Between KP 4.000 and KP 13.500 a sequence of sedimentary deposits are observed on the sub-bottom profile data including chaotic type deposits and an infill deposit within a small basin probably of tectonic origin.

Between KP 4.000 and KP 9.000 the side scan sonar data shows a mottled appearance with low to high reflectivity. The higher reflectivity areas are generally related to small topographic highs on the sub-bottom profiler and multibeam echo sounder data.

#### **4.6.1.2.2 Seabed Features and Sub-seabed Conditions from KP 16.000 – KP 141.000**

##### **Section KP 015.890 - KP 027.900**

Between KP 15.890 and KP 22.860 well layered drape deposits with a thickness of between 7 and 10 metres are present.

Between KP 15.890 and KP 18.600 the multibeam data shows isolated pockmarks. The sub-bottom profiler data that occasionally intersects the pockmarks does not show any evidence of shallow gas or carbonates associated with these features.

Between KP 19.400 and KP 22.860 the multibeam data shows numerous depressions with regular elongated shapes orientated NW – SE. The sub-bottom profiler data intersecting these features does not show any evidence of shallow gas or carbonates associated with them.

Between KP 022.745 to KP 027.900 the continental shelf is presented.

The seabed across the continental shelf dips gently to the south-west and shows relatively uniform reflectivity on side scan sonar records.

##### **Continental Slope KP 027.900 - KP 045.468**

The topography on the continental slope is dominated by three sub-parallel canyons that trend north-east / south-west. These canyons show numerous sediment displacement deposits from slope failure events. In many areas (especially in the upper regions of the canyons) the presence of subsequent sediment deposition cannot be ascertained on the seismic data.

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### **Northern Canyon System (C1)**

Approximately 200 metres south-west of this fault, three areas of high reflectivity are observed on the side scan sonar data. The chirp data shows an underlying high amplitude deposit cropping out at seabed. The multibeam echo sounder shows this area to have higher relief. This may represent a basement rock outcrop.

The canyon forms the upper area for which sediment displacement is observed. Relict and recent mass movement deposits have been identified within the canyon that seems to act as a channel system with a principal thalweg and a secondary thalweg.

Down slope from this canyon is an area of very rough and irregular seabed. This also represents sediments that have been displaced by mass movement events and has been interpreted as areas slump deposits. The chirp data shows multiple units with overlapping failures that probably represent separate mass movement events. This rough irregular seabed occurs along the south-west section of the active thalweg of the canyon where the mass movement deposits have been channeled down the slope. Blocks of material cannot be discounted in this region due to the nature of the deposits.

At KP 041.500 the data shows upper and lower mass movement deposits reaching 4 metres and 14 metres thickness respectively. Both units show a chaotic seismic character on the chirp data.

Between KP 045.000 and KP 045.265 a surficial mass movement deposit crosses the route. This deposit is up to approximately 6.5 metres thick and 515 metres wide and shows an irregular surface topography. Approximately 440 metres to the south-west of the proposed route the deposit subdivides into two lobes: a lobe elongated north-north-east / south-south-west which extends 2206 metres to the south-south-west of the proposed route and a lobe in the north-east / south-west direction which extends 1373 metres to the south-west.

### **Middle Canyon System (C2)**

The outer edge of the canyon represents the head scarp / headwall of slope failure events. Recent mass movement deposits have been identified within the active canyon thalweg.

Between approximately KP 031.000 and KP 032.280 the proposed route crosses a slope failure deposit with a maximum thickness of 16 metres. This deposit has been interpreted as a slump.

Between KP 029.000 and KP 030.000, areas of surface failure on the walls of the canyon are visible near the proposed route.

### **Southern Canyon System (C3)**

The southern canyon C3 shows many of the same features as the two canyons to the north-west. The ridge between the C3 Canyon and the C2 Canyon extends significantly in a south westerly direction down the continental slope and could therefore present a significant obstacle for the pipeline.

Recent mass movement events have been identified within the active canyon thalweg.

### **Distal Areas to the South-West**

The south-west of the survey area is characterized by relict mass movement deposits overlain by several metres of well layered drape deposits.

Several isolated blocks of sediment are also present in this area and these are likely to be material which has been transported down slope by mass movement events.

Between KP 45.350 and KP 46.290 the sub-bottom data shows debris flow deposits with a thickness of up to 6 metres. The multibeam and side scan sonar data show irregular seabed topography.

From KP 46.290 to KP 48.500 the sub-bottom data shows well layered drape deposits with a thickness of approximately 2.5 metres overlying debris flow deposits. From KP 48.500 to KP 60.740 the thickness of the well layered deposits increases up to 13 metres.

At KP 47.500 the multibeam gradient image shows a ridge that is possibly related to the buried debris flow deposits.

From KP 48.500 to KP 49.140 the sub-bottom data shows well layered drape deposits with a thickness of approximately 1.5 metres overlying debris flow deposits.

At KP 49.240 isolated blocks of debris flow deposits are present.

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From KP 49.300 to KP 63.450 the thickness of the well layered deposits increases up to 10 metres.

Between KP 60.740 and KP 62.500 drape deposits overlying the debris flow deposits have a thickness of approximately 2.5 metres.

Between KP 62.500 and KP 69.000 the sub-bottom data shows debris flow deposits with a thickness of up to 18 metres. The multibeam data shows irregular seabed topography.

Between KP 63.450 and KP 66.000 drape sediments, overlying debris flow deposits, have a thickness of 1.5 m.

From KP 69.000 to KP 75.130 the sub-bottom data shows well layered deposits significantly truncated by erosion.

Between KP 75.130 and KP 76.500 the sub-bottom data shows well layered deposits with the seabed surface affected by erosion. Between KP 76.50 and KP 84.340 the well layered deposits are only slightly affected by erosion. The side scan sonar image shows variation in reflectivity which can possibly be interpreted as fine grained components washed out leaving patches of more coarse material behind.

From KP 84.340 to KP 85.500 the sub-bottom data shows a veneer layer of drape sediments (less than 0.8 m) overlying debris flow deposits. From KP 85.500 to KP 100.000 the drape sediments slightly increase to approximately 1.6 metres thick and then from KP 100.000 to KP 105.030 the sediment thickness reaches more than 3 metres.

Between KP 105.130 and KP 120.000 the sub-bottom data shows well layered drape deposits with thickness between 3 and 5 metres overlying a folded and faulted unit. The undulating topography is a surface expression of this underlying unit. The faults observed in this unit do not extend into the overlying drape deposits.

From KP 113.500 to KP 120.000 drape sediments overlying the faulted unit are thicker than six metres.

At KP 117.000 the sub-bottom data shows the presence of a buried fault at 25 metres below seabed.

At KP 119.250 the undulating seabed is an expression of the edge of buried debris flow deposits overlain by 14 m thick well layered drape deposits.

From KP 120.000 to KP 125.300 and from KP 129.930 to KP 138.500 drape sediments overlying the faulted unit are thinner (typically less than 5 metres thick) and the surface expression of the underlying unit is more pronounced. At KP 124.000, KP 124.370, KP 124.600, KP 130.830 and KP 131.600 the drape sediments decrease to approximately 1 meter thick.

The Nabeul-Igalo (Global Marine Cable) was not observed at KP 124.200.

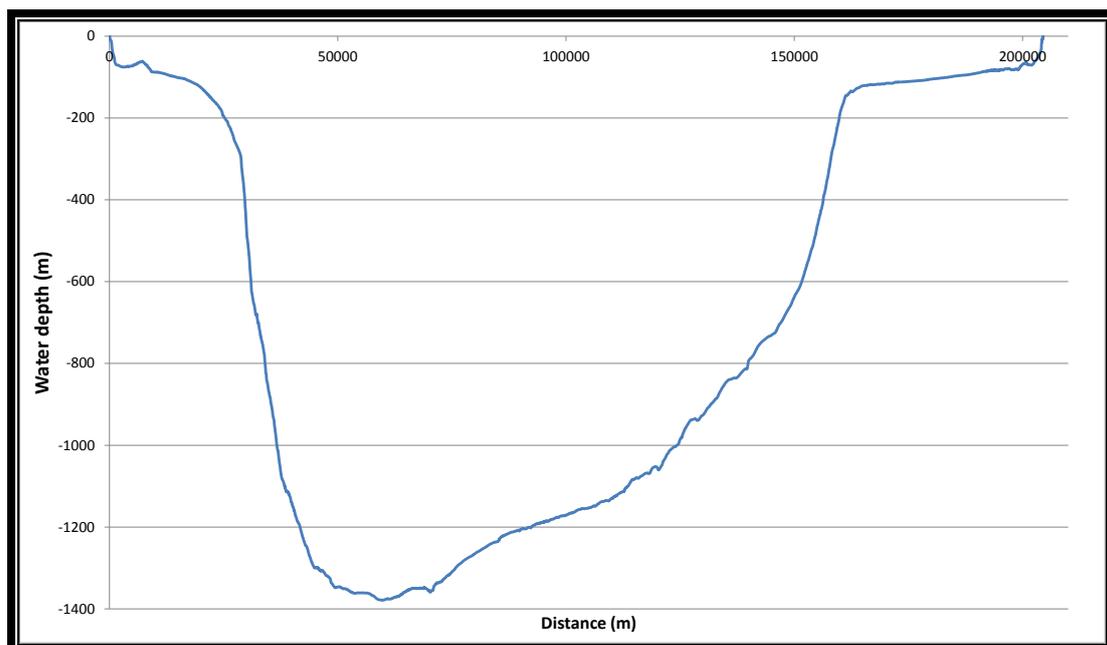
Between KP 138.500 and KP 140.213 the sub-bottom data shows a veneer of drape deposit overlying a folded and faulted unit. The side scan sonar and multibeam data occasionally show a surface expression of the shallow faults.

From what is previously described and through the ongoing FEED it can be assessed that no geological constrain arises for the oceanic section of the pipeline.

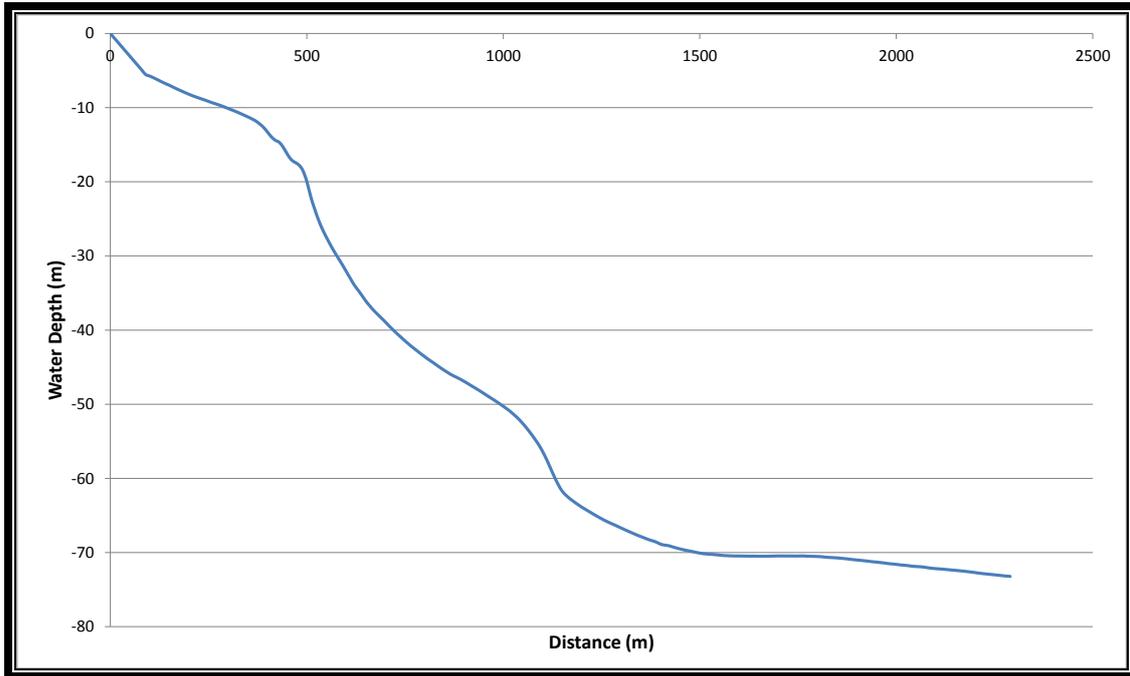
#### 4.6.2 Seabed profile

The seabed profile from Omprela 2 to Otranto is presented in Figure 4.3. The profile is extracted from the DTM data file (3m x 3m grid), which was prepared by Fugro as part of the detailed marine survey. The seabed profile of the Greek nearshore part is presented in Figure 4.4 whilst the bathymetry of the near coast part in Picture 4.21 (see Annex A – Maps (Volume II), Near Short Plot Plan (KP0.0 to KP0.8)).

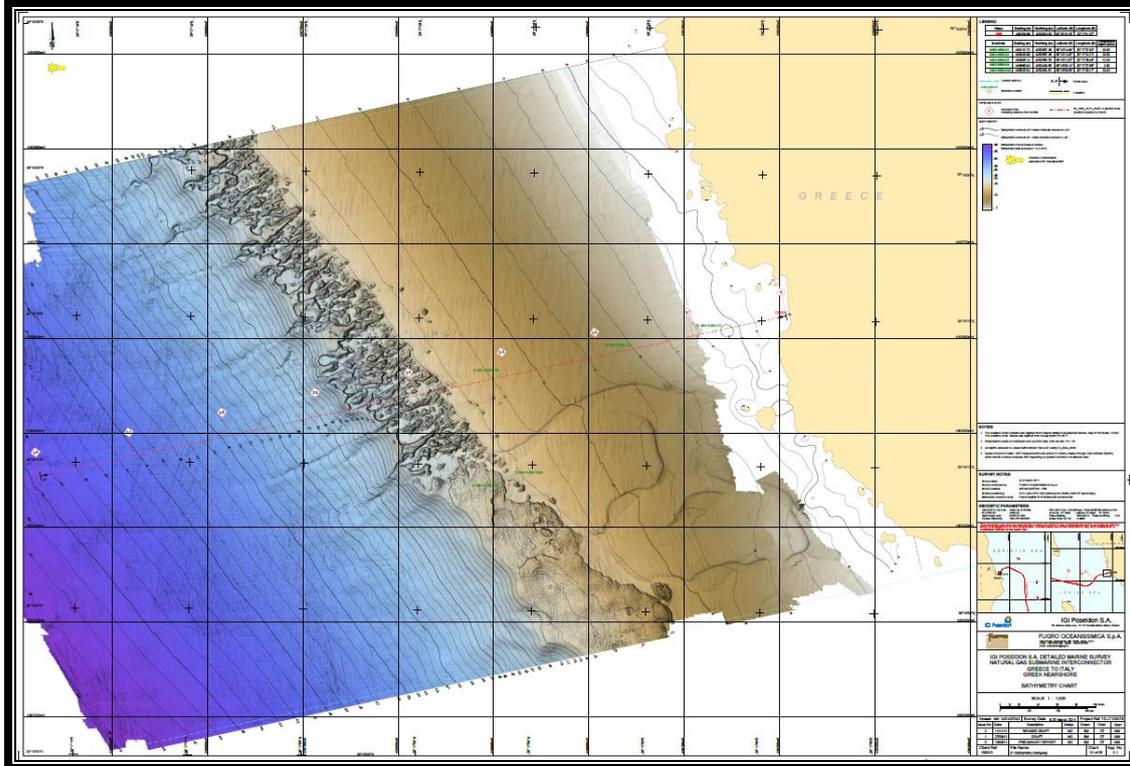
**Figure 4.3 Seabed Profile (from OM2 to OLF).**



**Figure 4.4 Seabed Profile Nearshore (Greece).**



**Picture 4.18 DMS survey bathymetry data.**



#### 4.6.3 Seawater characteristics

Seawater data is summarized in Table 4.28.

**Table 4.28 Seawater characteristics.**

Parameter	Unit	Value
Minimum density (Note 1)	kg/m <sup>3</sup>	1025
Maximum density (Note 1)	kg/m <sup>3</sup>	1035
Resistivity	Ohm*m	0.15~0.20
Average surface salinity	Parts per 1000	38.3
Average deep water salinity	Parts per 1000	38.6
Note 1: The density of seawater varies from 1,025 kg/m <sup>3</sup> at the surface to a maximum density of 1,035 kg/m <sup>3</sup> at the deep water seabed.		

Seawater temperatures (100 year return period) at the surface and at sea-bottom level are presented in Table 4.29:

**Table 4.29 Seawater temperatures.**

Parameter	Unit	Greek shelf	Deep water	Italian shelf
Surface temperature	°C	14.4	14.0	10.6
-minimum (winter)		24.4	25.7	25.8
-maximum (summer)				
At seabed	°C	14.1	13.3	12.4
-minimum (winter)		15.2	15.3	14.5
-maximum (summer)				

#### 4.6.4 Water level variations

In Table 4.30, the estimated extreme water levels per location and return period are presented. These water levels represent the summation of the non-tidal water elevations and the tidal effects. Note that the Highest Astronomical Tide (HAT) is taken as Mean Sea Level (MSL) +0.15m.

**Table 4.30 Estimated extreme water levels with regard to MSL.**

Location	Unit	Return Period		
		1 year	10 years	100 years
Greek Landfall	M	0.64	0.67	0.70
Greece Offshore	M	0.50	0.55	0.60
Italian Offshore	M	0.40	0.43	0.45
Italian Landfall	M	0.49	0.52	0.55

#### 4.6.5 Current Data

The estimated omni-directional maximum nearbed current data along the pipeline route for 1, 10 and 100 year return periods are presented in Table 4.31.

**Table 4.31 Estimated Maximum Nearbed Current Data along Pipeline Route**

Locations	Current near seabed (m/s)			Current at surface (m/s)		
	1yr	10yr	100yr	1yr	10yr	100yr
Landfall Greece	0.8	1.0	1.2	1.1	1.3	1.5
Strait Greek side	0.3	0.4	0.5	1.1	1.3	1.5
Ceter strait	0.3	0.4	0.5	1.2	1.4	1.5
Strait Italy side	0.6	0.8	1.0	1.2	1.4	1.5
Landfall Italy	0.8	1.0	1.2	1.2	1.4	1.5

#### 4.6.6 Wave Data

The omni-directional wave data for 1, 10 and 100 year return periods are presented in Table 4.32.

**Table 4.32 Wave data along pipeline route Greece to Italy.**

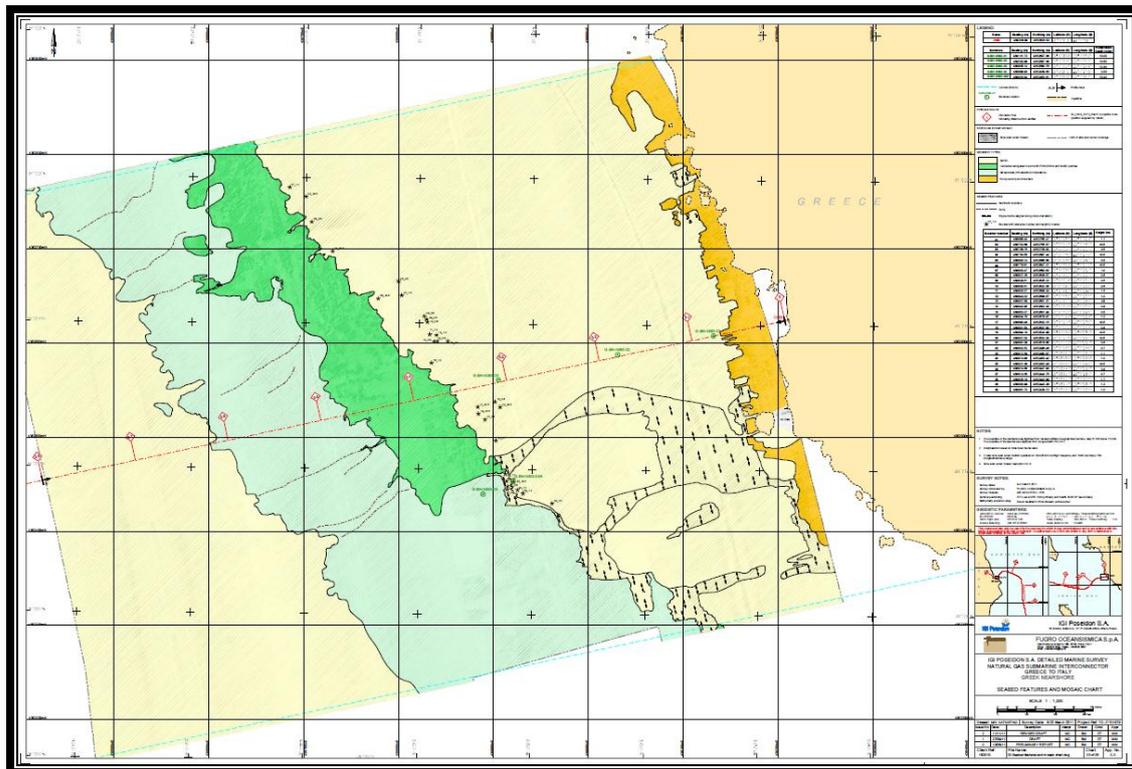
Output Locations	Hs (m)			Tp (s)		
	1yr	10yr	100yr	1yr	10yr	100yr
O2-1	2.97	3.41	3.75	13.0	15.5	18.3
O2-2	3.82	5.13	6.23	11.5	13.7	16.2
O2-3	3.79	4.96	6.11	10.4	11.8	13.3
5	5.0	6.1	7.1	9.4	10.9	12.5
6	5.7	7.0	8.2	10.4	12.2	14.3
7	5.7	7.0	8.2	10.4	12.2	14.3
8	6.0	7.3	8.6	6.7	8.2	9.7
9	6.5	8.1	9.7	11.3	13.6	16.5
10	6.5	8.1	9.7	11.3	13.6	16.5
11	6.3	7.6	8.9	11.4	13.9	16.9
12	6.4	7.8	9.2	11.9	14.7	18.2
13	6.2	7.6	9.0	11.6	14.3	17.5
14	6.2	7.6	9.0	11.6	14.3	17.5
15	5.7	6.9	8.2	10.7	12.9	15.6
16	5.7	6.9	8.2	10.7	12.9	15.6
17	5.0	6.3	7.6	10.7	12.9	15.6
18	5.0	6.3	7.6	10.7	12.9	15.6
19	5.0	6.3	7.6	10.7	12.9	15.6
20	4.5	5.7	6.8	10.7	12.9	15.6

#### 4.6.7 Marine Growth

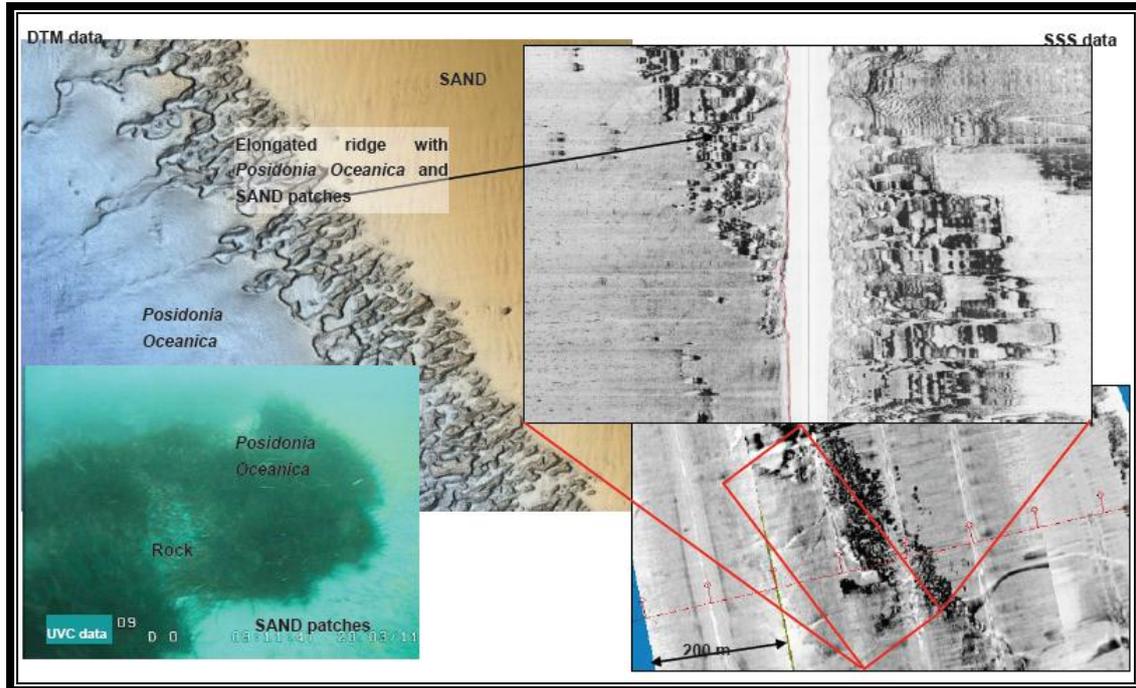
Based on the DMS study performed for the project, limited marine growth on the unburied pipeline sections is present. Specifically, results from the DMS performed for the marine (nearshore and offshore) section of the qualified, in the preliminary environmental licensing process, pipeline revealed that at the depth of 15m cemented elongated mounds with *Posidonia* and sand patches are located extending for ~120m (between ~K.P.0+360 and ~K.P.0+480). Further in sea, at depth of ~20m and for ~135m (between ~K.P.0+480 and ~K.P.0+615) seagrasses of *Posidonia oceanica* are formed. From then on only sandy bottom is present unfavouring marine growth (see Annex A – Maps (Volume II), Near Short Plot Plan (KP0.0 to KP0.8)).

It is noted that after the depth of 25m which corresponds approximately to KP 0+500 the pipeline will be laid on the sea bottom, without any excavation works, and the impacts to *Posidonia* seagrasses will be insignificant.

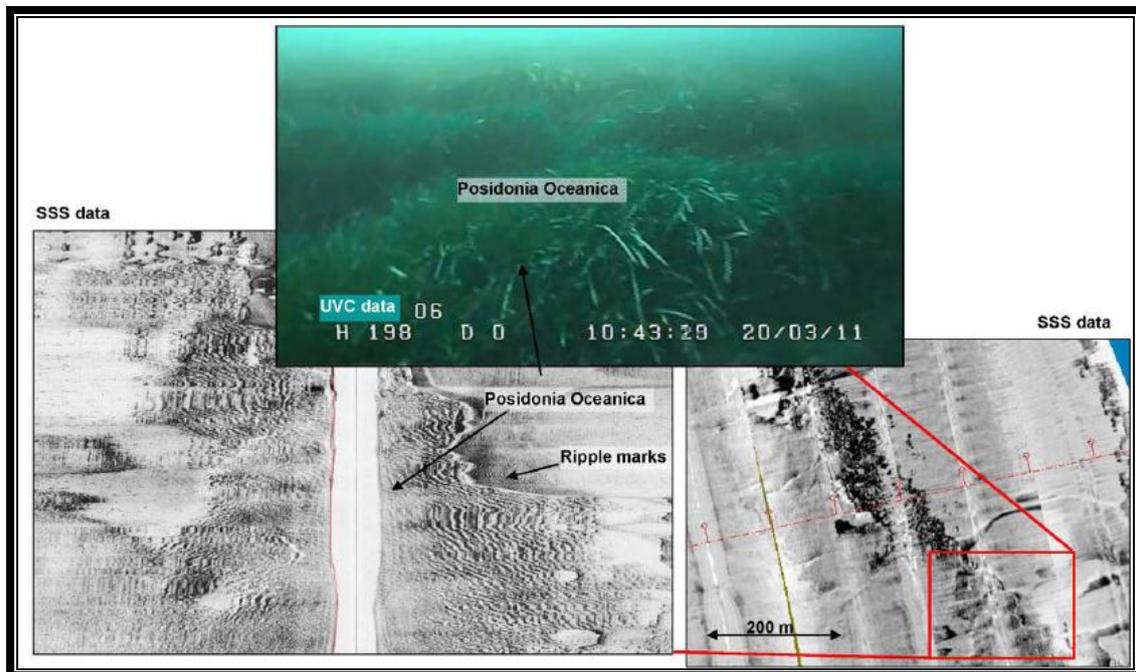
**Picture 4.19 DMS survey and *Posidonia* meadows.**



**Picture 4.20 Rocky ridge with *Posidonia oceanica* and sand patches.**



**Picture 4.21 *Posidonia oceanica* meadows.**



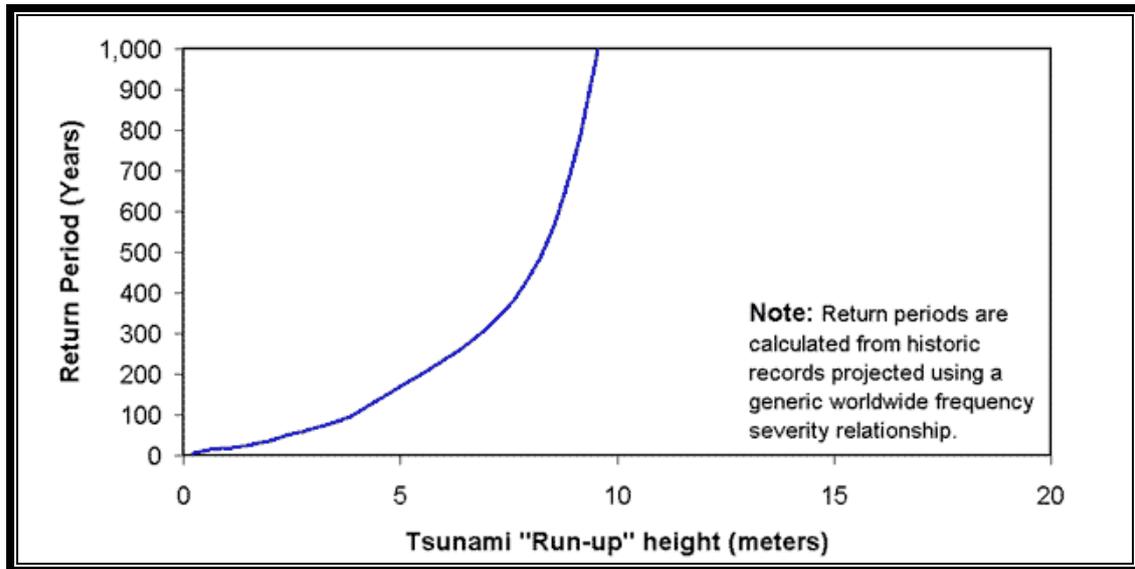
**Picture 4.22 Sparse and dead Posidonia oceanica.**



#### **4.6.8 Tsunamis**

Tsunamis are generally generated by offshore earthquakes triggering submarine landslides or fault movement. Such large-scale underwater displacement of sediment or rock creates large water disturbances, which are often initially characterized by a rapid draw down of the sea surface as the water moves into the area of seabed displacement. Then large kinematic waves propagate outwards from the zone of seabed disturbance. The waves travel across the ocean at very high velocities, often in excess of 450km/hr, and possess very long wavelengths and periods. At the coast, the tsunami flood level (run-up) is a function of the dimensions of the propagated waves and the local topography and bathymetry of the coastal zone.

**Figure 4.5 Tsunami Run Up Height vs. Return Period in Adriatic Sea**



#### 4.6.9 Geohazards

The Geohazard Analysis of the offshore pipeline quantifies the geophysical hazards along the route. All data in the present Chapter have been extracted from the Integrated Survey Results Report, which was performed by the Company Fugro GeoConsulting Limited, within the framework of the FEED (January 2012).

As per Integrated Survey Results Report, in conjunction with preliminary geohazard assessment results of the pre-FEED phase, the main seabed features that could impact on the through-life integrity of the proposed pipeline on the planned route include:

- Sediment displacements;
- Slope runout/turbidity currents;
- Rotational slope and slumping failure systems;
- Fault movements;
- Presence of gas;
- Surficial sand waves; and
- Rock outcrop.

The main geohazards potentially affecting the offshore pipeline route in Greece territorial waters consist primarily of seabed sediment failure on the continental slope crossing and associated sediment run out on the abyssal plain where the route runs at an offset from the adjacent Corfu margin; and potential structural movement associated with the Ionian thrust fault zone on the inner at the continental shelf.

The final results of the DMS geohazard assessment work are yet to be finalized. However, preliminary results indicate that there is no insurmountable geohazard along the proposed offshore route.

In respect of the continental slope, the preliminary geological interpretation, extracted from the Draft Integrated Survey Results Report confirms that the indications of slope failure within the canyon that is used by the pipeline to pass from the continental shelf to the abyssal plain are dated at circa 22,000years before present, and are overlain by a varying thickness of more clay, suggesting settled deposition after the slope failure. The slope failures date from the last glacial maximum and the conditioning factors and environmental conditions that were in place for the large-scale slope failure are not in operation today.

In respect of the Ionian Thrust Fault, the following comments are extracted from the Draft Integrated Survey Results Report:

*“The proposed route crosses the Ionian Thrust Fault at approximately KP 9.130. No physical offsets are seen in the top 20m of sediment in the seismic record. Instead, the shallow section exhibits dips reflecting the shape of the buried fault”.*

*The rock platform and rugged terrain in the vicinity of the Paxos – Corfu channel were extensively mapped during the DMS operations and the pipeline route was optimized (re-located) in order to avoid the excessive spanning issues that would result from installation across the rock outcrops, associated with (the adjacent) surface expression of the Ionian Thrust Fault. The preliminary age dating indicates that no (geological) recent structural deformation has occurred where the pipeline is routed to cross the Ionian Thrust Fault.*

## 4.7 Description of Climatic Conditions

In the following paragraphs, the meteorological parameters regulating the climate of the area are described.

### 4.7.1 Meteorological Stations

As closest to the investigation area Meteorological Station, the ones of Ioannina, Preveza and Corfu from the Prefectures of Thesprotia, Preveza and Corfu, respectively, were chosen. These were chosen because they were able to provide processed meteorological data for long time series. Thus, more accurate meteorological analysis was achieved.

**Table 4.33 Meteorological Stations.**

s/n	Stations	Altitude (m)	Owner	Time Series	Data *
1.	Ioannina	483.36	EMY	1956-2001	Rn, T, R.M., C, W.D.
2.	Preveza	15	EMY	1971-2001	Rn, T, R.M., C, W.D.
3.	Corfu	1.13	EMY	1955-2001	Rn, T, R.M., C, W.D.
* Symbols definition Rn = Rainfall T = Temperature R.M = Relative Humidity C = Cloud Cover W.D.= Wind Data					

### 4.7.2 Air Temperature

Available data regarding air temperature include mean monthly temperature, mean and absolute monthly minimum and maximum temperature, and are presented in the following Tables from the Meteorological Stations of Ioannina, Preveza and Corfu.

**Table 4.34 Monthly and Annual Figures of Mean Temperature, Mean Maximum and Minimum Temperature, Absolute Maximum and Minimum Temperature from M.S. of Ioannina.**

Temperature					
Months	Mean	Mean Maximum	Mean Minimum	Absolute Maximum	Absolute Minimum
January	4,7	10,0	0,2	20,0	-13,0
February	6,0	11,4	1,0	23,6	-10,2
March	8,8	14,4	3,2	29,2	-8,2
April	12,4	17,7	6,0	28,2	-3,0

Temperature					
Months	Mean	Mean Maximum	Mean Minimum	Absolute Maximum	Absolute Minimum
May	17,5	23,1	9,7	34,2	-0,5
June	22,0	27,7	12,8	38,8	5,2
July	24,9	30,9	15,0	42,4	7,4
August	24,5	31,0	15,1	40,5	7,0
September	20,1	26,6	12,2	37,3	3,0
October	15,0	21,3	8,5	32,2	-3,0
November	9,7	15,4	4,8	24,4	-8,4
December	5,8	10,9	1,7	19,0	-11,0
Annual	14,28	20,03	7,52	30,82	-2,89

**Table 4.35 Monthly and Annual Figures of Mean Temperature, Mean Maximum and Minimum Temperature, Absolute Maximum and Minimum Temperature from M.S. of Preveza.**

Temperature					
Months	Mean	Mean Maximum	Mean Minimum	Absolute Maximum	Absolute Minimum
January	9,5	13,2	6,3	20,0	-3,6
February	10,2	13,8	6,6	24,4	-2,0
March	12,2	15,8	8,0	26,4	-1,4
April	15,0	18,4	10,4	28,8	3,6
May	19,0	22,6	14,3	33,0	6,2
June	23,0	26,3	17,6	36,2	11,0
July	25,1	28,8	19,7	37,2	13,8
August	25,6	29,6	20,3	40,0	13,0
September	22,9	26,7	18,0	34,6	10,0
October	19,0	22,9	14,8	33,0	4,4
November	14,2	17,9	10,9	25,4	0,6
December	10,7	14,2	7,6	21,0	-0,6
Annual	17,20	20,85	12,88	30,00	4,58

**Table 4.36 Monthly and Annual Figures of Mean Temperature, Mean Maximum and Minimum Temperature, Absolute Maximum and Minimum Temperature from M.S. of Corfu.**

Temperature					
Months	Mean	Mean Maximum	Mean Minimum	Absolute Maximum	Absolute Minimum
January	9,7	13,9	5,2	20,5	-4,5
February	10,3	14,3	5,7	23,0	-4,6
March	12,0	16,0	6,9	26,0	-4,4
April	15,0	19,1	9,4	28,0	-0,1
May	19,8	23,9	13,1	33,8	3,6
June	24,0	28,1	16,6	35,8	8,7
July	26,5	31,0	18,6	42,4	10,0
August	26,5	31,4	19,1	40,7	11,3
September	22,7	27,6	16,7	37,8	7,2
October	18,5	23,3	13,6	33,0	2,8
November	14,3	18,7	10,0	26,2	-2,2
December	11,1	15,3	6,8	22,0	-3,0
Annual	17,53	21,88	11,81	30,77	2,07

Annual fluctuation of mean monthly, mean maximum and minimum temperature for the M.S. of Ioannina, Preveza and Corfu are illustrated from Figure 4.6 to Figure 4.10.

For the M.S. of Ioannina, mean monthly temperatures vary from 24.9°C (July) to 4.7°C (January), with an annual range of 22.2°C.

For the M.S. of Preveza, mean monthly temperatures vary from 25.6°C (August) to 9.5°C (January), with an annual range of 16.1°C.

For the M.S. of Corfu, mean monthly temperatures vary from 26.5°C (July) to 9.7°C (January), with an annual range of 16.8°C.

For the M.S. of Ioannina, mean maximum temperature varies from 31.0°C (August) to 10.0°C (January) and mean minimum from 15.2°C (September) to 0.2°C (January). Absolute maximum temperature is 42.4°C (July) and absolute minimum is -13.0°C (January).

For the M.S. of Preveza, mean maximum temperature varies from 29.6°C (August) to 13.2°C (January) and mean minimum from 20.3°C (September) to 6.3°C (January). Absolute maximum temperature is 40.0°C (August) and absolute minimum is -3.6°C (December).

For the M.S. of Corfu, mean maximum temperature varies from 31.4°C (August) to 13.9°C (January) and mean minimum from 19.1°C (August) to 5.2°C (January). Absolute maximum temperature is 42.4°C (July) and absolute minimum is -4.6°C (February).

For the M.S. of Ioannina, mean temperature range (maximum minus minimum temperature) varies from 9.2°C to 10.4°C, during winter, increases in spring to 11.2-13.4°C, maximizes in summer reaching 15.9°C and decreases in autumn from 10.6°C to 14.4°C.

Absolute minimum temperature has reached below zero levels, not only during winter's cold period (December, January, February), but also during spring time (March, April, May) and in October and November, because of the large frequency of cold invasion amplified by the area's relief.

For the M.S. of Preveza, mean temperature range (maximum minus minimum temperature) varies from 6.6°C to 7.2°C, during winter, increases in spring to 7.8-

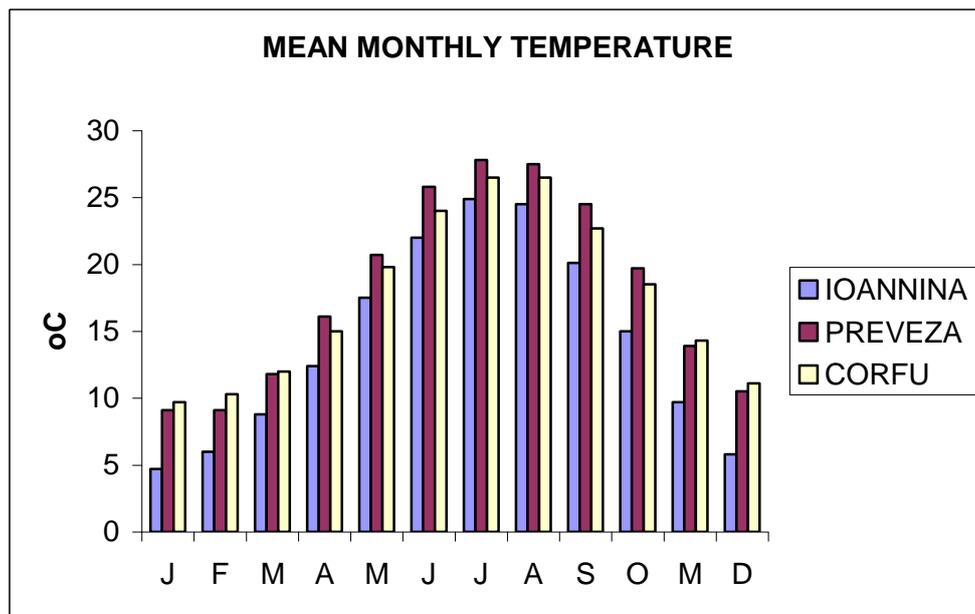
8.3°C, maximizes in summer reaching 9°C and decreases in autumn from 7°C to 8.7°C.

Absolute minimum temperature has reached below zero levels, not only during winter's cold period (December, January, February), but also during March.

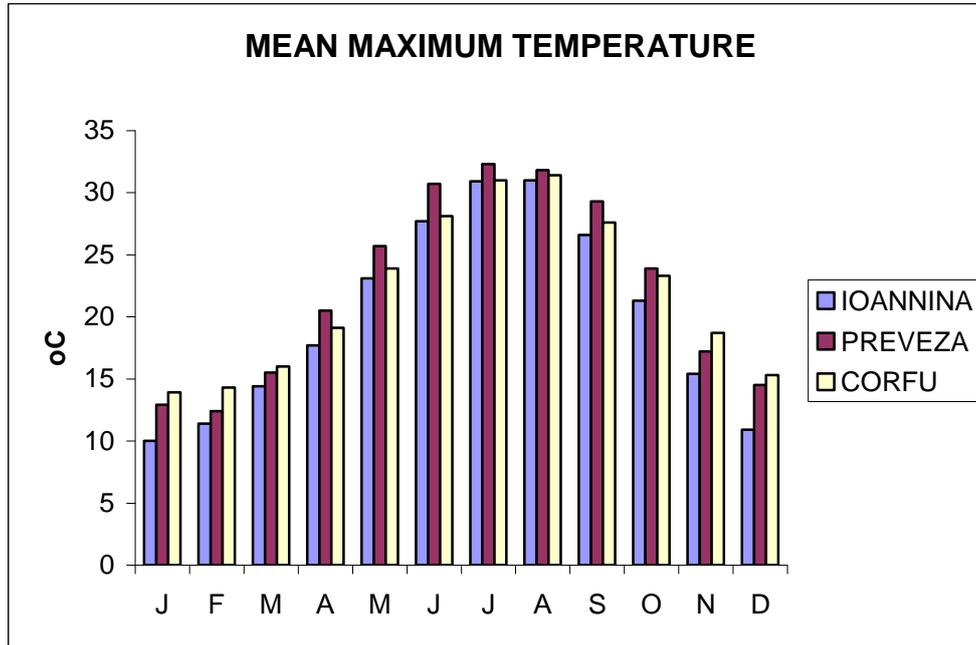
For the M.S. of Corfu, mean temperature range (maximum minus minimum temperature) varies from 8.5°C to 8.7°C, during winter, increases in spring to 9.1-10.8°C, maximizes in summer reaching 12.0°C and decreases in autumn from 8.7°C to 10.9°C.

Absolute minimum temperature has reached below zero levels, not only during winter's cold period (December, January, February), but also during March, May and November.

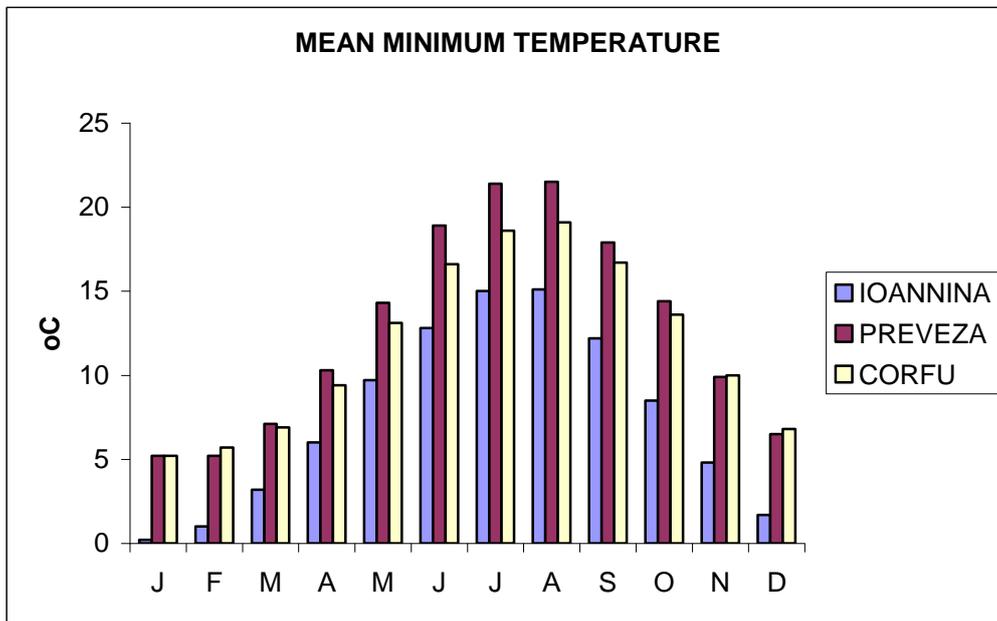
**Figure 4.6 Mean Monthly Temperature (°C).**



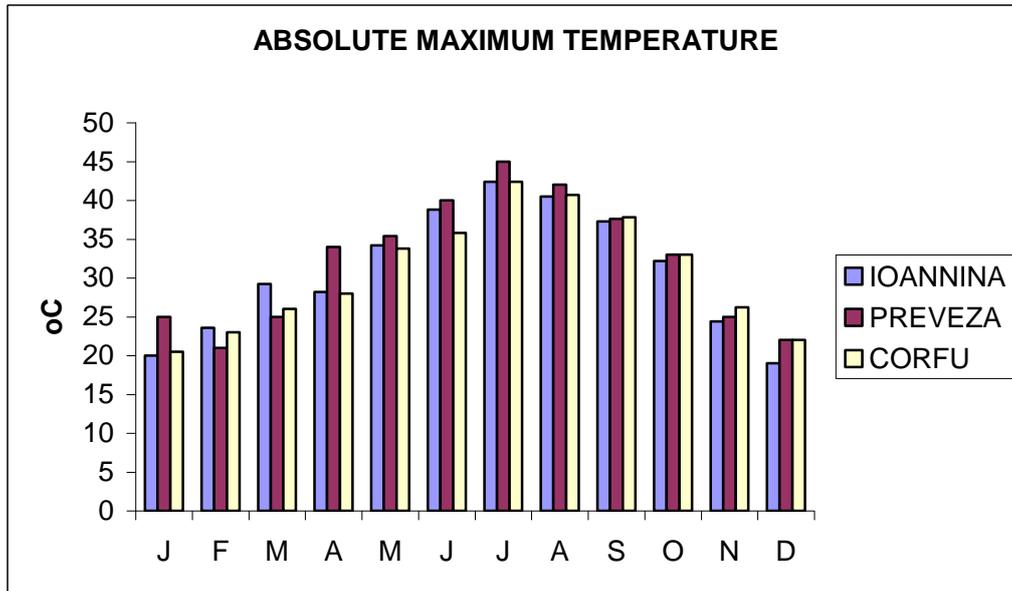
**Figure 4.7 Mean Maximum Monthly Temperature (°C).**



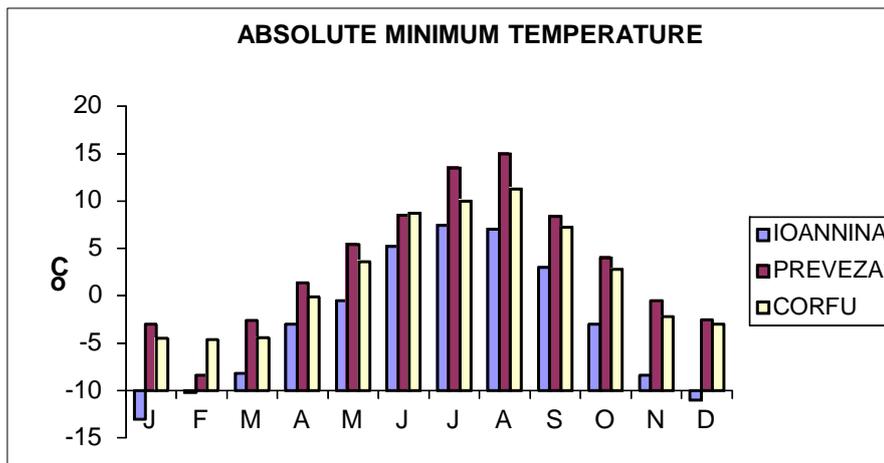
**Figure 4.8 Mean Minimum Temperature (°C).**



**Figure 4.9 Absolute Maximum Temperature (°C).**



**Figure 4.10 Absolute Minimum Temperature (°C).**



### 4.7.3 Rainfall and Atmospheric Precipitation

From Table 4.37 to Table 4.39 mean monthly rainfall and maximum 24 hour rainfall for M.S. of Ioannina, Preveza and Corfu are depicted.

**Table 4.37 Monthly Mean Rainfall and Maximum Rainfall for M.S. of Ioannina.**

Months	Rainfall	Maximum 24 hour Rainfall (mm)
January	118,7	89,7
February	110,4	56,6
March	92,2	58,8
April	78,1	67,3
May	67,5	45,4
June	41,8	55,3
July	30,4	53,2
August	30,6	72,0
September	53,5	64,5
October	97,8	11,6
November	170,3	94,0
December	175,0	86,6
Annual	1066,30	

**Table 4.38 Monthly Mean Rainfall and Maximum Rainfall for M.S. of Preveza.**

Months	Rainfall	Maximum 24 hour Rainfall (mm)
January	94,2	60,1
February	109,9	68,8
March	74,4	56,8
April	61,4	48,2
May	33,0	62,8
June	9,0	29,5
July	7,5	62,4
August	13,8	32,2
September	43,8	58,0
October	102,7	104,1
November	167,6	113,7
December	133,4	97,7
Annual	850,70	

**Table 4.39 Monthly Mean Rainfall and Maximum Rainfall for M.S. of Corfu.**

Months	Rainfall	Maximum 24 hour Rainfall (mm)
January	134,6	87,1
February	122,9	68,4
March	96,3	83,2
April	66,8	76,5
May	36,8	59,1
June	13,5	64,0
July	8,7	44,6
August	18,2	87,6
September	81,8	183,5
October	137,0	129,1
November	190,8	239,3
December	184,7	101,9
Annual	1092,10	

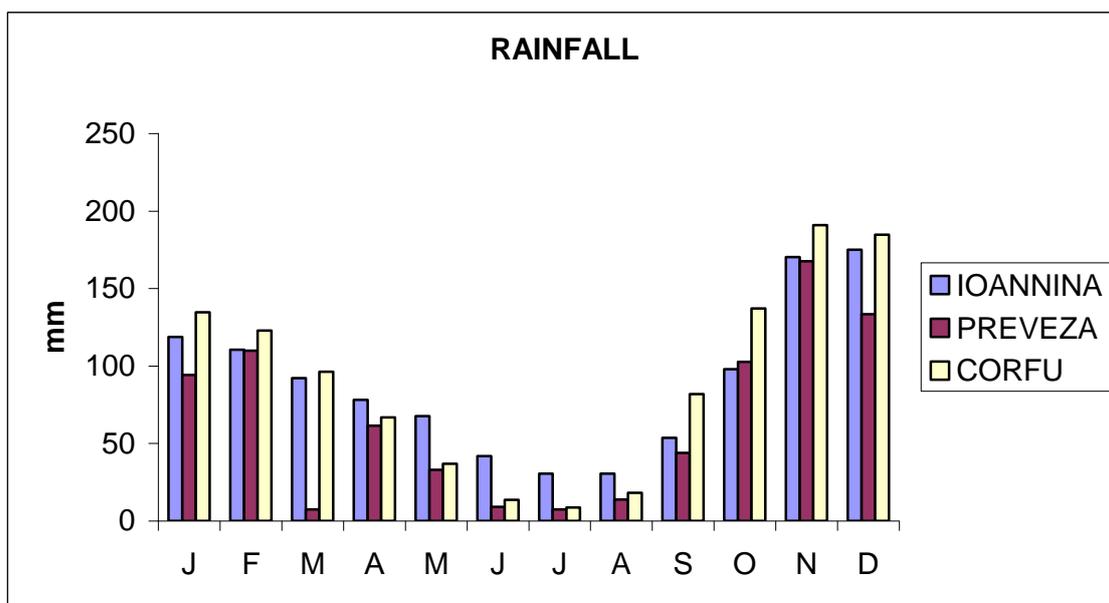
For M.S. of Ioannina, maximum rainfall appears in December and minimum in July.

For M.S. of Preveza, maximum rainfall appears in November and minimum in July.

For M.S. of Corfu, maximum rainfall appears in November and minimum in July.

In Figure 4.11 the annual mean rainfall of the above M.S. is illustrated.

**Figure 4.11 Annual Mean Rainfall.**



#### 4.7.4 Cloud Cover

Mean monthly cloud cover in eights for M.S. of Ioannina, Preveza and Corfu is presented in the following table.

**Table 4.40 Annual Cloud Cover.**

Months	Mean Monthly Cloud Cover		
	M.S. Ioannina	M.S. Preveza	M.S. Corfu
January	4,6	4,3	4,5
February	4,7	4,4	4,6
March	4,7	4,3	4,4
April	4,9	4,2	4,2
May	4,2	3,5	3,4
June	3,0	2,1	2,3
July	2,0	1,2	1,2
August	1,9	1,3	1,4
September	2,7	2,2	2,5
October	3,6	3,2	3,5
November	4,7	4,2	4,4
December	5,0	4,4	4,6

From Table 4.41 to Table 4.43, the number of days with cloud cover 0-1.5, 1.6-6.4 and 6.5-8.0, for M.S. of Ioannina, Preveza and Corfu, respectively, are presented.

**Table 4.41 Number of Days with Cloud Cover 0-1.5, 1.6-6.4, 6.5-8.0 for M.S. of Ioannina.**

Months	Number of Days with Cloud Cover		
	0 – 1.5	1.6 – 6.4	6.5 – 8.0
January	7,1	12,9	10,9
February	6,2	11,8	10,2
March	5,9	15,9	9,2
April	4,0	18,0	8,0
May	5,8	20,8	4,4
June	10,1	18,7	1,3
July	17,8	12,7	0,4
August	17,8	12,9	0,3
September	13,3	15,0	1,7
October	10,2	16,0	4,8
November	6,0	14,5	9,5
December	6,0	12,7	12,3

**Table 4.42 Number of Days with Cloud Cover 0-1.5, 1.6-6.4, 6.5-8.0 for M.S. of Preveza.**

Months	Number of Days with Cloud Cover		
	0 – 1.5	1.6 – 6.4	6.5 – 8.0
January	6,6	17,6	6,8
February	6,0	15,0	7,3
March	5,8	19,4	5,8
April	4,8	20,5	4,7
May	7,3	21,5	2,2
June	15,2	14,5	0,3
July	23,7	7,2	0,1
August	23,5	7,4	0,1
September	16,3	13,2	0,5
October	10,8	17,4	2,8
November	7,2	16,6	6,1
December	6,0	17,1	7,9

**Table 4.43 Number of Days with Cloud Cover 0-1.5, 1.6-6.4, 6.5-8.0 for M.S. of Corfu.**

Months	Number of Days with Cloud Cover		
	0 – 1.5	1.6 – 6.4	6.5 – 8.0
January	6,0	17,2	7,8
February	5,6	14,7	8,0
March	6,0	18,2	6,8
April	5,6	19,0	5,4
May	9,6	19,0	2,4
June	15,1	14,4	0,5
July	23,6	7,3	0,1
August	21,7	9,1	0,2
September	14,6	14,3	1,1
October	9,9	17,1	4,0
November	6,2	16,8	7,0
December	5,7	16,8	8,5

#### 4.7.5 Relative Humidity

Mean monthly and mean annual relative humidity for each M.S. are presented in the following table.

**Table 4.44 Relative Humidity.**

Months	Relative Humidity		
	M.S. Ioannina	M.S. Preveza	M.S. Corfu
January	77,2	73,1	75,9
February	73,9	71,3	74,3
March	69,4	71,2	73,2
April	68,1	73,0	72,7
May	65,8	73,6	69,5
June	58,8	70,8	63,4
July	52,1	69,4	59,8
August	54,1	69,3	62,1
September	63,9	70,1	70,4
October	71,1	70,5	74,8
November	80,0	74,6	77,6
December	81,8	74,9	77,4

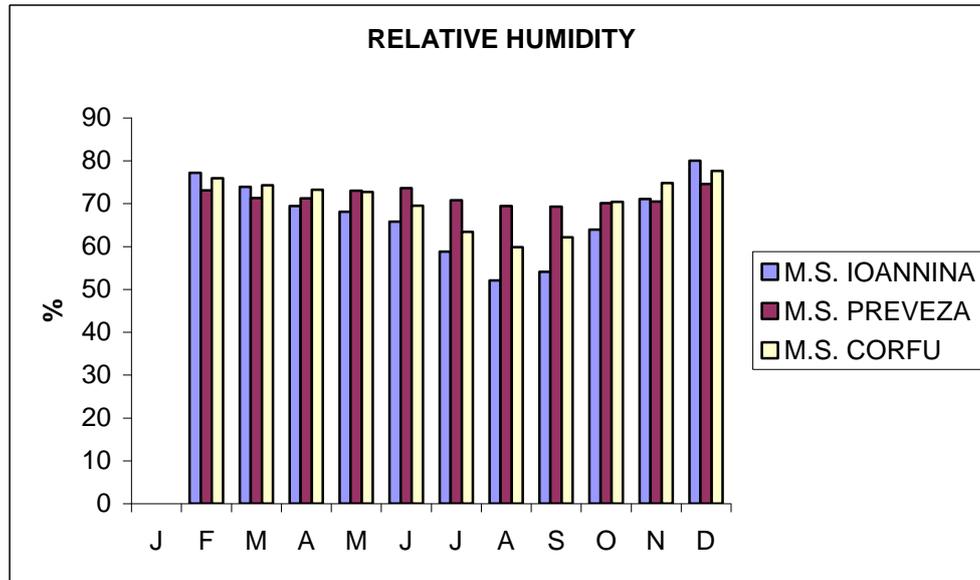
For M.S. of Ioannina, relative humidity is maximum in December and minimum in July.

For M.S. of Preveza, relative humidity is maximum in December and minimum in August.

For M.S. of Corfu, relative humidity is maximum in November and minimum in July.

Figure 4.12 illustrates annual relative humidity for all three M.S.

**Figure 4.12 Annual Relative Humidity.**



#### 4.7.6 Wind

Wind data for M.S. of Ioannina, Preveza and Corfu are depicted from Table 4.45 to Table 4.47.

From Figure 4.13 to Figure 4.15 the annual frequency of wind direction for M.S. of Ioannina, Preveza and Corfu is illustrated.

Regarding M.S. of Ioannina, prevailing winds are northwest in 6.5%, west follow in 6.4%, while calm appears in 66.1%.

Regarding M.S. of Preveza, prevailing winds are northeast in 22.1%, west follow in 19.6%, while calm appears in 20.3%.

Regarding M.S. of Corfu, prevailing winds are southeast in 13.5%, south follow in 9.8%, while calm appears in 43%.

**Table 4.45 Annual Wind Direction and Force in (%) and Beaufort Scale, period 1956-2001, for M.S. of Ioannina.**

WIND FORCE (BEAUF)	N	NE	E	SE	S	SW	W	NW	CALM	TOTAL
0									66,101	66,101
1	0,373	0,131	0,142	0,416	0,285	0,131	0,745	0,383		2,606
2	1,391	0,635	0,942	1,775	0,920	0,767	2,104	2,520		11,054
3	1,096	0,734	1,183	2,038	1,129	0,931	2,553	2,684		12,348
4	0,307	0,745	0,811	0,986	0,471	0,252	0,866	0,734		5,172
5	0,066	0,471	0,427	0,153	0,088	0,022	0,099	0,110		1,436
6	0,022	0,296	0,274	0,033	0,022	0,011	0,011	0,011		0,680
7	0,011	0,142	0,142	0,011	0,000	0,000	0,011	0,011		0,328
8	0,011	0,066	0,077	0,011	0,011	0,000	0,011	0,011		0,198
9	0,000	0,011	0,011	0,011	0,000	0,000	0,000	0,000		0,033
10	0,000	0,011	0,011	0,011	0,000	0,000	0,000	0,000		0,033
11	0,000	0,000	0,011	0,000	0,000	0,000	0,000	0,000		0,011
<b>TOTAL</b>	<b>3,277</b>	<b>3,242</b>	<b>4,031</b>	<b>5,445</b>	<b>2,926</b>	<b>2,114</b>	<b>6,400</b>	<b>6,464</b>	<b>66,101</b>	<b>100,000</b>

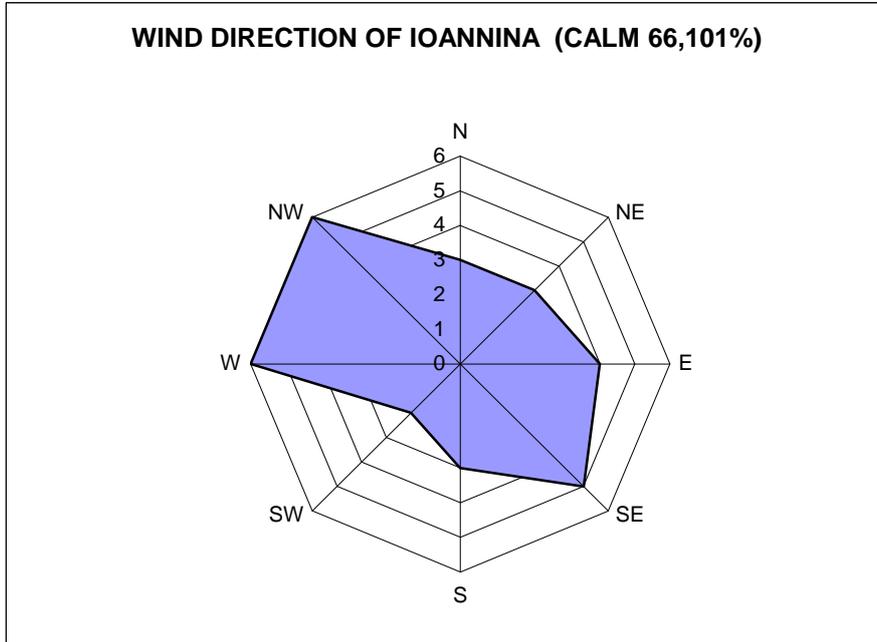
**Table 4.46 Annual Wind Direction and Force in (%) and Beaufort Scale, period 1956-2001, for M.S. of Preveza.**

WIND FORCE (BEAUF)	N	NE	E	SE	S	SW	W	NW	CALM	TOTAL
0									20,285	20,285
1	0,120	0,274	0,164	0,099	0,033	0,044	0,099	0,066		0,899
2	2,453	8,782	2,508	1,270	0,986	2,420	3,285	1,172		22,876
3	2,431	8,509	1,730	0,964	1,259	5,388	7,392	1,347		29,020
4	0,898	3,198	1,117	0,777	0,909	4,895	7,052	1,161		20,007
5	0,241	0,865	0,482	0,219	0,285	0,909	1,336	0,361		4,698
6	0,120	0,372	0,197	0,110	0,099	0,175	0,307	0,153		1,533
7	0,022	0,099	0,066	0,055	0,044	0,055	0,088	0,044		0,473
8	0,011	0,022	0,022	0,022	0,011	0,022	0,011	0,011		0,132
9	0,000	0,011	0,011	0,011	0,011	0,000	0,011	0,011		0,066
10	0,000	0,000	0,000	0,000	0,000	0,000	0,011	0,000		0,011
11	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000		0,000
<b>TOTAL</b>	<b>6,296</b>	<b>22,132</b>	<b>6,297</b>	<b>3,527</b>	<b>3,637</b>	<b>13,908</b>	<b>19,592</b>	<b>4,326</b>	<b>20,285</b>	<b>100,000</b>

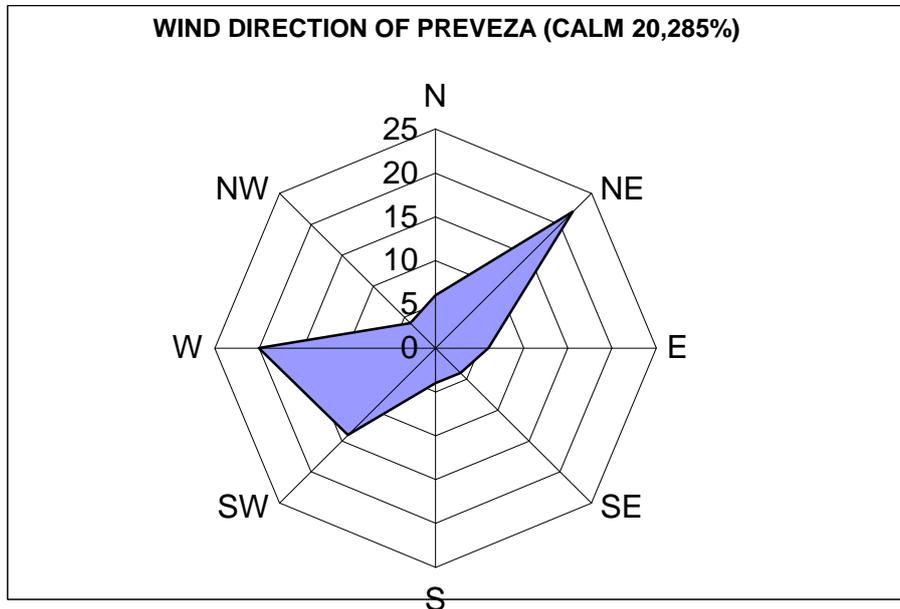
**Table 4.47 Annual Wind Direction and Force in (%) and Beaufort Scale, period 1956-2001, for M.S. of Corfu.**

WIND FORCE (BEAUF)	N	NE	E	SE	S	SW	W	NW	CALM	TOTAL
0									42,969	42,969
1	0,493	0,613	1,227	0,964	0,833	0,548	1,095	0,756		6,529
2	1,501	1,402	2,749	4,338	2,958	1,753	2,881	3,078		20,660
3	1,336	0,537	1,238	4,217	2,739	1,534	2,027	2,541		16,169
4	1,106	0,131	0,548	2,695	2,059	0,778	0,833	1,555		9,705
5	0,230	0,022	0,120	0,865	0,789	0,241	0,131	0,318		2,716
6	0,044	0,011	0,033	0,318	0,307	0,099	0,044	0,077		0,933
7	0,000	0,000	0,011	0,088	0,088	0,022	0,011	0,011		0,231
8	0,000	0,000	0,011	0,011	0,011	0,011	0,000	0,011		0,055
9	0,000	0,000	0,000	0,011	0,011	0,000	0,000	0,000		0,022
10	0,000	0,000	0,000	0,000	0,000	0,011	0,000	0,000		0,011
11	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000		0,000
<b>TOTAL</b>	<b>4,710</b>	<b>2,716</b>	<b>5,937</b>	<b>13,507</b>	<b>9,795</b>	<b>4,997</b>	<b>7,022</b>	<b>8,347</b>	<b>42,969</b>	<b>100,000</b>

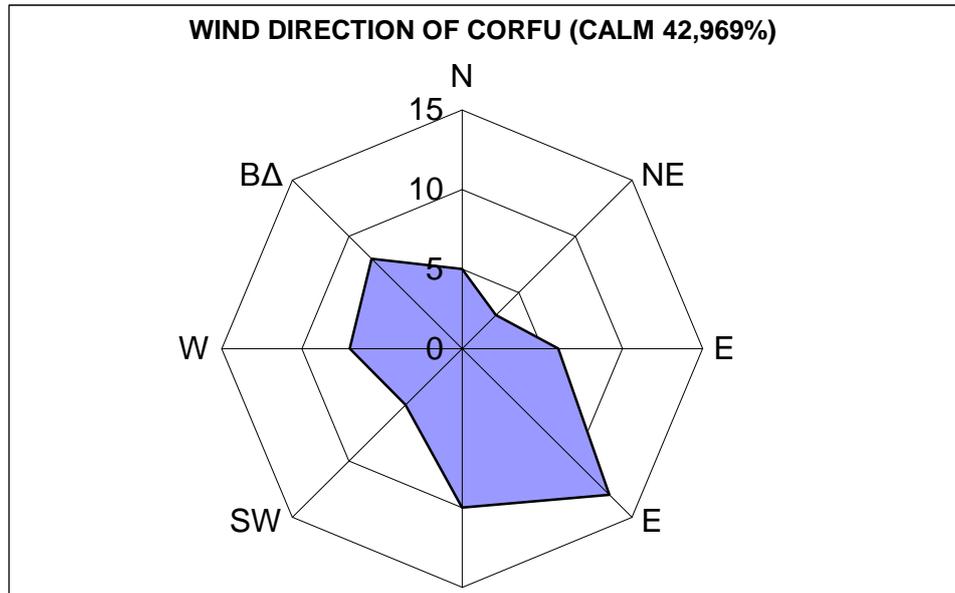
**Figure 4.13 Wind Direction Frequency Chart, for M.S. of Ioannina.**



**Figure 4.14 Wind Direction Frequency Chart, for M.S. of Preveza.**



**Figure 4.15 Wind Direction Frequency Chart, for M.S. of Corfu.**



## ***BIOTIC ENVIRONMENT***

### **4.8 Flora**

#### **4.8.1 Vegetation Types and Flora Data of the Coastal and Marine Part**

North Ionian Sea is included on the most oligotrophic areas of the Mediterranean, based on the distribution of abiotic and biotic parameters, such as oxygen, nutrients, chlorophyll a, abundance and production of phytoplankton and zooplankton. Specifically, distribution of various physicochemical parameters of Corfu Sea, such as temperature, salinity, turbidity and soluble oxygen, follow the pattern of water mass of the N. Ionian Sea (see following table). Sometimes, the impact of the seasonal flow variation of “Kalama” River, “Potamo” and few other torrents is evident in the fluctuations of the parameters mentioned above, by an increased inflow of nutrients in the system; these nutrients increase productivity, temporarily, creating a seasonal meso-oligotrophic profile<sup>11</sup>.

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<sup>11</sup> Gotsi-Skreta et al (1993), Psyllidou-Giouranovits & al (1994) & (1997)

**Table 4.48 Physicochemical and Biological Parameters of Corfu Sea.**

Physicochemical Parameters	Values
Turbidity	6 – 19m and 18 – 29m <sup>12</sup>
Soluble Oxygen	5,10 – 6,18 mL L <sup>-1</sup> <sup>13</sup>
Phosphate ions (PO <sub>4</sub> <sup>3-</sup> - P)	0,05 µg-at L <sup>-1</sup> <sup>14</sup>
Silica ions (SiO <sub>4</sub> <sup>4-</sup> - Si)	1,34 µg-at L <sup>-1</sup>
Ammonium ions (NH <sub>4</sub> <sup>+</sup> - N)	0,22 µg-at L <sup>-1</sup>
Nitrite ions (NO <sub>2</sub> <sup>-</sup> - N)	0,08 µg-at L <sup>-1</sup>
Nitric ions (NO <sub>3</sub> <sup>-</sup> - N)	0,27 µg-at L <sup>-1</sup>
Chlorophyll a	0,16 µg L <sup>-1</sup>

(Source: Psyllidou - Giouranovits et al, 1997)

Recording of coastal and near shore marine flora and fauna was made by Hellenic Marine Research Center (H.M.R.C.) in the scope of the study: “**Coastal morphology and marine biodiversity of some sites at the NW coasts of Greece (Ionian Sea) where an onshore natural gas pipeline is planned**” prepared for the project’s P.E.I.A. The study was prepared based on data collected in natural bays of the landfall sites, at limited depth, which are for Alternative Routings ALT3 and ALT4 “Perdika” bay, for Alternative Routing ALT7 is “Stavrolimenas” bay, and for Alternative Routings ALT1, ALT1a, ALT1b, ALT2, ALT5 and ALT6 “Omprela” bay.

The results were further detailed by the DMS study prepared for the project.

#### **4.8.1.1.1 “Omprela” bay (Landfall sites “Omprela 1” and “Omprela 2”)**

Sandy beach with strong presence of boulders and rocks (Picture 4.10). Reeds’ presence reveals that a small stream discharges in the bay, during winter time. Sea bottom is sandy with scattered big rocks, mainly in the shallows; many of these rocks are boulders rolled from land to the sea. No meadows of *Posidonia oceanica* or *Cymodocea nodosa* were observed by HCMR at shallow depths, probably due to high hydrodynamics. On the contrary, plenty algae (seaweeds) are present on top of the rocks. These seaweeds form bio-communities, with rich biodiversity, since

<sup>12</sup> Range of maximum and minimum annual turbidity values.

<sup>13</sup> Range of mean annual Soluble Oxygen values, in the water column.

<sup>14</sup> Mean annual values for Phosphate, Silica, Ammonium, Nitrate and Nitric Ions and Chlorophyll a, in the water column.

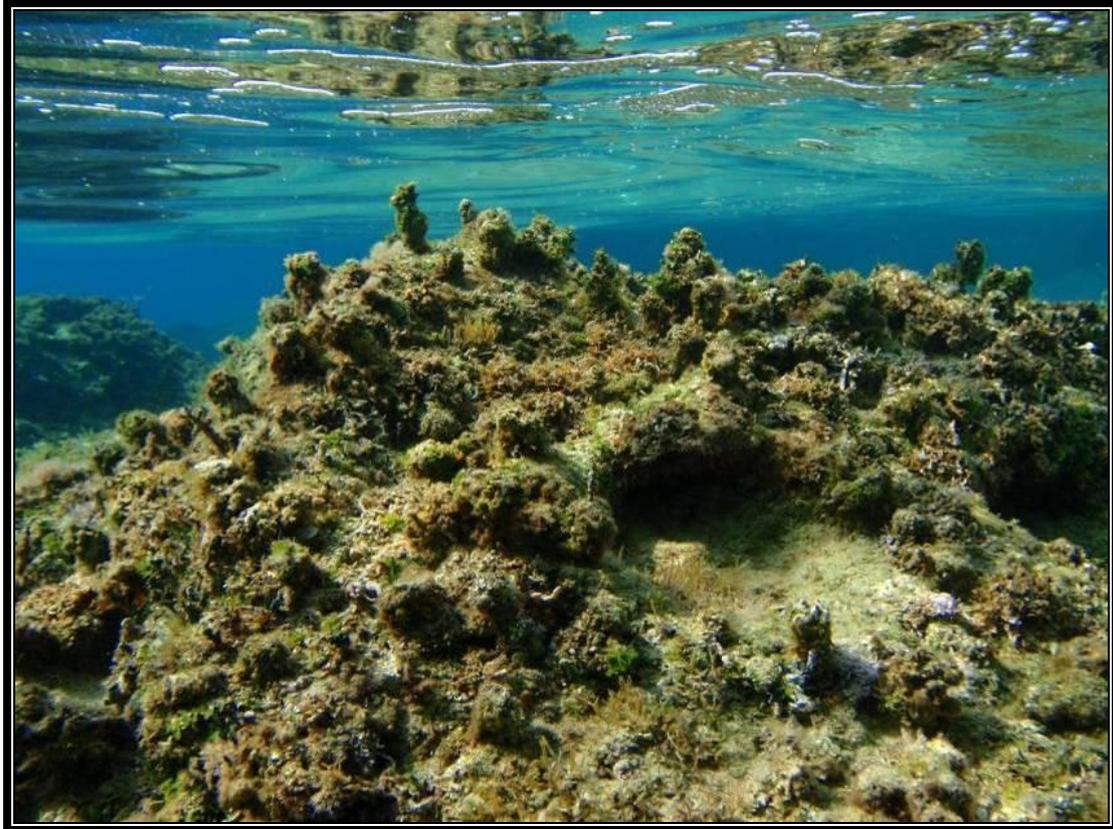
photophilous (light-loving) seaweeds develop on flat rock surfaces and skiophilous (shade-loving) on vertical ones. Photophilous algae are characteristic of coasts with medium to high hydrodynamic: intense vegetation of big Phaeophyceae (brown algae) (Picture 4.11) *Cystoseira compressa*, *Cystoseira spinosa*, *Cystoseira corniculata*, *Cystoseira foeniculacea* f. *tenuiramosa*, accompanied by the *Anadyomene stellata* Chlorophyceae (green algae) and *Jania rubens*, *Digenea simplex* and *Laurencia* spp Rhodophyceae (red algae). On the vertical rocks' surfaces the same species as at "Stavrolimenas" were observed including: Chlorophyceae *Halimeda tuna* and *Flabellia petiolata*, Phaeophyceae *Dictyota dichotoma* and Rhodophyceae *Corallina elongata*.

Benthic fauna is characterized by numerous small fishes, mollusks (oysters), sponges and hydrozoa forming a very rich biodiversity in the area.

**Picture 4.23 "Omprela" bay.**

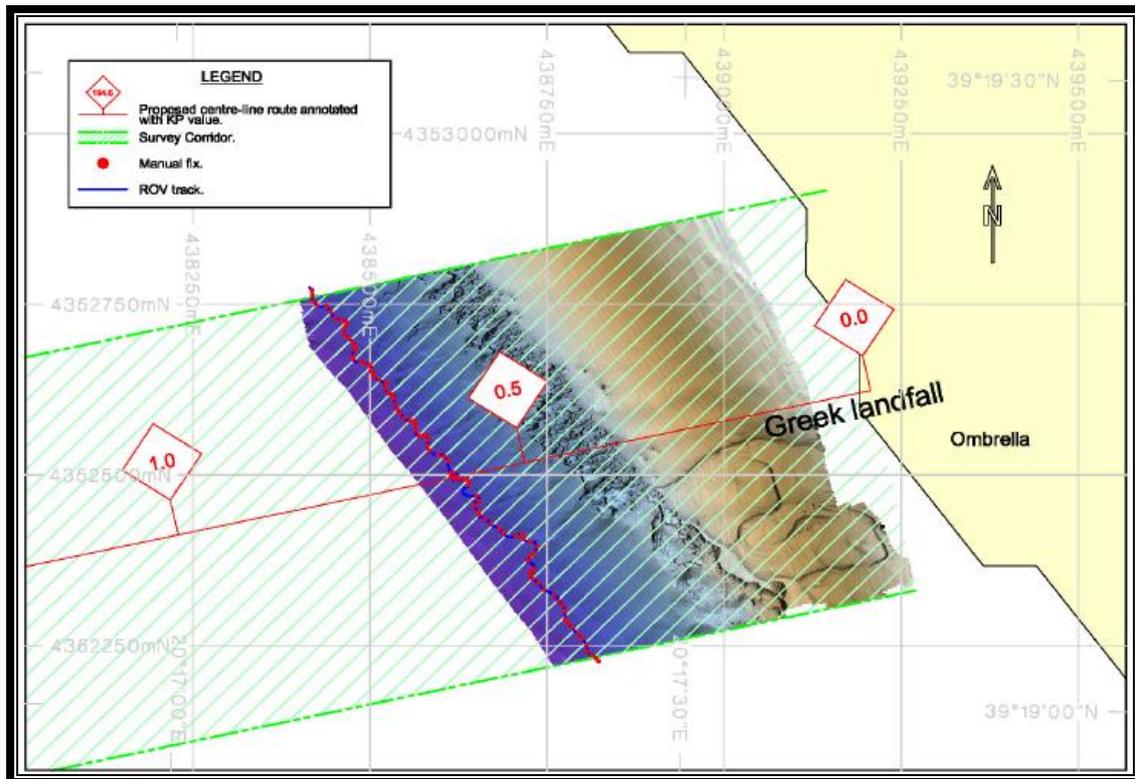


**Picture 4.24 Phaeophyceae *Cystoseira* spp at “Omprela” Bay.**



As described in section 4.6.7 results from the DMS performed for the marine (nearshore and offshore) section of the qualified, in the preliminary environmental licensing process, pipeline revealed that at the depth of 15m cemented elongated mounds with *Posidonia* and sand patches are located extending for ~120m (between ~K.P.0+360 and ~K.P.0+480). Further insea, at depth of ~20m and for ~135m (between ~K.P.0+480 and ~K.P.0+615) seagrasses of *Posidonia oceanica* are formed.

**Picture 4.25 Areas with Posidonia oceanica meadows.**



DMS was performed for the marine (nearshore and offshore) section of the qualified, in the preliminary environmental licensing process, pipeline. Consequently no primary field data exist for the other landfall sites. Along the nearshore part and including the zone determined by the DMS, satellite images provide a limited but most likely indication of the Posidonia development. These satellite images indicate the same characteristics as the ones determined in the DMS along all the coast of the investigated area. Consequently, although it is not possible to come with solid conclusion, it can be assessed that the development verified through the DMS for the given corridor is extended along the coast. In other words, the same conditions should be expected for all other coastal waters.

#### **4.8.1.1.2 “Stavrolimenas” bay (Landfall site “Stavrolimenas”)**

Enclosed bay with sandy beach in the middle, surrounded by almost vertical rocks ending at the sea (Picture 4.12). Reeds' presence is revealing of a small stream discharging to the bay, during winter. Sea bottom is sandy, in the middle of the bay, with angiosperm plants; on each side, vertical rocks are covered with algae. Marine

biodiversity is very rich; two species of marine angiosperms were found: clusters of *Posidonia oceanica* and of *Cymodocea nodosa* (Picture 4.13). *Cymodocea nodosa* is found only in the very shallow water (0-2m depth) while *Posidonia oceanica* sprawls from shallow to deeper waters, outside the bay. Additionally, *Posidonia oceanica* is found in small clusters on the lateral rocks, along with seaweeds. Regarding seaweeds, they occur in a large variety of species and their bio-community is typical of shores with vertical rocks. Consequently, common species are the skiophilous ones with dominants the following: Chlorophyceae *Halimeda tuna* and *Flabellia petiolata*, Phaeophyceae *Dictyota dichotoma* and *Dictyopteris polypodioides*, and Rhodophyceae *Corallina elongata* and *Tricleocarpa fragilis*. Nevertheless, in more level surfaces, photophilous species, like Rhodophyceae *Laurencia* spp are found. Very interesting was the sighting of the foreign Chlorophyceae *Caulerpa racemosa* var. *cylindracea* on pure, abundant state, at sandy bed, along with *Cymodocea nodosa*.

Benthic fauna is characterized by plenty of sponges on the bay's rocks, while many hydrozoa and bryozoa live among the rhizomes and leaves of *Posidonia oceanica*, revealing a large biodiversity of the marine area.

**Picture 4.26 "Stavrolimenas" Bay.**



**Picture 4.27 Meadows of *Posidonia oceanica* at "Stavrolimenas" bay.**



#### **4.8.1.1.3 "Perdika" bay (Landfall sites of "Sofas: and "Stamponi")**

Open bay with sandy beach in the middle, and rocks on the side. Sea bottom with plenty of gravels, boulders and small rocks. At shallow waters, small clusters of the angiosperms *Posidonia oceanica* meadows and also *Cymodocea nodosa* were found. However, leaves of *Posidonia* were widely washed up on the shore, a fact that reveals the existence of significant sea meadows in deeper waters. This is also supported by the satellite image by Google Earth. The available regional data allow us to presume that solid meadows of *Posidonia oceanica* start at 15-20m depth and stop at 30-35m depth (the deepest limit *Posidonia* can grow, since any deeper and the light would not suffice).

Seaweeds were plenty on the gravels and rocks near the shore. Algae vegetation is typical of the Greek coasts with high hydrodynamic: species short, flexible and with "hard attachment plates" resilient to undulation. High hydrodynamics can probably explain the limitation of *Posidonia oceanica* away from shoreline. Dominant algae species are: Phaeophyceae *Cystoseira compressa* and *Padina pavonica*,

Chlorophyceae *Anadyomene stellata*, Rhodophyceae *Amphiroa rigida*, *Liagora viscida* and *Laurencia* spp. From the species mentioned above *Cystoseira compressa*, *Anadyomene stellata* and *Amphiroa rigida* are sensitive to pollution and their presence is indicative of the ecosystem's good status. Additionally, very important is the presence of the sandstone algae *Dasycladus vermicularis*, amidst the rocks.

Biodiversity of the area is significant, with many small fishes and also crustaceans, among which the foreign crab *Percon gibbesi*. Additionally, numerous sea urchins were observed which sometimes strip the rocks from the algae, creating the so call "barrens" (Picture 4.15).

**Picture 4.28 "Perdika" bay.**



**Picture 4.29 Barrens caused by sea urchins at "Perdika" bay.**



#### **4.8.2 Vegetation Type and Flora Data of the Onshore Part**

The investigated area, from a phyto-sociological percept, belongs to the Mediterranean Vegetation Zone of evergreen broadleaved bushes (*Quercetalia ilicis*). This Zone is characterized by shrubby vegetation, known as maquis vegetation, and is developed in the most humid areas of the Mediterranean Zone, up to 700m, often in areas degraded by fire or grazing. Bushes up to 3m tall, with deep roots and small, leathery leaves prevail. Distinctive characteristic of this zone is the lack of herbaceous vegetation at the undergrowth. Dominant species include: *Quercus coccifera*, *Pistacia lentiscus*, *Arbutus unedo*, *Phillyrea media*, *Quercus ilex*, *Erica* sp, *Myrtus communis*, *Olea oleaster*. Also present are the following: *Laurus nobilis*, *Cistus* sp, *Arbutus drachnae*, *Pistacia terebinthus*, *Cercis siliquastrum*, *Spartium junceum*, *Callicotome villosa*, *Smilax aspera*, *Asparagus acutifolius*. Finally, in areas of higher rainfall hydrophilous species such as *Nerium oleander* and *Vitex agnus – castus* occur. From agricultural point of view, most areas are covered by olive groves. Lastly, at riverside areas and banks, *Platanus orientalis* is sometimes growing.

#### 4.8.2.1.1 Alternative Routing ALT1: Landfall site “Omprela 2”, C/S-M/S at “Variko” site

Vegetation along ALT1 is described in Table 4.49, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.50 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.49 Vegetation description along ALT1 (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	1.700	1.7	Passing through plains, Agricultural lands.
1.700	2.200	0.5	Passing through hilly areas (“Kastro” and “Pori” locations). Neighboring with the statutory Recreation Park. Forest with thick coppices of <i>Quercus macrolepis</i> . Riverside strips (“Megalo Pori” stream) with zones of co-domination <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> . Thick bushlands of <i>Quercus coccifera</i> .
2.200	3.200	1	Passing through semi-hilly areas. Agricultural lands.
3.200	5.200	2	Passing through semi-hilly areas (“Almiros” location). Forest with thick coppices of <i>Quercus macrolepis</i> . Riverside zones (“Megalo Pori” and “Rethi” streams) with co-domination of <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> . Thick bushlands of <i>Quercus coccifera</i> .
5.200	6.000	0.8	Passing through semi-plain areas. Neighboring with “Dimokastro” archaeological site. Agricultural lands.
6.000	6.928	0.928	Passing through semi-plain area (“Almiros” location). Forestal areas with thick coppices of <i>Quercus coccifera</i> . Landfall site “Omprela 2”.

**Table 4.50 General characteristics of ALT1 regarding vegetation.**

Mileage		Route Length per Vegetation (km)						
From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
0.000	0.029	0.029						
0.029	0.512				0.483			
0.512	0.650	0.138						
0.650	1.293				0.643			
1.293	1.920	0.627						
1.920	2.117				0.197			
2.117	2.209	0.092						
2.209	2.420				0.211			
2.420	4.672	2.252						
4.672	5.452				0.780			
5.452	6.461	1.009						
6.461	6.522				0.060			

	Mileage		Route Length per Vegetation (km)						
	From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
	6.522	6.549	0.028						
	6.549	6.800		0.251					
	6.800	6.928							0.128
<b>Total (km)</b>	6.928		4.175	0.251	0.000	2.374	0.000	0.000	0.128
<b>Percentage (%)</b>	100.000		60.258	3.625	0.000	34.272	0.000	0.000	1.846
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>	0.218		0.134	0.008	0.000	0.076	0.000	0.000	0.004

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed site for the Onshore Facilities is at “Variko” site.

#### 4.8.2.1.2 Alternative Routing ALT1a: Landfall site “Omprela 2”, C/S-M/S at “Florovouni” site

Vegetation along ALT1a is described in Table 4.51, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.52 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.51 Vegetation description along ALT1a (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	1.500	1.500	Passing through hilly area (“Florovouni” slopes). Grasslands, with herbaceous vegetation, locally grazed; dominant species <i>Phlomis fruticosa</i> and <i>Euphorbia</i> sp. Individuals of <i>Pistacia lentiscus</i> . Riverside vegetation with individuals of <i>Platanus orientalis</i> , <i>Vitex agnus – castus</i> and <i>Pistacia lentiscus</i> .
1.500	2.600	1.100	Passing through plains, Agricultural lands.
2.600	3.200	0.600	Passing through hilly areas (“Kastro” and “Pori” locations). Neighboring with the statutory Recreation Park. Forest with thick coppices of <i>Quercus macrolepis</i> . Riverside strips (“Meglo Pori” stream) with zones of co-dominance <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> . Thick bushlands of <i>Quercus coccifera</i> .
3.200	4.200	1.000	Passing through semi-hilly areas. Agricultural lands.

From KP	To KP	Section Length (approx) (km)	Vegetation Description
4.200	6.200	2.000	Passing through semi-hilly areas ("Almiros" location). Forest with thick coppices of Quercus macrolepis. Riverside zones ("Megalo Pori" and "Rethi" streams) with co-dominance of Platanus orientalis and Quercus macrolepis. Also present are Vitex agnus – castus, Erica arborea, Quercus ilex and Nerium oleander. Thick bushlands of Quercus coccifera.
6.200	6.900	0.700	Passing through semi-plain areas. Neighboring with "Dimokastro" archaeological site. Agricultural lands.
6.900	8.000	1.100	Passing through semi-plain area ("Almiros" location). Forestal areas with thick coppices of Quercus coccifera.
8.000	8.187	0.187	Passing through thick bushlands of Quercus coccifera. Landfall site "Omprela 2".

**Table 4.52 General characteristics of ALT1a regarding vegetation.**

	Mileage		Route Length per Vegetation (km)						
	From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
	0.000	0.313		0.313					
	0.313	1.283			0.970				
	1.283	1.551		0.268					
	1.551	2.620				1.069			
	2.620	3.179	0.559						
	3.179	3.376				0.197			
	3.376	3.468	0.092						
	3.468	3.679				0.211			
	3.679	5.931	2.252						
	5.931	6.711				0.780			
	6.711	7.720	1.009						
	7.720	7.781				0.060			
	7.781	7.808	0.028						
	7.808	8.059		0.251					
	8.059	8.187							0.128
<b>Total (km)</b>	8.187		3.940	0.832	0.970	2.317	0.000	0.000	0.128
<b>Percentage (%)</b>	100.00		48.12	10.16	11.85	28.30	0.00	0.00	1.56
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>	0.258		0.126	0.027	0.031	0.074	0.000	0.000	0.004

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed site for the Onshore Facilities is at "Florovouni" site.

#### 4.8.2.1.3 Alternative Routing ALT1b: Landfall site “Omprela 2”, C/S-M/S at “Florovouni” site

Vegetation along ALT1b is described in Table 4.53, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.54 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.53 Vegetation description along ALT1b (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	1.800	1.800	Passing through hilly area (“Florovouni” slopes). Grasslands, with herbaceous vegetation, locally grazed; dominant species <i>Phlomis fruticosa</i> and <i>Euphorbia</i> sp. Individuals of <i>Pistacia lentiscus</i> . Riverside vegetation with individuals of <i>Platanus orientalis</i> , <i>Vitex agnus – castus</i> and <i>Pistacia lentiscus</i> .
1.800	3.800	2.000	Passing through plains, Agricultural lands.
3.800	4.300	0.500	Passing through hilly areas (“Kastro” and “Pori” locations). Neighboring with the statutory Recreation Park. Forest with thick coppices of <i>Quercus macrolepis</i> . Riverside strips (“Meglo Pori” stream) with zones of co-domination <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> . Thick bushlands of <i>Quercus coccifera</i> .
4.300	5.300	1.000	Passing through semi-hilly areas. Agricultural lands.
5.300	7.300	2.000	Passing through semi-hilly areas (“Almiros” location). Forest with thick coppices of <i>Quercus macrolepis</i> . Riverside zones (“Megalo Pori” and “Rethi” streams) with co-domination of <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> . Thick bushlands of <i>Quercus coccifera</i> .
7.300	8.100	0.800	Passing through semi-plain areas. Neighboring with “Dimokastro” archaeological site. Agricultural lands.
8.100	9.242	1.142	Passing through semi-plain area (“Almiros” location). Forestal areas with thick coppices of <i>Quercus coccifera</i> . Landfall site “Omprela 2”.

**Table 4.54 General characteristics of ALT1b regarding vegetation.**

Mileage		Route Length per Vegetation (km)						
From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
0.000	0.646		0.646					
0.646	1.903			1.257				
1.903	2.074				0.171			
2.074	2.308	0.235						
2.308	2.791				0.483			
2.791	2.929	0.138						
2.929	3.572				0.643			
3.572	4.199	0.627						
4.199	4.396				0.197			
4.396	4.488	0.092						
4.488	4.699				0.211			
4.699	6.951	2.252						
6.951	7.731				0.780			
7.731	8.740	1.009						
8.740	8.801				0.060			
8.801	8.828	0.028						
8.828	9.080		0.251					
9.080	9.242							0.163
<b>Total (km)</b>	9.242	4.380	0.897	1.257	2.545	0.000	0.000	0.163
<b>Percentage (%)</b>	100.000	47.394	9.707	13.597	27.539	0.000	0.000	1.762
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>	0.291	0.140	0.029	0.040	0.081	0.000	0.000	0.005

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed site for the Onshore Facilities is at “Florovouni” site.

**4.8.2.1.4 Alternative Routing ALT2: Landfall site “Omprela 2”, C/S-M/S at “Gouri” site**

Vegetation along ALT2 is described in Table 4.55, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.56 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.55 Vegetation description ALT2 (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	2.000	2.000	Passing through hilly are ("Pori" location). Forest with thick coppices of Quercus macrolepis. Riverside zones ("Megalo Pori" and "Rethi") with co-dominance of Platanus orientalis and Quercus macrolepis. Also present are Vitex agnus – castus, Erica arborea, Quercus ilex and Nerium oleander.
2.000	3.700	1.700	Passing through semi-hilly areas ("Almiros" location). Forest with thick coppices of Quercus macrolepis. Riverside zones ("Megalo Pori" and "Rethi" streams) with co-dominance of Platanus orientalis and Quercus macrolepis. Also present are Vitex agnus – castus, Erica arborea, Quercus ilex and Nerium oleander.
3.700	4.500	0.800	Passing through semi-plain areas. Neighboring with "Dimokastro" archaeological site. Agricultural lands.
4.500	5.600	1.100	Passing through semi-plain area ("Almiros" location). Forest with thick coppices of Quercus macrolepis.
5.600	6.593	0.993	Passing through thick bushlands of Quercus coccifera. Landfall site "Omprela 2".

**Table 4.56 General characteristics of ALT2, regarding vegetation.**

	Mileage		Route Length per Vegetation (km)						
	From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
	0.000	2.527	2.527						
	2.527	2.621				0.094			
	2.621	4.302	1.680						
	4.302	5.081				0.780			
	5.081	6.091	1.009						
	6.091	6.151				0.060			
	6.151	6.179	0.028						
	6.179	6.430		0.251					
	6.430	6.593							0.163
<b>Total (km)</b>		6.593	5.244	0.251	0.000	0.934	0.000	0.000	0.163
<b>Percentage (%)</b>		100.000	79.546	3.809	0.000	14.174	0.000	0.000	2.471
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>		0.206	0.168	0.008	0.000	0.030	0.000	0.000	0.005

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed site for the onshore facilities is at "Gouri" site.

#### 4.8.2.1.5 Alternative Routing ALT3: Landfall “Stamponi”, C/S-M/S Kalivia

Vegetation along ALT3 is described in Table 4.57, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.58 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.57 Vegetation description along ALT3 (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	0.200	0.200	Passing through hilly –semi-hilly areas (“Kalivia” location). Forestial land with shrubby evergreen broadleaved vegetation with domination of Pistacia lentiscus. Coppices of Quercus coccifera.
0.200	3.600	3.400	Passing through hilly areas (“Granitsa” and “Perama” locations). Grasslands grazed locally, with domination of Phlomis fruticosa and Euphorbia sp. Individuals of Quercus macrolepis, Quercus coccifera and Pistacia lentiscus.
3.600	4.000	0.400	Passing through plains. Agricultural area.
4.000	4.489	0.489	Passing through semi-plain areas (“Perama” location). Forest with coppices of Quercus macrolepis. Landfall at “Perdika” bay, site “Stamponi”.

**Table 4.58 General characteristics of ALT3, regarding vegetation.**

	Mileage		Route Length per Vegetation (km)						
	From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
	0.000	3.184			3.184				
	3.184	3.321	0.138						
	3.321	3.921				0.600			
	3.921	4.312	0.391						
	4.312	4.386				0.073			
	4.386	4.489							0.103
<b>Total (km)</b>	4.489		0.529	0.000	3.184	0.673	0.000	0.000	0.103
<b>Percentage (%)</b>	100.000		11.780	0.000	70.920	14.998	0.000	0.000	2.303
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>	0.140		0.017	0.000	0.102	0.022	0.000	0.000	0.003

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed Onshore Facilities site is located at “Kalivia” location.

#### 4.8.2.1.6 Alternative Routing ALT4: Landfall “Sofas”, C/S-M/S Station at “Kalivia” site

Vegetation along ALT4 is described in Table 4.59, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.60 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.59 Vegetation description along ALT4 (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	2.800	2.800	Passing through hilly areas (“Granitsa” location). Grassland, locally grazed, with domination of <i>Phlomis fruticosa</i> and <i>Euphorbia</i> sp. Individuals of <i>Quercus macrolepis</i> , <i>Quercus coccivera</i> and <i>Pistacia lentiscus</i>
2.800	3.200	0.400	Passing through hilly – semi-hilly areas (“Perama” location) Forest with coppices of <i>Quercus macrolepis</i> . Riverside zones (“Souha” stream) with co-dominance of <i>Quercus macrolepis</i> and <i>Platanus orientalis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> .
3.200	3.925	0.725	Passing through plain. Agricultural lands. Landfall at “Perdika” bay, site “Sofas”.

**Table 4.60 General characteristics of ALT4, regarding vegetation.**

	Mileage		Route Length per Vegetation (km)						
	From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
	0.000	2.489			2.489				
	2.489	3.185	0.696						
	3.185	3.829				0.644			
	3.829	3.925							0.096
<b>Total (km)</b>	3.925		0.696	0.000	2.489	0.644	0.000	0.000	0.096
<b>Percentage (%)</b>	100.000		17.738	0.000	63.415	16.408	0.000	0.000	2.439
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>	0.123		0.022	0.000	0.080	0.021	0.000	0.000	0.003

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed Onshore Facilities site is located at “Kalivia” location.

#### 4.8.2.1.7 Alternative Routing ALT5: Landfall site “Omprela 1”, C/S-M/S at “Variko” site

Vegetation along Alternative Routing ALT5 is described in Table 4.61, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.62 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.61 Vegetation description along ALT5 (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	1.300	1.300	Passing through plains, Agricultural lands.
1.300	1.800	0.500	Passing through hilly areas (“Kastro” and “Pori” locations). Neighboring with the statutory Recreation Park. Forest with thick coppices of <i>Quercus macrolepis</i> . Riverside strips (“Meglo Pori” stream) with zones of co-dominance <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> .
1.800	3.600	1.800	Passing through semi-hilly areas. Agricultural lands.
3.600	4.600	1.000	Passing through hilly areas (“Pori” location). Forest with thick coppices of <i>Quercus macrolepis</i> . Riverside zones (“Megalo Pori” and “Rethi” streams) with co-dominance of <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> .
4.600	7.808	3.208	Passing through thick bushlands of <i>Quercus coccifera</i> . Landfall site “Omprela 1”.

**Table 4.62 General characteristics of ALT5, regarding vegetation.**

Mileage		Route Length per Vegetation (km)						
From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
0.000	0.028	0.028						
0.028	0.511				0.483			
0.511	0.649	0.138						
0.649	1.292				0.643			
1.292	1.919	0.627						
1.919	2.116				0.197			
2.116	2.208	0.092						

	Mileage		Route Length per Vegetation (km)						
	From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
	2.208	2.419				0.211			
	2.419	3.211	0.792						
	3.211	3.387				0.176			
	3.387	4.840	1.453						
	4.840	7.723		2.883					
	7.723	7.808							0.085
<b>Total (km)</b>		7.808	3.130	2.883	0.000	1.710	0.000	0.000	0.085
<b>Percentage (%)</b>		100.000	40.088	36.925	0.000	21.896	0.000	0.000	1.092
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>		0.247	0.100	0.092	0.000	0.055	0.000	0.000	0.003

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed site for the onshore facilities is at “Variko” site.

#### 4.8.2.1.8 Alternative Routing ALT6: Landfall site “Omprela 1”, C/S-M/S at “Gouri” site

Vegetation along ALT6 is described in Table 4.63, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.64 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.63 Vegetation description along ALT6 (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	3.500	3.500	Passing through hilly areas (“Pori” location). Forest with thick coppices of <i>Quercus macrolepis</i> . Riverside zones (“Megalo Pori” and “Rethi” streams) with co-dominance of <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> .
3.500	6.927	3.427	Passing through thick bushlands of <i>Quercus coccifera</i> . Landfall site “Omprela 1”.

**Table 4.64 General characteristics of ALT6, regarding vegetation.**

	Mileage		Route Length per Vegetation (km)						
	From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
	0.000	2.527	2.527						
	2.527	2.576				0.049			
	2.576	4.023	1.447						
	4.023	6.842		2.819					
	6.842	6.927							0.085
<b>Total (km)</b>		6.927	3.974	2.819	0.000	0.049	0.000	0.000	0.085
<b>Percentage (%)</b>		100.000	57.368	40.697	0.000	0.704	0.000	0.000	1.230
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>		0.219	0.127	0.090	0.000	0.002	0.000	0.000	0.003

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed site for the onshore facilities is at “Gouri” site.

#### 4.8.2.1.9 Alternative Routing ALT7: Landfall site “Stavrolimenas”, C/S-M/S at “Variko” site

Vegetation along Alternative Routing ALT7 is described in Table 4.65, according to the classification of Ministry of Agriculture (Annex A – Maps (Volume II), Map 7240-AU-VM-01). Table 4.66 provides a more detailed presentation of the vegetation traversed by the routing. During the area characterization, it was considered that the working strip will be equally distributed on both sides of the pipeline axis.

**Table 4.65 Vegetation description along ALT7 (direction East - West).**

From KP	To KP	Section Length (approx) (km)	Vegetation Description
0.000	1.100	1.100	Passing through plains, Agricultural lands.
1.100	2.200	1.1	Passing through semi-hilly areas (“Glossa” and “Gerovitsa” areas). Forest with coppices of <i>Quercus macrolepis</i> . Riverside zones (“Megalo Pori” stream) with co-dominance of <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> .
2.200	2.400	0.2	Passing through plains. Agricultural lands.

From KP	To KP	Section Length (approx) (km)	Vegetation Description
2.400	2.900	0.5	Passing through semi-hilly areas (“Glossa” and “Gerovitsa” areas). Forest with coppices of <i>Quercus macrolepis</i> . Riverside zones (“Megalo Pori” stream) with co-domination of <i>Platanus orientalis</i> and <i>Quercus macrolepis</i> . Also present are <i>Vitex agnus – castus</i> , <i>Erica arborea</i> , <i>Quercus ilex</i> and <i>Nerium oleander</i> .
2.900	3.200	0.3	Passing through semi-plain area. Agricultural lands.
3.200	3.600	0.4	Passing through semi-plain areas (“Gerovitsa” area). Forest with coppices of <i>Quercus macrolepis</i> .
3.600	3.800	0.2	Passing through semi-plain areas. Forestial lands with shrubby evergreen broadleaved vegetation; dominant species <i>Pistacia lentiscus</i> . Coppices of <i>Quercus coccifera</i> .
3.800	4.500	0.7	Passing through plain – semi-plain areas. Agricultural lands.
4.500	4.759	0.259	Passing through plains. Shrubby evergreen broadleaved vegetation, with domination of <i>Pistacia lentiscus</i> . Coppices of <i>Quercus coccifera</i> . Landfall at “Stavrolimena” bay.

**Table 4.66 General characteristics of ALT7, regarding vegetation.**

	Mileage		Route Length per Vegetation (km)						
	From K.P.	To K.P.	Forest	Forestial	Grassland	Agricultural	Rocky	Residential	Landfall
	0.000	0.029	0.029						
	0.029	0.702				0.673			
	0.702	2.275	1.573						
	2.275	2.403				0.128			
	2.403	2.985	0.582						
	2.985	3.091				0.107			
	3.091	3.457	0.365						
	3.457	3.666		0.209					
	3.666	4.543				0.877			
	4.543	4.689		0.146					
	4.689	4.759							0.070
	0.000	0.029	0.029						
	0.029	0.702				0.673			
<b>Total (km)</b>	4.759		2.549	0.355	0.000	1.785	0.000	0.000	0.070
<b>Percentage (%)</b>	100.000		53.556	7.458	0.000	37.506	0.000	0.000	1.480
<b>Working Strip Area per Vegetation (km<sup>2</sup>)*</b>	0.150		0.082	0.011	0.000	0.057	0.000	0.000	0.002

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

It should be noted that the proposed site for the Onshore Facilities is at “Variko” site.

#### 4.8.2.1.10 Onshore Facilities (C/S-M/S)

The following table illustrates vegetation's dominant type upon which the various alternatives of the Onshore Facilities for the Compressor and Metering Station are located.

**Table 4.67 Vegetation of Onshore Facilities (C/S-M/S) sites.**

s/n	C/S-M/S Code	Corresponding Routing(s)	Vegetation Type
1	C/S-M/S 1	ALT4	<ul style="list-style-type: none"> <li>• 90% Grasslands</li> <li>• 10% Forest</li> </ul>
2	C/S-M/S Kalivia	ALT3, ALT4	<ul style="list-style-type: none"> <li>• 50% Grassland</li> <li>• 50%Forestrial</li> </ul>
3	C/S-M/S Florovouni	ALT1a, ALT1b	<ul style="list-style-type: none"> <li>• 90% Grasslands</li> <li>• 10% Forestrial</li> </ul>
4	C/S-M/S Variko	ALT1, ALT1b, ALT5, ALT7	<ul style="list-style-type: none"> <li>• 80% Agricultural</li> <li>• 20% Forest</li> </ul>
5	C/S-M/S 2	ALT1, ALT1b, ALT5, ALT7	<ul style="list-style-type: none"> <li>• 50% Agricultural.</li> <li>• 50% Forest</li> </ul>
6	C/S-M/S Gouri	ALT2, ALT6	Agricultural
7	C/S-M/S 3	ALT1, ALT1a, ALT1b, ALT5,	Forest
8	C/S-M/S 4	ALT5, ALT6	Forest

At this face of the project, the official characterization of the lands traversed by the proposed route is not available. However, the project and in specifically the proposed route have received a preliminary approval of the competent forestrial authorities. According to national legislation, natural gas pipelines are permitted to traverse forestrial areas and specifically IGI through L.4001/2011.

In any case prior to the commencement of the construction works, all applicable permits will be acquired. After the completion of the construction works, reinstatement according to the local authorities will be performed.

## 4.9 Fauna

### 4.9.1 Description of Terrestrial Fauna, with Emphasis on Rare, Endemic and/or Protected Species of Vertebrae

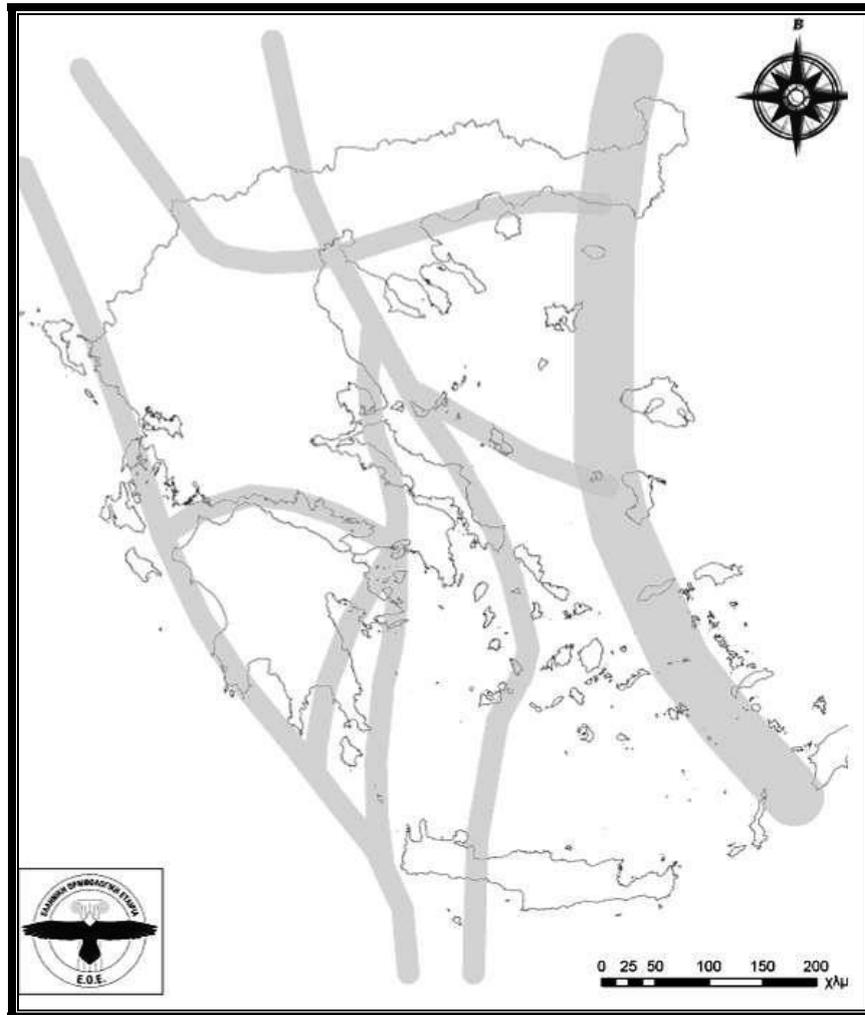
Vertebrae of Thesprotia are more studied in the area of “Kalama” River delta and the mountains of “Paramithia”, where, due mainly to avifauna, detailed lists of species and sometimes population dynamics exist. On the whole, the area of “Perdika” is probably within the distribution area of most of the common species of northwest Greece, with the exception of those sited in the mountains or in specific habitats (such as freshwater fish fauna). Taken for granted the geographical proximity of all investigated routings, species that may be sited concern all investigated routings.

The projects area is under the projection of the western migration corridor within Greek territory as illustrated on the following picture. Nevertheless, characterized protected areas for avifauna (both statutory, such as SAC, and not statutory protected, such as IBAs) lay outside the investigated area. Part of the ‘Krania-Mentzebelios’ Wildlife Reserve lies in the investigated area, nonetheless, at a distance of ~1100m from the closest routing.

The following table includes species that are cited in the above mentioned areas. This is a conservative approach meaning that the following species do not necessarily lay in the investigated area. On the contract the ecological significance of the investigated area is augmented by the references made for the protected areas in the broader area and specifically for the protected areas of:

- GR2120006 ‘ ELI KALODIKI, MARGARITI, KARTERI KAI LIMNI PRONTANI’ (March of Kalodiki, Margariti, Karteri and Lake Prontani), at a distance of ~1500m and
- the Wildlife Reserve of ‘Krania-Mentzebelios’ at a distance of ~1000m.

**Picture 4.30 Greek migratory corridors.**



Based on the species habitats and ecologies, remarks are made upon the estimated engagement or not within the project's area and recommendation upon the time constraints that should be taken into account during construction. Ecological data have been retrieved by various literature and online sources including:

- IUCN, red list database (<http://www.iucnredlist.org/>)
- Birdlife international database (<http://www.birdlife.org>)
- ARKive database (<http://www.arkive.org>)
- Archipelagos wildlife library (<http://wildlife-archipelago.gr>)
- Greek Biodiversity Database (<http://greek-biodiversity.web.auth.gr>)
- Legakis, A. & Maragkou, P (ed). 2009 *Greek Red Book*

**Table 4.68 Fauna in the broader investigated area.**

Class	Order	Species	Τοπική Ονομασία	Bern	Bonn	92/43/EU	79/409/EU	IUCN/Greek Red Book	CITES	Ecology	Remarks	Time Constraints
Mammals	Rodentia	Nannospalax leucodon	Μικροτυφλοπόντικας					DD/NE		Inhabits steppe grassland, meadows and pastures, in areas with a deep layer of loose, freely-draining soil in which it digs its extensive burrows. It is absent from ploughed land and arable monocultures, although it may be found in agricultural landscapes where there is a mixture of pastures, small crop-fields and orchards. It has a slow reproductive rate, raising litters of only 2-4 young.	It is possible to be present in the investigated area.	
		Neomys anomalus	Βαλτομυγαλίδα					LC/NT		It inhabits lush vegetation next to slow-flowing or still eutrophic waters (marshes, swamps, lakes, rivers, and streams). Its habitat choice is influenced by competition with the larger Eurasian water shrew N. fodiens, which is a stronger swimmer. In general, N. anomalus is less aquatic than N. fodiens and can colonise areas away from water. However, in regions where N. fodiens is absent, N. anomalus may adopt its competitor's aquatic niche and increase in size. N. anomalus is strictly carnivorous, feeding predominantly on soft-bodied invertebrates such as insect larvae, spiders and worms	No proper habitats were observed in the investigated area.	
		Muscardinus avellanarius	Βουνομωξός					LC/DD		Inhabits steppe grassland, meadows and pastures, in areas with a deep layer of loose, freely-draining soil in which it digs its extensive burrows. It is absent from ploughed land and arable monocultures, although it may be found in agricultural landscapes where there is a mixture of pastures, small crop-fields and orchards. It has a slow reproductive rate, raising litters of only 2-4 young.	It is possible to be present in the investigated area.	
		Microtus thomasi	Σκαπτοποντικός					LC/NE		It prefers open areas with deep soil, in which it digs extensive burrows. Recorded habitats include meadows and pastures on karst limestone, and high mountain pastures. It is also found on arable farmland.	It is possible to be present in the investigated area.	
		Oryctolagus cuniculus	Λαγός					NT/NE		It prefers a mixed habitat of Mediterranean oak savanna or scrub-forest, or areas with around 40% cover for shelter from predators and open areas that support their diet of grasses and cereals. Builds warrens in soft soil, but find shelter in scrub in rocky areas, though predation risk is higher in above ground dwellings. It can breed throughout the year (uncommon in lagomorphs), though this is limited by climate and resource availability. They raise altricial young between three and six at a time, which leave the warren in under a month. Females reach sexual maturity on average in 3.5 months, males 4 months, and can live up to 9 years, though many succumb to predation and other perils much earlier.	It is possible to be present in the investigated area.	
		Lepus europaeus	Κουνέλι					LC/NE		Lepus europaeus is a highly adaptable species that can persist in any number of habitat types. When available, weeds and wild grasses are preferred. Gestation is 41-42 days and reproduction occurs year round. . Females reach maturity around seven to eight months and male at six months.	It is possible to be present in the investigated area.	
	Insectivora	Talpa europaea	Ασπάλακας					LC/DD		It is present in most habitats where there is sufficiently deep soil to permit the construction of its extensive burrows. It prefers meadows, pastures, arable land, gardens and parks, and is rarely found in coniferous forests, or habitats with sandy, stony or permanently waterlogged soils. It feeds mainly on earthworms, as well as other soil invertebrates.	It is possible to be present in the investigated area.	
		Crocidura leucodon	Χωραφομυγαλίδα					LC/NE		Habitat preferences for this species vary in different parts of its geographic range. In France, it is found in damp areas with dense vegetation, whereas in central Europe and Italy it prefers open agricultural landscapes. At the northern edge of its range it is associated with gardens and houses in suburban and urban areas, and in the Balkans and Asia Minor it can be found in moist habitats in the mountains including screes, stony areas, riverbanks and stone walls. In Russia the species occurs in moist habitats within steppe and semi-desert areas. It feeds on invertebrates, including insects, insect larvae and worms.	It is possible to be present in the investigated area.	
		Crocidura suaveolens	Κηπομυγαλίδα	II				LC/NE		In western and southern Europe and it inhabits a wide range of habitats including vineyards, olive groves, terraced farmland on hillsides, dry Mediterranean shrubland, sand dunes, rocky areas in the mountains, and damp densely-vegetated patches near to water. It tends to avoid dense forests. Small, soft-bodied insects form a major part of its diet. Its main requirement is enough vegetation and moisture to support its insect prey, and in arid areas it tends to be more common near springs and oases; however, it is more tolerant of dry conditions than many of its congeners. The gestation period is 28 days and life expectancy one year; a female usually has four young.	Common everywhere in Greece	
		Sorex minutus	Νανομυγαλή					LC/NE		It tends to be found in relatively damp areas with dense vegetation at ground level, and it occurs in a wide variety of habitats including swamps, grasslands, heaths, sand dunes, woodland edge, rocky areas, shrubland, and mountainous forests. It feeds on invertebrates.	It is possible to be present in the investigated area.	

Class	Order	Species	Τοπική Ονομασία	Bern	Bonn	92/43/EU	79/409/EU	IUCN/Greek Red Book	CITES	Ecology	Remarks	Time Constraints
	Carnivora	Lutra lutra	Βίδρα	II		II,IV		NT/EN	I	Otters live in wetland areas. It is found mainly in rivers, streams, lakes, deltaic systems, estuaries and lagoons, as well as in irrigated areas (irrigation canals, rice fields) and in drainage channels and ditches. It has semi-aquatic habits. Swims with great comfort and ability, but spends much of its time on land. It feeds mainly on fish and other aquatic animals (crabs, crayfish, frogs, snakes, small mammals, birds, etc). The area of nesting is always on land, but usually near water. Indicatively, in riparian habitats, where their habitat is linear, the territory of an animal can extend up to 40 km long river bed, always depending on the availability of existing food. In Greece, in the lowlands and during summer, since many rivers and most small wetlands are drying up, otters move to less suitable habitats such as coastal regions, channels, etc. The presence of fresh water is always necessary for the presence of the species in an area.	No proper habitats were observed in the investigated area.	
		Canis aureus	Τσακάλι			V		LC/EN		The preferred habitat is a mosaic of small crops and Mediterranean scrub and wetlands with dense stands of vegetation. Its spread in Greece coincides with areas of low altitude (usually less than 300 meters, in marginal cases in the Peloponnese up to 600 m or 1,000 m, occasionally). It occurs in areas significantly modified by man and appears to prefer foods related to human activities (residues of livestock farming, fruits of fruit trees, etc.). Generally it can be characterized as opportunist - gatherer and not active hunter. The reproductive activity of the jackal in Greece has not been studied but seems to have a breeding period from late winter to early spring.	According to the Greek Red Book it is not present in the area	
		Vulpes vulpes	Αλεπού					LC/NE		Red Foxes have been recorded in habitats as diverse as tundra, desert and forest, as well as in city centres. Natural habitat is dry, mixed landscape, with abundant "edge" of scrub and woodland. They are also abundant on moorlands, mountains (even above the treeline, known to cross alpine passes), deserts, sand dunes and farmland from sea level to 4,500 m. They generally prefer mosaic patchworks of scrub, woodland and farmland. Red foxes flourish particularly well in urban areas. They are most common in residential suburbs consisting of privately owned, low-density housing and are less common where industry, commerce or council rented housing predominates. In many habitats, foxes appear to be closely associated with man, even thriving in intensive agricultural areas.	Relatively abundant in Greece.	
		Canis lupus	Λύκος	II		II,IV,V		LC/VU	II	They feed mainly with free grazing livestock, animal corpses from livestock facilities and other smaller mammals. In a few areas with sufficient density of wild ungulates (wild boar, deer) it has been observed to be fed occasionally in these species. The habitat of the wolf is, essentially, the area where food is available. It is found in lowland, upland and mountainous areas, and wherever food availability is high and continuous through the year.	No references of wolves presence in the area exist.	
	Artiodactyla	Sus scrofa	Αγριόχοιρος					LC/NE		It occupies a wide variety of temperate and tropical habitats, from semi-desert to tropical rain forests, temperate woodlands, grasslands and reed jungles; often venturing onto agricultural land to forage. It is found in a variety of habitats. In Europe, it prefers broadleaved forests and especially evergreen oak forests, but may also be found in more open habitats such as steppe, Mediterranean shrubland, and farmland, so long as there is water and tree cover nearby. In Europe it is found from sea level to 2,400 in the Pyrenees, but it can be found at higher elevations in Asia.	Relatively abundant in Greece.	
Amphibians		Rana epeirotica	Λιμνοβάτραχος Δ. Ελλάδας					VU		This species is mostly aquatic and is commonly associated with still waters, slow-moving rivers, canals, and marshes, often with rich vegetation at their edges. Breeding and larval development takes place in these waterbodies. It is not known if the species can adapt to changes in habitat.	No proper habitats were observed in the investigated area.	

Class	Order	Species	Τοπική Ονομασία	Bern	Bonn	92/43/EU	79/409/EU	IUCN/Greek Red Book	CITES	Ecology	Remarks	Time Constraints
Freshwater Fish Fauna		Barbus sperchiensis	Μπριάννα Σπερχειού					NT/NT		Streams and rivers; prefers stretches with clear water and riffles.	No proper habitats were observed in the investigated area.	
Avifauna		Accipiter nisus	Ξεφτέρι					LC/NE		The Eurasian sparrowhawk breeds in forests and wooded areas, particularly favouring areas consisting of a mixture of woodland and open patches in which to hunt. During winter, this species occupies a greater variety of habitats, and may be found in areas with very few trees. It occupies a range of altitudes, from sea-level to mountainous regions. Eurasian Sparrowhawks breed in suitable woodland of any type, with the nest, measuring up to 60cm across, built using twigs in a tree. Four or five pale blue, brown-spotted eggs are laid; the success of the breeding attempt is dependent on the female maintaining a high weight while the male brings her food. The chicks hatch after 33 days and fledge after 24 to 28 days.	It is possible to be present in the investigated area.	
		Acrocephalus arundinaceus	Τσιχλοποταμίδα					LC/NE		It breeds in Europe and westernmost temperate Asia. It is migratory, wintering in tropical Africa. This bird migrates north at a rather late date, with some birds still in winter quarters at the end of April. This passerine bird is a species found in large reed beds, often with some bushes. On their breeding grounds, they are territorial. In their winter quarters, they are frequently found in large groups, and may occupy a reed bed to the exclusion of almost all other birds. Like most warblers, it is insectivorous, but it will take other prey items of sufficiently small size, even including vertebrates such as tadpoles. 3-6 eggs are laid in a basket nest in reeds.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		Alcedo atthis	Αλκυόνα				I	LC/DD		The Common Kingfisher is widely distributed over Europe, Asia, and North Africa, mainly south of 60°N. It is a common breeding species over much of its vast Eurasian range. In temperate regions, it inhabits clear, slow-flowing streams and rivers, and lakes with well-vegetated banks. It frequents scrubs and bushes with overhanging branches close to shallow open water in which it hunts. In winter it is more coastal, often feeding in estuaries or harbours and along rocky seashores. The highest densities of breeding birds are found in habitats with clear water, which permits optimal prey visibility, and trees or shrubs on the banks. These habitats have also the highest quality of water, so the presence of this bird confirms the standard of the water. It can tolerate a certain degree of urbanisation, provided the water remains clean.	It is possible to be present in the investigated area and especially in the landfill sites, during winter..	
		Anas acuta	Ψαλίδα				II,III	LC/NE		The Northern Pintail has been called the "nomads of the skies." due to their wide-ranging migrations. This dabbling duck breeds across northern areas of Eurasia south to about Poland and Mongolia. It winters mainly south of its breeding range, reaching almost to the equator in Panama, northern sub-Saharan Africa and tropical South Asia. The Northern Pintail's breeding habitat is open unwooded wetlands, such as wet grassland, lakesides or tundra. In winter, it will utilise a wider range of open habitats, such as sheltered estuaries, brackish marshes and coastal lagoons. It is highly gregarious outside the breeding season and forms very large mixed flocks with other ducks.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		Anas platyrhynchos	Πρασινοκέφαλη				II,III	LC/NE		The Mallard is widely distributed across the Northern Hemisphere. Specifically for Eurasia, it ranges from Iceland and southern Greenland and parts of Morocco (North Africa) in the west, Scandinavia to the north, and to Siberia, Japan, and China in the east. It is strongly migratory in the northern parts of its breeding range, and winters farther south. The Mallard inhabits a wide range of habitat and climates, from Arctic Tundra to subtropical regions. It is found in both fresh- and salt water wetlands, including parks, small ponds, rivers, lakes and estuaries, as well as shallow inlets and open sea within sight of the coastline. Water depths of less than 1 metre are preferred, birds avoiding areas more than a few metres deep. They are attracted to bodies of water with aquatic vegetation.	It is possible to be present in the investigated area and especially in the landfill sites	
		Anas querquedula	Σαρσέλα				II	LC/VU		It nests in eutrophic-mesotrophic wetlands, usually with shallow fresh waters and dense vegetation, and more rarely in lagoons. During migration, it occurs in almost all types of wetlands, but mainly in coastal. Large herds also migrate along the sea coast (in enclosed, shallow bays, etc.); often, they pass unnoticed.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	Breeding period (April - June)

Class	Order	Species	Τοπική Ονομασία	Bern	Bonn	92/43/EU	79/409/EU	IUCN/Greek Red Book	CITES	Ecology	Remarks	Time Constraints
		Aquila pomarina	Κραυγαητός				I	LC/EN		An eagle with quite a specific habitat, lives in low and semi-low land forests (nests in trees), always in vicinity to freshwater wetlands (rivers, streams, marshes, meadows, etc), where it hunts. It feeds on a wide variety of serpents, amphibians, small mammals, birds and big insects, rarely on dead animals.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		Ardea cinerea	Σταχτοσικινιάς					LC/NE		It feeds in shallow water, catching fish, frogs, and insects with its long bill. Herons will also take small mammals, reptiles and occasionally warbler nestlings, plovers, young and adult snipes, takes ducklings and tern chicks and other small birds. It will often wait motionless for prey, or slowly stalk its victim. This species breeds in colonies in trees close to lakes, the seashore or other wetlands, although it will also nest in reedbeds. It builds a bulky stick nest.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		Ardeola ralloides	Κρυπτοσικινιάς				I	LC/VU		The Squacco lives in freshwater wetlands and river deltas and rarely in coastal wetlands. It nests in lakeside or riverside forests with trees, willows, alder or poplar (rarer reeds) to form mixed colonies with other heron species. It feeds on amphibians, insects and fish in rice fields, when they are available and shallow swamps and freshwater drainage ditches and canals. It spawns during May 2 to 7 eggs (average eggs / nest: 4.7), which incubates for 22-25 days.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	Breeding period (April - July)
		Aythya nyroca	Βαλτόπαπια	I,II	I,II		I	NT/VU		It prefers mainly inland wetlands (lakes, freshwater marshes) or coastal wetlands with a mosaic of reed or other emergent vegetation. During breeding, it frequents in shallow water with floating vegetation such as water lilies (Nymphaea alba) in Ambrakiko bay. It nests in dense reeds or other aquatic vegetation, on the outskirts of the free water surface or in dense emergent vegetation over water. It is an omnivorous species but it is referenced that it prefers foods of plant origin, such as leaves and roots of aquatic plants (emerging and floating); it also feeds on animal species (mollusks and other invertebrates), especially during the breeding season. Looks for food searching the surface or diving in shallow waters (30-100 m), near dense vegetation.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	Breeding period (March - July)
		Buteo buteo	Γερακίνα					LC/VU		The main environment for this species includes woodlands, heathlands, highlands, hills and farmland. Recently, the species has entered urban areas. The Common Buzzard spawns only once a year three or four eggs (usually between March and June). It builds its nest of twigs and leaves on trees or rock ledges. The species presents a large global reach and IUCN emphasizes that there may be some four million individuals worldwide. In Greece, Common Buzzard is a common bird and present even during the winter months. It is distributed along the mainland and on most islands. This species feeds on a variety of animals including: rodents, small birds, reptiles, amphibians and sometimes with corpses.	It is possible to be present in the investigated area	Breeding period (April - June)
		Buteo rufinus	Αητογερακίνα					LC/VU		Lives in open areas with hills, scattered rocks, brushwood, scarce maquis vegetation, meadows, extensive cultivations, etc; locally it can be seen in scarce pinewoods. It nests mainly on rocks, and rarely on trees. The species feeds on small or medium mammals, serpents, birds and also large arthropods.	It is possible to be present in the investigated area. Prior to the construction works, the landfall sites should be investigated	Breeding period (April - July)

Class	Order	Species	Τοπική Ονομασία	Bern	Bonn	92/43/EU	79/409/EU	IUCN/Greek Red Book	CITES	Ecology	Remarks	Time Constraints
		Ciconia ciconia	Λευκοπελαργός	I,II	I,II		I	LC/VU		Relatively common species, mainly in the lowlands, and hilly areas. Anthropophilous species nests near human settlements in areas with wetlands, flooded rice fields, meadows and extensive crops, with an average density of 9.61 pairs per 100 km <sup>2</sup> . It avoids cold and wet areas with low temperature and areas with dense vegetation. It prefers to feed on shallow and stagnant water in water-saturated soils, often in dry meadows and pastures. The diet consists of any kind of small animals such as insects, reptiles, amphibians and small mammals. It also feeds on bird eggs and nestlings. In the past, the species was making its nest on large trees, while today 81% of the population nests on power poles and 14 % roofs of churches and houses.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	Breeding period (April - June)
		Ciconia nigra	Μαυροπελαργός	I,II	I,II		I	LC/EN	II	Shy species and less anthropophilous to the white stork (Ciconia ciconia). It nests in solitude, away from settlements, usually in trees and rarely on rocks, hilly, semi-mountainous areas, with coniferous, deciduous or mixed forests, valleys, clearings, etc. small cultivations, but always in proximity to freshwater wetlands (streams, marshes, wet meadows, etc.), where it finds its prey. Outside breeding season it frequents in wetlands, coastal or inland, often with white storks, herons, etc. It feeds mainly on reptiles and amphibians (especially frogs), small mammals and occasionally small birds.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	Breeding period (April - June)
		Circaetus gallicus	Φιδαητός				I	LC/NT		This species spreads throughout the Mediterranean basin and into Russia and the Middle East, and into parts of Asia. Those present on the northern edge of the Mediterranean and other parts of Europe migrate mainly to sub-Saharan Africa north of the equator, leaving in September/October and returning in April/May. In the Middle and Far East the populations are resident. In Europe it is most numerous in Spain where it is fairly common but elsewhere it is rare in many parts of its range. The Short-toed Snake Eagle is found in open cultivated plains, arid stony deciduous scrub areas and foothills and semi-desert areas. It requires trees for nesting.	It is possible to be present in the investigated area	
		Circus aeruginosus	Καλαμάκιρκος				I	LC/VU		It lives in wetlands with extensive reedbeds or other similar riparian vegetation, where it nests and mainly searches for food. It feeds mainly on small mammals and birds (riparian and passerine). Outside the breeding period, it roosts in groups in reedbeds, often with other species of circus sp.	No such habitats were observed in the investigated area consequently, no engagement with the species is to be expected.	Breeding period (March - July)
		Circus cyaneus	Βαλτόκιρκος				I	LC/NE		The Hen Harrier is a bird of open habitats such as heather moorland and extensive agriculture. However, much of its range has been (and continues to be) afforested, predominantly with conifers. Hen Harriers nest and forage in commercial forestry when it is young, before the canopy closes (typically at between 9-12 and years old), but do not make much use of thicket and subsequent growth stages. Areas dominated by forestry may remain suitable to Hen Harriers provided that a mosaic of age classes is maintained within the forest, such that areas of young, pre-thicket forest are always available.	It is possible to be present in the investigated area	
		Columba palumbus	Φάσσα	III			II,III	LC/NE		In the colder northern and eastern parts of its Europe and western Asia range the Common Wood Pigeon is a migrant, but in southern and western Europe it is a well distributed and often abundant resident. It breeds in trees in woods, parks and gardens, laying two white eggs in a simple stick nest which hatch after 17 to 19 days. Wood Pigeons seem to have a preference for trees near roadways and rivers. The nests are vulnerable to attack, particularly by crows, the more so early in the year when the leaf cover is not fully formed. The young usually fly at 33 to 34 days; however if the nest is disturbed some young may be able to survive having left the nest as early as 20 days from hatching.	It is possible to be present in the investigated area	
		Cygnus olor	Κύκνος				II	LC/LC		The Mute Swan is found naturally mainly in temperate areas of Europe across western Asia, as far east as the Russian Maritimes, near Sidemi. It is partially migratory throughout northern latitudes in Europe and Asia, as far south as north Africa and the Mediterranean. The mute swan is found in a wide range of water bodies, including rivers, lakes, ponds, reservoirs, flood waters, tidal estuaries, and sheltered coasts.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	

Class	Order	Species	Τοπική Ονομασία	Bern	Bonn	92/43/EU	79/409/EU	IUCN/Greek Red Book	CITES	Ecology	Remarks	Time Constraints
		Falco naumanni	Κίρκινέζι	I,II	I,II		I	VU/VU		It lives in warm, open areas, eg in Steppic and pseudostepik areas, dry meadows, non-irrigated crops and occasionally in brushwood and open grasslands. It feeds mainly on insects (mainly Orthoptera) and less on small mammals and other small vertebrates. It nests usually in colonies numbering from 5 to 250 pairs or alone. It builds its nest on holes in old houses and warehouses, under roofs, holes in trees and on rocky slopes. The foraging areas lay within a radius of 10.5 km, and more rarely up to 15 km from the nest.	According to the mapping of the Greek Red Book it is possible that there is an engagement in the north-east boundaries of the investigated area.	Breeding period (April - June)
		Falco vespertinus	Μαυροκίρκινέζο				I	NT/DD		It is found in eastern Europe and Asia although its numbers are dwindling rapidly due to habitat loss and hunting. It is migratory, wintering in Africa. It is a regular wanderer to western Europe. In their Eurasian breeding range, red-footed falcons inhabit open habitats with some tree cover.	It is possible to be present in the investigated area	
		Ficedula albicollis	Κρικομυγοχάφτης				I	LC/NE		They are birds of deciduous woodlands, parks and gardens, with a preference for old trees with cavities in which it nests. They build an open nest in a tree hole, or man-made nest-boxes. Normally 5-7 eggs are laid. The song is slow strained whistles, quite unlike the Pied Flycatcher. Pied flycatchers can mimic the song of the Collared Flycatcher in sympatric populations.	It is possible to be present in the investigated area	
		Fulica atra	Φαλαριδα	I,II	I,II		II,III	LC/NE		It occurs and breeds in Europe, Asia, Australia, and Africa. It is resident in the milder parts of its range, but migrates further south and west from much of Asia in winter as the waters freeze. This species builds a nest of dead reeds or grasses, but also pieces of paper or plastic near the water's edge or on underwater obstacles protruding from the water, laying up to 10 eggs, sometimes 2 or 3 times per season. The Coot is an omnivore, and will take a variety of small live prey including the eggs of other water birds, as well as algae, vegetation, seeds and fruit. It shows considerable variation in its feeding techniques, grazing on land or in the water. In the water it may upend in the fashion of a Mallard or dive in search of food.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		Gyps fulvus	Όρνιο				I	LC/CR		Gregarious vulture species characteristic of open areas that are found in hilly and mountainous areas, exploiting livestock activities. It feeds exclusively on carrion ungulates large or medium size which selects the soft parts of the body, preferably in the bowels. The spread of its colonies always coincide with the existence of a limestone substrate, where many pairs nest along steep slopes, canyons and cliffs almost over the sea. The breeding season lasts from mid- January to mid-March, with the majority of nesting events take place in late February. It lays an egg, which is incubated for 57 days, while the chick feathers in 120-140 days .	It is possible to be present in the investigated area. Prior construction works special care should be given in the landfall sites.	Breeding period (January - August)
		Himantopus himantopus	Καλαμοκανάς				I	LC/LC		The breeding habitat is marshes, shallow lakes and ponds. Some populations are migratory and move to the ocean coasts in winter; those in warmer regions are generally resident or short-range vagrants. In Europe, the Black-winged Stilt is a regular spring overshoot vagrants north of its normal range, occasionally remaining to breed in northern European countries, for example in Britain in 1987. These birds pick up their food from sand or water. They mainly eat insects and crustaceans. The nest site is a bare spot on the ground near water. These birds often nest in small groups, sometimes with Avocets.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		Hirundo rustica	Χελιδόνι					LC/NE		The Barn Swallow is the most widespread species of swallow in the world. It is a distinctive passerine bird with blue upperparts, a long, deeply forked tail and curved, pointed wings. It is found in Europe, Asia, Africa and the Americas.	It is possible to be present in the investigated area	
		Lanius senator	Κοκκινοκέφαλος					LC/NE		The Woodchat breeds in southern Europe, the Middle East and northwest Africa, and winters in tropical Africa. It breeds in open cultivated country, preferably with orchard trees and some bare or sandy ground. This migratory medium-sized passerine eats large insects, small birds and small amphibians. Like other shrikes it hunts from prominent perches, and impales corpses on thorns or barbed wire as a "larder".	It is possible to be present in the investigated area	

Class	Order	Species	Τοπική Ονομασία	Bern	Bonn	92/43/EU	79/409/EU	IUCN/Greek Red Book	CITES	Ecology	Remarks	Time Constraints
		Milvus migrans	Τσίφτης				I	VU/CR		It occurs mainly in lowlands and semi lowlands with sparse forests, hedges, etc, especially in river valleys with riparian vegetation. It nests in trees. Often it forages in cultivations and landfills. It feeds on a big variety of vertebrates, big insects and, in significant extent, carcasses and garbage	According to the mapping of the Greek Red Book there is no engagement in the investigated area.	
		Neophron percnopterus	Ασπροπάρης	I,II	I,II		I	EN/CR		It nests in solitude, in densities defined by local conditions of food availability and of suitable nesting sites (rocks). It is a social vulture whilst on feeding ground; it feeds largely on carrion and any other residue of organic origin, even feces of mammals, while its diet is supplemented with small vertebrates (especially turtles). It reaches the breeding grounds in late March and begins incubating the eggs (1-2, very rarely 3) in late April. The chicks hatch in June but remain in the nest until early September. In mid-September the bulk of the population departs for Central Africa, through the Bosphorus.	According to the mapping of the Greek Red Book there is no engagement in the investigated area.	
		Nycticorax nycticorax	Νυχτοκόρακας				I	LC/NT		The breeding habitat is fresh and salt-water wetlands throughout much of the world. It breeds in Europe, Asia and Africa. Black-crowned Night Herons nest in colonies on platforms of sticks in a group of trees, or on the ground in protected locations such as islands or reedbeds. Three to eight eggs are laid. This heron is migratory in the northernmost part of its range, but otherwise resident.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		Philomachus pugnax	Μαχητής				I,II	LC/NE		It is a medium-sized wading bird that breeds in marshes and wet meadows across northern Eurasia. This highly gregarious sandpiper is migratory and sometimes forms huge flocks in its winter grounds, which include southern and western Europe, Africa, southern Asia and Australia. The Ruff forages in wet grassland and soft mud, probing or searching by sight for edible items. It primarily feeds on insects, especially in the breeding season, but it will consume plant material, including rice and maize, on migration and in winter.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		Plegadis falcinellus	Χαλκόκοτα		II		I	LC/CR		The glossy ibis live mainly in freshwater wetlands and rivers delta (rarely in coastal areas). It nests in lakeside or riparian forests with willows and alders, and shrubs, and more rarely in extensive reedbeds. It feeds mainly on invertebrates, looking at shallow freshwater marshes and wet meadows, and in rice fields if available.	No such habitats were observed in the investigated area consequently no engagement should be expected. It is possible that the species is passing through the project's area.	Breeding period (March – June)
		Streptopelia turtur	Τριγώνι							It is a migratory species with a southern Palearctic range, including Turkey and north Africa, although it is rare in northern Scandinavia and Russia. It winters in southern Africa. Mainly found in lowland agricultural land with copses, large hedgerows, and orchards near to cereal or weedy fields. Dry sunny habitats are preferred by the turtle dove but it can also be found on heathland, and in gardens and parks.	It is possible to be present in the investigated area	
		Scolopax rusticola	Μπεκάτσα				II,III	LC/NE		It is a medium-small wading bird found in temperate and subarctic Eurasia. It has cryptic camouflage to suit its woodland habitat, with reddish-brown upperparts and buff-coloured underparts. Its eyes are set far back on its head to give it 360-degree vision and it probes in the ground for food with its long, sensitive bill, making it vulnerable to cold weather when the ground remains frozen.	It is possible to be present in the investigated area	

Class	Order	Species	Τοπική Ονομασία	Bern	Bonn	92/43/EU	79/409/EU	IUCN/Greek Red Book	CITES	Ecology	Remarks	Time Constraints
		<i>Sylvia cantillans albistriata</i>	Κοκκινοτσιροβάκος							It is a small typical warbler which breeds in the southernmost areas of Europe and northwest Africa. This small passerine bird is migratory, and winters along the southern edge of the Sahara. It occurs as a vagrant well away from the breeding range, in both spring and autumn as far north as Great Britain. This is a bird of dry open country, often on hill slopes, with bushes for nesting. The nest is built in low shrub or gorse, and 3-5 eggs are laid. Like most "warblers", it is insectivorous, but will also take berries.	It is possible to be present in the investigated area	
		<i>Tachybaptus ruficollis</i>	Νανοβουτηχτάρι							This bird breeds in small colonies in heavily vegetated areas of freshwater lakes across Europe, much of Asia down to New Guinea, and most of Africa. Most birds move to more open or coastal waters in winter, but it is only migratory in those parts of its range where the waters freeze. Outside of breeding season, it moves into more open water, occasionally even appearing on the coast in small bays.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	
		<i>Turdus merula</i>	Κότσυφας							The Common Blackbird breeds in temperate Eurasia, North Africa, the Canary Islands, and South Asia. Populations are sedentary in the south and west of the range, although northern birds migrate south as far as northern Africa and tropical Asia in winter. Urban males are more likely to overwinter in cooler climates than rural males, an adaptation made feasible by the warmer microclimate and relatively abundant food that allow the birds to establish territories and start reproducing earlier in the year. Common over most of its range in woodland, the Common Blackbird has a preference for deciduous trees with dense undergrowth. However, gardens provide the best breeding habitat with up to 7.3 pairs per hectare, with woodland typically holding about a tenth of that density, and open and very built-up habitats even less. The Common Blackbird occurs up to 1000m in Europe.	It is possible to be present in the investigated area	
		<i>Turdus philomelos</i>	Τσίχλα				II	LC/NE		It breeds in most of Europe. The Song Thrush typically nests in forest with good undergrowth and nearby more open areas, and in western Europe also uses gardens and parks. It breeds up to the tree-line, reaching 2,200metres. In intensively farmed areas where agricultural practices appear to have made cropped land unsuitable, gardens are an important breeding habitat. The winter habitat is similar to that used for breeding, except that high ground and other exposed localities are avoided.	It is possible to be present in the investigated area	
		<i>Vanellus vanellus</i>	Καλημάνια				II	LC/VU		Nest both inland and in coastal wetlands. They prefer freshwater wet meadows, wet farmland, shallow mud flats on the edge of the lagoons, etc., but avoid halophytic formations or saline soils. During winter, the species frequents at the edges of wetlands and in lowland, semi-lowlands with crops, pastures, extensive meadows, etc. They feed on insects, worms and other invertebrates.	No proper habitats were observed in the investigated area. It is possible that the species is passing through the project's area.	Breeding period (March – July)

**Abbreviations of IUCN/GRB**

CR: Critically Endangered / EN: Endangered / VU: Vulnerable / NT: Near Threatened / LC: Least Concern / DD: Data Deficient / NE: Not Evaluated

## 4.9.2 Description of Marine Fauna

### 4.9.2.1.1 Fish fauna

Table 4.69 Fish Fauna Data.

Species	Geographical Distribution	Ecology	Protection Status	Presence in Investigated Area
<b><i>Acipenser naccari</i></b>	The species is sited in Ionio by Papaconstantinou (1988). In database FISHBASE 2000 its presence is reported as uncertain in the NW coasts of Greece. In the database's map distribution areas include sides to the north of the investigated area, in Dalmatian shores and Adriatic Sea.	It is an anadromous benthic organism, living in depths 10-40m, often sited in sandy muddy bottoms, feeding on benthic invertebrates and smaller fishes.	It is threatened by habitat loss, pollution and overfishing. It is included in Annexes II and V of 92/43/E.U. Directive, protected by P.D.67/1981, Barcelona Convention and Bern Convention (Annex II) and has been categorized as Vulnerable by IUCN (2003).	Possible presence of <i>Acipenser naccari</i> in "Perdika" and "Stavrolimena" bays is deemed significant, according to the habitats characteristics, although the area lays at its distribution limits.
<b><i>Alosa fallax</i></b>	The species is sited in Ionio by Papaconstantinou (1988). In database FISHBASE 2000 its presence is not reported in Ionio.	Pelagic, strongly migratory, anadromous organism, entering lower part of rivers during spawning. Feeds on small fishes and crustaceans.	It is included in Annexes II and V of 92/43/E.U. Directive, in Barcelona Convention and Bern Convention (Annex III) and has been categorized as Data Deficient by IUCN (2003).	Although its habitats' characteristics do not support its presence in the investigated area, due to the species migration, is deemed possible in "Peridka" and "Stavrolimenas" bays.
<b><i>Cetorhinus maximus</i></b>	The species is sited in Ionio by Papaconstantinou (1988). In database FISHBASE 2000 its presence is supported, since it is considered as cosmopolitan species.	Second largest shark, pelagic-oceanic, oceanodromous species, found in continental and insular shelves, offshore and often close to land, enters enclosed bays; during winter is found on deeper waters. Depth range 0-2000m. Feeds by filtering copepods, barnacles, decapod larvae and fish eggs from the water column.	International trade restricted (CITES Appendix II); it is included in Annex I of the Convention on the Law of the Sea (1982). Protected by Barcelona Convention and Bern Convention (Annex II) and has been categorized as Vulnerable by IUCN (2003).	Possible to visit the bays, transitory.

Species	Geographical Distribution	Ecology	Protection Status	Presence in Investigated Area
<b><i>Epinephelus marginatus</i></b>	The species is not sited in Ionio, according to Papaconstantinou (1988), but its presence in Ionio is deemed possible, since FISHBASE 2000 place it all over Mediterranean basin.	Reed-associated, marine species, depth range 8-300m. Prefers rocky bottoms and is territorial. Juveniles are found closer to shore in rocky tidal pools. Feeds on reef fishes, crabs and octopi.	Barcelona Convention and Bern Convention (Annex III)	Possible presence in rocky parts of the shores, reefs and insulars, located in the area.
<b><i>Mycteroperca rubra</i></b>	The species is sited in Ionio by Papaconstantinou (1988).	Benthic organism sited in rocky and sandy beds; depth range 15-200m. Feeds on mollusks and small fishes.	Categorized as Data Deficient by IUCN (2003).	Possible
<b><i>Petromyzon marinus</i></b>	The species is sited in Ionio by Papaconstantinou (1988), but according to FISHBASE 2000 it is absent from Mediterranean.	Benthic, anadromous, amphihaline making important migrations, spending his adult life in sea (depth range 1-650m) and enter freshwater estuaries for spawning during spring, where it dies after spawning. Feeds on dead fishes and netted ones. Also during juvenile they attach themselves to health fish and leech on them.	Barcelona Convention and Bern Convention (Annex III)	Possible
<b><i>Salaria fluviatilis</i></b>	It is not included in the list of Papaconstantinou (1988), but its presence in Ionio is verified by FISHBASE 2000 and more specific in N. Ionio, near the investigated area.	Benthic freshwater fish, sited in small rivers and shallow waters.	Bern Convention (Annex III)	Possible to occur in the broader area of the "Kalama" estuary and the "Perdika" delta.
<b><i>Sciaena umbra</i></b>	The species is sited in Ionio by Papaconstantinou (1988), and according to FISHBASE 2000 it occurs all over Mediterranean.	Benthic organisms living in rocky and sandy bottoms, often in reefs and caves. Depth 0-200m. Feeds on fishes and crustaceans.	Barcelona Convention and Bern Convention (Annex III)	Possibly visiting

Species	Geographical Distribution	Ecology	Protection Status	Presence in Investigated Area
<b><i>Squatina squatina</i></b>	The species is sited in Ionio by Papaconstantinou (1988), and according to FISHBASE 2000 it occurs all over Mediterranean.	Benthic, oceanodromous, found in continental shelves, from close inshore to at least 150m depth. Feeds mainly on bony fishes, but also skates, crustaceans and mollusks. It lies, usually, buried in sand or mud, with only its eyes protruding.	Barcelona Convention and Bern Convention (Annex III)	Possibly visiting and/or occurring in "Perdika" and "Stavrolimenas" bays.
<b><i>Thunnus thynnus</i></b>	It is not included in the list by Papaconstantinou (1988), but its presence, in Ionio, is verified by FISHBASE 2000, specifically in the open sea near Peloponnesus.	Pelagic-oceanic species, depth range 0-985m; seasonally coming close to shore, tolerating a wide range of temperatures. Feeds on small schooling fishes, such as anchovies, sauries and hakes, or on squids and red crabs.	Bern Convention (Annex III). Categorized as Data Deficient by IUCN (2003).	Possibly visiting "Perdika" and "Stavrolimenas" bay.
<b><i>Xiphias gladius</i></b>	The species is sited in Ionio by Papaconstantinou (1988), and according to FISHBASE 2000 it occurs all over Mediterranean..	Pelagic-oceanic species, depths 0-800m. Sometimes found in coastal waters, but generally above thermocline, preferring temperatures of 18°C to 22°C. Migrate towards temperate or cold waters in summer and back to warm waters in the fall. Adults are opportunistic feeders, moving from surface to the bottom. Feeds mainly on fishes but also on crustaceans and squids.	Barcelona Convention (Annex III). Categorized as Data Deficient by IUCN (2003).	Possibly sporadically.

#### 4.9.2.1.2 Marine Benthic Macrofauna a) Molluscs

##### Bivalve

The following Bivalves (Table 4.70) occur in the broader area, in various depths, in mid and deep coastal waters. They occur, mainly, on sandy and silty bottoms, rarely on rocky ones.

**Table 4.70 Benthic Macrofauna (Bivalves).**

s/n	Bivalves
1	<i>Acanthocardia aculeata</i>
2	<i>Acanthocardia echinata</i>
3	<i>Acanthocardia tuberculata</i>
4	<i>Aequipecten opercularis</i> (Syn <i>Chlamys opercularis</i> )
5	<i>Anomia ephippium</i>
6	<i>Arca noae</i>
7	<i>Barbatia barbata</i> (Syn <i>Arca barbata</i> )
8	<i>Barnea candida</i>
9	<i>Callista chione</i>
10	<i>Chamelea gallina</i> (Syn <i>Venus gallina</i> )
11	<i>Chlamys glabra</i>
12	<i>Donax semistriatus</i>
13	<i>Donax trunculus</i>
14	<i>Donax venustus</i>
15	<i>Ensis ensis</i>
16	<i>Ensis arquatus</i> (Syn <i>E. Siliqua</i> )
17	<i>Glossus humanus</i>
18	<i>Laevicardium oblongum</i>
19	<i>Lithophaga lithophaga</i>
20	<i>Mactra glauca</i>
21	<i>Mytilus galloprovincialis</i>
22	<i>Ostrea edulis</i>
23	<i>Paphia aurea</i> (Syn <i>Venerupis aurea</i> )
24	<i>Pecten jacobaeus</i>
25	<i>Pholas dactylus</i>
26	<i>Pinna nobilis</i>
27	<i>Pteria hirundo</i>
28	<i>Solemya togata</i> +
29	<i>Solen marginatus</i>
30	<i>Spisula subtruncata</i>
31	<i>Spondylus gaederopus</i>
32	<i>Tapes decussatus</i>
33	<i>Venerupis pullastra</i>
34	<i>Venus verrucosa</i> (Syn <i>Chamelea verrucosa</i> )

### Gastropods

The following Gastropods occur, mainly, in the sub coastal zone, in rocky and sandy bottoms.

- *Cerithium vulgatum*
- *Haliotis tuberculata*
- *Tonna galea*

### **b) Echinoderms**

The following echinoderms are sited, mainly, in the sub coastal zone. They occur mainly in rock bottoms and meadows of *Posidonia oceanica*

- *Arbacia lixula* (Echinoidea)
- *Asterina pancerii* (Asteroidea)
- *Ophidiaster ophidianus* (Asteroidea) H
- *Paracentrotus lividus* (Echinoidea) H
- *Sphaerechinus granularis* (Echinoidea) P

#### **4.9.2.1.3 Marine Mammals**

Mediterranean monk seal (*Monachus monachus*) is reported in the central Ionian sea, where at least 17-20 individuals is estimated to live in the coasts of Zakynthos. In coastal waters of the broader eastern Ionian, there have been reported the following: striped dolphin (*Strenella coeruleoalba*), Bottlenose dolphin (*Tursiops truncatus*), and common dolphin (*Delphinus delphis*), with estimated population of 100-150 individuals at “Kalamos” island, north of Zakynthos. At NW coasts of Corfu, washed up individuals of Cuvier’s Beaked Whale (*Ziphius cavirostris*) have been reported.

#### **4.10 Areas under Special Environmental Protection Legislation**

According to the General Regional Plan of Epirus (HGG 1451/06.10.2003) 28% of Epirus area is covered by protected areas. Nevertheless, within the onshore investigated area, no protected areas are present under the Greek Law 1650/86 (as amended by Law 3937/2011). No part of the terrestrial investigated area includes areas of:

- Strict Nature Reserves
- Nature Reserves
- Natural Parks (national or regional)
- Habitats and Species Management Areas including:
  - Special Areas of Conservation (SAC - NATURA2000)
  - Special Protection Areas (SPA – NATURA2000)
  - Wildlife Reserves It is noted that part of the Wildlife Reserve Crania-Mentzevelios is situated within the study area, in a distance of 1.100m from the closest alternative and 2500m from the proposed route.
- Other, including
  - Protected Landscapes or Seascapes
  - Protected natural formations
  - Forests (aesthetic, urban, protective) and Natural Monument.

The entire natural area (forests and forestial areas) inside the terrestrial part of the investigated area is under the provisions of the Forest Code of the Forest Legislation. No areas currently under replantation are crossed by the routings.

The closest to the investigated pipelines protected areas are:

- The Special Protection Area GR2120006 ‘ ELI KALODIKI, MARGARITI, KARTERI KAI LIMNI PRONTANI’ (*March of Kalodiki, Margariti, Karteri and Lake Prontani*), in a distance of ~1500m, (overallping IBA GR078 and Wildlife Reserve of Kalodiki marsh)
- The Wildlife Reserve of ‘Krania-Mentzebelios’ at a distance of ~1100m from the closest investigated routing and ~2500m from the proposed routing.

According to the GR2120006 site’s Standard Data Form it has an area of 1807.98ha and mean altitude of 167.84m. there are no habitats included in Annex I of 92/42/EU. Habitats classes are illustrated in the following table.

**Table 4.71 Habitats classes of GR2120006**

Habitat Classes	%
Inland water bodies (Standing water, Running water)	6
Bogs, Marshes, Water fringed vegetation, Fens	13
Heath, Scrub, Maquis and Garrigue, Phygrana	16
Humid grassland, Mesophile grassland	16
Extensive cereal cultures (including Rotation cultures with regular fallowing)	19
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	30
<b>Total</b>	<b>100</b>

Additionally, there are Quercus frainetto dominated forests with the presence of Q. pubescens, Q. ceciflora and Q. Cerris.

The site is important for the breeding of waterbirds while species of concern include Aythya nyroca.

Threats include the dumping of waste, the expansion of agriculture, uncontrolled water extraction and pollution, and hunting.

According to Hellenic Ornithological Society IBA GR078 'Limni Kalodikiou, Eli Margaritiou kai Karteriou' (Kalodiki lake, Marshes of Margariti and Karteri) is overlapped by GR2120006. Protected species of IBA 078 is Aythya nyroca. The Wild Life Reserve of Kalodiki marsh is also overlapped by the above mentioned NATURA. This reserve was created (HGG 729/23-8-1996) to protect species of frogs, coot, heron, egret, moorhen, mallard, snipe, starling, otter, ferret, jackal and Myocastor coypus.

The 'Krania-Mentzebelios' Wildlife Reserve covers an area of ~1620ha. It is mainly a wildlife reserve for hunted species including wildboar, wolves, foxes, woodcocks, wood pigeons, thrushes and blackbirds. It was established through the HGG971/B/27.07.2001.

Other protected areas, in a distance even further than the offshore investigated area of 10km are the natura sites GR2230002 and GR2230004, and two small island wetlands (Marathia beach mouth and Gardena river mouth). These small island wetlands are protected with an unpublished, till the time of the preparation of this ESIA, Presidential Decree, for small island wetlands of area <80.000m<sup>2</sup>.

All the above protected areas are illustrated on the 7240-AU-ON-01 map (see Annex A – Maps (Volume II)).

It is repeated that all protected areas are not engaged with the investigated routes but just lay in the wider, investigated area.

## ***ANTHROPOGENIC ENVIRONMENT***

### **4.11 General**

As an introduction, it should be noted that recently, Greece had a new law dictating the administrative framework (L. 3852/2010 – Kallikratis scheme). According to the new administrative framework, the term ‘Prefecture’ has been, essentially, replaced by the term ‘Administrative Region’, ‘Region’, or ‘Regional Community’. The prefectural authorities were redistributed according to their area of competence, type of competence and other administrative criteria. However, since no official translation exists, the term Region is used to describe the former term Prefecture. Based on the same legislation, Municipalities have been enlarged incorporating local communities and municipal districts. Municipal districts have been renamed to municipal communities and local communities to either municipal communities or local communities depending on their population (2.000 being the classification limit). However, since no official results of the 2011 census were published till the time of the preparation of the present ESIA, the following data are provided based on the former administrative framework (Kapodistrias).

The Project will take place in Epirus Region, one of the poorest regions of Europe which includes the former Prefectures of Arta, Thesprotia, Ioannina and Preveza. The project is located mainly in Thesprotia Region-Regional Unity (Municipality of Igoumenitsa) and a very small part at Preveza Region-Regional Unity (Municipality of Parga), for the onshore section. For the offshore section, besides the near coast sections which are under the administrative area of the above regions, the project enters the Region of Ionian Islands, which includes the former Prefectures of Zakynthos, Kerkira (Corfu), Kefallonia and Lefkada. More specifically the project is located at the area of Corfu Region-Regional Unity (Municipalities of Corfu and Paxoi).

Specifically, alternative routings ALT1, ALT1a, ALT1b, ALT2, ALT5 and ALT6 go mainly through administrative boundaries of Municipality of Igoumenitsa (former boundaries of Perdika's Local Community), whilst for a small part they enter Municipality of Parga, near the borders of the two municipalities. Alternative routings ALT3 and ALT4 traverse the area of Municipality of Igoumenitsa (mainly through the area of former local community of "Perdika" and a small part through former Sivota Municipality). Alternative routing ALT7 traverses also entirely through Municipality of Igoumenitsa area without entering any other local community except for Perdika.

#### **4.11.1 Thesprotia Region**

Thesprotia Region, these last years, presents significant development, which is, mainly, due to the completion of large infrastructure projects like Igoumenitsa's port, Egnatia Road and Border Station of Sagiada (border network). All these have given the Region a gateway role for Greece to and from Europe; a fact that presents significant development opportunities and also demands investment initiatives to promote the strategic role of the Region in sectors of Transport, Communication, Tourism, Service and Commerce and in primary production sector.

Thesprotia Region consists of the following municipalities (according to Kallikratis scheme):

- Municipality of Igoumenitsa, including the former municipalities (according to Kapodistra scheme) of a) Igoumenitsa, b) Sivota, c) Margariti, d) Parapotamos and Local Community of Perdika
- Municipality of Filiata, including the former municipalities (according to Kapodistria scheme) of a) Filiata and b) Sagiada
- Municipality of Souli, including the former municipalities (according to Kapodistria scheme) of a) Paramithia, b) Aheronta and Local Community of Souli

#### **4.11.2 Preveza Region**

Preveza Region is one of the four regions of the administrative region of Epirus, sited at the southeast border of Epirus. The location of the prefecture, its morphology and

climate are some of the basic advantages that have brought the prefecture to the surface, promoting it to cultural crossroad.

Preveza Region consists of the following municipalities (according to Kallikratis scheme):

- Municipality of Parga, including the former municipalities (according to Kapodistria scheme) of a) Parga and b) Fanari
- Municipality of Preveza, including the former municipalities (according to Kapodistria scheme) of a) Zalogos, b) Louros, and c) Preveza
- Municipality of Ziros, including the former municipalities (according to Kapodistria scheme) of a) Anogio, b) Thesprotiko, c) Filippiada and Local Community of Kranea

#### **4.11.3 Corfu Region**

Corfu Region consists of the following municipalities (according to Kallikratis scheme):

- Municipality of Kerkira, including the former municipalities (according to Kapodistra scheme) of a) Kerkira, b) Melitei, c) Korissi, d) Parelion, e) Paliokastri, f) Lefkimi, g) Feakon, h) Thinalioy, i) Esperion, j) Ahillion, k) Agiou Georgiou, l) Kassopeon and Local Communities of a) Othonoi, b) Mathraki, and c) Erikousses
- Municipality of Paxoi

#### **4.12 Demographic Data**

Focusing on the closest to the area administrative units and based on the 2001 census data of National Statistical Service of Greece, demographic dynamics of Thesprotia, Preveza and Corfu Prefectures (Regions-Regional Unities) are illustrated on the following table. It is repeated that the data refer to the Kapodistra scheme and only the names are presented according to Kallikratis scheme:

**Table 4.72 Population Dynamics.**

<b>Local Administration Organizations</b>	<b>1991</b>	<b>2001</b>
<b><i>Thesprotia Region (former Prefecture)</i></b>	<b>41.755</b>	<b>43.601</b>
<b>Igoumenitsa Municipality</b>	<b>11.608</b>	<b>17.710</b>
<b>Sivota Municipal community</b>	<b>2617</b>	<b>3010</b>
Plataria	758	955
Argirotopou	526	520
Sivota	756	908
Faskomilia	577	627
<b>Perdika Local (in 1991)- Municipal (in 2001) Community</b>	<b>1730</b>	<b>2272</b>
Perdika	1.569	1.715
Arrila	79	74
Karavostasi	0	23
<b>Margariti Municipal Community</b>	<b>5575</b>	<b>3032</b>
Karteri	369	301
<b><i>Preveza Region (former Prefecture)</i></b>	<b>57.068</b>	<b>58.144</b>
<b>Parga Municipality</b>	<b>1900</b>	<b>4033</b>
Agia	918	844
<b><i>Corfu Region (former Prefecture)</i></b>	<b>103.461</b>	<b>111.081</b>
Lefkimi Municipal Community	4257	6704
Paxi Municipal Community	2236	2438

#### **4.12.1 Thesprotia Region**

The general trend of migration from village to city is obvious, and causing a high demographic concentration in big cities of the region (Ioannina, Arta, Preveza and Igoumenitsa). It is calculated that from 1981 until 1991 Ioannina's population has increased by 27%.

The Region of Thesprotia hosts 0.4% of the country's population and produces 0.3% of the GDP (5th place from last). The rate of natural population reduction is modified from -3 in 2000 to 1.9 in 2002 (dominance of births/1.000 inhabitants), and the proportion of pupils in elementary school is lower than the country's average (58 per 1,000 inhabitants against 59 for Greece). Between the census data of 1991 and 2001, population increased by 4.3%, at a lower rate than the national one (6.9%). The contribution of the Prefecture to the GDP is almost constant over the recent years.

#### **4.12.2 Preveza Region**

It has the smallest area of all Epirus' Regions, but the largest population density and the highest G.D.P per capita, figures that illustrate high development rates. All resources have been exploited so much as to demonstrate much higher GDP per capita than the rest of Epirus.

From 55.262 persons in 1971, the population reached 55.915 in 1981, 57.068 in 1991 and 58.144 in 2001 (census data). At the same time, population density is much higher than that of Thesprotia and Ioannina Regions, approaching that of Arta's Region. Urban population represents 27% of the total population of the Region.

Preveza region gathers 0.53% of the country's population, producing 0.4% of the GDP. The percentage of birth increase in the Region reaches 9.1%, according to 2003-4 data. Between census of 1991 and 2001, population has increased by 1.9%, an increase quite lower than that of the rest of Greece (6.9%).

#### **4.12.3 Corfu Region**

Corfu Region comprises 1% of the national population and produces 0.9% of GDP. The high rate of natural population reduction of 1996 (-2) (dominance of births/1.000 inhabitants) was limited to -0.3 in 1997, to be decreased once more to -2.1 in 1998. The Region has a relatively high proportion of pupils in elementary school (61 per 1,000 inhabitants against 59 for nationwide) and high schools (68 against 73 for the whole country) positioned 30th in the prefectures' classification. Between 1991 and 2001 census data, population was reduced by 18.9%.

### **4.13 Economic and Social Environment**

The presented data are mainly based on the 2001 official census, since, the official results of the 2011 census is yet to be available.

#### **4.13.1 Thesprotia Region**

Epirus is one of the poorest and least developed regions in Greece; a situation that can be explained, among others by the geographical and political isolation for a significant period of time. This geographic isolation is a result of the morphology of

the region (the mountainous ranges that separate Epirus from Northern and Central Greece) as well as of the insufficient road network connecting Epirus to the rest of the country.

The political isolation is due to the closed, until 1990s, northern borders with Albania and the other counties of the Balkanians. For the region of Epirus there are indications that this decline will be reversed and that the differences between the region and the country in total will be decreased. Towards this aspect, the new infrastructure built recently (as the ones stated previously) is expected provide Region of Epirus with a strategic role as a gate to EU and Western Balkans.

Thesprotia Region (Regional Unity), in specific, appears to be transformed socially and economically, by decreasing agricultural activity and increasing the services sector.

Agriculture accounts for 13% of the Regional Unity production (2002), corresponding to 0.6% of the total agricultural production in the country. The agricultural productivity is low due to the mountainous character of the area. In 1981, 43% of the workforce in the region was occupied in agriculture. In 1991 the percentage was decreased to 30%. The region has been in the 8th place, nationwide, in rice production for 2003.

The manufacturing sector is less developed, compared to the Greek average, and in 1991 it occupied 22% of the workforce.

The services sector is dominated by tourism which in 1991 provided jobs to 45% of the workforce. Despite the importance of tourism in the regional economy, it is understood that the sector, in Epirus, has yet to be fully exploited.

#### **4.13.2 Preveza Region**

Production activity is based mainly on the primary and tertiary sector, but there is some mild processing activity. At "Mitikas" there is a statutory Industrial Area, with small unit factories, only; the most important ones, not only in regional unity level but also in entire Epirus, are located at Filipiada (at the borders with Arta Region).

Primary sector accounts for 30.8% of the workforce, secondary sector accounts for 17% and tertiary sector 48%. Significant percentage is that of the unemployed (12.8%) in comparison to the national productive population (87.2%). Distinctive is

the percentage of economically not active population, which reaches 55.4%, and similar are the figures for Parga Municipality.

Nevertheless, despite of the significant touristic development of Preveza Region, there is no serious decrease of the two other sectors; a fact evident by agriculture, which achieves high levels of organization.

A significant percentage of the population (25.3%) is occupied in agriculture, pasturing, forestry and fishing. According to 1999-2000 census data of agriculture and farming, the biggest part of the Region's land is covered by arboraceous/ tree crops and annual crops, while a small percentage of the land is covered by vineyards.

Due to greenhouses, production levels are substantial in species of vegetables, while citreous, table olives and olive oil come in second place. Livestock products follow a normal course.

Around 11% of the active population is employed in service sector; they are salesmen in shops or flea markets, specialized craftsmen and other relevant technical jobs.

Small is the percentage for scientists and artists (4.2%), while 7.3% is the population working on the upper administrative or managerial levels of private and public sector.

#### **4.13.3 Corfu Region**

The primary sector constitutes a significant part of the local economy. It contributes to the increase of the local income and also employment. Regarding primary sector, the most important product is olive oil (60-70% of total production in the Ionian Islands Region, 6% of oil production in the country), horticultural products, etc. The growth of tourism coincided with the gradual closure of traditional industries in the Region and the decline of traditional manufacturing (cheese and meat products, silversmith's trade etc.). At the same time, the conditions for family businesses expansion were developed, mainly for the supply of the tourism market.

During the 50's and the 60's, trade evolved around products from local agriculture and agricultural related industry. With the growth of tourism, a shift was evident to new sectors such as clothing - footwear, folk art etc.

The cultivated agricultural land is approximately 34.7 thousand hectares, 2.4 thousand of which (6.9%) are irrigated. The larger part of cultivated land comprises arboraceous/ tree cultivations (69%), with around 4.4 million olive trees. As far as manufacturing units are concerned, there are approximately 1,100 in the area, 373 of which have installed power more than 15 HP.

A 21.5% of the working force is employed in the primary sector, 17.8% in the secondary and 56.4% in the tertiary. The product output mainly comes from services (tourism) with increasing contribution from 67% in 1990 to 77% in 1998. Per capita product is 12,300 € (7th Prefecture from top in Greece), a little higher than the average for the country (105%).

The inhabitants of the Region show high consumption of domestic electricity (95% of the country's average). Every 100 inhabitants 25 cars correspond and 1 new residence (the average for the country being 28 and 0.8 respectively, in 1999). Income was reportedly 3,500 € per person in 1999 (80% of the country's average) and bank deposits were 4,000 € per person. With 3.2 million overnight stays of foreign tourists per annum, Corfu Prefecture is among the most visited places (7% of the national total, 4th place in the country in overnight stays per person, following Dodekanisa, Zakynthos and Rethimno).

#### **4.14 Fishing**

Information on professional fishing activities of the area are illustrated in the following table<sup>15</sup>. The data represent a minimum fishing activity, since permits for fishing in the specific area are issued from other prefectures, as well. Also, activities may be subject to national and local fishing regulations (such as means and season of fishing) but only general regulations are included in the table.

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<sup>15</sup> Data from Fishing Supervisors of Thesprotia and Corfu Prefectures (10-12 June 2004) and ESYE for Preveza Prefecture (2006)

**Table 4.73 Fishing Activity in Thesprotia, Preveza and Corfu Regions.**

<b>Fishing Boat Category</b>	<b>Number of Registered Boats in the Area</b>	<b>Comments</b>
<b><i>Thesprotia Region</i></b>		
“Light-Fishing” (pirofani)	69	Ports: Perdika, Sivota
Seines (vitzotrata)	1	Seines fish at 70m distances from the shores.
Trawlers (mihanotrata)	1	Trawlers are not allowed fishing in distance smaller than 5km from the shores or in case of shallow waters, at depths smaller than 50m.
Others	14	
<b><i>Preveza Region</i></b>		
Deep Sea Fishing	16	
Mid Sea Fishing	645	
Trawlers	333	Trawlers are not allowed fishing in distance smaller than 5km from the shores or in case of shallow waters, at depths smaller than 50m.
Purse Seines (gri-gri)	312	With swordfish’s fishing permit. The use of PS is not allowed within 300m from the coast or up to the 50m depth contour, whenever the 50m depth occurs in shorter distances.
Coastal Fishing	5814	
Trawlers	343	
Other	5471	
<b><i>Corfu Region</i></b>		
Fishing Nets – Longlines	30	With swordfish’s fishing permit
Mid Sea Fishing	638	
Seines	20	Seines fish at 70m distances from the shores.
Deep Sea Trawler	4	With fishing permit in international waters or areas defined by international regulations. Trawlers are not allowed fishing in distance smaller than 5km from the shores or in case of shallow waters, at depths smaller than 50m.
Trawlers	2	Trawlers are not allowed fishing in distance smaller than 5km from the shores or in case of shallow waters, at depths smaller than 50m.
Purse Seines	1	With swordfish’s fishing permit. The use of PS is not allowed within 300m from the coast or up to the 50m depth contour, whenever the 50m depth occurs in shorter distances.
Other	5	

According to local authorities (see Annex K – Contact with Authorities (Volume III)), in the broader area there is a port which can facilitate 85 small nearshore fishing boats.

Although the use of trawlers is illegal, on site visits by divers confirmed the markings of such practice.

## **4.15 Tourism**

### **4.15.1 Thesprotia Region**

The western part of continental Greece is less developed, regarding tourism, compared to the destinations of the Aegean Sea, but undergoes a rapid development. According to the General Regional Plan of Epirus (HGG 1451/06.10.2003) areas of touristic uses and summer houses are developed along the coasts of Thesprotia, specifically at the areas of Sivota, Perdika and Plataria. Available statistical data from the Hellenic Tourism Organization amounts the number of nights spent by foreign tourists and Greeks in hotels of Thesprotia to 142,800 for the year 2000. This corresponds to an increase of 34% compared to 1996 figures. Occupancy rates in hotels have been close to 50% for the year 2000, and are relatively stable for the period 1996 – 2000, indicating that the increase in visitors instigated new touristic developments.

With regard to the landfall points, “Stamponi” is located at the northern part of “Perdika” bay, with no touristic development. “Perdika” bay hosts a camping, with exclusive access to “Sofas” beach. “Stavrolimenas” shows no evidence of permanent tourism or residential activity. “Omprela” location is remote from both touristic and residential activity. According to correspondence from the local competent authorities (see Annex K – Contact with Authorities) Omprela bay is a rocky area without any touristic activity itself, although some nearby sandy beaches, approachable only by boat, are visited by tourists in the summer period.

### **4.15.2 Preveza Region**

Preveza Region, despite of its rather small size, combines harmonically touristic development, classic and alternative, of coastal areas; agricultural development and

wildlife conservation. It is a touristic destination for a large range of visitors, due to its advantages (climate, long beaches, monuments, natural beauty).

The number of registered lodgings of the Region, according to census data 2007, is 88. Out of these, 77 are hotel facilities and the other 11 are campings.

Registered tourist beds are 6.317, out of which 55.8% are hotels and other similar lodgings.

#### **4.15.3 Corfu Region**

The tourism model which evolved in the post-war period with the standard parcel of services is criticized, today, and believed to be in need of supplementing with a different, more selective and individualized approach of visitor - consumer, with emphasis on the environment and the particular characteristics of the region.

The region of Corfu plays an important role in the tourism of Ionian Islands Region, with respect to both the level of demand (visitors) and the level of supply (beds). An important element is that Greek visitors exhibit an increasing preference for Corfu, from 54% (1960) to 66% (1991) of the total demand of the region, anticipating thus for the losses with respect to the foreign demand (80% in 1960, 65% in 1990).

The number of registered beds amounts to 91,190, from which 61.5% are beds of rented rooms. Most beds are found in the Municipality Communities of Corfu and Feakon. Regarding hotel beds 36.2% are of Lux or A' category and 35.4% of B' to E' category.

A. Corfu has 37.000 beds distributed in hotels as follows:

- 2.042 beds at 5 stars hotels LUX category
- 11.712 beds at 50 hotels A' category
- 10.460 beds at 77 hotels B' category
- 10.215 beds at 176 hotels C' category
- 1.570 beds at 43 hotels D' category
- 1.002 beds at 27 hotels E' category

Additionally, there are:

- B. 25 furnished residence of A' category, with 198 rooms and 319 beds.
- C. 56.139 beds in rented rooms and apartments of A', B', and C' categories, of 4.369 enterprises in total (1.961 A' category, 1.509 B' category and 899 C' category).
- D. 12 camping of 1.100 spaces, of 3.000 persons capacity (3 A' category, 1 B' category and 8 C' category).

#### **4.16 Land Uses**

According to existing legislation and the scope of the study, all existing and planned land uses were recorded in an influence area of ~2.5km<sup>2</sup>. The land uses are presented in a 1:30.000 scale map (see Annex A – Maps (Volume II), Map 7240-AU-LU-01).

Land uses were recorded having taken into account all town planning and physical planning studies (existing residential limits, under study residence areas expansion and General Town Plans), statutory provisions for protected areas, legislation for statutory archaeological sites, major national infrastructure projects, railroad network, medium tension transmission network of PPC and under study or construction projects of Directorate of Road Construction Studies (DMEO) of Ministry of Environment, Energy and Climate Change, Ministry of Infrastructure, Transportation and Networks and the Directorates of Technical Services of Thesprotia and Preveza Prefectural Authorities. Data were taken from the following sources: (a) Various Regional Authorities of Epirus (Dir. Of Works, Land Registers, etc), (b) Thesprotia and Preveza Prefectural level Authorities (Town Planning, Dir. Of Technical Services, Survey Dep., Dir. of Industry), (c) Other parties, (d) Archaeological Services, Forest Departments, MEECC – Dir. Of Environmental Planning and Physical Planning, MITN - Dir. Of Town Planning, Dir of Physical Planning, etc., (e) Survey maps of Ministry of Agriculture.

In the following tables, the land uses and the various characteristics of the investigated area are presented. Detailed presentation of the various land uses traversed by the investigated routings follows.

**Table 4.74 Land Uses in the Investigated Area.**

S/n	Land Use	Total Area (m <sup>2</sup> )	Percentage of the Total Area (%)
1	Existing Residential Areas	3244931.98	3.32
2	Abandoned Settlements	462359.95	0.47
3	Proposed Residential Areas of A' Residence	276885.50	0.28
4	Proposed Residential Areas of B' Residence	1285815.44	1.32
5	Forest	12665270.48	12.97
6	Site of Extraordinary Beauty	510793.51	0.52
7	Outside Town Plan Olive groves	10980958.5219	11.22
8	Other Outside Town Plan Areas	14936523.93	15.29
9	Touristic	11370243.79	11.64
10	Industrial Areas	258672.41	0.26
11	Manufacturing Activities	266555.53	0.27
12	Quarry Areas	518508.65	0.54
13	Stock Farming	35787248.59	36.64
14	Archaeological Sites	994177.26	1.02
15	Recreation Parks	1389244.64	1.42
16	Wildlife Reserve Areas	2815596.94	2.88
17	Beach (without amenities)	7730.53	0.01
18	Beach with amenities	104066.31	0.11
19	Graveyard	20146.87	0.02
20	Landfill	8021.64	0.01
<b>Total</b>		<b>97660894.90</b>	<b>100.00</b>

**Table 4.75 Other Characteristics of the Investigated Area.**

Other Characteristics	Total Length (m)	Total Area (m <sup>2</sup> )
Hydrographical network <sup>1</sup>	182679.853	5481276.873
Water supply network <sup>2</sup>	13038.787	n/a
Medium Tension Transmission Network <sup>3</sup>	21790.722	n/a
	<b>Number</b>	<b>Total Estimated Area (m<sup>2</sup>)</b>
Irrigational Drillings <sup>4</sup>	7	7.000
Springs	76	n/a
PPC's Medium Voltage Substations <sup>5</sup>	19	190000.000
<sup>1</sup>	Total length was calculated without taking into account river's class. Total area was calculated for a riverbed of 30m.	
<sup>2</sup>	There are 3 water supply pipelines. Their total area was considered negligible.	
<sup>3</sup>	In the investigated area there are 25 medium tension power lines of PPC. Their total area was considered negligible.	
<sup>4</sup>	The area of one drilling was considered 1m <sup>2</sup> .	
<sup>5</sup>	Total area of a PPC's Medium Voltage Substation was taken equal to 10.000m <sup>2</sup> .	
Note: Tables present data for the whole investigated area.		

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#### **4.16.1 Alternative Routing ALT1 : Landfall site “Omprela 2”, C/S-M/S at “Variko” site**

Land uses along ALT1 and their respective area of working strip per land use category are illustrated in Table 4.76. During the calculation of the area of the working strip, it was considered that working strip is equally distributed on each side of the routing.

#### **4.16.2 Alternative Routing ALT1a : Landfall site “Omprela 2”, C/S-M/S at “Florouvouni” site**

Land uses along ALT1a and their respective area of working strip per land use category are illustrated in Table 4.77. During the calculation of the area of the working strip, it was considered that working strip is equally distributed on each side of the routing.

#### **4.16.3 Alternative Routing ALT1b : Landfall site “Omprela 2”, C/S-M/S at “Florouvouni” site**

Land uses along ALT1b and their respective area of working strip per land use category are illustrated in Table 4.78. During the calculation of the area of the working strip, it was considered that working strip is equally distributed on each side of the routing.

#### **4.16.4 Alternative Routing ALT2: Landfall site “Omprela 2”, C/S-M/S at “Gouri” site**

Land uses along ALT2 and their respective area of working strip per land use category are illustrated in Table 4.79. During the calculation of the area of the working strip, it was considered that working strip is equally distributed on each side of the routing.

#### **4.16.5 Alternative Routing ALT3: Landfall “Stamponi”, C/S-M/S at “Kalivia” site**

Land uses along ALT3 and their respective area of working strip per land use category are illustrated in Table 4.80. During the calculation of the area of the working strip, it was considered that working strip is equally distributed on each side of the routing. The landfall section was not included.

#### **4.16.6 Alternative Routing ALT4: Landfall “Sofas”, C/S-M/S at “Kalivia” site**

Land uses along ALT4 and their respective area of working strip per land use category are illustrated in Table 4.81. During the calculation of the area of the

working strip, it was considered that working strip is equally distributed on each side of the routing. The landfall section was not included.

**4.16.7 Alternative Routing ALT5: Landfall site “Omprela 1”, C/S-M/S at “Variko” site**

Land uses along ALT5 and their respective area of working strip per land use category are illustrated in Table 4.82. During the calculation of the area of the working strip, it was considered that working strip is equally distributed on each side of the routing. The landfall section was not included.

**4.16.8 Alternative Routing ALT6: Landfall site “Omprela 1”, C/S-M/S at “Gouri” site**

Land uses along ALT6 and their respective area of working strip per land use category are illustrated in Table 4.83. During the calculation of the area of the working strip, it was considered that working strip is equally distributed on each side of the routing. The landfall section was not included.

**4.16.9 Alternative Routing ALT7: Landfall site “Stavrolimenas”, C/S-M/S at “Variko” site**

Land uses along ALT7 and their respective area of working strip per land use category are illustrated in Table 4.84. During the calculation of the area of the working strip, it was considered that working strip is equally distributed on each side of the routing. The landfall section was not included.

**Table 4.76 General Characteristics of ALT1 regarding Land Uses.**

Mileage		Route Length per Land Use (km)																			
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
0.000	0.023					0.023															
0.023	0.107							0.084													
0.107	0.383					0.276															
0.383	0.531								0.149												
0.531	0.574					0.043															
0.574	0.939							0.365													
0.939	1.159								0.220												
1.159	1.224							0.065													
1.224	2.094									0.869											
2.094	4.235										2.141										
4.235	4.743								0.509												
4.743	5.344							0.600													
5.344	5.404								0.060												
5.404	5.471							0.067													

	Mileage		Route Length per Land Use (km)																			
	From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
	5.471	5.596					0.124															
	5.596	5.853						0.258														
	5.853	5.956					0.103															
	5.956	6.229						0.272														
	6.229	6.327							0.098													
	6.327	6.406					0.080															
	6.406	6.800						0.394														
	6.800	6.928																			0.128	
<b>Total (km)</b>	6.928		0.00	0.00	0.00	0.00	0.649	0.00	2.105	1.036	0.869	2.141	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.128
<b>Percentage (%)</b>	100.00		0.00	0.00	0.00	0.00	9.36	0.00	30.38	14.96	12.54	30.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.85
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.218		0.00	0.00	0.00	0.00	0.02	0.00	0.07	0.03	0.03	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

**Table 4.77 General Characteristics of ALT1a regarding Land Uses.**

Mileage		Route Length per Land Use (km)																		
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall
0.000	1.227														1.227					
1.227	2.381								1.154											
2.381	2.450							0.069												
2.450	2.618					0.168														
2.618	2.752							0.134												
2.752	3.352									0.600										
3.352	5.493										2.141									
5.493	6.002								0.509											
6.002	6.602							0.600												
6.602	6.662								0.060											
6.662	6.730							0.067												
6.730	6.854					0.124														
6.854	7.112							0.258												
7.112	7.215					0.103														
7.215	7.487							0.272												
7.487	7.585								0.098											
7.585	7.665					0.080														
7.665	8.059							0.394												
8.059	8.187																			0.128
<b>Total (km)</b>	8.187	0.00	0.00	0.00	0.00	0.475	0.00	1.795	1.821	0.600	2.141	0.00	0.00	0.00	1.227	0.00	0.00	0.00	0.00	0.128

Mileage		Route Length per Land Use (km)																		
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall
<b>Percentage (%)</b>	100.000	0.00	0.00	0.00	0.00	5.799	0.00	21.921	22.242	7.332	26.156	0.00	0.00	0.00	14.988	0.00	0.00	0.00	0.00	1.56
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.258	0.00	0.00	0.00	0.00	0.02	0.00	0.06	0.06	0.02	0.07	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

**Table 4.78 General Characteristics of ALT1b regarding Land Uses.**

Mileage		Route Length per Land Use (km)																			
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
0	2.237														2.237						
2.237	2.274							0.037													
2.274	2.337					0.062															
2.337	2.421							0.084													
2.421	2.697					0.276															
2.697	2.845								0.149												
2.845	2.888					0.043															
2.888	3.253							0.365													
3.253	3.473								0.220												
3.473	3.538							0.065													
3.538	4.407									0.869											
4.407	6.549										2.141										
6.549	7.057								0.509												
7.057	7.657							0.600													
7.657	7.718								0.060												
7.718	7.785							0.067													
7.785	7.909					0.124															
7.909	8.167							0.258													
8.167	8.270					0.103															

Mileage		Route Length per Land Use (km)																		
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall
8.270	8.543							0.272												
8.543	8.641								0.098											
8.641	8.720					0.080														
8.720	9.114							0.394												
9.114	9.242																			0.128
<b>Total (km)</b>	9.242	0.00	0.00	0.00	0.00	0.69	0.00	2.14	1.04	0.87	2.14	0.00	0.00	0.00	2.24	0.00	0.00	0.00	0.00	0.13
<b>Percentage (%)</b>	100.000	0.00	0.00	0.00	0.00	7.445	0.00	23.183	11.212	9.404	23.169	0.00	0.00	0.00	24.203	0.00	0.00	0.00	0.00	1.38
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.292	0.00	0.00	0.00	0.00	0.02	0.00	0.07	0.03	0.03	0.07	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

**Table 4.79 General Characteristics of ALT2 regarding Land Uses.**

Mileage		Route Length per Land Use (km)																			
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
0.000	0.547								0.547												
0.547	0.652												0.106								
0.652	0.824								0.172												
0.824	1.008												0.184								
1.008	2.570								1.561												
2.570	3.861									1.292											
3.861	4.370								0.509												
4.370	4.970							0.600													
4.970	5.030								0.060												
5.030	5.098							0.067													
5.098	5.222					0.124															
5.222	5.480							0.258													
5.480	5.583					0.103															
5.583	5.855							0.272													
5.855	5.953								0.098												
5.953	6.033					0.080															
6.033	6.427							0.394													
6.427	6.593																				0.166
<b>Total (km)</b>	6.593	0.00	0.00	0.00	0.00	0.31	0.00	1.59	2.95	0.00	1.29	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17

	Mileage		Route Length per Land Use (km)																			
	From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
<b>Percentage (%)</b>	100.000		0.00	0.00	0.00	0.00	4.657	0.00	24.14	44.701	0.00	19.592	0.00	4.393	0.00	0.000	0.00	0.00	0.00	0.00	0.00	2.516
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.206		0.00	0.00	0.00	0.00	0.01	0.00	0.05	0.09	0.00	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

**Table 4.80 General Characteristics of ALT3 regarding Land Uses.**

	Mileage		Route Length per Land Use (km)																		
	From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall
	0.000	0.088						0.088													
	0.088	0.125													0.037						
	0.125	0.478						0.353													
	0.478	2.913													2.435						
	2.913	3.614						0.701													
	3.614	3.768					0.154														
	3.768	4.047				0.279															
	4.047	4.381					0.335														
	4.381	4.489																			0.107
<b>Total (km)</b>	4.489		0.00	0.00	0.000	0.279	0.489	0.00	1.142	0.000	0.00	0.00	0.00	0.00	0.000	2.471	0.00	0.00	0.00	0.00	0.107
<b>Percentage (%)</b>	100.000		0.00	0.00	0.000	6.220	10.885	0.00	25.446	0.000	0.00	0.00	0.00	0.00	0.000	55.058	0.00	0.00	0.00	0.00	2.392
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.140		0.00	0.00	0.00	0.01	0.02	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

**Table 4.81 General Characteristics of ALT4 regarding Land Uses.**

Mileage		Route Length per Land Use (km)																		
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall
0.000	1.565														1.565					
1.565	1.783								0.219											
1.783	2.174				0.391															
2.174	2.634							0.460												
2.634	2.741					0.107														
2.741	2.791								0.050											
2.791	2.997					0.206														
2.997	3.206							0.209												
3.206	3.525					0.319														
3.525	3.610				0.085															
3.610	3.724							0.114												
3.724	3.821					0.097														
3.821	3.839																0.018			
3.839	3.925																			0.086
<b>Total (km)</b>	3.925	0.00	0.00	0.000	0.476	0.729	0.00	0.782	0.269	0.00	0.00	0.00	0.00	0.000	1.565	0.00	0.018	0.00	0.00	0.00
<b>Percentage (%)</b>	100.000	0.00	0.00	0.000	12.131	18.574	0.00	19.936	6.849	0.00	0.00	0.00	0.00	0.000	39.868	0.00	0.456	0.00	0.00	2.185
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.123	0.00	0.00	0.00	0.02	0.02	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

**Table 4.82 General Characteristics of ALT5 regarding Land Uses.**

Mileage		Route Length per Land Use (km)																			
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
0.000	0.019					0.019															
0.019	0.103							0.084													
0.103	0.379					0.276															
0.379	0.527								0.149												
0.527	0.570					0.043															
0.570	0.935							0.365													
0.935	1.155								0.220												
1.155	1.220							0.065													
1.220	2.090									0.869											
2.090	3.240										1.151										
3.240	3.291								0.051												
3.291	6.443										3.152										
6.443	6.761					0.318															
6.761	6.803								0.043												
6.803	6.968					0.165															
6.968	7.072								0.165												
7.072	7.703										0.631										
7.703	7.808																				0.104
<b>Total (km)</b>	7.808	0.000	0.000	0.000	0.000	0.820	0.000	0.514	0.627	0.869	4.934	0.000	0.000	0.000	0.000	0.000	0	0	0	0.104	
<b>Percentage (%)</b>	100.	0.00	0.00	0.00	0.00	10.50	0.00	6.579	8.030	11.13	63.19	0.00	0.00	0.00	0.000	0.00	0	0	0	1.335	

	Mileage		Route Length per Land Use (km)																		
	From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.248		0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.02	0.03	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

**Table 4.83 General Characteristics of ALT6 regarding Land Uses.**

	Mileage		Route Length per Land Use (km)																			
	From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
	0.000	0.536							0.536													
	0.536	0.641												0.106								
	0.641	0.813							0.172													
	0.813	0.997												0.184								
	0.997	2.434							1.437													
	2.434	5.791									3.356											
	5.791	6.169					0.378															
	6.169	6.211							0.043													
	6.211	6.376					0.165															
	6.376	6.480							0.104													
	6.480	6.842									0.361											
	6.842	6.927																				0.085
<b>Total (km)</b>	6.927		0.00	0.00	0.00	0.00	0.543	0.00	0.00	2.292	0.00	3.717	0.00	0.290	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.085
<b>Percentage (%)</b>	100.000		0.00	0.00	0.00	0.00	7.834	0.00	0.00	33.087	0.00	53.667	0.00	4.181	0.00	0.000	0.00	0.00	0.00	0.00	0.00	1.231
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.219		0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.07	0.00	0.12	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

**Table 4.84 General Characteristics of ALT7 regarding Land Uses.**

Mileage		Route Length per Land Use (km)																			
From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
0.000	0.019					0.019															
0.019	0.103							0.084													
0.103	0.379					0.276															
0.379	0.527								0.149												
0.527	0.570					0.043															
0.570	0.905							0.335													
0.905	0.926								0.021												
0.926	0.951					0.025															
0.951	1.105								0.154												
1.105	1.261					0.156															
1.261	1.574							0.313													
1.574	1.704					0.130															
1.704	1.819							0.115													
1.819	1.886					0.067															
1.886	2.000							0.114													
2.000	2.374					0.375															
2.374	2.604							0.230													
2.604	2.930					0.326															
2.930	3.080							0.149													

	Mileage		Route Length per Land Use (km)																			
	From K.P.	To K.P.	Existing Residential Area	Abandoned Settlement	Proposed Residential Areas of A' Residence	Proposed Residential Areas of B' Residence	Forest	Site of Extraordinary Beauty	Outside Town Plan Olive groves	Other Outside Town Plan Areas	Recreation Park	Touristic	Industrial	Manufacturing	Quarry	Livestock	Beach without Amenities	Beach with Amenities	Graveyards	Landfills	Landfall	
	3.080	3.217					0.137															
	3.217	3.333						0.116														
	3.333	3.389					0.056															
	3.389	4.043						0.653														
	4.043	4.494				0.452																
	4.494	4.628						0.134														
	4.628	4.680														0.052						
	4.680	4.759																				0.079
<b>Total (km)</b>	4.759		0.00	0.00	0.00	0.452	1.611	0.00	2.242	0.323	0.00	0.00	0.00	0.00	0.00	0.000	0.052	0.00	0.00	0.00	0.00	0.079
<b>Percentage (%)</b>	100.000		0.00	0.00	0.00	9.490	33.840	0.00	47.115	6.795	0.00	0.00	0.00	0.00	0.000	1.092	0.00	0.00	0.00	0.00	0.00	1.669
<b>Working Strip Area per Land Use (km<sup>2</sup>)*</b>	0.150		0.00	0.00	0.00	0.01	0.05	0.00	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

\* The above areas have been calculated based on a working Strip of 32m. In reality, these calculations are conservative because in forestial areas, covered with thick vegetation and in organized tree crops, every effort will be made to reduce the width of the working strip; however, the width shall not be smaller than 26m. Landfall section was not included.

#### 4.16.10 Onshore Facilities (C/S-M/S)

The following table illustrates land uses upon which the various alternatives of the Onshore Facilities for the Compressor and Metering Station are located.

**Table 4.85 Land uses of Onshore Facilities (C/S-M/S) sites.**

s/n	C/S-M/S Code	Corresponding Routing(s)	Vegetation Type
1	C/S-M/S 1	ALT4	<ul style="list-style-type: none"> <li>• 40% Areas outside city plan – Remaining areas</li> <li>• 40% Forests</li> <li>• 20% Areas outside city plan - Olive groves</li> </ul>
2	C/S-M/S Kalivia	ALT3, ALT4	Areas outside city plan - Olive groves
3	C/S-M/S Florovouni	ALT1a, ALT1b	Stock Farming area
4	C/S-M/S Variko	ALT1, ALT1b, ALT5, ALT7	<ul style="list-style-type: none"> <li>• 50% Areas outside city plan - Olive groves</li> <li>• 40% Areas outside city plan – Remaining areas</li> <li>• 10% Forests</li> </ul>
5	C/S-M/S 2	ALT1, ALT1b, ALT5, ALT7	<ul style="list-style-type: none"> <li>• 50% Areas outside city plan – Remaining areas</li> <li>• 50% Forest</li> </ul>
6	C/S-M/S Gouri	ALT2, ALT6	Stock Farming area
7	C/S-M/S 3	ALT1, ALT1a, ALT1b, ALT5,	Tourism development area
8	C/S-M/S 4	ALT5, ALT6	Tourism development area

At this phase of the project, the ownership status along the proposed route is not finalized. As the FEED proceeds and upon final environmental approval of the project, the Owner will prepare detailed cadastral tables and diagrams. At that point the comments of the Forest authority regarding ownership along the proposed pipeline route will be taken into account (see Annex K – Contact with Authorities). In short, the authority commented that some areas are managed by Dir. of Rural Development & Economy of Thesprotia Region as colonial areas subject to special stock-farming legislation while other areas are municipal managed by Municipality of Igoumenitsa.

## 4.17 Existing Infrastructure

### 4.17.1 Airports

The main airport of the area is that of Ioannina ‘Vasilefs Piroi’ (King Pyrrhus) situated at the capital of Epirus Region, at a distance ~55km from the investigated area. It is a national and international airport.

During summer, the main air traffic moves to the national and international airport of Kerkira (Corfu) ‘Ioannis Kapodistrias’. Although the airport is closer to the investigated area (~45km) the fact that is situated on the Corfu island makes its interaction with the project less important.

Lastly, another, smaller airport is located at a distance of ~60km near Preveza. It is also national and international airport.

### 4.17.2 Seaports - Navigation

#### Preliminary Data

The broader area is traversed by passenger ships, serving domestic routes or connecting Greek and Italian harbors, as well as commercial ships from “Astakos” harbor. Data of routes’ frequency were provided by the Ministry of Mercantile Marine, Aegean and Islands Policy and the port Authorities of Patra, Igoumenitsa, Preveza, Corfu and Astakos.

**Table 4.86 Ship's Activity in Ionian Sea (2003).**

Port	Ship Category	Destination	Traffic (Number of Departures)
Patra	Passenger Commercial	Greek ports (Kefalonia)	615
		Italy	2975
		Greek ports	148
		Italy	39
Igoumenitsa	All (Passenger και Commercial)	Greek ports (Corfu, Paxi etc) Italy	7434 5060
Preveza	Passenger Commercial Fishing	Aktio	
Parga	Passenger	Corfu, Paxi – Antipaxi	
Sagiada	Passenger	Corfu, Paxi – Antipaxi	
Corfu	All	Greek ports and Italy	10322
Astakos	Passenger Commercial Passenger	Greek ports (Sami, Ithaki)	400
		Greek ports	58
		All	18

More recent data were provided by a dedicated shipping study performed during the ongoing FEED of the project. Its results are quoted in the present section.

### Dedicated shipping study

#### 4.17.2.1.1 Introduction

The shipping route study and corresponding database were developed covering the entire length of the proposed pipeline route. The main data sources used in the route database development were AIS shipping surveys.

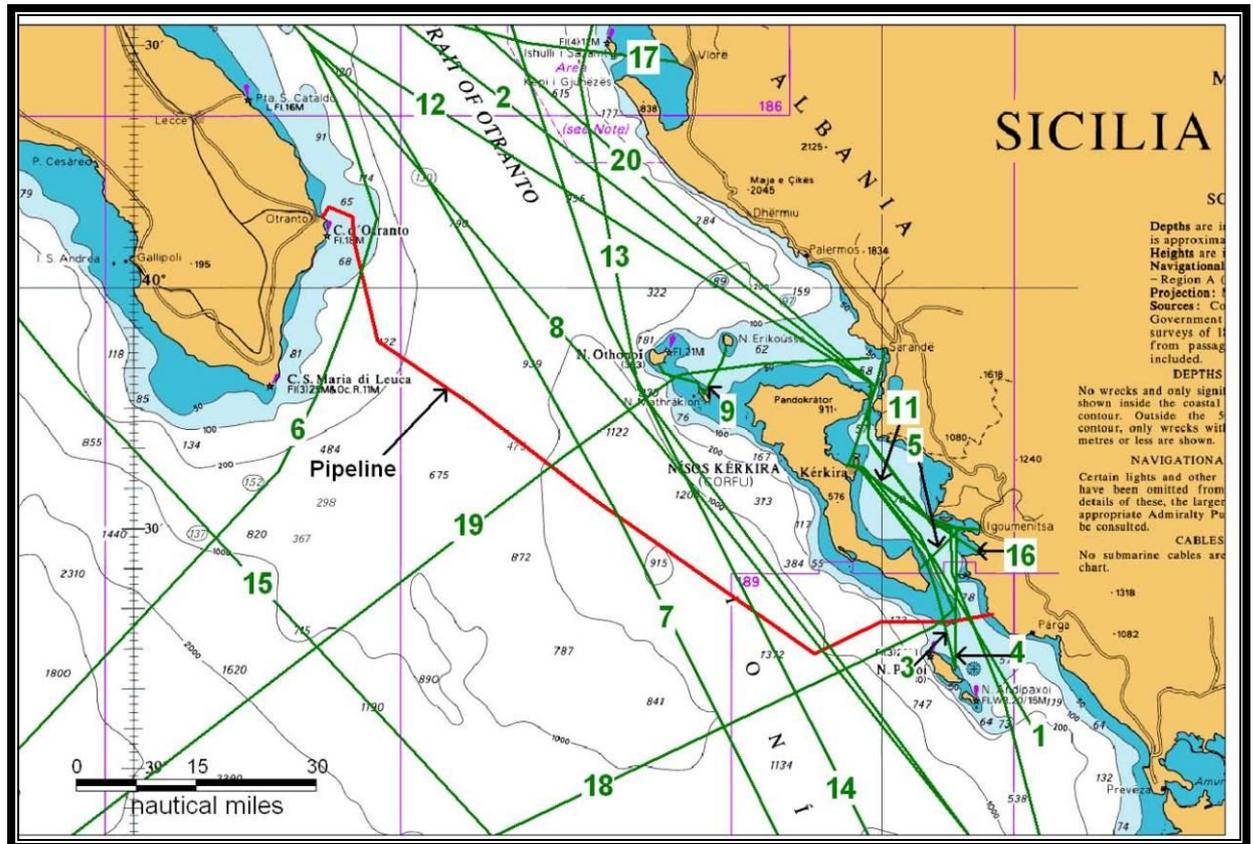
The tracks were grouped into various routes based on their positions and courses, and the mean positions (center-lines) and widths (standard deviations) of the routes were estimated. The numbers of ships on each route identified from the AIS data were factored to an annual basis. The effective survey periods at each AIS survey location were taken into account and the routes were extrapolated as required. Supplementary information on port movements and ferry timetables was also used to ensure the final database was as accurate as possible. Finally, the AIS ship identity data logged in the surveys was used to re-categorize vessels according to standard type categories based on ICST (94) Levels 3 and 4. Ships were also categorized by size based on deadweight tonnage. The type and size categories used are summarized in the following table.

**Table 4.87 Ship type and size categories.**

Type Code	General Type	Subtypes (examples)
1	Cargo	General Cargo, Container Carrier, Reefer, Bulk Carrier, Gas Carrier, Ro/Ro (Freight)
2	Tanker	Crude Oil, Product, Chemical, Bunkering, Vegetable Oil
3	Ferry	Passenger Ferry, HSC, RoPax
4	Other	Miscellaneous / Other Vessels
Size Code	Deadweight Tons (DWT)	
1	< 1,500	
2	1,500-5,000	
3	5,000-15,000	
4	15,000-40,000	
5	≥ 40,000	

Twenty main routes were defined to be operating in the area and are presented in the following figure.

**Picture 4.31 Main routes operating in the project's area.**



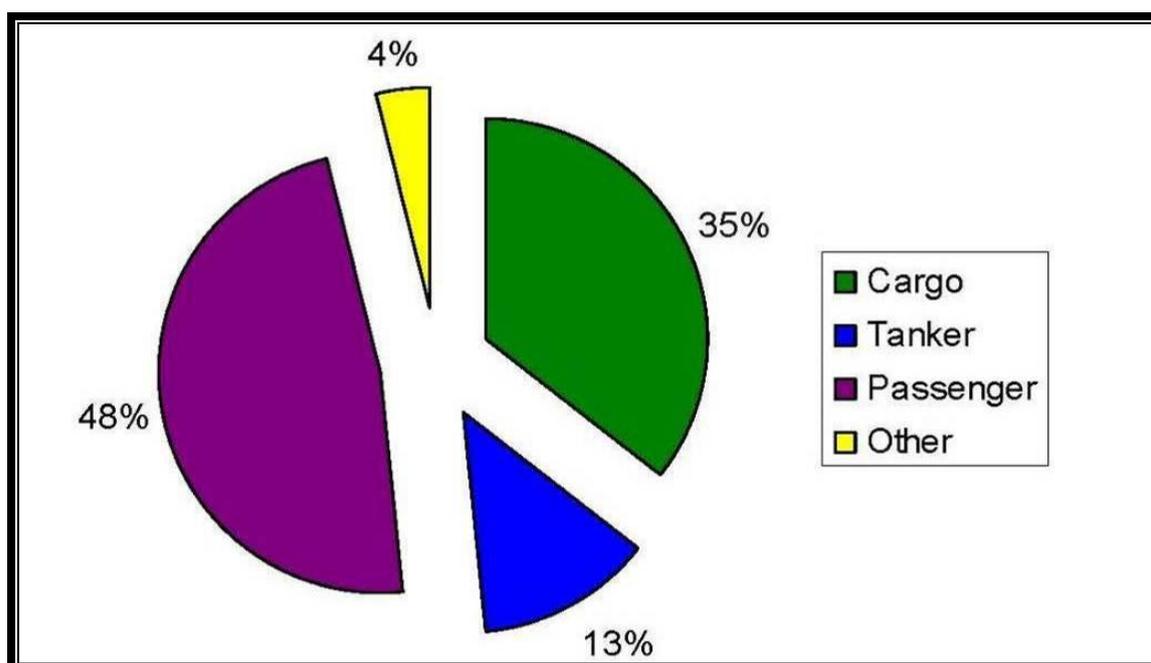
Details on each route in terms of ships per year and departure / destinations points are presented in the following table. The routes which intersect the pipeline are No's 1-4, 6-8, 13-14 and 18-19. This indicates an average of 65-70 vessels per day.

The overall size and type distributions for the shipping route database are presented in the following figures. The majority of ships in the route database are passenger ships (48%) and cargo vessels (35%). The remaining traffic consists of, tankers (13%) and other / miscellaneous vessels (4%). The most common size category is vessels between 5,000 and 15,000 DWT (38%). Only 18% of vessels have a DWT of greater than 15,000 DWT.

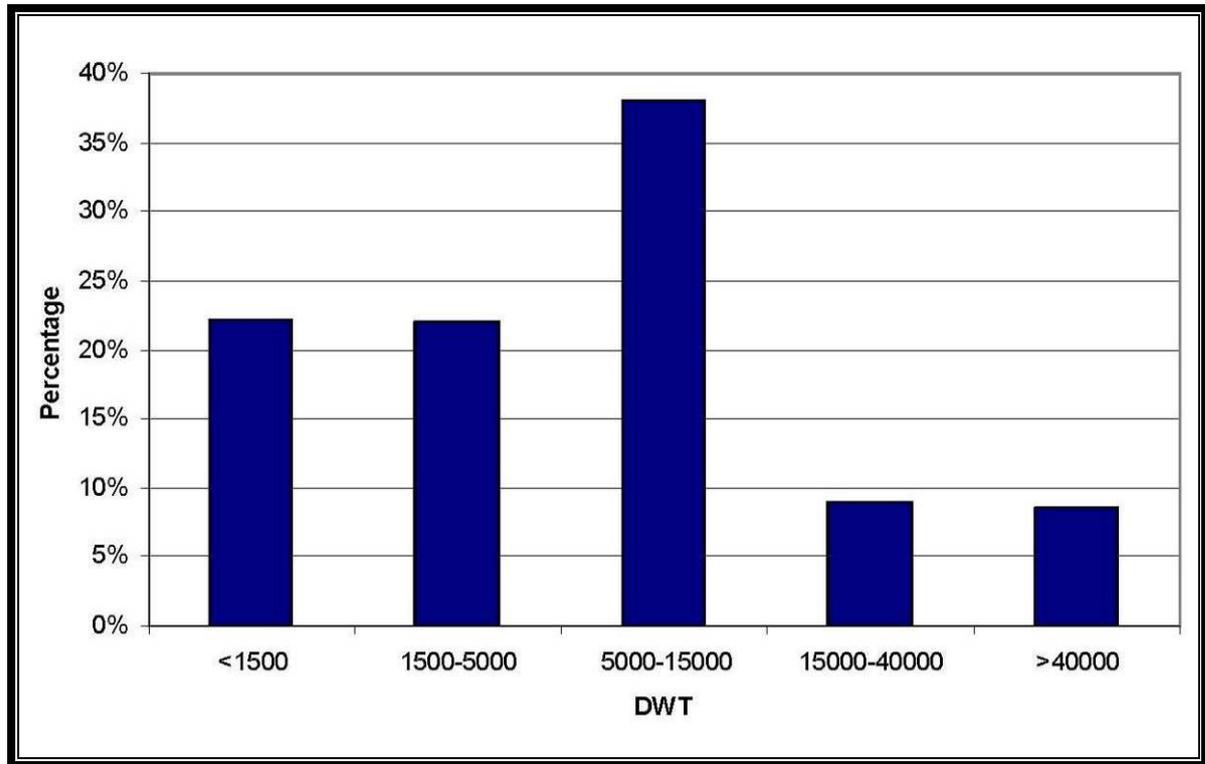
**Table 4.88 Ship routes close to the project.**

Route No.	Description	Ships Per Year	% of Total
1	Corfu – Southern Greece	2,167	6%
2	Southern Greece – Italy	3,17	9%
3	Gaios Paxos – Sarande	1,78	5%
4	Gaios Paxos – Igoumenitsa – Corfu	616	2%
5	Igoumenitsa – Lefkimmi	1,3	4%
6	Italy – South West	4,778	14%
7	Italy – Southern Greece/Turkey	9,64	28%
8	Ancona/Ravenna – Katakolon	1,46	4%
9	Othoni – Erikoussa	320	1%
10	Bari – Durres	466	1%
11	Corfu – Igoumenitsa	3,308	10%
12	Igoumenitsa – Bari/Brindisi	1,894	6%
13	Albania – Southern Greece	680	2%
14	Dubrovnik – Turkey	187	1%
15	Taranto – Southern Greece/Turkey	222	1%
16	Corfu-Platariaker	91	<1%
17	Brindisi – Vlore	493	1%
18	Corfu – Genoa/Barcelona	137	<1%
19	Greece – Sicily	80	<1%
20	Igoumenitsa – Ancona/Venice	1,17	3%
<b>TOTAL</b>		<b>33,959</b>	<b>100%</b>

**Figure 4.16 Type distribution for the shipping route database.**



**Figure 4.17 Size Distribution for the Shipping Route Database**



#### **4.17.2.1.2 Ship Density – Study Area**

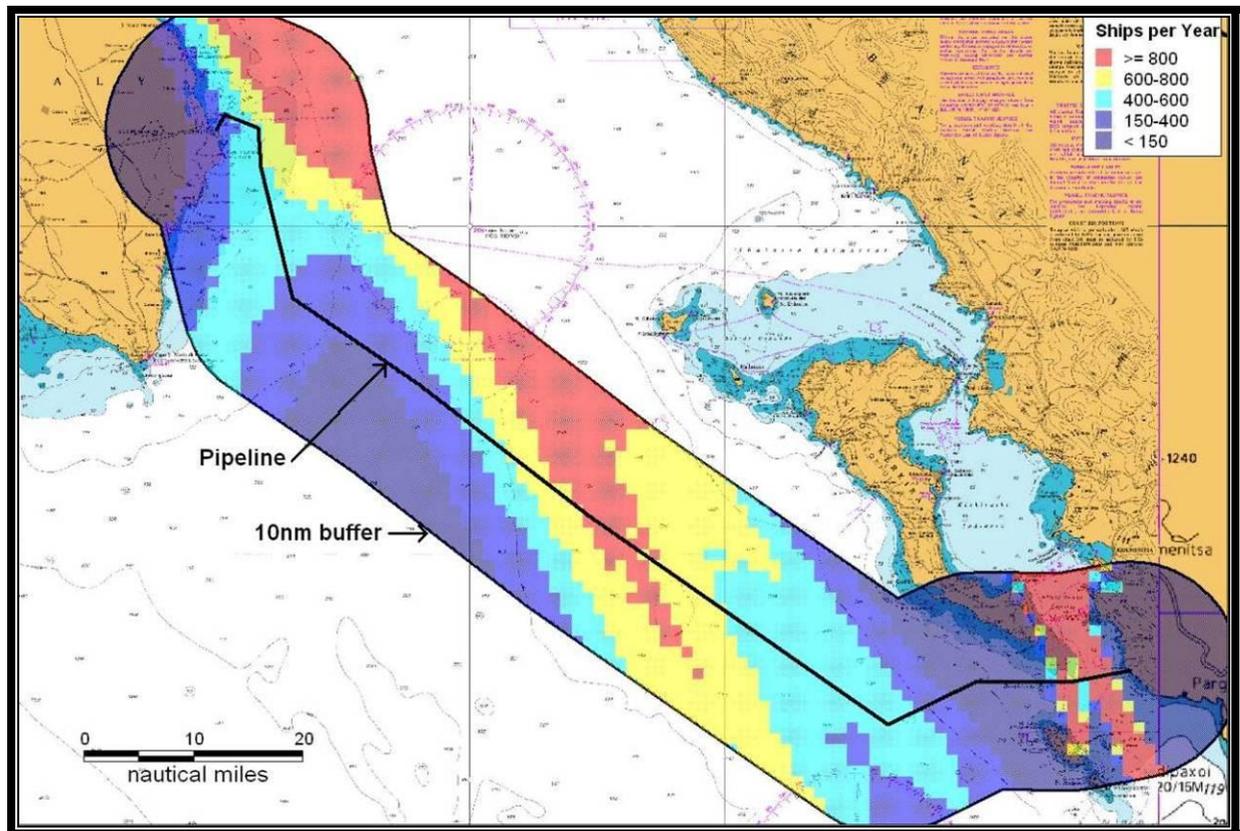
The variation in shipping density in the study area has been modeled using the route database. The results were ranked and color-coded according to relative shipping density for the total grid covered. Cells with negligible traffic were ranked as 1 (lowest density). The remaining cells were ranked from 1 (lowest) to 5 (highest), with approximately one-fifth of the non-negligible cells within each of the five categories.

The rankings correspond to the following ranges.

- Rank 1: < 150 ships per year per nm<sup>2</sup>
- Rank 2: 150 to 400 ships per year per nm<sup>2</sup>
- Rank 3: 400 to 600 ships per year per nm<sup>2</sup>
- Rank 4: 600-800 ships per year per nm<sup>2</sup>
- Rank 5: ≥ 800 ships per year per nm<sup>2</sup>

The results from the ship density model are presented in the following figure. The figure illustrates that the higher density areas are off the Greek landfall, mainly due to ferry routes, and the central area where vessels cross heading NW-SE.

**Figure 4.18 Ship Density Chart within 10nm of the Pipeline.**



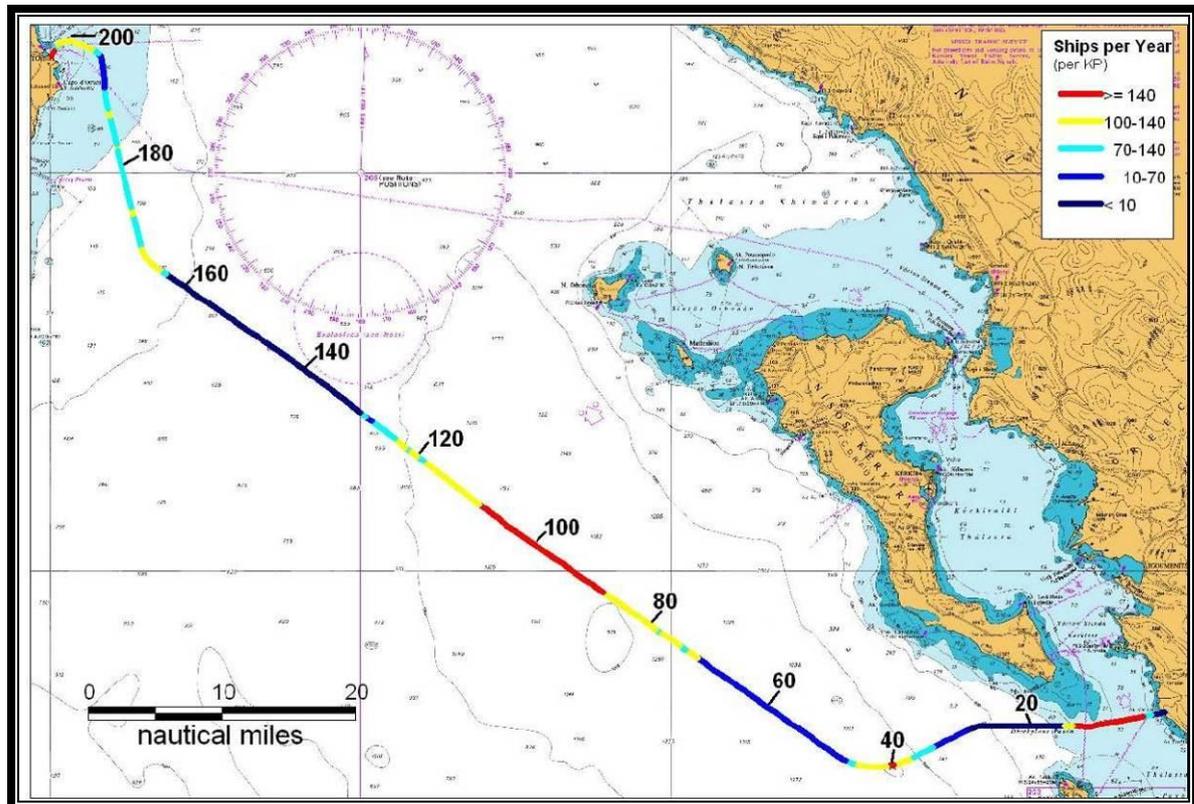
#### 4.17.2.1.3 Ship Density – Pipeline (per KP)

The annual ships per year crossing each kilometer section of pipeline (KP) have been estimated. The KP's have been numbered between 1 and 203 where KP=1 is the first kilometer section (at the Greek landfall) and KP=203 is the final section (at the Italian landfall). The variation in shipping density along the pipeline route is presented in the following figure. (The labels in the figure identify the KP at 20km intervals). The highest shipping density sections, colored red corresponding to over 140 ship crossings per year, are within the following zones:

- KP = 4 to 13
- KP = 40
- KP = 88 to 108

The highest density area for small-to-moderate size vessels (up to 15,000 DWT) tends to be near the Greek landfall. For larger vessels, the central area around KP = 100 is highest density.

**Figure 4.19 Annual ships per year crossing pipeline KP sections.**



#### 4.17.2.1.4 Conclusions

It was concluded that there are twenty main merchant shipping routes in the area with eleven of these routes intersecting the proposed pipeline route. The daily number of ship crossings is estimated at 65-70.

Figure 4.18 presents a ship density “heat map” indicating that the highest density areas are near the two landfalls (due to coastal traffic) and the central section of pipeline where vessels are crossing on international voyages. The highest density area for small-to-moderate size vessels was near the Greek landfall. For larger vessels, the central area around KP = 100 is highest density. Minimal anchoring was observed on AIS in the vicinity of the proposed pipeline route.

In any case, the construction works of the offshore part of the Project are not expected to cause any significant impact on marine activities of the area. According

to standard procedures of the Ministry, ships, traveling in the area will be informed of the construction works and limitations for approaching the area will ensure safety for both navigation and Pipeline. Pipeline's installation rate is expected to be approximately 2.0-3.5km per day, so the impact on navigation will be temporary.

#### 4.17.3 Road Network

Although it is entirely outside the project's area, Egnatia Highway should be mentioned. Stretching from Igoumenitsa to Alexandroupoli (Turkish-Greek borders), this new Highway is central for the development of Epirus Region. The impacts of the highway in the development of the region (tourism, industry, commerce etc) and also to the natural environment are yet to be fully assessed. However, a general assessment indicates the increase of all development factors across the Egnatia Highway.

Project's investigated area is traversed by parts of the National and Provincial Road Network. The most important for the local community ones are presented in the following table (see Annex A – Maps (Volume II), Map 7240-AU-LU-01); the major road is the one of Parga – Sivota (also known as Agia – Plataria).

**Table 4.89 Main Road Network in the Investigation Area.**

Road	Length inside the investigation area(m)
Parga – Sivota	19082
Karteri – Perdika	10124
Perdika – Arillas	3350
Perdika – Karavostasi	4511
Karavostasi – Dimokastro	3414

During the ongoing FEED of the Project, the preliminary qualified route crosses the asphalt road of Perdika – Sivota near KP2300 (see Annex B – Figures (Volume II), Alignment Sheets, scale 1:1.000).

**Table 4.90 List of Crossings (proposed onshore route).**

KP	Type of Crossing	Method of Crossing
2170	Dirt Road	Open Cut
2280	Asphalt Road	Open Cut
2300	Overhead Power Line	-
2330	Dirt Road	Open Cut
3350	Dirt Road	Open Cut
3780	Dirt Road	Open Cut
3940	Dirt Road	Open Cut
5750	Dirt Road	Open Cut
5760	Dirt Road	Open Cut
5840	Dirt Road	Open Cut
5950	Dirt Road	Open Cut
6020	Dirt Road	Open Cut
6510	Dirt Road	Open Cut
6570	Overhead Power Line	-
6590	Dirt Road	Open Cut
7290	Dirt Road	Open Cut
7720	Dirt Road	Open Cut
7970	Dirt Road	Open Cut
8010	Dirt Road	Open Cut

#### 4.17.4 Power Supply Network

Responsible for power supply of the area, through high voltage network, is the Public Power Cooperation S.A (PPC or 'DEI')., Independent Power Transmission Operator (IPTO or 'ADMIE') and the Hellenic Transmission System Operator S.A. (HTSO or 'DESMIE') According to official correspondence (see Annex K – Contact with Authorities (Volume III), the closest existing high voltage power supply line is the Arachthos – Igoumenitsa one. This and other medium voltage power lines, taken from the General Town Plans, are illustrated on the relevant land use map (see Annex A – Maps (Volume II), Map 7240-AU-LU-01).

Regarding the offshore section, according to the data presented in the PEIA and provided by the DMS study there are the following offshore power cables that are engaged with the proposed offshore route-corridor. These cables are operated by HTSO (previously by PPC) and TERNA (previously by Enel).

- Paxos – Paramithia Power Cables (1 and 2) (crossed in the Greek offshore section)
- Otranto - Ftelia Power Cables (1 and 2) (crossed in the Italian offshore section).

In the broader area there are more underwater cables as indicatively illustrated in the 7240-AU-OM-02 maps (see Annex A – Maps (Volume III)).

#### **4.17.5 Water Supply Network**

Water supply network is restricted to the local communities. The investigated pipeline routes do not enter the limits of any residential area; consequently no water supply network is assessed. Some irrigation channels or hoses could be present. These should be surveyed prior to the commencement of project's commencement.

According to the ongoing FEED, the proposed onshore route does not cross any main irrigation or water supply network.

#### **4.17.6 Telecommunication Network**

According to the General Regional Plan of Epirus (HGG 1451/06.10.2003) the telecommunication network is underdeveloped in Epirus. Available data from the General Town Plans did not reveal any telecommunication cables inside the onshore investigated area. However, it should be taken as granted than such cables will be present in the area.

Regarding the offshore section, the DMS study performed for the ongoing FEED of the qualified in the preliminary environmental licensing concluded that there are two offshore telecommunication cables: one from Preveza to Glyfada (national cable) and another one from Corfu to Otranto (international) (both crossed in the Greek section).

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#### **4.18 Unexploded Ordnance (UXO)**

It is noted that the UXO area exists in the broader area of the offshore route, near the borders of Greece – Italy, which was taken into consideration for the determination of the offshore route at the previous stages of the project.

According to the DMS performed during the ongoing FEED of the project no UXOs were identified along the offshore route.

#### **4.19 Historical and Cultural Data**

From the investigation of the Project's area, a series of archaeological sites were identified along the routings. In total, the following sites were identified:

- Dimokastro Acropolis

According to available information from the ministry of culture<sup>16</sup>, the archaeological site of Dimokastro (or Elimo-Elinokastro) is located at a hill south of Karavostasi bay of Perdika community. It is a fortified coastal settlement which is matched with ancient Elina. The fortified settlement is created during the late classical period. Most of the walls are built during the 4th century BC (circumstance 2000m) at the same time as the biggest ancient settlements of Thesprotia: of Elea (Veliani), Gitani and Fanoti (Doliani). At that period the area of the fortified settlement was ~70.000m<sup>2</sup>. During the Hellenistic era, the fortifications were extended to the west, encompassing a total area of 150.000m<sup>2</sup>, approximately, reaching to the coast at a fairly safe small harbor, Skala Hellinicou, thus confirming the growth of the settlement in the 3rd and 2nd centuries BC. The city's population at the time of its peak is estimated reaching 6,000 inhabitants. The position of the fortified settlement is exceptional, next to Karavostasi bay, which in antiquity should be penetrated deeper into the valley, creating a large natural harbor, as its newest name suggests. From the settlement itself, which seems to be facing the sea, one has excellent views over the southern part of Corfu, Paxos, Antipaxi and Lefkada.

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<sup>16</sup> Lazou, Lazari, Tzortzatos, 2007. Retrieve from [odysseus.culture.gr](http://odysseus.culture.gr)

In summer 2000, after the identification of three illegal excavations at the highest point of the fortification, an excavation of the ancient settlement begun. This research continued in the years 2001 ~ 2002 and resulted in the partial disclosure of some, already partially visible, buildings, which yielded no significant finds. According to preliminary findings of this survey, it is assumed that the continued occupation of the citadel after the destruction by the Romans in 167 BC, during the first century BC or even later, when inside a building a large cistern is constructed.

The fortified city has an area of 220.000m<sup>2</sup> and circumference wall of 3400m. The fortification surrounds the settlement from east to the north side, whilst the south and the west, naturally fortified and difficult accessible, are protected by a fortification only in their accessible points.

The fortification consists of three consecutive sections, which Mr. S. Dakaris conventionally named: the two east ones (acropolis A and B) with a perimeter of 1,600 m, fit chronologically in the fourth century BC, while the west one (acropolis C), with a circumference of 1,400 m, is constructed in the Hellenistic period. The fortification wall is preserved in good condition. Made in polygonal wall masonry and width ranging from 0.80 m on the western side of citadel 'A', up to 3.90 m on the north side of the citadel 'B'. The main gate of the settlement is east - southeast reached by an uphill path that leads from the plain. A second gate was at the southeastern edge of the citadel " B", while at the northwestern part of the fortification at the hill top, south of the northwest tower, an auxiliary gate was serving the transition from citadel A to citadel " B".

Throughout the fortified settlement foundations of buildings are visible, some of which are carved in the rock as are some rock-hewn cisterns and foundations offerings. Inside one of the houses, a large water reservoir of the first century BC was recently found. All buildings are built on artificial terraces which are held by strong retaining walls, while in the center of the citadel" A" is an open space - flat, where public buildings of the city were apparently centralized. Roads, partially carved into the rock formed around the buildings and the perimeter fortification.

- Grimala archaeological site

No published information are available for this site. It is of the Classical, Hellenic and Roman period.

- Polineri Acropolis

In Polyneri one can see the ruins of the settlement and the Acropolis, the middle-age walls and parts of the modern village, which coexist in such a way as to create a total picture of historical continuity. The ancient settlement, which was approximately at the same position as the modern settlement Polineri, is located at a 300m rising, in a natural fortified position, controlling the bay of Plataria and the passage from which today the route Igoumenitsa – Parga passes. The ancient Acropolis surrounded by polygonal walls with carefully placed blocks. The wall, which has a total length of 990m and an average thickness of 3.5 m, surrounds an area of 55.000m<sup>2</sup>. The fortified settlement, which has been largely destroyed by newer buildings dates from the late Classical period. (4th century BC). The fortification consists of rubble (stone masonry), ancient building material in secondary use, plenty of lime-cement and bricks (plinths) irregularly placed. It has roughly triangular plan, with a total circumference of 160m and width 1.80 m. Exact dating of the monument is not feasible because of insufficient data. It could however be dated to the later Roman times. Today, the modern village of Polineri has developed among the ruins of the ancient Acropolis.

- Vrahonas settlement

The abandoned traditional settlement of Vrachona (othoman settlement) is located at a hill SE of Sivota and consists of approximately 50 ruined houses. Most of them are two stores high with arched constructions in the ground level, constructed with local stone, dating from 18th to 19th century. In the west of the settlement there are also ruins of a small prehistoric acropolis, which consists essentially the only example of fortified prehistoric settlement in broader Thesprotia region (see previous monument). Brahonas settlement was the initial area where Sivota village was located and prospered during the previous century. Residents were engaged in stock farming.

With the exception of Dimokastro area, there is no engagement with any of the previously mentioned archaeological sites, as supported by the correspondence with the competent authorities (see Annex K – Contact with Authorities (Volume III)). Dimokastro monument is not engaged directly but it is neighboring to the qualified pipeline route (ALT1a). According to the same correspondence, the distance between the boundaries of Dimokastro archaeological site and the proposed route (approximately 50m) has been deemed adequate. In case antiquities are discovered during construction works, the Owner is obliged to comply with the recommendations

of the Archaeological Service; this could involve works' supervision, and undertaking the cost of recovery excavations, maintenance, study and publication of the findings, according to the existing legislation.

Regarding the offshore section, during the performed DMS, along a 500m buffer zone of the proposed offshore pipeline, some locations were identified where on site investigation with the use of ROV (Remote Operated Vehicle) was deemed necessary. In May 2012 an archaeological marine survey was performed by ELKETHE, under the supervision of the Marine Antiquities Committee in the wider area of the pipeline route and 3 archaeological/ historical findings were discovered. The assessment of the competent Archaeological Ephorate concluded to the following:

- At point IGI-1 (coordinates 400963, 4345569, in WGS84, 34N), there is a wreck from the roman period of the 3rd century A.D., in a depth of 1.180m, at close distance (13m) from the intended pipeline route.
- At point IGI-7 (coordinates 400591, 4342821, in WGS84, 34N), there is a wreck of the 17-18th Century A.D. in a depth of 1.260m, at a distance greater than 2.000m from the intended pipeline route.
- At point IGI-10 (coordinates 385098, 4352392, in WGS84, 34N) there is a wreck from the roman period, at the same age with the wreck of the first point, in a depth of 726m and at great distance from the intended pipeline route.

According to the M.D. 3385 (HGG 1701/B/19.11.2003), a minimum distance of 300m is defined as protection zone for a series of activities, as per Article 15, par. 4 of Law 3028/2002. Consequently, in reference to the findings close to points IGI-7 and IGI-10 no impacts are expected from the construction of the project. However, regarding IGI-1, a change of the pipeline route was required, in order to pass at a distance greater than 300m from the identified wreck. The adapted final pipeline route passes at a distance of 322m from the wreck, which is considered satisfactory, for ensuring its integrity.

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#### **4.20 Existing Pollution Status**

In the broader region, there are no nuisances regarding air quality, vibrations or noise. The overall ecological status is good. Upcoming touristic development, especially in the Stavrolimenas area, does not seem to have significant impacts on the ecological status of the overall investigated area, at least up till now.

#### **4.21 Landscape characteristics.**

The major landscape feature is the natural landscape of shrublands and grasslands. There are no buildings or other manmade structures of significance or geological formations of importance. However, Epirus region is known for its folklore architecture, especially for its mountainous settlements. Buildings are engulfed by the landscape through the use of local materials, orientation and morphology.

The choice of the C/S-M/S locations takes into consideration the main topological characteristics of the broader area, including: settlements, main roads, places of importance to tourists/visitors, the hills and other points at various elevation.

In the relevant annex (Annex E - Photographic documentation of the Onshore Section (Volume III)) the existing landscape of the proposed locations of the project are shown. In the relevant annex (Annex G - Photorealistics of Onshore Facilities (Volume III)), the prepared photorealistic impressions are presented. It is evident that emphasis was given to the architectural design of the facilities (e.g. limited volume, construction of roof) so that the Stations should be as harmonized as possible with the natural environment.

#### **4.22 Trends.**

As previously described the Egnatia Highway has changed the up till now road and transport network of the Epirus Region. The highway has no direct impact on the project, but may have impact, in the future, to the development of the Region. Sectors of economy such as commerce and tourism could be positively affected. At the same time, there could be some negative impacts on the Regional Environment if the sustainable approach is not opted.

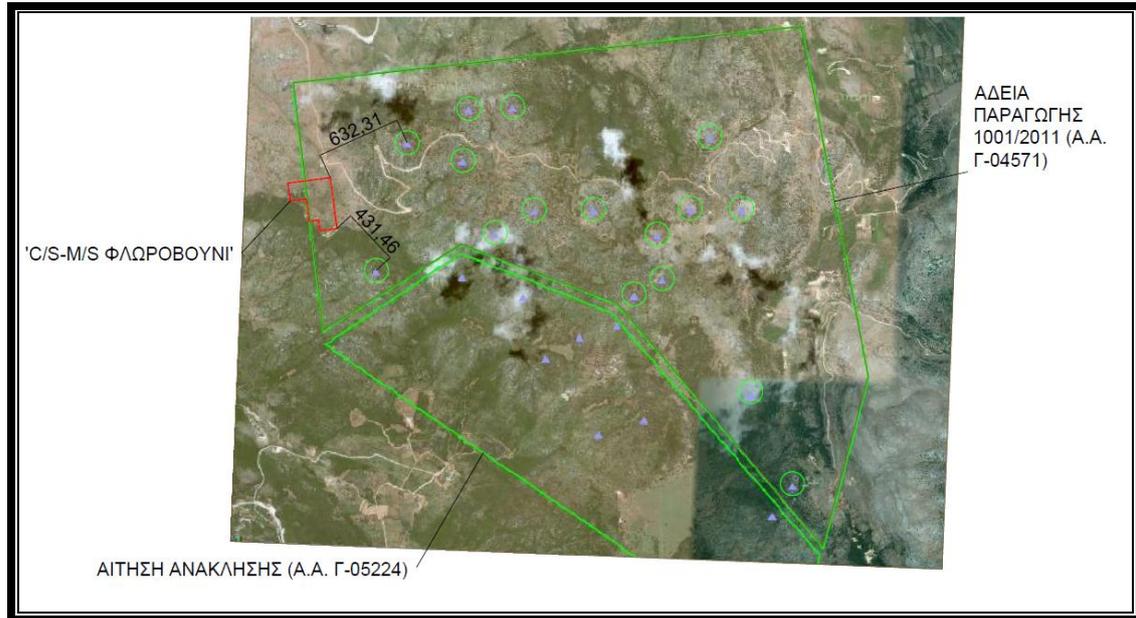
According to the General Regional Plan of Epirus (HGG 1451/06.10.2003) the connection of all Epirus Region with the Natural Gas National Network is deemed

significant. Specifically, the connection with Eastern Greece or through the investigated project of natural gas interconnecting network between Greece and Italy. In combination with L.4001/2011, which dictates the creation of Epirus Natural Gas Supply company, and the implementation of the investigated project this goal seems feasible.

Concerning other significant infrastructure developments in the project area, based on data from Regulatory Authority for Energy, a wind farm of 26MW planned at Kalivia site has been aborted. On the contrary, at Florovouni site, a wind farm of 32MW, of EDF EN GREECE S.A. & Co – PREVEZA 1 LTD, has received the 1001/2011 positive response (Production Permit). The area of the wind farm overlaps, partially, with the C/S-M/S Florovouni. The study of the installation of the 32MW wind farm by EDF EN GREECE S.A. & Co – PREVEZA 1 LTD has received the Production Permit but is yet to receive final operation permit. The overlapping of the wind farm parcel and the C/S-M/S Florovouni site has been addressed through a meeting between the two interested parties with positive results.

The wind farm project has 16 wind turbines in an overall area of ~876ha and includes most of the Onshore Facilities parcel as illustrated in the following figure. The overlapping section does not include any wind turbines inside it. Regarding safety, in case of both projects' operation, contacts with the engineering team of the wind farm development have already been established and reached an agreement on relocating the two closest to the Facilities wind turbines. More details are presented in the relevant section of cumulative impacts in chapter 6.

**Figure 4.20 Wind farm and Onshore Facilities.**



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## 5 DESCRIPTION OF THE PROJECT

### 5.1 General Description of the Project

The proposed Project, that is construction of the Greek Part of the Offshore High Pressure Natural Gas Pipeline Greece – Italy, will be undertaken by the Company “I.G.I. POSEIDON” and consists of:

- The Offshore Pipeline (length ~205 km, of which the 145 km belong to the Greek section)
- The Compression and Metering Station in Thesprotia or Preveza Region.
- The Onshore Section, approximately 11km long (for the proposed route), i.e. 8.2km in Greece and 2.6km in Italy

The pipeline studied in the present ESIA shall have a 32” diameter and 140bar operating pressure (160bar design pressure) and it is part of the whole Interconnector Greece-Italy (I.G.I.).

The whole Interconnector Greece-Italy Pipeline starts at the Greek-Turkish borders, at “Kipi” location in Evros Region, crosses Greece from East to West and ends at the proposed landfall point in “Omprela 2” in Thesprotia Region. From this point, the Natural Gas Pipeline continues offshore, crosses the Ionian and the Adriatic Sea, reaching Otranto, Italy. The onshore part from Kipi to the Onshore Facilities is under the scope of D.E.S.F.A.

The main objective of the overall I.G.I. is the unobstructed transportation of gas from reserves located in the broader area of Caspian, the Middle East and Eastern Mediterranean, to consuming centers in Italy, West Europe and the Balkan Peninsula.

It should be noted that a part of the natural gas quantities transferred through the I.G.I., will supply Bulgaria (through the Interconnector Greece-Bulgaria – I.G.B.) and also Epirus and Western Macedonia Region with natural gas. Agreements have been signed and studies for the I.G.B. have already started, whilst DEPA has to start the procedure for the Epirus’ and Western Macedonia’s Gas Supply Company within one year of the pipeline’s operation commencement at the latest (L.4001/2011, ar.179).

With this Project, Greece is promoted to a key energy factor in the broader region by implementing its national strategy with the aim of becoming a “Natural Gas Channel”

between East and West. This is made clear through the voting of Law 4001/2011. Under ar. 176, the project has been characterized as of National Importance and Public Interest.

### **5.1.1 Reference to Natural Gas**

From a strategic point of view, Natural Gas has been chosen as an alternative fuel resource, in order to replace Diesel, crude oil and LPG, to a percentage of 10-12% of the country's overall energy balance, since it demonstrates a number of advantages:

- It consists of a mix of gaseous hydrocarbons, mainly of methane (CH<sub>4</sub>) in a percentage of 85-95%, ethane (C<sub>2</sub>H<sub>6</sub>), propane (C<sub>3</sub>H<sub>8</sub>), other nitrogen oxides (NO<sub>x</sub>), carbon dioxide (CO<sub>2</sub>) and others. The mixture is clean, colorless, odorless, non-toxic and insoluble in water, it ignites in the air in concentrations 5-15% (by volume), conditionally fire spark exists, and its Calorific Value ranges between 9.000-11.000 Kcal/m<sup>3</sup>. The level of emissions during combustion is significantly lower than that of conventional fuels, which is the main environmental advantage of Natural Gas.
- Natural Gas occurs in underground geosynclines (special layers), its verified reserves are in ample quantities, it is the third energy source in international level, and its cost is lower than that of the conventional fuels.
- For its use, there is no need for additional process of cleaning and treatment, as is the case for instance with the crude oil or the coal. It is easily burned and is very widely used in small industry (ovens, ceramics, etc) and industry (fertilizers, paper mills, cement plants, building materials etc), in power production (units of combined circle, cogeneration of electricity and heat), as well as in residential uses (heating, hot water, cooking, etc).

### **5.2 Description of Project's components**

The Poseidon Project, developed by IGI Poseidon S.A. is part of the IGI (Interconnector Greece –Italy) Project. The IGI Project will allow the supply of gas from the Middle East and Caspian region to the European market through the interconnection of the Greek and Italian gas networks.

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The IGI Project consists of two sections:

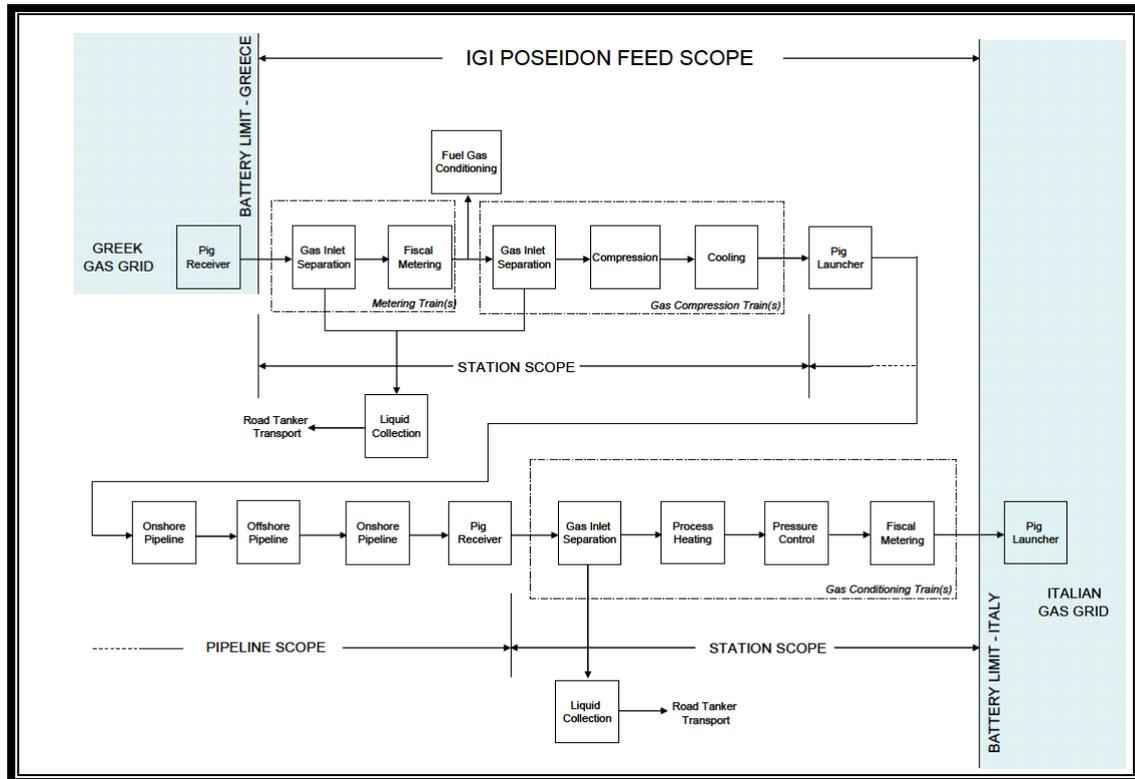
- An onshore section, stretching from Komotini (north-east of Greece, next to the Greek Turkish border) to the north western coast of Greece (Thesprotia area). This section will be developed by the Greek company; Hellenic Gas Transmission System Operator, DESFA (company active in gas transmission sector, previously part of DEPA);
- An offshore section, from the north-western coast of Greece to Italy.

The latter section of the IGI Project is the Poseidon Project, which comprises:

- A compressor and fiscal metering station next to the Greek landfall (Florovouni, Thesprotia area);
- A deep-water offshore pipeline from the Greek landfall to Italy (Otranto, Apulia region). The offshore section (about 205km, ca. 1370 m water depth) will cross the Greek shelf, descend the slope into the north Ionian Basin and then ascend the Italian slope, to make landfall east of Otranto;
- A receiving fiscal metering and pressure reduction station in Italy (Otranto, Apulia region);
- Two short buried onshore pipeline sections connecting compressor station in Greece and metering station in Italy to the respective landfalls, including associated scraper launching and receipt facilities;
- Associated SCADA and Telecommunication systems.

The overall system flow diagram is illustrated in the following figure.

**Figure 5.1 Overall system flow diagram.**



In the rest of the chapter, a detailed description of the Greek part of the project is presented.

### 5.3 Greek Part of Project

The main components of the Greek section of the project are:

#### 5.3.1 Compressor and Metering Station

The compressor and metering station in Greece consists of the following main process units:

- Metering unit. The purpose of the metering unit is to measure the quantity/quality of gas being transferred between the upstream pipeline operator and IGI Poseidon. The metering unit consists of the following components: Scrubbers, Metering runs, Sampling systems
- Compression unit. The purpose of the compression unit is to elevate the pressure of the gas in order to be able to reach Italy. The compression unit

consists of the following components: Scrubbers, Compressors (gas turbine driven), Coolers, Anti-surge & train recycle loop

The compressor and metering station in Greece will include the following utility systems:

- Fuel gas system (for gas turbine driver)
- Vent (cold vent) system (for emergency release of gas)
- Process drain system (for collection of liquid hydrocarbons)
- Open drain system (for collection of rain / spilled fluids)
- Sanitary drain system (for collection of sanitary waste / fluids)
- Instrument & Utility Air system (for valve actuators and tool-air)
- Nitrogen system (for purging of vent system)
- Diesel system (for diesel supply to emergency diesel gen set)
- Potable water system (supply by means of truck)
- Sewage disposal by means of septic tank

The Greek Compressor and Metering Station will be supported by the required systems, equipment and site-wide infrastructure and include, but not limited to, the following;

- Building facilities and other housings, including HVAC, hot water systems, sewerage, public health, drainage, active fire protection, lighting, power distribution, alarm systems, telecoms and all other services.
- Other site-wide infrastructure including roads, surface areas, landscaped areas, fencing, access, tanks and bunds, drainage and waste water systems, including oily water collection/treatment systems.
- Pipe work including suction and discharge lines, headers, inlet slug catchers, scrubbers, filters, separators, condensate collection systems including sump tanks, vent/flare systems.
- Gas compressor units including related utility systems such as intake system, exhaust system, gas and other coolers.

- Fuel-gas systems, gas and other heaters.
- Pressure control systems.
- Metering systems.
- Utilities including compressed air, instrument air, nitrogen systems, potable and utility water systems, other diesel storage and distribution systems, lubrication storage and distribution systems, other hazardous materials storage and dispensing systems.
- Control and instrumentation systems, including local controls, distributed controls for packages/systems and field instrumentation, emergency shutdown systems, fire and gas detection systems, ICSS.
- Corrosion protection / monitoring systems.
- Electrical power and distribution systems including transformers, switchgears, motor control centers, distribution boards, emergency generator systems.
- UPS systems, grounding systems, lightning protection systems, cabling, lighting and small power, winterization- and heat tracing systems, security- and intruder systems, communication systems.
- All process, instrumentation, control, mechanical, electrical, electronic and special equipment.
- All other aspects required for the realization of proper functional facilities.

The overall flow diagram of the compressor and metering station Onshore Facilities is illustrated below.

The main facilities, including the arrangements for compressing, metering and regulating of natural gas, consist of ground floor buildings of a total area of 4.500m<sup>2</sup> approximately.

Regarding the necessary area of the Station site, the following are noted:

- The fenced area of the Station is illustrated in Annex B – Plot Plans (Volume II) and has an area of 77200m<sup>2</sup> approximately. In this area, it is included the planned final siting of the facilities, in order to operate to the maximum capacity (4 compressor units + 1 back up, instead of 3 compressor units + 1 back up, during the first phase). Although typically located outside the fenced

area, an area of approximately 4800m<sup>2</sup> (80x60m approximately) is included in the above mentioned area of 77200m<sup>2</sup>, for potential use of visitors parking etc.

- A ring road for serving the station and the neighboring properties will be required. This road will replace the existing earth road and will be constructed by the Project Owner. This road is estimated to have a width of 6m and at a distance of 8m from the fence line.

Regarding the site, expropriation of the area will be requested for the construction and operation of the Project (see Annex A – Maps (Volume II), Map 7240-AU-LU-02, sheet 3 of 5). The site will also include:

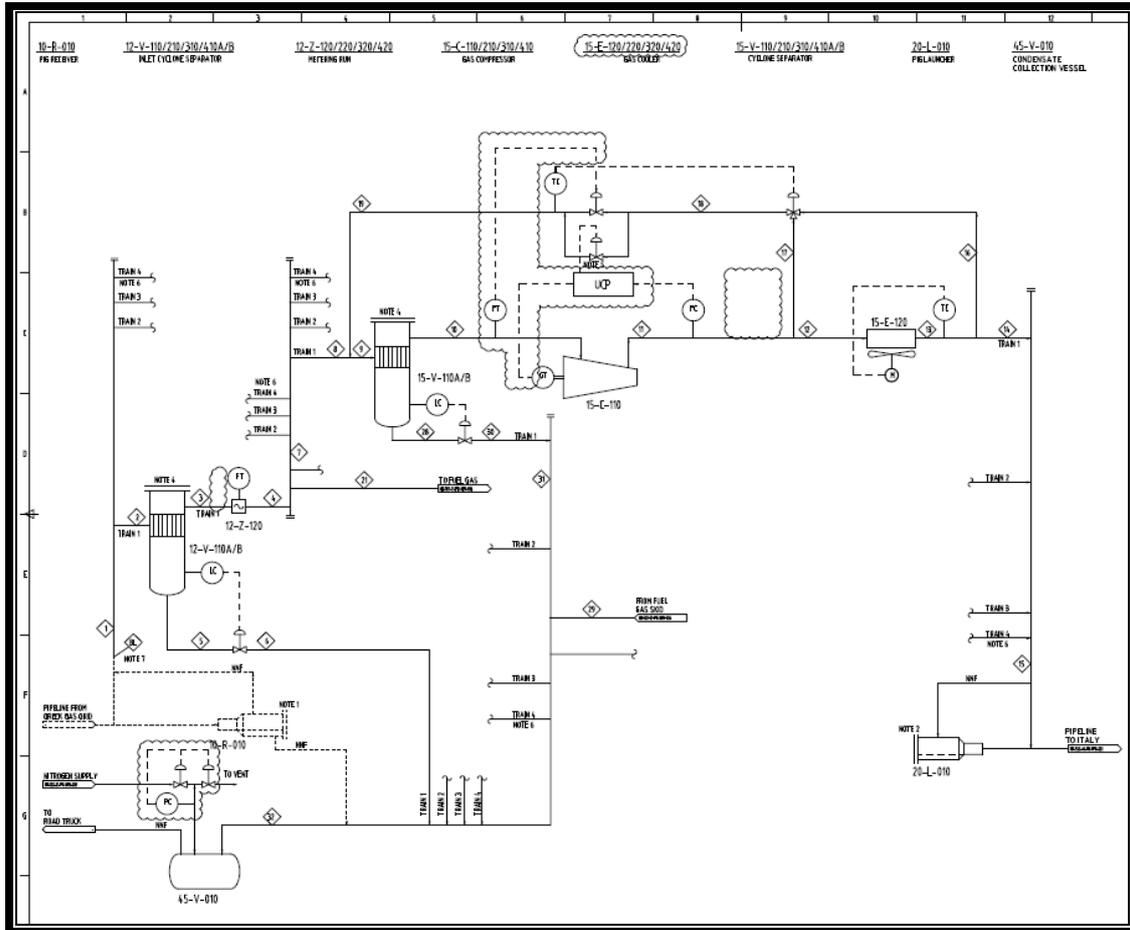
- An area of 14416m<sup>2</sup> (136x106m) which will be used for temporary construction facilities for the installation of the 5th compressor unit, as well as for potential future auxiliary spaces. It is noted that the sum of this area (14416m<sup>2</sup>) is approximately equal to the 9ha which are mentioned in the rest of the text as surface of the Compressor and Metering Station.
- A corridor 10 to 20m in the perimeter of the Station, for the case that additional space is required during the Detailed Design.

In any case, all the legal procedures for the necessary land acquisition will be followed.

The equipment that will be used in the Compressor and Metering Station will incorporate the latest technology. The layout of the Onshore Facilities is provided in the relevant figures of Annex B (see Annex B – Plot Plans (Volume II)) whilst the following pictures illustrate similar Compressor and Metering Stations in European countries.

It is noted that in 2008 and in 2011 sites visits at operational Compressor and Metering Stations, of similar technology, were performed: (a) in 2008 at Messina's area and (b) in 2011 at Tuscany (Station Terra Nuovo Bracciolini) and at Emilia Romania (Station Poggio Renatico). These visits were performed by IGI representatives, local community representatives and journalists. The pictures of the said stations are illustrated here below.

**Figure 5.2 Overall flow diagram.**



**Picture 5.1 Onshore Facilities in Italy (Messina).**



**Picture 5.2 Onshore Facilities in Italy (Messina).**



**Picture 5.3 Onshore Facilities in Italy (Messina).**



**Picture 5.4 Onshore Facilities in Italy-Tuscany (visited by IGI and local community representatives, and journalists in 2011).**



**Picture 5.5 Onshore Facilities in Germany (Eischleben).**



**Picture 5.6 Onshore Facilities in Germany (Eischleben).**



### **5.3.2 Pipeline System**

The Greek part of the pipeline system consists of the following components:

- The onshore section, from the landfall site to the compressor and metering station (onshore facilities) (~8km). A small block valve (occupying ~150m<sup>2</sup>) at

approximately 600m from the Greek landfall site, necessary for the safety of the natural gas pipeline. It is stressed out that the block valve station has a minimal to no visual influence due to its size.

- At the C/S-M/S area, a pig trap will be included to facilitate pigging operations for inspection of the pipeline during the operational phase
- The offshore section from the landfall site to the end of Greek territorial waters, of approximately 145km. This section is divided into:
  - Near shore section (coastal) up to the 25m depth contour, where the pipeline will be buried (~500m), and
  - Offshore section, in deeper waters routed along the Greek continental shelf, Greek slope and Ionian basin

#### **5.4 Location of the Project (Proposed Routing)**

The Project includes the construction and the operation of the Offshore Natural Gas Pipeline in Ionian and Adriatic Sea, which will transfer Natural Gas from Caspian Region, the Middle East and Eastern Mediterranean to Italy and the Western European Market. The offshore section of the pipeline was concluded after the performance of RMS by MMT S.A. and DMS by Fugro GeoConsulting S.A.

The investigation of the onshore routing has been part of an Integrated Assessment of a number of alternative/ feasible routings, adjusted to the natural and the social-economic characteristics of the specific region.

It is noted that the project has gone through a preliminary environmental and social impact assessment (PEIA) which has been approved by the competent authorities, according to national legislation.

It is deemed important to provide, in short, the history of this pre-license: The initial PEIA was qualifying the route Stamponi-Kalivia, from the Landfall site at Stamponi to the Onshore Facilities at Kalivia site. Due to issues raised by the Local Community, the landfall site Omprela 2 was opted and consequently the route from Omprela 2 to Variko site (location of the onshore facilities) was finally approved with the 13021/17.09.10 decision of Ministry of Environment, Energy and Climate Change. In continuance, and following the recommendation of the Local Authorities, in front of

the 'Committee on Production and Commerce' of the Greek Parliament, the area of Florovouni was investigated as a new site for the onshore facilities. The Onshore Facilities location was agreed during a site visit with the participation of the Local Authorities' representatives. This modification, along with the necessary, corresponding modifications of the pipeline route, was approved with the 200088/08.07.11 decision of Ministry of Environment, Energy and Climate Change, through the submission of a supplementary PEIA.

### **5.5 Methodology of preparation and design of the project's alternatives**

The methodology used in the study of the alternative routings is based on the following principles:

1. Routings' investigation must be based on multi-scientific data analysis of the traversed areas
2. Construction feasibility must be examined in the total length of the alternatives routings
3. Routings must be in a safe distance (technically feasible) from protected forest ecosystems or, if it cannot be avoided, they must have the minimum impact on them.
4. Geological and hydro geological formations must be taken into account in the geometry of the routings
5. Assessment of existing/ planned land uses of the area that are crossed by the routings
6. Assessment of the potential local community's acceptance of the project.
7. Assessment of crossing protected areas and ecosystems (e.g. NATURA 2000), if any
8. Investigation of the landfall site's suitability

Firstly, routings are drafted in 1:50.000 scale drawings and at the next phase, routings are adjusted to more detailed topographical diagrams of H.G.M.S. of 1:5.000 scale, where improvements, if any, take place so as every alternative route is sufficiently sound, both scientifically and technically.

**(i) Routings in 1:50.000 scale:** A general route of the Pipeline is drafted, based on the geographical demands of the Project and all environmental data (such as protected areas, General Town Plans, summer houses, forests, industrial and manufacturing areas, landfills, archaeological sites, transport networks and military areas). In this phase, all the consequences related to the Project are pre-assessed and recorded. As background material geological maps, general use maps of 1:50.000 and 1:100.000 scale, and satellite images (in scale 1:20.000, approximately) are used.

**(ii) Routings in 1:5.000 scale:** The initial proposal, designed on the 1:50.000 diagrams, is adjusted in detail based on topographical diagrams of 1:5.000 scale by H.G.M.S., which are more detailed, and any required modifications are made.

The Onshore Facilities for the Compressor and Metering Station were investigated based on various criteria such as space availability and morphology, distance from the landfall site and constraints regarding social and natural environment. These could be enlisted as follows:

- Prohibitive Criteria (archaeological, residential and other statutory restrictions)
- Safety Criteria (flood risks, airports and military installations, etc)
- Operational criteria (accessibility, connectivity)
- Environmental Criteria (protected areas, visibility)
- Other criteria (social acceptability)

The block valve station follows the same selection criteria, even though it occupies a very small area (150m<sup>2</sup>) and consequently the overall scale is much smaller.

## **5.6 Investigation of Alternatives**

### **5.6.1 Investigation of Offshore Alternative Routings**

Five (5) near shore (coastal) Alternative Routes were examined from a technical point of view, illustrated on the attached maps of 1:50.000 and 1:100.000 scale. These refer to the relevant onshore parts near the landfall sites (sites “Stamponi”, “Sofas”, “Stavrolimenas”, “Omprela 1” and “Omprela 2”); they are technically feasible and are examined in detail in the present Environmental Impact Assessment, under

the following section A. The section A corresponds to the offshore (deep-water) corridor that was qualified during the feasibility study. Alternative offshore routing OS-AA and OS-B (same offshore corridor) refer to the deepest section of the offshore part and, although technically feasible, are not preferable. Alternative offshore routing D (northern corridor) technically was rejected since it creates significant navigational and maritime safety issues and on top of that environmental and permitting (e.g. crossing in short width of numerous international cables) issues.

#### A. Proposed Offshore Section Routing (OS-A):

From the various landfall sites (Stamponi, Sofas, Stavrolimenas, Omprela 2 and Omprela 1) offshore subsections proceed up till the meeting point with the Proposed Offshore section axis (OS-A). For offshore subsections ALT3-OFFSHORE, ALT4-OFFSHORE, ALT5-OFFSHORE and ALT7-OFFSHORE this point is IP-1 (168777, 4357239 in GreekGrid87), whilst for the PROPOSED OFFSHORE ROUTING and ATL1-OFFSHORE, the meeting point with the offshore section axis is IP-1A (164535,4356528 in GreekGrid87) <sup>17</sup>.

##### o Proposed Offshore Route (OS-A)

The Proposed offshore route starts from the landfall site “Omprela 2”, which is located in the southern part of the coastal zone of Perdika Local Community in Igoumenitsa Municipality of Thesprotia, near the administrative borders of Parga Municipality, submerges in the Ionian Sea south of Corfu Island up to a distance of ~16.2km southwest of it, follows a southwest course for 9km. Then it follows a northwest course for ~19km north of Paxi, and it heads southwest, passing between Corfu and Paxi, for ~3.5km until the end of Greek Territorial Waters. At that point, it heads towards the coast of Otranto in Italy. The total length of this Greek offshore section is about 145km. During the special marine archaeological

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<sup>17</sup> The names of the offshore alternatives correspond to the name of the onshore alternatives that use as landfall site the starting point of each offshore alternative. Since ALT1 and ALT2 have Omprela 2 as landfall site, their corresponding offshore alternative is ALT1-OFFSHORE; for ALT5 and ALT6 that have Omprela 1 as landfall site, their corresponding offshore alternative is ALT5-OFFSHORE. ALT1a and ALT1b due to different approaching angle to the landfall site have a different near shore route. Since, through the preliminary environmental licensing process ALT1a was the qualified onshore route, the proposed offshore (near shore and offshore) route is the PROPOSED OFFSHORE ROUTE.

survey, ship wrecks were observed close to the route from which the necessary distance (at least 300m) is kept.

- Nearshore Alternate Routing ALT1-OFFSHORE.

The Alternative Routing ALT1-OFFSHORE of the offshore part starts from the landfall site “Omprela 2”, which is located in the southern part of the coastal zone of Perdika Local Community of Igoumenitsa Municipality, near the administrative borders of Parga Municipality, submerges in the Ionian Sea south of Corfu Island up to a distance of 16.2km southwest of it, follows a southwest course for 4km. Then it follows a northwest course for 14.5km north of Paxi, and it heads southwest, passing between Corfu and Paxi, for 9.5km until the end of Greek Territorial Waters. At that point, it heads towards the coast of Otranto in Italy. The total length of this Greek offshore section alternative is about 147km.

- Nearshore Alternative Routing ALT3-OFFSHORE.

The Offshore Alternative Routing ALT3-OFFSHORE of the offshore part starts from “Perdika” bay (Landfall site “Stamponi”), 200m north of “Sofas” beach, submerges in Ionian Sea at a distance of 14km from the eastern coasts of Corfu, following a SW course for 13km and then heading W/SW between Corfu and Paxi for about 15.3km it ends at the limit of the Greek Territorial Waters. From that point on, it heads westwards, in the middle of Adriatic Sea, approaches the Italian shelf, south of Otranto, and then turns northwest and landfalls at the coast of Otranto in Italy. The total length of this Greek offshore section alternative is about 145km.

- Nearshore Alternative Routing ALT4-OFFSHORE.

The Alternative Routing ALT4-OFFSHORE of the offshore part starts from “Perdika” bay (Landfall site “Sofas”) northwest of Perdika Local Community of Igoumenitsa Municipality, submerges in the Ionian Sea at a 14km distance east of Corfu, following northwestern direction for 3.5km and then southwestern direction for 10.5km. Then, heading west/southwestern, passing between Corfu and Paxi it ends on the limit of the Greek Territorial Waters. At that point, it heads towards the coast of Otranto in Italy. The total length of this Greek offshore section alternative is about 148km.

- Nearshore Alternate Routing ALT5-OFFSHORE

The Alternative Routing ALT5-OFFSHORE of the offshore part starts from the landfall site “Omprela 1” located in Parga Municipality of Preveza Region jurisdiction (in small distance from “Omprela 2” which belongs to Perdika Local Community of Igoumenitsa Municipality) submerges in the Ionian Sea south of Corfu Island up to a distance of 16.5 km southeast of it, following a southwest course for 3.5km. Then it follows a northwest course for 9km north of Paxi and it heads southwest passing between Corfu and Paxi for 16.7km until the end of Greek Territorial Waters. From that point, it heads west in the middle of Adriatic Sea, approaches the Italian shelf south of Otranto and then turns northwest and landfalls at the coast of Otranto in Italy. The total length of this Greek offshore section alternative is about 145km.

- Nearshore Alternate Routing ALT7-OFFSHORE

The Alternative Routing ALT7-OFFSHORE of the offshore part starts from landfall site “Stavrolimenas” at Stavrolimenas bay southwest of Perdika Local Community of Igoumenitsa Municipality, submerges in the Ionian Sea south of Corfu Island at a distance of 15 km southeast of it, follows a southwest course for 11km and heads west/southwest passing between Corfu and Paxi at a distance of 16.4km until the end of Greek Territorial Waters. At that point, it heads towards the coast of Otranto in Italy. The total length of this Greek offshore section alternative is about 145km.

It should be noted that during scheduled (May 2012) offshore archaeological survey along the proposed offshore route of the project (OS-A). No archaeological findings (shipwrecks) along this route were identified that would obstruct the implementation of the proposed offshore pipeline route.

Having already received the preliminary environmental license of the landfall site ‘Omprela 2’, the C/S-M/S at Florovouni site, and the corresponding route, it was deemed necessary to give emphasis on these components. Consequently, the already completed DMS and the ongoing FEED, among other studies, have focused on the specific site and the corresponding routing.

#### B. Other Alternative Offshore Routings

Other alternative offshore routings include two technically feasible routings (A and B) and one not technically feasible routing (D).

- Alternative Offshore Routing "A" OS-AA

This Routing is almost identical to OS-A and it was the offshore route initially planned during the basic design of the Project. Due to the different approaching angle of the qualified in the PEIA onshore section, this offshore routing was modified to the proposed offshore routing OS-A.

- Alternative Offshore Routing "B" (OS-B) in Adriatic Sea

This Routing branches from the Proposed Offshore Routing (OS-A) at a distance of ~30km southwest of Corfu, then heads away from the Greek shelf, crosses the Adriatic Sea in northwest direction, approaches the Italian shelf at a distance of 40 km southeast of Otranto and then directs northwest and landfalls at the coast of Otranto in Italy.

This alternative routing is not technically rejected, but is not the proposed one, since it has greater length than the Proposed Offshore Routing OS-A. The construction of the offshore pipeline is very costly. Since no environmental or social parameter is affected by the option of OS-B, there was no reason to qualify OS-B as the proposed offshore route.

- Alternative Offshore Routing "D" (northern corridor)

This Routing starts at "Ftelia" bay of Thesprotia Region, submerges in the bay of Corfu City, passes through the northern sea-straits between Corfu-Albania, passes north of Erikousa Island of Corfu Region and meets the Proposed Offshore Routing OS-A at a distance of 27 km northwest of Othoni Island of Corfu Region.

This Routing has been rejected as technically not feasible for the following reasons:

- The Northern sea-straits of Corfu present a very small width of approximately 3km of which only half belongs to Greece (meaning approximately 1.5km).
- In the Greek section (approximately 1.5km) several international submerged cables exist, which due to the morphology of the sea bottom would be crossed repeatedly.

- Taking into account the rigidity of the pipeline and the morphology of the sea bottom (numerous outcrops) extended earthworks would be required to level the sea bottom. This would utterly change the existing environmental conditions of the marine environment and would cause additional damages to the offshore cables.
- Additionally, during construction, the navigation in the straits would have to stop in order to avoid marine collisions, whilst anchoring would be of an issue during both construction and operation phase.

Furthermore, regarding transboundary impacts to Albania, this route neighbors the area of Virne and Butrinti very significant biodiversity and cultural hotspots for Albania. Indicatively, an ancient city in Butrinti area has been announced a World Heritage Site from UNESCO.

### **5.6.2 Investigation of Onshore Alternative Routings**

Nine (9) routings were examined from a technical point of view for the relatively short onshore section, of which one is proposed as the Proposed Route (ALT1a), and the other eight (8) as Alternatives (ALT1, ALT1b, ALT2, ALT3, ALT4, ALT5, ALT6 and ALT7). Basically, ALT1a and ALT1b are variations of ALT1 related with the displacement of the Onshore Facilities from Variko to Florovouni site. ALT2 is another alternative of ALT1 connecting ALT1's landfall site Omprela 2 to the Onshore Facilities at Gouri site. Respectively, ALT5 is a variation of ALT6 connecting ALT6's landfall site Omprela 1 to the Onshore Facilities at Variko site. In short, the routings are:

1. Alternative (Qualified) Routing ALT1a: "Omprela 2" – "Florovouni"
2. Alternative Routing ALT1b "Omprela 2" – "Florovouni"
3. Alternative Routing ALT1: "Omprela 2" – "Variko"
4. Alternative Routing ALT2: "Omprela 2" – "Gouri"
5. Alternative Routing ALT3: "Stamponi" – "Kalivia"
6. Alternative Routing ALT4: "Sofas" – "Variko"
7. Alternative Routing ALT5: "Omprela 1" – "Variko"

8. Alternative Routing ALT6: “Omprela 1” – “Gouri”

9. Alternative Routing ALT7: “Stavrolimenas” – “Variko”

All routings that are described above are technically feasible. Alternative Routings ALT5 and ALT6 present serious technical difficulties, especially concerning the landfall site Omprela 1. Alternative Routings ALT1, ALT1a, ALT1b and ALT2 present less important technical difficulties.

These Routings are examined in detail in the present E.I.A..

It is noted, that having already received the preliminary environmental license of the landfall site ‘Omprela 2’, the C/S-M/S at Florovouni site, and the corresponding route towards Florovouni area, it was deemed necessary to give emphasis on these components. Consequently, the already completed DMS and the ongoing FEED, among other studies, have focused on the specific sites and the corresponding routing.

### **Onshore Alternative Routing ALT1**

**Spatial sequence:** Regions of Thesprotia and Preveza

**Landfall site:** “Omprela 2”

**Onshore Facilities:** C/S-M/S Variko

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Variko is 6.928m.

**Geometry - Relief:** ALT1 starts from the landfall “Omprela 2”, southwest of Perdika. Heading northeast, it runs parallel to the archaeological site of Dimokastro and turning east, it enters Preveza Region. At “Agii Pantes” location, it turns north, at the eastern limit of the statutory recreation park, in “Kastro” location, enters Thesprotia Region, and crosses the National Road of Parga – Sivota, ending at “Variko” location, at the Compressor and Metering Station.

**Slopes’ protection:** Slopes’ protection is required for ~750m (gradients bigger than 36%). This corresponds to 7% of the total length of the routing.

**Crossings:** All pipeline’s crossing will be constructed using the open-cut method.

**Passing through protected areas:** It doesn't cross or neighbour protected areas.

**Archaeological sites:** The routing does not cross archaeological sites. Specifically, the minimum distance of the pipeline from the limits of the "Dimokastro" archaeological site is 50m.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0,142km<sup>2</sup>.

**Ecosystems' energy flow:** Limited, temporary and reversible discontinuity of the ecosystems' energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives from the machinery used in the construction works for the pipeline and the onshore facilities; that noise is temporary, reversible and limited. The noise from the operation of the Onshore Facilities should be considered negligible since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected at the slope of the landfall site "Omprela 2", which should be limited, reversible and temporary (after the construction works' completion, reinstatement of the working strip will take place).

Regarding onshore facilities, due to the natural cavity where the site ("Variko" location) is located and its distance to the coastal area and the Perdika settlement, visual pollution is expected to be spatially limited (no visual pollution caused to the settlement, the existing road network or the coastal front) and visual contact will be limited.

**Air pollution:** The usual emissions of the construction machinery are expected, which impacts are temporary, reversible and limited. Regarding onshore facilities, its emissions shall range well below statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development; consequently, no impact on land value is expected.

**Social acceptance:** No residential area, productive activities, or touristic establishments are affected; consequently, no significant social objections are expected.

**Feasibility:** Some geological issues are expected in Omprela 2. Adequate relevant pipeline protection measures and slopes stabilization measures will be applied, if required.

### **Onshore Alternative Routing ALT1a**

**Spatial sequence:** Regions of Thesprotia and Preveza

**Landfall site:** “Omprela 2”

**Onshore Facilities:** C/S-M/S Florovouni

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Florovouni is 8.187m.

**Geometry - Relief:** ALT1a starts from the landfall “Omprela 2”, southwest of Perdika. Heading northeast, it runs parallel to the archaeological site of Dimokastro and turning east, it enters Preveza Region. At “Agii Pantes” location, it turns north, at the eastern limit of the statutory recreation park, in “Kastro” location, enters Thesprotia Region, and crosses the National Road of Parga – Sivota, runs through Perdikoraki hill ending at “Florovouni” location, at the Compressor and Metering Station.

**Slopes’ protection:** Slopes’ protection is required for ~800m (gradients bigger than 36%). This corresponds to ~10% of the total length of the routing.

**Crossings:** All pipeline’s crossing will be constructed using the open-cut method.

**Passing through protected areas:** It doesn’t cross or neighbour protected areas.

**Archaeological sites:** The routing does not cross archaeological sites. Specifically, the minimum distance of the pipeline from the limits of the “Dimokastro” archaeological site is 50m.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0,153km<sup>2</sup>.

**Ecosystems’ energy flow:** Limited, temporary and reversible discontinuity of the ecosystems’ energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives from the machinery used in the construction works for the pipeline and the onshore facilities; that noise is temporary, reversible and limited. The noise from the operation of the Onshore Facilities should be considered negligible since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected at the slope of the landfall site “Omprela 2”, which should be limited, reversible and temporary (after the construction works’ completion, reinstatement of the working strip will take place).

Regarding onshore facilities, due to the natural cavity where the site (“Florovouni” location) is located and its distance to the coastal area, Perdika, Karteri and Katavothra settlements, visual pollution is expected to be spatially limited (no visual pollution caused to the settlement, the existing road network or the coastal front) and visual contact will be limited.

**Air pollution:** The usual emissions of the construction machinery are expected, which impacts are temporary, reversible and limited. Regarding onshore facilities, its emissions shall range well below statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development; consequently, no impact on land value is expected.

**Social acceptance:** No residential area, productive activities, or touristic establishments are affected; consequently, no significant social objections are expected. On top of that, the Onshore Facilities and the rerouting of ALT1 were agreed with the representatives of the Local Authorities.

**Feasibility:** Some geological issues are expected in Omprela 2. Adequate relevant pipeline protection measures and slopes stabilization measures will be applied, if required.

Specific stabilization measures will be implemented to ensure the integrity of the pipeline and the reinstatement of the area (see chapter 6). In general, stabilization measures may include:

1. Engineered structures (concrete, gabions, etc.)
2. Vegetation, phytotechnical measures (soil stabilization with planting native species)
3. Soil bioengineering systems: living plant materials used as structural components, combined with natural or synthetic support materials (geogrids, erosion control fabric).

### **Onshore Alternative Routing ALT1b**

**Spatial sequence:** Regions of Thesprotia and Preveza

**Landfall site:** “Omprela 2”

**Onshore Facilities:** C/S-M/S Florovouni

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Florovouni is 9.243m.

**Geometry - Relief:** ALT1b starts from the landfall “Omprela 2”, southwest of Perdika. Heading northeast, it runs parallel to the archaeological site of Dimokastro and turning east, it enters Preveza Region. At “Agii Pantes” location, it turns north, at the eastern limit of the statutory recreation park, in “Kastro” location, enters Thesprotia Region, and crosses the National Road of Parga – Sivota, runs through Perdikoraki hill ending at “Florovouni” location, at the Compressor and Metering Station.

**Slopes' protection:** Slopes' protection is required for ~1000m (gradients bigger than 36%). This corresponds to 10.8% of the total length of the routing.

**Crossings:** All pipeline's crossing will be constructed using the open-cut method.

**Passing through protected areas:** It doesn't cross or neighbour protected areas.

**Archaeological sites:** The routing does not cross archaeological sites. Specifically, the minimum distance of the pipeline from the limits of the "Dimokastro" archaeological site is 50m.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0,169km<sup>2</sup>.

**Ecosystems' energy flow:** Limited, temporary and reversible discontinuity of the ecosystems' energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives from the machinery used in the construction works for the pipeline and the onshore facilities; that noise is temporary, reversible and limited. The noise from the operation of the Onshore Facilities should be considered negligible since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected at the slope of the landfall site "Omprela 2", which should be limited, reversible and temporary (after the construction works' completion, reinstatement of the working strip will take place).

Regarding onshore facilities, due to the natural cavity where the site ("Florovouni" location) is located and its distance to the coastal area, Perdika, Karteri and Katavothra settlements, visual pollution is expected to be spatially limited (no visual pollution caused to the settlement, the existing road network or the coastal front) and visual contact will be limited.

**Air pollution:** The usual emissions of the construction machinery are expected, which impacts are temporary, reversible and limited. Regarding onshore facilities, its emissions shall range well below statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development; consequently, no impact on land value is expected.

**Social acceptance:** No residential area, productive activities, or touristic establishments are affected; consequently, no significant social objections are expected. On top of that, the Onshore Facilities and the rerouting of ALT1 were indicated by representatives of Perdika's local community.

**Feasibility:** Some geological issues are expected in Omprela 2. Adequate relevant pipeline protection measures and slopes stabilization measures will be applied, if required.

## **Onshore Alternative Routing ALT2**

**Spatial sequence:** Regions of Thesprotia, Preveza

**Landfall site:** "Omprela 2"

**Onshore Facilities:** C/S-M/S Gouri

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Gouri is 6.539m.

**Geometry - Relief:** ALT2 starts from the landfall "Omprela 2", southwest of Perdika. Heading northeast, it runs parallel to the archaeological site of Dimokastro and turning east, it enters Preveza Region. It passes through the "Perivlepton" hill, where it turns northeast, running through "Agi Pantas" and "Pori" locations, and it crosses the National Road of Parga – Sivota, ending at "Gouri" location at the onshore installations.

**Slopes' protection:** Slopes' protection is required for ~900m (8% of the total length of the routing).

**Crossings:** All pipeline's crossing will be constructed using the open-cut method.

**Passing through protected areas:** It doesn't cross or neighbour protected areas.

**Archaeological sites:** The routing does not cross archaeological sites. Specifically, the minimum distance of the pipeline from the limits of the "Dimokastro" archaeological site is 50m.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0,176km<sup>2</sup>.

**Ecosystems' energy flow:** Limited, temporary and reversible discontinuity of the ecosystems' energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives from the machinery used in the construction works for the pipeline and the onshore facilities; that noise is temporary, reversible and limited. The noise from the operation of the Onshore Facilities should be considered negligible since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected at the slopes of the landfall site "Omprela 2", which shall be limited, reversible and temporary (after the construction works' completion, reinstatement of the working strip will take place).

Regarding the Onshore Facilities site, at "Gouri" location, due to the area's relief and its distance from the coastal front and the Perdika settlement, visual intrusion is expected to be spatially limited (no visual pollution to settlements, existing road network or coastal front), while visual contact will exist only from close distance.

**Air pollution:** The usual emissions of the construction machinery are expected, the impacts of which are temporary, reversible and limited. Regarding the onshore facilities, their emissions shall range well below statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development; consequently, no impact on land value is expected.

**Social acceptance:** No residential area, productive activities, or touristic establishments are affected; consequently, no significant social objections are expected.

**Feasibility:** Some geological issues are expected in Omprela 2. Adequate relevant pipeline protection measures and slopes stabilization measures will be applied.

### **Onshore Alternative Routing ALT3**

**Spatial sequence:** Thesprotia Region

**Landfall site:** "Stamponi"

**Onshore Facilities:** C/S-M/S Variko

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Kalivia is 4489m.

**Geometry - Relief:** ALT3 starts from the site "Stamponi" northwest of Perdika Community of Thesprotia Region, crosses the national road Perdika-Parga and heads northeast to "Granitsa" hillside until the limits of Perdika Community where it turns east. At "Kalivia" location, it enters Sivota Municipality where it ends at the onshore facilities

**Slopes' protection:** Slopes' protection is required for ~500m (6% of the total length of the routing).

**Crossings:** All pipeline's crossing will be constructed using the open-cut method.

**Passing through protected areas:** It doesn't cross or neighbour protected areas.

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**Archaeological sites:** No engagement.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0.017km<sup>2</sup>.

**Ecosystems' energy flow:** Limited, temporary and reversible discontinuity of ecosystems' energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives, mainly, from the machinery used in the construction works for the pipeline and the onshore facilities; that noise disturbance is temporary, reversible and limited. The noise that comes from the operation of the Onshore Facilities should be considered negligible, since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected only during construction phase and will be temporary and limited. Regarding the onshore facilities, due to the natural cavity where the site is located ("Kalivia" location), no visual pollution is expected towards the settlement, the existing road network or the coastal front. Consequently, visual intrusion will be spatially limited at small distance from the Onshore Facilities site, and only from the circumferential ridge of the surrounding hills.

During the pipeline construction at the landfall area of Stamponi, some excavations shall be required, in order to create gentle slopes in the trench, inside which the pulling and the installation of the pipeline shall take place. After the completion of the pipeline installation, the landscape reinstatement shall be at its initial form.

**Air pollution:** The usual emissions of the construction machinery are expected, which impacts are temporary, reversible and limited. Regarding the onshore facilities, their emissions shall range well below statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development; consequently, no impact on land value is expected.

**Social acceptance:** No residential area, productive activities, or touristic establishments are affected; consequently, no significant social objections were expected. However, during preliminary environmental licensing reactions by the local community occurred.

**Feasibility:** No significant construction issues are expected.

#### **Onshore Alternative Routing ALT4**

**Spatial sequence:** Thesprotia Region

**Landfall site:** “Sofas”

**Onshore Facilities:** C/S-M/S Kalivia

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Kalivia is 3.925m.

**Geometry - Relief:** ALT4 starts from the site “Sofas”, northwest of Perdika Community of Thesprotia Region, crosses the national road Perdika-Parga and heads northeast to “Granitsa” hillside. At “Kalivia” location, it enters Sivota Municipality where it ends up to the onshore facilities.

**Slopes’ protection:** Slopes’ protection is required for ~650m (9% of the total length of the routing)

**Crossings:** All pipeline’s crossing will be constructed using the open-cut method..

**Passing through protected areas:** It doesn’t cross or neighbour protected areas.

**Archaeological sites:** No engagement.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0,022km<sup>2</sup>.

**Ecosystems' energy flow:** Limited, temporary and reversible discontinuity of the ecosystems' energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives from the machinery used in the construction works for the pipeline and the onshore facilities; that noise is temporary, reversible and limited. The noise from the operation of the Onshore Facilities should be considered negligible, since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected only during construction phase and will be temporary and limited, near the landfall site "Sofas". It is noted that construction works will take place outside touristic season and the reinstatement will be full. Regarding the onshore facilities, due to the natural cavity where the site is located ("Kalivia" location), no visual pollution is expected towards the settlement, the existing road network or the coastal front. Consequently, visual intrusion will be spatially limited at a small distance from the Onshore Facilities site, and only from the circumferential ridge of the surrounding hills.

**Air pollution:** The usual emissions of the construction machinery are expected, which impacts are temporary, reversible and limited. Regarding the onshore facilities, their emissions shall range well below the statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development. Landfall site is close to planned residential expansions and if they are, fully, included in the town plan, the land use along the pipeline must comply with the requirement (not building within 20m of the pipeline).

The landfall site is close to a camping site. Pipeline's construction will take place outside touristic season and consequently, no impact on the camping's operation should be expected, during construction.

Taken into consideration that:

1. The onshore route part shall be buried in a trench at least 2.5m deep, along the entire length of the pipeline (and of course on the "Sofas" beach)
2. the offshore route part till approximately 25m depth, will be also buried in a trench (as well as, of course, the coastal part)
3. after the completion of the construction works, full, thorough and uncompromising reinstatement of the working strip takes place
4. all activities (swimming, fishing, water skiing, etc.) are allowed

it is concluded that no impact on "Sofas" and the adjacent camping will occur.

**Social acceptance:** Despite the fact that:

- the public can use unobstructed the sandy beach, since the landfall is in the rocky, unused, remote part of the beach,
- the pipeline is buried and full reinstatement will take place, so no visual pollution will take place,
- all the activities of the coastal area (swimming, fishing, water skiing, etc.) are allowed

it is not unlikely to experience some social objection, due to the existing and future touristic development in "Sofas" beach, where the landfall site is located.

**Feasibility:** No significant construction issues are expected.

### **Onshore Alternative Routing ALT5**

**Spatial sequence:** Regions of Thesprotia and Preveza

**Landfall site:** "Omprela 1"

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**Onshore Facilities:** C/S-M/S Variko

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Variko is 7.808m.

**Geometry - Relief:** ALT5 starts from the landfall “Omprela 1”, west of Parga, in Preveza. Heading east, it passes through the “Perivlepton” hill. At “Agii Pantes” it turns north, passing by the eastern limit of the Recreation Park at “Kastro” location. There, it enters Thesprotia Region, crosses National Road Parga-Perdika, and ends at “Variko” location, at the onshore facilities.

**Slopes’ protection:** Slopes’ protection is required for ~750m (gradient bigger than 36%). This corresponds to 7% of the total length of the routing.

**Crossings:** All pipeline’s crossing will be constructed using the open-cut method.

**Passing through protected areas:** It doesn’t cross or neighbour protected areas.

**Archaeological sites:** No engagement.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0,192km<sup>2</sup>.

**Ecosystems’ energy flow:** Limited, temporary and reversible discontinuity of the ecosystems’ energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives from the machinery used in the construction works for the pipeline and the onshore facilities; that noise is temporary, reversible and limited. The noise from the operation of the Onshore Facilities should be considered as negligible since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected at the slopes of the landfall site “Omprela 1”, which shall be limited, reversible and temporary (after the construction works’ completion, reinstatement of the working strip will take place). However, it is possible that, due to the bracing works required for

the slopes of the specific landfall, the reinstatement shall not be to the landscape's former condition.

Regarding the onshore facilities, due to the natural cavity where the site ("Variko" location) is located and its distance to the coastal area and the Perdika settlement, visual pollution is expected to be spatially limited (no visual pollution caused to the settlement, the existing road network or the coastal front) and visual contact will be limited.

**Air pollution:** The usual emissions of the construction machinery are expected, the impacts of which impacts are temporary, reversible and limited. Regarding the onshore facilities, their emissions shall range well below the statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development; consequently, no impact on land value is expected.

**Social acceptance:** No residential area, productive activities, or touristic establishments are affected; consequently, no significant social objections are expected.

**Feasibility:** It is estimated that significant geotechnical issues are expected at the landfall site "Omprela 1". The Pipeline's construction at "Omprela 1" is considered as very difficult.

### **Onshore Alternative Routing ALT6**

**Spatial sequence:** Regions of Thesprotia, Preveza

**Landfall site:** "Omprela 1"

**Onshore Facilities:** C/S-M/S Gouri

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Gouri is 6.927m

**Geometry - Relief:** ALT6 starts from the landfall “Omprela 1”, west of Parga, in Preveza. Heading east, it passes through the “Perivlepton” hill, where it turns northeast, running through “Agii Pantes” and “Pori” locations, and it crosses the National Road of Parga – Sivota, ending at “Gouri” location at the onshore facilities.

**Slopes’ protection:** Slopes’ protection is required for ~900m (8% of the total length of the routing).

**Crossings:** All pipeline’s crossing will be constructed using the open-cut method.

**Passing through protected areas:** It doesn’t cross or neighbour protected areas.

**Archaeological sites:** No engagement.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0,217km<sup>2</sup>

**Ecosystems’ energy flow:** Limited, temporary and reversible discontinuity of the ecosystems’ energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives from the machinery used in the construction works for the pipeline and the onshore facilities; that noise is temporary, reversible and limited. The noise from the operation of the Onshore Facilities should be considered as negligible since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected at the slopes of the landfall site “Omprela 1”, which should be limited, reversible and temporary (after the construction works’ completion, reinstatement of the working strip will take place). However, it is possible that, due to the bracing works required for the slopes of the specific landfall, the reinstatement shall not be to the landscape’s former condition.

Regarding the Onshore Facilities site, at “Gouri” location, due to the area’s relief and its distance from the coastal front and the Perdika settlement, visual intrusion is expected to be spatially limited (no visual disturbance to

settlements, existing road network or coastal front), while visual contact will exist only from close distance.

**Air pollution:** The usual emissions of the construction machinery are expected, which impacts are temporary, reversible and limited. Regarding the onshore facilities, its emissions shall range well below statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development; consequently, no impact on land value is expected.

**Social acceptance:** No residential area, productive activities, or touristic establishments are affected; consequently, no significant social objections are expected.

**Feasibility:** It is estimated that significant geotechnical issues are expected at the landfall site "Omprela 1". The Pipeline's construction at "Omprela 1" is considered as very difficult.

### **Onshore Alternative Routing ALT7**

**Spatial sequence:** Thesprotia Region

**Landfall site:** "Stavrolimenas"

**Onshore Facilities:** C/S-M/S Variko

**Total length:** The total pipeline length from the landfall site till the Onshore Facilities at Variko is 4.759m

**Geometry - Relief:** ALT3 starts from "Stavrolimenas" bay, southwest of Perdika Community of Thesprotia Region, heading east, and ends at the onshore facilities, at "Variko" site.

**Slopes' protection:** Slopes' protection is required for ~700m (8,7% of the total length of the routing).

**Crossings:** All pipeline's crossing will be constructed using the open-cut method.

**Passing through protected areas:** It doesn't cross or neighbour protected areas.

**Archaeological sites:** No engagement.

**Deforestation of forestial lands:** Deforestation of forestial lands (forests and bushlands) is estimated at 0,093km<sup>2</sup>.

**Ecosystems' energy flow:** Limited, temporary and reversible discontinuity of the ecosystems' energy flow on both sides of the deforested areas, only during construction.

**Noise:** It derives from the machinery used in the construction works for the pipeline and the onshore facilities; that noise is temporary, reversible and limited. The noise from the operation of the Onshore Facilities should be considered as negligible, since: (i) the level at the fence line of the facilities will be 50dB, which is low, (ii) no sensitive receptor exists nearby, and (iii) noise is rapidly decreasing relevant to distance.

**Visual pollution:** Visual pollution is expected at the slopes of the landfall site "Stavrolimenas", which should be limited, reversible and temporary (after the construction works' completion, reinstatement of the working strip will take place).

Regarding the Onshore Facilities site, at "Variko" location, due to the area's relief and its distance from the coastal front and the Perdika settlement, visual intrusion is expected to be spatially limited (no visual pollution to settlements, existing road network or coastal front), while visual contact will be limited.

**Air pollution:** The usual emissions of the construction machinery are expected, the impacts of which are temporary, reversible and limited. Regarding the onshore facilities, their emissions shall range well below statutory limits.

**Fauna:** Impacts on biodiversity are expected to be localized on both sides of the deforested areas, only during construction phase.

**Land uses:** The routing traverses mainly forestial lands. No residential land uses are affected.

**Land value:** The routing does not traverse through areas of residential or touristic development; only the landfall site presents touristic interesting.

Taken into consideration that:

1. The onshore route part is buried in a trench of at least 2.5m, along the entire length of the pipeline (and of course on the “Sofas” beach)
2. the offshore route part till 25m depth, will be also buried in a trench (including, of course, the coastal part)
3. after the completion of the construction works, full, thorough and uncompromising reinstatement of the working strip takes place
4. all activities (swimming, fishing, water skiing, etc.) are allowed

it is concluded that no impact on “Stavrolimenas” will occur.

**Social acceptance:** Despite of the fact that:

- the public can use unobstructed the sandy beach, since the landfall is in the rocky, unused remote part of the beach,
- the pipeline is buried and full reinstatement will take place, so no visual pollution will take place,
- all the activities of the coastal area (swimming, fishing, water skiing, etc.) are allowed

it is not unlikely to experience some social objection, due to the existing and future touristic development in “Sofas” beach, where the landfall site is located.

**Feasibility:** No significant construction issues are expected.

### 5.6.3 Investigation of Onshore Facilities Site

During the PEIA 11 locations for the Onshore Facilities site were investigated. 7 out of these 11 locations were investigated by the present EIA. In addition, a new site (proposed location of the onshore facilities) at Florovouni site was investigated.

It is noted, that having already received the preliminary environmental license of the landfall site 'Omprela 2' and the corresponding route towards Florovouni area, it was deemed necessary to give emphasis on these components. Consequently, the ongoing FEED, among other studies, has focused on the specific sites and the corresponding routing.

The investigated sites are:

#### Onshore Facilities C/S-M/S 1

**Location:** Perdika

**Relevant Routings:** ALT4

**Geology:** Limestones and Dolomites of Sinion and Pantokratora

**Morphology:** Small excavation works (slopes ~8%)

**Protected areas:** No engagement

**Archaeological sites:** ~2.8km

**Visual pollution:** Due to the proximity to Perdika settlement, although limited, some visual pollution is expected.

**Land uses:** Areas outside city plan designated for various uses and forestial.

**Social acceptance:** Due to proximity to Perdika social acceptance is deemed very limited.

#### Onshore Facilities C/S-M/S Kalivia

**Location:** Kalivia

**Relevant Routings:** ALT3, ALT4

**Geology:** Limestones and Dolomites of Sinion and Pantokratora and Terra Rossa.

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**Morphology:** Small excavation works (slopes ~8%)

**Protected areas:** No engagement

**Archaeological sites:** ~6km

**Visual pollution:** Due to the natural cavity where the site is located ("Kalivia" location), no visual pollution is expected towards the settlement, the existing road network or the coastal front. Consequently, visual intrusion will be spatially limited at small distance from the Onshore Facilities site, and only from the circumferential ridge of the surrounding hills.

**Land uses:** Areas outside city plan designated mainly for olive groves and other uses.

**Social acceptance:** During the preliminary environmental licensing this location was strongly opposed.

#### **Onshore Facilities C/S-M/S Florovouni**

**Location:** Florovouni

**Relevant Routings:** ALT1a, ALT1b

**Geology:** Limestones and Dolomites of Sinion and Pantokratora.

**Morphology:** Small excavation works (slopes ~8%)

**Protected areas:** No engagement

**Archaeological sites:** ~5.5km

**Visual pollution:** Due to the natural cavity where the site is located ("Florovouni" location), no visual pollution is expected towards Perdika or Karteri settlements, the existing road network or the coastal front. Consequently, visual intrusion will be spatially limited at small distance from the Onshore Facilities site, and only from the circumferential ridge of the surrounding hills.

**Land uses:** Areas designated for stock farming.

**Social acceptance:** During the preliminary environmental licensing this location was proposed by representatives of Perdika local community. Consequently, social acceptance is deemed high.

### **Onshore Facilities C/S-M/S Variko**

**Location:** Variko

**Relevant Routings:** ALT1, ALT2, ALT3

**Geology:** Limestones and Dolomites of Sinion and Pantokratora.

**Morphology:** Small excavation works (slopes ~5%)

**Protected areas:** No engagement

**Archaeological sites:** 3.16km

**Visual pollution:** Due to the natural cavity where the site (“Variko” location) is located and its distance to the coastal area and the Perdika settlement, visual pollution is expected to be spatially limited (no visual pollution caused to the settlement, the existing road network or the coastal front) and visual contact will exist only from close distance.

**Land uses:** Areas outside city plan designated mainly for olive groves and other uses.

**Social acceptance:** During the preliminary environmental licensing this location was strongly opposed.

### **Onshore Facilities C/S-M/S 2**

**Location:** Glossa

**Relevant Routings:** ALT1, ALT1b, ALT5, ALT7

**Geology:** Limestones and Dolomites of Sinion and Pantokratora and Talus and lateral scree slopes.

**Morphology:** Small excavation works (slopes ~8%)

**Protected areas:** No engagement

**Archaeological sites:** 2.8km

**Visual pollution:** Due to the natural cavity where the site is located and its distance to the coastal area and the Perdika settlement, visual pollution is expected to be spatially limited (no visual pollution caused to the settlement). Some visual pollution should be expected through the existing road network; however, from close distance.

**Land uses:** Areas outside city plan designated for various uses and forestial.

**Social acceptance:** Due to proximity to Perdika social acceptance is deemed limited.

### **Onshore Facilities C/S-M/S Gouri**

**Location:** Gouri

**Relevant Routings:** ALT5, ALT6

**Geology:** Limestones and Dolomites of Sinion and Pantokratora and Terra Rossa.

**Morphology:** Small excavation works (slopes ~4%)

**Protected areas:** No engagement

**Archaeological sites:** ~5km

**Visual pollution:** Due to the natural cavity where the site is located ("Gouri" location), no visual pollution is expected towards Perdika or Karteri settlements, the existing road network or the coastal front. Consequently, visual intrusion will be spatially limited at small distance from the Onshore Facilities site, and only from the circumferential ridge of the surrounding hills.

**Land uses:** Areas designated for stock farming.

**Social acceptance:** Since this location is remote, no social objection is estimated.

### **Onshore Facilities C/S-M/S 3**

**Location:** Kastro

**Relevant Routings:** ALT1, ALT1a, ALT1b, ALT5

**Geology:** Triassic breccia

**Morphology:** Small excavation works (slopes ~8%)

**Protected areas:** No engagement

**Archaeological sites:** ~2km

**Visual pollution:** Due to the natural cavity where the site is located and its distance to the coastal area and the Perdika settlement, visual pollution is expected to be spatially limited (no visual pollution caused to the settlement). However, the site is closer to the coast and the archaeological site, that are important view points and could cause some limited visual contact.

**Land uses:** Areas designated for tourism development.

**Social acceptance:** Due to proximity to Perdika and Archaeological site of Dimokastro social acceptance is deemed limited.

#### **Onshore Facilities C/S-M/S 4**

**Location:** Perivlepton

**Relevant Routings:** ALT5, ALT6

**Geology:** Limestones and Dolomites of Sinion and Pantokratora and Triassic breccia.

**Morphology:** Small excavation works (slopes ~8%)

**Protected areas:** No engagement

**Archaeological sites:** ~2km

**Visual pollution:** Due to the natural cavity where the site is located and its distance to the coastal area and the Perdika settlement, visual pollution is expected to be spatially limited (no visual pollution caused to the settlement). However, the site is closer to the coast and the archaeological site, that are important view points and could cause some limited visual contact.

**Land uses:** Areas designated for tourism development.

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**Social acceptance:** Due to proximity to the coast and Archaeological site of Dimokastro social acceptance is deemed limited.

#### **5.6.4 Investigation of Landfall Sites**

The five different landfall sites investigated and proposed during the preliminary environmental licensing were forwarded for further investigation to the EIA phase. However, having a preliminary environmental license for the Omprela 2 landfall site, the C/S-M/S at Florovouni site, and the corresponding routing towards Florovouni area, the project deemed necessary to focus on this one. Consequently, the already completed DMS and the ongoing FEED, among other studies, have focused on the specific site.

##### **Landfall Site “Stamponi”**

**Location:** Perdika bay

**Geology:** Jurassic limestones comprising of cohesive rock formations, without instability phenomena.

**Morphology:** Slopes ~10%, following an initial coastal step of more than 20m high.

**Feasibility:** No geotechnical problems are expected, during construction or operation phase

**Social acceptance:** this location was not qualified during preliminary environmental licensing.

##### **Landfall Site “Sofas”**

**Location:** Perdika bay

**Geology:** Jurassic limestones comprising of cohesive rock formations, without instability phenomena.

**Morphology:** Slopes ~8%

**Feasibility:** No geotechnical problems are expected, during construction or operation phase

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**Social acceptance:** this location was not qualified during preliminary environmental licensing.

#### **Landfall Site “Stavrolimenas”**

**Location:** Stavrolimenas bay

**Geology:** Jurassic schists with alternations of cherts and silic clays.

**Morphology:** Slopes ~4%

**Feasibility:** No geotechnical problems are expected, during construction or operation phase

**Social acceptance:** this location was not qualified during preliminary environmental licensing.

#### **Landfall Site “Omprela 2”**

**Location:** South of Omprela

**Geology:** Talus and lateral screes of slopes. Indications of limestones of Senonio are also present.

**Morphology:** Slopes ~20%

**Feasibility:** Some geotechnical difficulties exist. If required, special construction measures will be applied as the ones presented in the relevant section of chapter 6 and here below.

**Social acceptance:** this location was qualified during preliminary environmental licensing.

#### **Landfall Site “Omprela 1”**

**Location:** South of Omprela

**Geology:** Blue clays and conglomerates, and coincides with the fault's trace.

**Morphology:** Slopes ~23%

**Feasibility:** Numerous instabilities and slides horseshoes exist. Displacement of the Miocene sediments, laid on top of clays and conglomerates Evidence of near surface underground water. Significant

geotechnical problems are expected during construction and operation phase.

**Social acceptance:** this location was not qualified during preliminary environmental licensing.

### **Other Landfall Sites**

It is noted that other landfall sites also, outside the specific investigated area, were assessed in the past but were rejected since they present significant safety and/ or environmental issues. These included:

- Gonia/Gata landfall site, northern than Omprela 2. This site is close to Igoumenitsa harbor and consequently the corresponding routings would be close to residential areas and infrastructures. On top of that, on the same cape biological treatment facilities are operating. Additionally, the corresponding offshore pipeline route runs parallel to navigation routes to and from Igoumenitsa port which creates safety issues.
- Ai Giannakis. This landfall site is situated in a protected NATURA site. The corresponding onshore route would also cross through protected habitats. In addition, according to published data by IGME, the area is known for its offshore water springs near the landfall site and the increased probability of geological discontinuities (cavings).

### **Construction Feasibility at Landfall Site “Omprela 2”.**

For the safe installation at the landfall site “Omprela 2”, which was qualified in the PEIA stage, geological, geotechnical and seismic study have been performed.

For the installation design a relevant study is already in progress by the FEED Engineer. The installation design will use data from the existing studies and field data including data from the sampling boreholes. Precise stabilization measures, if required, will be defined by the EPC Contractor in the next phase of the project.

Common stabilization measures for unstable slopes include geotextile installation, installation of drainage/ trench facilities, etc (see chapter 6).

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### 5.6.5 “No Action” Scenario

The “No Action” scenario refers to the option of not implementing the Offshore Natural Gas Pipeline and the complementary installations (i.e. the onshore facilities.).

On regional level, the opportunity of supplying Epirus Region and of course Thesprotia Region with Natural Gas is wasted. According to Greek Law 4001/2011, ar.179, DEPA is obliged to start the process of establishing Epirus and Western Macedonia Natural Gas Supplier within one year, at the latest, of the IGI pipeline operation commencement. Consequently, the use of such an environmental friendly, and cost-effective, fuel such as natural gas would have environmental and economical positive impacts on the regional level.

The non-construction of the Offshore Natural Gas Pipeline would not permit the transfer of the large quantities of Natural Gas from the Caspian region, the Middle East and Eastern Mediterranean to Western Europe. Consequently, the environmental benefits from the use of Natural Gas will be lost, in both Regional and National level. These benefits are obvious and beyond doubt, taking into account that the Natural Gas could substitute other more pollutant fossil fuels. Since Renewable Energy Sources are not yet capable to fully replace fossil fuels, natural gas is promoted as the best alternative. Supporting this argument, there are numerous of studies<sup>18,19,20,21</sup>. The following tables are sourced from the above mentioned studies.

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<sup>18</sup> USA Department of Energy (DOE): DOE/NETL-2010/1397

<sup>19</sup> USA Environmental Protection Agency (EPA) <http://epa.gov/cleanenergy/energy-and-you/affect>. Retrieved on 09.05.2011.

<sup>20</sup> International Energy Association: IEA CO2 Emissions from Fuel Combustion Highlights 2010 Edition

<sup>21</sup> OECD Greenhouse Gas Emissions (1991)

**Table 5.1 Natural Gas Technologies for electricity production and pollutants emissions (DOE).**

POLLUTANT	TECHNOLOGY					
	IGCC	units	PC	units	NGCC	units
SO <sub>2</sub>	0.0128	lb/MMBtu	0.085	lb/MMBtu	Negligible	
NO <sub>x</sub>	15	ppmv (dry) @ 15% O <sub>2</sub>	0.07	lb/MMBtu	2.5	ppmv (dry) @ 15% O <sub>2</sub>
PM (Filterable)	0.0071	lb/MMBtu	0.013	lb/MMBtu	Negligible	
Hg	>90%	capture	1.14	lb/Tbtu	N/A	

IGCC: Integrated Gasification Combined Cycle  
PC: Pulverised Combustion  
NGCC: Natural Gas Combined Cycle

**Table 5.2 Environmental comparison Natural Gas and other Fossil Fuels (EPA).**

FUEL	POLLUTANT			Water Use
	CO <sub>2</sub> (lbs/MWh)	SO <sub>2</sub> (lbs/MWh)	No <sub>x</sub> (lbs/MWh)	
Coal	2249	13	6	Large quantities for removal of impurities at mining, steaming and cooling
Oil	1672	12	4	Large quantities for steam production and cooling
Natural Gas	1135	0.1	1.7	Quantities required for cooling purposes

**Table 5.3 CO<sub>2</sub> emissions from fossil fuel combustion.**

FUEL	gCO <sub>2</sub> /kWh
Lignite/ brown coal	940
Sub-bituminous coal	930
Patent fuel	880
Bituminous coal	840
Crude oil	640
Natural gas	370

**Table 5.4 Pollutants emissions per fuel.**

Ρυπαντής	Άνθρακας	Μαζούτ	Diesel	Φυσικό Αέριο
NO <sub>x</sub> (mg/MJ)	250	180	170	100
SO <sub>2</sub> (mg/MJ)	110	360	150	0.3
CO (mg/MJ)	80	15	15	15
Suspended Solids (ppm/MJ)	460	115	10	2

Source: OECD, *Greenhouse Gas Emissions* (1991)

Supporting the above data, Greenpeace argues that natural gas is the only viable bridge to an age of renewable energy<sup>22</sup>, as presented in the NordStream Fact Sheet 2011.

Additionally, the consequences of the “No Action” scenario on energy policy level would be significant. That is because the availability of large quantities of Natural Gas would reduce the European dependence on oil and increase the energy options.

Eventually, it is reasonable to expect that if the Project is not constructed, Greece shall lose a critical opportunity to be promoted to an important key factor in the international energy market and to an energy hub of Southeast Europe. According to Law 4001/2011, ar. 176, the project has been characterized as of National Importance and Public Interest, demonstrating the political support and importance of the project.

For the above reasons, combined with the effectively negligible (relatively to the benefits of the Project) impacts during the operation phase and the controlled and reversible impacts during the construction phase of the Project, the “No Action” Scenario is rejected.

#### **5.6.6 Proposed Routing - Classification of Alternative Offshore Routings**

It should be noted that the near coast offshore section is related to the corresponding landfall site (as described in section 5.6.1). Regarding the offshore, deep water, section:

- OS-A presents the most adjusted to the qualified in the PEIA landfall site near shore and offshore section. Detailed marine survey has been performed for the offshore corridor. It crosses 4 identified power cables and 2 identified telecommunication cables. Technical problems, concerning the sea bottom are not assessed significant. The near coast section is engaged for ~115m with *Posidonia oceanica* and sand patches and for 140m with *Posidonia oceanica* seagrass. The route crosses only for a limited length ships routes and does not create navigational issues.

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<sup>22</sup> Greenpeace, 2010. Erdgas: Die Brücke ins regenerative Zeitalter. August 2010. Sited in Nord Stream, 2011, Fact Sheet, September 2011.

- Alternative Offshore Routing “A” OS-AA is almost identical to OS-A. Due to the different approaching angle of the qualified in the PEIA onshore section, this offshore routing was modified to the proposed offshore routing OS-A.
- Alternative Offshore Routing “B” (OS-B) in Adriatic Sea This Routing branches from the Proposed Offshore Routing (OS-A) at a distance of ~30km southwest of Corfu. From then on relevant data have been acquired from the RMS. The route runs parallel to unverified offshore cables and to identified navigation routes for bigger length than OS-A. It has greater length than and significant bigger cost without any environmental or social benefit
- Alternative Offshore Routing “D” (northern corridor). This Routing has been rejected as technically not feasible. The Northern sea-straits of Corfu present a very small width of approximately 3km of which only half belongs to Greece. In the Greek section (approximately 1.5km) several international submerged cables exist, which due to the morphology of the sea bottom would be crossed repeatedly. Taking into account the rigidity of the pipeline and the morphology of the sea bottom (numerous outcrops) extended earthworks would be required to level the sea bottom. This would utterly change the existing environmental conditions of the marine environment and would cause additional damages to the offshore cables. Additionally, the navigation in the straits would have to stop, during construction, in order to avoid marine collisions, whilst anchoring would be of an issue during both construction and operation phase. Furthermore, regarding transboundary impacts to Albania, this route neighbors the area of Virne and Butrinti very significant biodiversity and cultural hotspots for Albania. Indicatively, the ancient city of Butrinti has been announced a World Heritage Site from UNESCO.

Based on the environmental, technical and economical data of all the investigated routings and the preliminary environmental licensing, Proposed Offshore Routing OS-A is the qualified one.

**Table 5.5 Assessment of Offshore Alternative Routings.**

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Proposed Routing</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative D</b>
		<b>OS-A</b>	<b>OS-AA</b>	<b>OS-B</b>	<b>OS-D</b>
<b>1</b>	<b>Statutory Feasibility</b>				
1.1	Passing through areas under the Statutory Environmental Protection Framework of NATURA2000 (Yes - No)	No	No	No	No
1.2	Passing through Statutory Archaeological Sites (Yes - No)	No	No	No	No
<b>2</b>	<b>Social Acceptance</b>				
2.1	Expected Social Objection (Very Big - Big - Medium - Small)	Small <i>Reasoning: The landfall site, and the routing, received preliminary environmental approval while the C/S-M/S of Florovouni was agreed with the representatives of the Local Authorities</i>	Small <i>Reasoning: The landfall site, and the routing, received preliminary environmental approval while the C/S-M/S of Florovouni was indicated by representatives of local community</i>	Small <i>Reasoning: The landfall site, and the routing, received preliminary environmental approval while the C/S-M/S of Florovouni was indicated by representatives of local community</i>	Small <i>The landfall site is very distant. However, due to the straits width, offshore activities would require more time and have larger impact on navigation and environment.</i>
2.2	Expected O.T.A. Position (Positive-Usual-Negative)	Usual <i>Reasoning: the offshore presence will not be noticeable.</i>	Usual <i>Reasoning: the offshore presence will not be noticeable.</i>	Usual <i>Reasoning: the offshore presence will not be noticeable.</i>	Usual <i>Reasoning: the offshore presence will not be noticeable.</i>
2.3	Impacts on Fishing (Big-Medium-Small)	None	None	None	None

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Proposed Routing</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative D</b>
		<b>OS-A</b>	<b>OS-AA</b>	<b>OS-B</b>	<b>OS-D</b>
2.4	Impact on Tourism (Big-Medium-Small)	None <i>Reasoning: No touristic activities are developed in the area during the scheduled nearshore construction activities</i>	None <i>Reasoning: No touristic activities are developed in the area during the scheduled nearshore construction activities</i>	None <i>Reasoning: No touristic activities are developed in the area during the scheduled nearshore construction activities</i>	None <i>Reasoning: No touristic activities are developed in the area during the scheduled nearshore construction activities</i>
3	<b>Safety</b>				
3.1	Engagement with Navigation Routes (Existing-Not Existing)	Existing (perpendicular crossing)	Existing (perpendicular crossing)	Existing (perpendicular crossing)	Existing (parallel routes)
3.2	Passing through Military Areas – UNX (High probability – Low Probability – Known)	No engagement	No engagement	No engagement	No engagement
3.3	Engagement with Existing Infrastructure	Crossing 4 power cables and 2 telecommunication cables	Crossing 4 power cables and 2 telecommunication cables	Crossing 4 power cables and 2 telecommunication cables	Identified 2 crossings, near Otranto and known offshore cables in the area of Ftelia bay
3.4	Available manoeuvring area for the pipeline laying boats	Open sea	Open sea	Open sea	Corfu straits ~3000m wide
4	<b>Geo-Environmental Characteristics</b>				
4.1	Foundation Conditions (Suitable-Partially Suitable-Unsuitable)	Suitable <i>Reasoning: see relevant section in Ch.4</i>	Suitable <i>Reasoning: see relevant section in Ch.4</i>	Suitable <i>Reasoning: see relevant section in Ch.4</i>	Not Suitable <i>Reasoning: according to available data the morphology of the sea bottom is very abnormal</i>

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Proposed Routing</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative D</b>
		<b>OS-A</b>	<b>OS-AA</b>	<b>OS-B</b>	<b>OS-D</b>
4.2	Seismic Design and Protection Feasibility (High-Medium-Small)	High	High	High	High
4.3	Impact on Water Column (Extensive-Limited)	Limited <i>Reasoning: Normal morphology of sea bottom would not require extensive sea bottom landscaping</i>	Limited <i>Reasoning: Normal morphology of sea bottom would not require extensive sea bottom landscaping</i>	Limited <i>Reasoning: Normal morphology of sea bottom would not require extensive sea bottom landscaping</i>	Extensive <i>Reasoning: Abnormal morphology of sea bottom would require extensive sea bottom landscaping</i>
4.4	Engagement with Posidonia oceanica meadows	Small <i>Reasoning: DMS showed ~250m of pipeline engagement out of which approximately half regard only pipeline laying down on the sea bottom.</i>	Small <i>Reasoning: DMS showed ~250m of pipeline engagement out of which approximately half regard only pipeline laying down on the sea bottom.</i>	Small <i>Reasoning: DMS showed ~250m of pipeline engagement out of which approximately half regard only pipeline laying down on the sea bottom.</i>	Small <i>Reasoning: Unverified data suggest the presence of P.oceanica in the straits as well.</i>
4.5	Impact on Marine Ecosystems (Extensive-Limited)	Limited <i>Reasoning: Impact only during construction. ~250m of engagement with Posidonia</i>	Limited <i>Reasoning: Impact only during construction. ~250m of engagement with Posidonia</i>	Limited <i>Reasoning: Impact only during construction. ~250m of engagement with Posidonia</i>	Estimated Extensive <i>Reasoning: Abnormal morphology of sea bottom would require extensive sea bottom landscaping</i>
4.6	Impact on Marine Biodiversity (Extensive-Limited, Temporary-Long Term, Reversible-Irreversible.)	Limited Temporary, Reversible <i>Reasoning: Impact only during construction. ~250m of engagement with Posidonia.</i>	Limited Temporary, Reversible <i>Reasoning: Impact only during construction. ~250m of engagement with Posidonia.</i>	Limited Temporary, Reversible <i>Reasoning: Impact only during construction. ~250m of engagement with Posidonia.</i>	Unknown Extent, Temporary, Reversible <i>Reasoning: Impact only during construction. Unknown extent of engagement with Posidonia.</i>

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Proposed Routing</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative D</b>
		<b>OS-A</b>	<b>OS-AA</b>	<b>OS-B</b>	<b>OS-D</b>
4.7	Reinstatement Measures Feasibility (Small-Medium-Big)	Big <i>Reasoning: Artificial reef along the nearshore buried pipeline section</i>	Big <i>Reasoning: Artificial reef along the nearshore buried pipeline section</i>	Big <i>Reasoning: Artificial reef along the nearshore buried pipeline section</i>	Big <i>Reasoning: Artificial reef along the nearshore buried pipeline section</i>
5	<b>Technical and Economical Criteria</b>				
5.1	Construction Difficulties, i.e. crossings, gradients. (Small-Medium-Big-Very Big)	Medium <i>Reasoning: normal seabed profile, plenty of maneuvering space, perpendicular crossing</i>	Medium <i>Reasoning: normal seabed profile, plenty of maneuvering space, perpendicular crossing</i>	Medium <i>Reasoning: normal seabed profile, plenty of maneuvering space, perpendicular crossing</i>	Very big <i>Reasoning: abnormal seabed profile, minimum maneuvering space, parallel engagement with offshore cables</i>
5.2	Construction Difficulties for Navigation and Manoeuvring space. (Small-Medium-Big-Very Big)	Small <i>Reasoning: plenty of maneuvering space and small navigation detour</i>	Small <i>Reasoning: plenty of maneuvering space and small navigation detour</i>	Small <i>Reasoning: plenty of maneuvering space and small navigation detour</i>	Very Big <i>Reasoning: minimum maneuvering space and possible necessary navigation detour south of Corfu</i>

The coordinates of the offshore route are illustrated in Table 5.6. Based on the performed DMS study, the crossings of the proposed route are illustrated in table.

**Table 5.6 Offshore proposed route coordinates.**

Points	WGS84-UTM 34N		GGRS'87		Radius (m)	KP
	Easting (m)	Northing (m)	Easting (m)	Northing (m)		
OM2	439206	4352669	180,414	4,358,695	n/a	0.000
IP-1a	435400	4351800	176,577	4,357,951	2000	
IP-1b	433270	4348310	174,329	4,354,530	3000	
IP-1c	427500	4349400	168,591	4,355,812	5000	
IP-1d	421406	4350938	162,544	4,357,554	5000	
IP-2a	413104	4351291	154,247	4,358,183	5000	
IP-2b	409689	4349395	150,766	4,356,399	5000	
IP-2.1	405361	4347309	146,365	4,354,455	5000	
IP-2.2	404398	4346664	145,380	4,353,842	5000	
IP-3.1	398372	4343620	139,247	4,350,995	8500	
IP-4	348192	4380175	90,231	4,389,262	10000	
IP-5a	319867	4403220	62,642	4,413,288	10000	
IP-5b	316322	4405903	59,183	4,416,094	5000	
IP-5c	313589	4407595	56,503	4,417,880	5000	
IP-5d	310520	4409817	53,504	4,420,209	5000	
IP-5e	308421	4411897	51,472	4,422,363	5000	
IP-5f	305461	4413467	48,561	4,424,035	5000	
IP-6	298974	4418400	42,230	4,429,194	5000	
IP-6a	298033	4422841	41,438	4,433,673	5000	
IP-6b	297321	4426685	40,854	4,437,547	5000	
IP-7	294414	4440408	38,407	4,451,390	3500	
IP-8	294034	4447101	38,253	4,458,106	2000	
IP-9	288624	4449559	32,918	4,460,751	2000	
OLF	287153	4446993	31,358	4,458,231	n/a	204.80 9

**Table 5.7 List of Crossings (offshore proposed route).**

KP	CROSSING POINT (UTM Zone 34N, (CM21°E))	Depth (m)	Name of Crossing	Method of Crossing
2169	E:294398.817 N:4440674.299	65-70	Paxos – Paramithia 1 Power Cable	To be defined
2609	E:436656.45 N:4352071.80	65-70	Paxos – Paramithia 2 Power Cable	To be defined
40295	E:401860.16 N:4345790.82	1150	Preveza – Glyfada Telecommunication Cable	To be defined
106240	NOT CROSSING BUT CLOSING AT ~1000m	1140	Corfu – Otranto Telecommunication Cable	To be defined
192802	E:294244.82 N:4443385.81	84.9	Italy – Greece (Otranto – Epirus) Power Cable	To be defined
193850	E:294185.43 N:4444431.64	85	Otranto – Ftelia Power Cable	To be defined

### **5.6.7 Proposed Routing - Classification of Alternative Onshore Routings**

Based on the environmental, technical and economical data of all the investigated routings and the preliminary environmental licensing, Alternative Routing ALT1a was selected to be proposed, against the other feasible Alternative Routings ALT1, ALT1b, ALT2, ALT3, ALT4, ALT5, ALT6 and ALT7.

In short, the 130221/17.09.2010 preliminary environmental licensing that the project obtained approved ALT1 from Omprela 2 landfall site to Variko onshore facilities. Following a unanimous request from the Local Authorities representatives, in front of the Greek Parliament, the Onshore Facilities were moved to Florovouni site. The new route ALT1a from Omprela 2 to Florovouni Onshore Facilities received the 200088/08.07.2011 preliminary environmental licensing, modifying the first approval.

Here follows their classification and its reasoning, based on the above and the technical, environmental and social parameters:

- ALT1a presents some technical issues, especially in the slope next to the landfall site “Omprela 2” which nevertheless can be surpassed by special engineering solutions. During preliminary environmental licensing, this option was accepted, in spite of the increased construction cost, in comparison to the other routes. C/S-M/S Florovouni was selected based on recommendations made by the representatives of the Local Authorities. The corresponding near coast section is the OS-A section.
- Even though ALT1b meets the same social criteria, as set during the preliminary environmental licensing, i.e. Omprela 2 as landfall site and C/S-M/S Florovouni, it is longer and consequently the cost and the environmental impacts are slightly bigger. The corresponding near coast section is the OS-A section.
- ALT1 presents technical problems, especially in the slope next to the landfall site “Omprela 2” which nevertheless can be surpassed by special engineering solutions. During preliminary environmental licensing, this option was accepted, in spite of the increased construction cost, in comparison to the other investigated routes. Nevertheless, due to the proximity of the C/S-M/S Variko to Perdika community, the routing was rejected. This routing was the second alternative (ALT2) in the PEIA. The corresponding near coast section is the ALT1 – Offshore section.

- ALT2 is very similar to ALT1 but given that it is longer, the cost and the environmental impacts are slightly bigger. This routing was the third alternative (ALT2A) in the PEIA. The corresponding near coast section is the ALT1 – Offshore section.
- ALT3 does not traverse areas of residential or touristic development and, due to the remoteness of the landfall, no visual nuisances are caused. However, due to issues raised by the Local community during the preliminary environmental licensing, this alternative was rejected. This routing was the proposed one (K.X.) in the PEIA. The corresponding near coast section is the ALT3 – Offshore section.
- ALT4 does not present any technical issues. The disturbance caused by the fact that it crosses an area planned for residential expansion is limited. Furthermore, the landfall site “Sofas” presents smaller touristic development trend than ALT7 area (landfall site “Stavrolimenas”). During the preliminary environmental licensing this alternative was rejected. This routing was the first alternative (ALT1) in the PEIA. The corresponding near coast section is the ALT4 – Offshore section.
- ALT5 has very serious construction difficulties, especially in the slope next to the landfall site “Omprela 1”, in comparison to the other investigated routings. Compared to Omprela 2, this landfall site is more steep and demanding for construction and safety measures, meaning additional cost and impacts, without having any advantage compared to Omprela 2 site. This routing was the fourth alternative (ALT4A) in the PEIA. The corresponding near coast section is the ALT5 – Offshore section.
- ALT6 has very serious construction difficulties, especially in the slope next to the landfall site “Omprela 1”, in comparison to the other investigated routings. Compared to Omprela 2, this landfall site is more steep and demanding for construction and safety measures, meaning additional cost and impacts, without having any advantage compared to Omprela 2 site. This routing was the fifth alternative (ALT4) in the PEIA. The corresponding near coast section is the ALT5 – Offshore section.
- ALT7 does not have technical problems. However, during preliminary environmental assessment, this option was strongly opposed by the local

community and that is why it holds the last place at the routings classification. This routing was the third alternative (ALT3) in the PEIA. The corresponding near coast section is the ALT7 – Offshore section.

Based on what was previously stated and assessing their advantages and disadvantages, the Routings are classified as follows:

1. Alternative Routing ALT1a: “Omprela 2” – “Florovouni”,
2. Alternative Routing ALT1b: “Omprela 2” – “Florovouni”,
3. Alternative Routing ALT1: “Omprela 2” – “Variko”,
4. Alternative Routing ALT2: “Omprela 2” – “Gouri”,
5. Alternative Routing ALT3: “Stamponi” - “Kalivia”,
6. Alternative Routing ALT4: “Sofas” – “Kalivia”,
7. Alternative Routing ALT5: “Omprela 1” – “Variko”,
8. Alternative Routing ALT6: “Omprela 1” – “Gouri”,
9. Alternative Routing ALT7: “Stavrolimenas” – “Variko”,

For the reasons described above, the proposed ALT1a is preferable in comparison to the other investigated routings, so it is selected as the most appropriate one.

The following table (Table 5.8) is relevant of the assessment of the investigated routings. It includes a small reasoning for the provided answers. For more details the reader should look in the relevant chapter of impact assessment and mitigation (chapter 6).

**Table 5.8 Assessment of Onshore Alternative Routings.**

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Assessed Alternative Routings</b>								
		<b>ALT1</b>	<b>ALT1a</b>	<b>ALT1b</b>	<b>ALT2</b>	<b>ALT3</b>	<b>ALT4</b>	<b>ALT5</b>	<b>ALT6</b>	<b>ALT7</b>
<b>1</b>	<b>Statutory Feasibility</b>									
1.1	Passing through areas under the Statutory Environmental Protection Framework of NATURA2000 (Yes - No)	No	No	No	No	No	No	No	No	No
1.2	Passing through areas under the Statutory Environmental Protection Framework of Sites of Outstanding Natural Beauty (Yes - No)	No	No	No	No	No	No	No	No	No
1.3	Passing through Statutory Archaeological Sites (Yes - No)	No	No	No	No	No	No	No	No	No
<b>2</b>	<b>Social Acceptance</b>									

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Assessed Alternative Routings</b>								
		<b>ALT1</b>	<b>ALT1a</b>	<b>ALT1b</b>	<b>ALT2</b>	<b>ALT3</b>	<b>ALT4</b>	<b>ALT5</b>	<b>ALT6</b>	<b>ALT7</b>
2.1	Expected Social Acceptance (Very Big - Big - Medium - Small)	<b>Medium</b> <i>Reasoning: The landfall site received preliminary environmental approval but the community rejected the associated C/S-M/S of Variko</i>	<b>Big</b> <i>Reasoning: The landfall site, and the routing, received preliminary environmental approval while the C/S-M/S of Florovouni was indicated by representatives of local community</i>	<b>Big</b> <i>Reasoning: The landfall site received preliminary environmental approval while the C/S-M/S of Florovouni was indicated by representatives of local community</i>	<b>Medium</b> <i>Reasoning: The landfall site received preliminary environmental approval but the community rejected the associated C/S-M/S of Gouri</i>	<b>Small</b> <i>Reasoning: During preliminary environmental licensing, local community raised issues concerning the landfall site.</i>	<b>Small</b> <i>Reasoning: During preliminary environmental licensing, local community raised issues concerning the landfall site.</i>	<b>Medium</b> <i>Reasoning: Community rejected the associated C/S-M/S of Variko</i>	<b>Medium</b> <i>Reasoning: Community rejected the associated C/S-M/S of Gouri</i>	<b>Very Small</b> <i>Reasoning: Community rejected the landfall site and the associated C/S-M/S of Variko</i>
2.2	Expected O.T.A. (Local Administrative Organization) Position (Positive-Usual-Negative)	<b>Negative</b> <i>Reasoning: OTA is expected to follow social stance</i>	<b>Positive</b> <i>Reasoning: OTA is expected to follow social stance The route has received already a preliminary environmental approval</i>	<b>Usual</b> <i>Reasoning: OTA is expected to follow social stance</i>	<b>Negative</b> <i>Reasoning: OTA is expected to follow social stance</i>	<b>Negative</b> <i>Reasoning: OTA is expected to follow social stance</i>	<b>Negative</b> <i>Reasoning: OTA is expected to follow social stance</i>	<b>Usual</b> <i>Reasoning: OTA is expected to follow social stance</i>	<b>Usual</b> <i>Reasoning: OTA is expected to follow social stance</i>	<b>Negative</b> <i>Reasoning: OTA is expected to follow social stance</i>
2.3	Area of Working Strip (km <sup>2</sup> )*	0.218	0.258	0.291	0.206	0.140	0.123	0.247	0.219	0.150

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Assessed Alternative Routings</b>								
		<b>ALT1</b>	<b>ALT1a</b>	<b>ALT1b</b>	<b>ALT2</b>	<b>ALT3</b>	<b>ALT4</b>	<b>ALT5</b>	<b>ALT6</b>	<b>ALT7</b>
2.4	Area of Affected Crops (km <sup>2</sup> )**	0,076	0,074	0,081	0,030	0,022	0,021	0,055	0,002	0,057
2.5	Impact on Tourism (Big-Medium-Small)	<b>Small</b> <i>Reasoning: No touristic activities are developed in the area</i>	<b>Small</b> <i>Reasoning: No touristic activities are developed in the area</i>	<b>Small</b> <i>Reasoning: No touristic activities are developed in the area</i>	<b>Small</b> <i>Reasoning: No touristic activities are developed in the area</i>	<b>Small</b> <i>Reasoning: Small touristic activities are developed in the area</i>	<b>Medium</b> <i>Reasoning: Small touristic activities are developed in the area</i>	<b>Small</b> <i>Reasoning: No touristic activities are developed in the area</i>	<b>Small</b> <i>Reasoning: No touristic activities are developed in the area</i>	<b>Big</b> <i>Reasoning: Certain touristic activities are developed in the area</i>
3	<b>Safety</b>									
3.1	Engagement with Onshore Transportation Network (Existing-Not Existing)	Existing*	Existing*	Existing*	Existing*	Existing	Existing	Existing*	Existing*	Existing
3.2	Passing through Industrial – Manufacturing Areas of planned expansion (Existing-Not Existing)	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing				

	Assessment Criteria for the Alternative Routings	Assessed Alternative Routings								
		ALT1	ALT1a	ALT1b	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
3.3	Passing through Residential – Summering Areas (Existing-Not Existing)	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing	Existing (planned expansion)	Not Existing	Not Existing	Existing (planned expansion)
3.4	Passing through Military Areas (Existing-Not Existing)	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing
4	<b>Geo-Environmental Characteristics</b>									
4.1	Foundation Conditions (Suitable-Partially Suitable-Unsuitable)	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>Suitable</b> <i>Reasoning: see relevant section in Ch.4</i>
4.2	Seismic Design and Protection (High-Medium-Small)***	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>	<b>High</b> <i>Reasoning: see relevant section in Ch.4</i>
4.3	Impact on Water Table and Springs (Extensive-Limited)	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction.</i>	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction</i>	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction</i>	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction</i>	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction</i>	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction</i>	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction</i>	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction</i>	<b>Limited</b> <i>Reasoning: Few such features exist. Impact only during construction</i>

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Assessed Alternative Routings</b>									
		<b>ALT1</b>	<b>ALT1a</b>	<b>ALT1b</b>	<b>ALT2</b>	<b>ALT3</b>	<b>ALT4</b>	<b>ALT5</b>	<b>ALT6</b>	<b>ALT7</b>	
4.4	Engagement with Forestrial Ecosystems, Wildlife Reserves and Sites of Outstanding Beauty (Very Big - Big - Medium - Small)	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction`</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>	<b>Small Limited</b> <i>Reasoning: Few forestrial ecosystems are crossed by the routing. Impact only during construction</i>
4.5	Minimum Estimated Trees Felled.****	2226	2101	2336	2797	282	371	1670	2120	1360	
4.6	Impact on Flora (Extensive-Limited, Temporary-Long Term, Reversible-Irreversible)	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Assessed Alternative Routings</b>								
		<b>ALT1</b>	<b>ALT1a</b>	<b>ALT1b</b>	<b>ALT2</b>	<b>ALT3</b>	<b>ALT4</b>	<b>ALT5</b>	<b>ALT6</b>	<b>ALT7</b>
4.7	Impact on Wild life-Avifauna (Extensive-Limited, Temporary-Long Term, Reversible-Irreversible)	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>	<b>Limited, Temporary Reversible.</b> <i>Reasoning: Impact only during construction. No fragmentation of habitats or substantial increase of human activities</i>
4.8	Reinstatement Measures Feasibility (Small-Medium-Big)	<b>Big</b> <i>Reasoning: Following construction, reinstatement will be complete</i>	<b>Medium</b> <i>Reasoning: Based on the available geological data, reinstatement will be demanding and costly, without any significant advantages</i>	<b>Medium</b> <i>Reasoning: Based on the available geological data, reinstatement will be demanding and costly, without any significant advantages</i>						
5	<b>Technical and Economical Criteria</b>									

	<b>Assessment Criteria for the Alternative Routings</b>	<b>Assessed Alternative Routings</b>								
		<b>ALT1</b>	<b>ALT1a</b>	<b>ALT1b</b>	<b>ALT2</b>	<b>ALT3</b>	<b>ALT4</b>	<b>ALT5</b>	<b>ALT6</b>	<b>ALT7</b>
5.1	Construction Difficulties, i.e. crossings, gradients, accessibility. (Small-Medium-Big-Very Big)	<b>Medium</b> <i>Reasoning: steep slopes, geological difficulties at the landfall site</i>	<b>Medium</b> <i>Reasoning: steep slopes, geological difficulties at the landfall site</i>	<b>Medium</b> <i>Reasoning: steep slopes, geological difficulties at the landfall site</i>	<b>Medium</b> <i>Reasoning: steep slopes, geological difficulties at the landfall site</i>	<b>Small</b> <i>Reasoning: average slopes, no geological difficulties at the landfall site</i>	<b>Small</b> <i>Reasoning: average slopes, no geological difficulties at the landfall site</i>	<b>Very Big</b> <i>Reasoning: steep slopes, significant geological difficulties at the landfall site</i>	<b>Very Big</b> <i>Reasoning: steep slopes, significant geological difficulties at the landfall site</i>	<b>Small</b> <i>Reasoning: average slopes, no geological difficulties at the landfall site</i>
Notes										
*	A 32m width zone was used to calculate the Working Strip. The landfall site was not included in the calculations									
**	A 32m width zone was used to calculate the working strip along agricultural uses, as they were determined through satellite imagery interpretation of vegetation coverage.									
***	<u>High</u> : Seismic protection is possible <u>Medium</u> : Large scale protective measures are required for seismic protection									
****	For the estimation of the minimum felled trees the following assumptions were made: <ul style="list-style-type: none"> <li>Average leaf coverage of Quercus sp (dominant species in the area) is 30m<sup>2</sup></li> <li>Average land coverage of forests by Quercus sp is 50%</li> </ul> These figures were used to calculate the number of trees that would require to be felled based on a 32m Working Strip along Forests (as they were classified through interpretation of satellite images) of each route. This figure is not absolute and a variation of ±30% should be expected since not all trees are of quercus sp nor all the forest areas have a 50% forestial trees coverage. It is used in order to provide a rough estimation of the possible impacts to forests. Lastly, it has not been taken into account that along forestial areas covered with thick vegetation every effort will be made in order to reduce the Working Strip in a width not smaller than 26m.									

The coordinates of the qualified (proposed) route ALT1a are illustrated in Table 5.9. Based on the alignment sheets (see Annex B – Plot Plans (Volume II)), the crossings of the proposed route are illustrated in Table 5.10.

**Table 5.9 Onshore proposed route coordinates.**

Location	WGS84 - UTM Zone 34N		Local Geodetic System Greece	
	Easting (m)	Northing (m)	Easting (m)	Northing (m)
IP-G-1	443,975	4,356,939	185,329	4,362,808
IP-G-2	443,954	4,356,935	185,307	4,362,806
IP-G-3	443,962	4,356,883	185,314	4,362,753
IP-G-4	443,914	4,356,695	185,260	4,362,567
IP-G-5	443,522	4,356,366	184,856	4,362,250
IP-G-6	443,254	4,356,011	184,576	4,361,904
IP-G-7	443,026	4,355,937	184,345	4,361,837
IP-G-8	442,792	4,355,817	184,107	4,361,725
IP-G-9	442,613	4,355,762	183,927	4,361,676
IP-G-10	442,137	4,355,251	183,433	4,361,181
IP-G-11	442,158	4,354,780	183,438	4,360,709
IP-G-12	442,031	4,354,532	183,303	4,360,465
IP-G-13	442,035	4,353,625	183,277	4,359,557
IP-G-14	441,679	4,353,575	182,919	4,359,519
IP-G-15	441,150	4,353,345	182,382	4,359,307
IP-G-16	441,045	4,353,460	182,281	4,359,425
IP-G-17	440,594	4,353,463	181,830	4,359,443
IP-G-18	440,099	4,353,823	181,346	4,359,819
IP-G-19	439,901	4,353,706	181,144	4,359,709
IP-G-20	439,806	4,353,535	181,044	4,359,542
IP-G-21	439,788	4,353,412	181,021	4,359,418
IP-G-22	439,719	4,353,333	180,949	4,359,342
IP-G-23.1	439,709	4,352,889	180,925	4,358,898
IP-G-23.2	439,736	4,352,800	180,949	4,358,807
IP-G-24	439,535	4,352,691	180,745	4,358,706
IP-G-25	439,442	4,352,723	180,652	4,358,740
OM2	439,206	4,352,669	180,414	4,358,694

**Table 5.10 List of Crossings (proposed onshore route).**

KP	Type of Crossing	Method of Crossing
2170	Dirt Road	Open Cut
2280	Asphalt Road	Open Cut
2300	Overhead Power Line	-
2330	Dirt Road	Open Cut
3350	Dirt Road	Open Cut
3780	Dirt Road	Open Cut
3940	Dirt Road	Open Cut
5750	Dirt Road	Open Cut
5760	Dirt Road	Open Cut
5840	Dirt Road	Open Cut
5950	Dirt Road	Open Cut
6020	Dirt Road	Open Cut
6510	Dirt Road	Open Cut
6570	Overhead Power Line	-
6590	Dirt Road	Open Cut
7290	Dirt Road	Open Cut
7720	Dirt Road	Open Cut
7970	Dirt Road	Open Cut
8010	Dirt Road	Open Cut

For the proposed onshore route, 3 alternative sites for the complementary block valve were assessed (see Annex A – Maps (Volume II), Map 7240AU-LU-02, Sheet 4 of 5). The main criteria are: accessibility, topography and proximity to the landfall point. The distance to the landfall site could not exceed 1km for operational reasons. Given the topography of the landfall area, the current selected location is the first feasible location land inward of the landfall point. The proposed location is Alternative A due to its proximity to the landfall site. The classification of the alternatives for the block valve are tabulated below:

**Table 5.11 Assessment of Alternative sites for the block valve station.**

Site	Number of Parcel <sup>(1)</sup>	Land Use
A	13	Abandoned farmland
B	14	Abandoned farmland
C	17	Olive grove

Note 1: According to Technical Survey Report of the Onshore Section, Doc. No:IGI-402-20-PL-RPT-001

### **5.6.8 Proposed Sites for Compression and Metering Station – Classification of Alternatives**

Based on the environmental, technical and economical data of all the investigated Onshore Facilities sites for the compressor and metering station, and the preliminary environmental licensing, C/S-M/S Florovouni was selected to be proposed, against the other feasible Alternative Onshore Facilities sites C/S-M/S 1, C/S-M/S Kalivia, C/S-M/S Variko, C/S-M/S 2, C/S-M/S Gouri, C/S-M/S 3 and C/S-M/S 4.

In short, the 130221/17.09.2010 preliminary environmental licensing that the project obtained approved ALT1 from Omprela 2 landfall site to Variko onshore facilities. Due to issues raised by the Local Community and following the recommendation of the Local Authorities in front of the Greek Parliament, the Onshore Facilities were moved to Florovouni site. The new route ALT1a from Omprela 2 to Florovouni Onshore Facilities received the 200088/08.07.2011 preliminary environmental licensing, modifying the first approval.

Regarding ALT1, three alternative sites were examined: C/S-M/S Variko, C/S-M/S 2 and C/S-M/S 3. C/S-M/S 2 is surrounded by steep slopes causing accessibility problems; on top of that, the site is located adjacent to a torrent's bed, which may cause problems during the operation phase. C/S-M/S 3 presents some geotechnical construction problems because of the intense area's morphology. C/S-M/S Variko site has mild morphology and it is the best site in comparison to the others. However, Variko site was not accepted by the local community of Perdika and the representatives of the local authorities suggested another technically feasible location (at Florovouni area) which was opted.

Regarding ALT1a, two alternative sites are available: C/S-M/S 3 and C/S-M/S Florovouni. C/S-M/S Florovouni is located in a relevant mild morphology. Among the arguments in favor of this site is the fact that the representatives of the local authorities suggested the relevant site, consequently, no objections should be anticipated about it.

Regarding ALT1b, six alternative sites could be used: C/S-M/S Florovouni, C/S-M/S Variko, C/S-M/S 2, C/S-M/S 3, and C/S-M/S 4

For ALT3 C/S-M/S Kalivia site for the Onshore Facilities is proposed; prior to PEIA submission, this site had received positive comments from the Technical Chamber of Greece/ Epirus' Department, as the most fitting one. However, the site was rejected

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during the preliminary environmental licensing. Regarding Alternative Routing ALT4, two alternative sites (C/S-M/S 1 and “C/S-M/S Kalivia”) were examined; the “C/S-M/S Kalivia” site was proposed.

Regarding ALT7 two alternative sites, C/S-M/S 2 and C/S-M/S Variko, were examined. Based on the previous arguments, Variko site was qualified for ALT7.

Regarding ALT6, two alternative sites were examined: C/S-M/S 4 and C/S-M/S Gouri. C/S-M/S 4 presents geotechnical construction problems, because of the area’s morphology. Thus, “C/S – M/S Gouri” is proposed, located in an area of mild morphology. However, during preliminary environmental licensing, this site was not accepted either.

ALT2 has C/S-M/S Gouri as corresponding Onshore Facilities site, whilst ALT5 has C/S-M/S 2, C/S-M/S 3, C/S-M/S 4 and C/S-M/S Variko.

The aforementioned conclusions are supported by the following table (Table 5.12), comparing the sites of the Onshore Facilities for the investigated Routings.

**Table 5.12 Assessment of Alternative Sites for the Compressor and Metering Station.**

	<b>Assessment Criteria for the Onshore Facilities Sites</b>	<b>Alternative Sites of the Onshore Facilities.</b>							
		<b>C/S-M/S 1</b>	<b>C/S - M/S Kalivia</b>	<b>C/S - M/S Florovouni</b>	<b>C/S - M/S Variko**</b>	<b>C/S-M/S 2</b>	<b>C/S - M/S Gouri*</b>	<b>C/S-M/S 3</b>	<b>C/S-M/S 4</b>
	<b>Applicable for Routings</b>	ALT4	ALT3, ALT4	ALT1a, ALT1b	ALT1, ALT1b, ALT5, ALT7	ALT1, ALT1b, ALT5, ALT7	ALT2, ALT6	ALT1, ALT1a, ALT1b, ALT5,	ALT5, ALT6
<b>1</b>	<b>Prohibitive Criteria</b>								
1.1	Sufficient Area for the C.M.S (Yes - No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.2	Passing through Archaeological Sites (Yes-No)	No	No	No	No	No	No	No	No
1.3	Neighbouring to Archaeological Sites (km)*	4.409	6.131	5.163	3.16	2.548	4.702	2.229	2.164
1.4	Passing through areas of planned Town Plan expansion (Yes - No)	No	No	No	No	No	No	No	No
1.5	Neighbouring to areas of planned Town Plan expansion (km)*	0.482	1.429	4.251	2.465	1.940	4.336	1.862	2.240

	<b>Assessment Criteria for the Onshore Facilities Sites</b>	<b>Alternative Sites of the Onshore Facilities.</b>							
		<b>C/S-M/S 1</b>	<b>C/S - M/S Kalivia</b>	<b>C/S - M/S Florovouni</b>	<b>C/S - M/S Variko**</b>	<b>C/S-M/S 2</b>	<b>C/S - M/S Gouri*</b>	<b>C/S-M/S 3</b>	<b>C/S-M/S 4</b>
1.6	Existing restriction due to Airport Regulations (Yes - No)	No	No	No	No	No	No	No	No
1.7	Existing Power Supply Network (Yes - No)	No	No	No	No	No	No	No	No
1.8	Existing Water Supply Network (Yes - No)	No	No	No	No	No	No	No	No
1.9	Passing through National Roads and O.S.E. Expropriation Zones (Yes - No)	No	No	No	No	No	No	No	No
1.10	Accessibility Problems (Big - Medium - Small)	Small	Small	Small	Small	Small	Small	Small	Small
1.11	Other Restricting Provisions (Yes - No)	No	No	No	No	No	No	No	No
2	<b>Criteria of Possible Deviation</b>								

	<b>Assessment Criteria for the Onshore Facilities Sites</b>	<b>Alternative Sites of the Onshore Facilities.</b>							
		<b>C/S-M/S 1</b>	<b>C/S - M/S Kalivia</b>	<b>C/S - M/S Florovouni</b>	<b>C/S - M/S Variko**</b>	<b>C/S-M/S 2</b>	<b>C/S - M/S Gouri*</b>	<b>C/S-M/S 3</b>	<b>C/S-M/S 4</b>
2.1	Building Terms Restrictions (Existing - Not Existing)	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing	Not Existing
2.2	Suitable Land Use (Yes - No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.3	Possibility of "Parcel Integrity Deviation" (Yes - No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>3</b>	<b>Safety Criteria</b>								
3.1	Distance from the nearest Airport (Ioannina Airport) (km)*.	57,35	54,94	55.65	56,85	57,65	56,29	58,60	59,69
3.2	Passing through areas existing or planned Military Areas (Yes - No)	No	No	No	No	No	No	No	No
3.3	Inflammation Sources at distance smaller than 30m from the parcel's limits (Yes - No)	No	No	No	No	No	No	No	No

	<b>Assessment Criteria for the Onshore Facilities Sites</b>	<b>Alternative Sites of the Onshore Facilities.</b>							
		<b>C/S-M/S 1</b>	<b>C/S - M/S Kalivia</b>	<b>C/S - M/S Florovouni</b>	<b>C/S - M/S Variko**</b>	<b>C/S-M/S 2</b>	<b>C/S - M/S Gouri*</b>	<b>C/S-M/S 3</b>	<b>C/S-M/S 4</b>
3.4	Passing through Quarries (Yes - No)	No	No	No	No	No	No	No	No
3.5	Neighbouring to Quarries (km)*	3.269	1.947	5.446	0.791	0.818	3.469	2.255	1.756
3.6	Fire Risk (Big - Medium – Small)	Small	Small	Small	Small	Small	Small	Small	Small
3.7	Floods Risk (Big - Medium - Small)	Small	Small	Small	Small	Medium	Small	Medium	Small
4	<b>Operational Criteria</b>								
4.1	Capacity for future expansion of the onshore facilities. site (Yes - No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.2	Capacity for connection to high speed road (Yes - No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.3	Existing access road (Yes - No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	<b>Assessment Criteria for the Onshore Facilities Sites</b>	<b>Alternative Sites of the Onshore Facilities.</b>							
		<b>C/S-M/S 1</b>	<b>C/S - M/S Kalivia</b>	<b>C/S - M/S Florovouni</b>	<b>C/S - M/S Variko**</b>	<b>C/S-M/S 2</b>	<b>C/S - M/S Gouri*</b>	<b>C/S-M/S 3</b>	<b>C/S-M/S 4</b>
4.4	Capacity for unobstructed connection of medium pressure network to the Onshore Facilities (Yes - No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	<b>Criteria of Possible Problems</b>								
5.1	Expected Social Acceptance (Very Big - Big - Medium - Small)	<b>Small Reasoning:</b> During preliminary environmental approval local community raised issues	<b>Small Reasoning:</b> During preliminary environmental approval local community raised issues	<b>Big Reasoning:</b> During preliminary environmental approval the site was indicated by the representatives of local authorities	<b>Small Reasoning:</b> During preliminary environmental approval local community raised issues	<b>Small Reasoning:</b> During preliminary environmental approval local community raised issues	<b>Big Reasoning:</b> the site is remotod from any sensitive receptor	<b>Medium Reasoning:</b> due to the proximity to the coast and the archaeological site	<b>Medium Reasoning:</b> due to the proximity to the coast and the archaeological site
5.2	Problems caused by morphology (Big - Medium - Small)	Small	Small	Small	Small	Medium	Medium	Medium	Medium
6	<b>Environmental Criteria</b>								
6.1	Passing through Forest (Yes - No)**	Yes (~10%)	No	No	Yes (~20%)	Yes (~50%)	No	Yes	Yes

	<b>Assessment Criteria for the Onshore Facilities Sites</b>	<b>Alternative Sites of the Onshore Facilities.</b>								
		<b>C/S-M/S 1</b>	<b>C/S - M/S Kalivia</b>	<b>C/S - M/S Florovouni</b>	<b>C/S - M/S Variko**</b>	<b>C/S-M/S 2</b>	<b>C/S - M/S Gouri*</b>	<b>C/S-M/S 3</b>	<b>C/S-M/S 4</b>	
6.2	Wildlife or Domestic animals nuisance (Extensive-Limited, Temporary-Long Term, Reversible-Irreversible)	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>	<b>Limited, Long-term, Reversible</b> <i>Reasoning: Impacts during construction will be short termed. During operation no habitats are affected. Some increase of human activities which will end with decommission.</i>
6.3	Visual Intrusion to the Landscape (Very Big - Big - Medium - Small)	Medium <i>Reasoning: Proximity to Perdika and Coast</i>	Small <i>Reasoning: Natural cavity of the landscape</i>	Small <i>Reasoning: Natural cavity of the landscape</i>	Small <i>Reasoning: Natural cavity of the landscape</i>	Big <i>Reasoning: Natural cavity of the landscape but proximity of the road</i>	Small <i>Reasoning: Natural cavity of the landscape</i>	Big <i>Reasoning: Natural cavity of the landscape but proximity of the coast and archaeological site</i>	Big <i>Reasoning: Natural cavity of the landscape but proximity of the coast and archaeological site</i>	
	Notes									
*	Distances are calculated from the centroid of each site to the nearest relevant site.									
**	The characterization of the area is based on the vegetation cover map.									

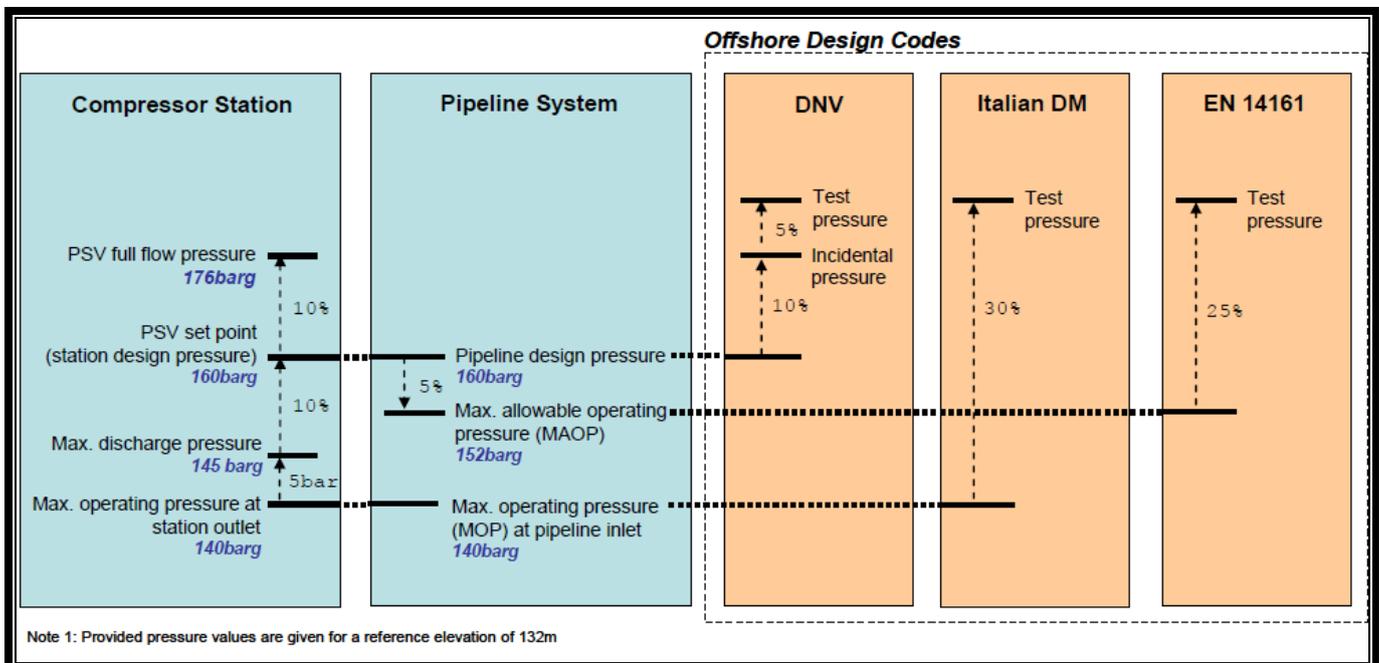
## 5.7 Pipeline Technical Design

The study of the Offshore High Pressure Natural Gas Pipeline System is prepared according to the existing international standards and regulations, in order to construct a safe and technologically advanced project.

### 5.7.1 Main Codes and Standards

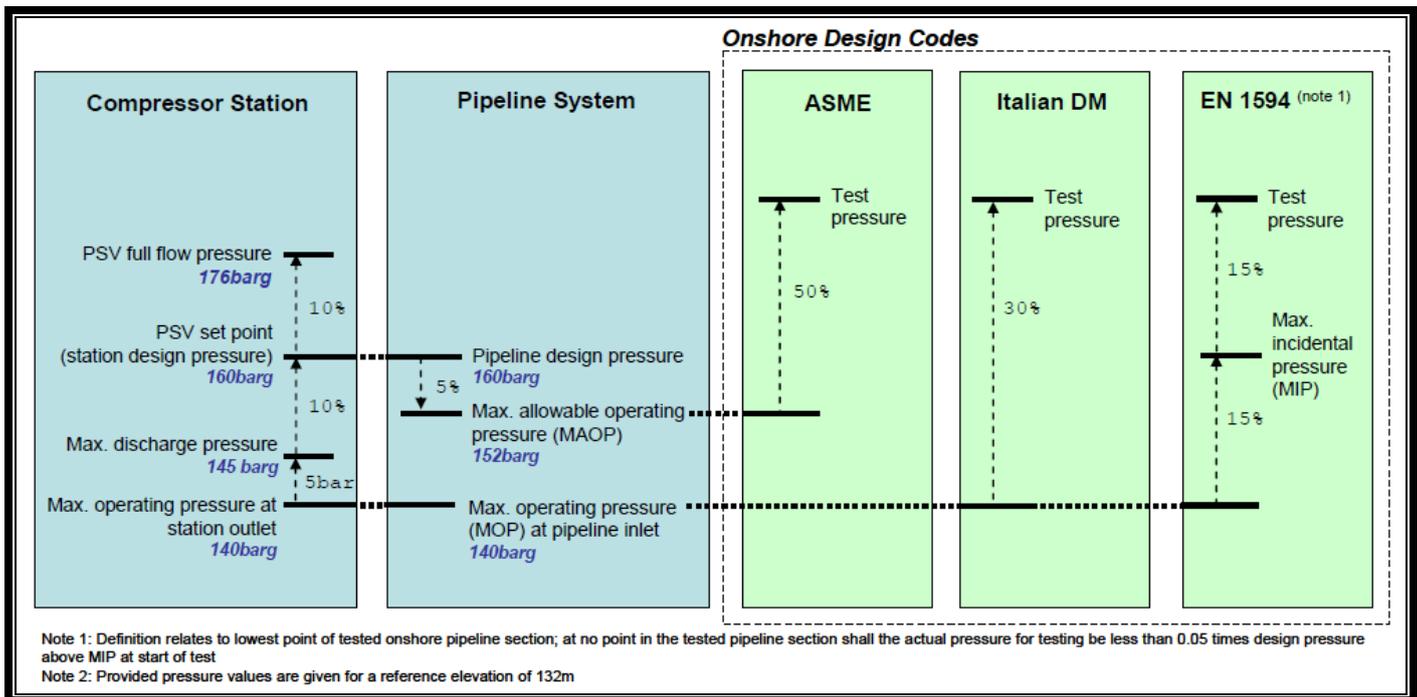
For the design of the offshore part the following main design codes will be used:

**Figure 5.3 Compressor and Pipeline Pressure Definition – Offshore Design Codes.**



The design of the onshore part will be according to the Technical Regulation “*Natural Gas Transportation Systems of Maximum Operation Pressure over 16 bar*” and the following codes:

**Figure 5.4 Compressor and Pipeline Pressure Definition – Onshore Design Codes.**



### 5.7.2 Design Export Capacity

The design capacity of the system is shown in the following table.

**Table 5.13 Planned Transport Volumes.**

Description	Annual flow rate	Daily flow rate
Initial capacity	9 BNCM/year	27,4 MNCM/day
Future expansion	12 BNCM/ year	36,5 MNCM/day

### 5.7.3 Pipeline Design Conditions

The pipeline operating and design pressure are given in the following table.

**Table 5.14 Gas Export Pressures.**

Parameter	Value
Maximum operating pressure	140 barg
Design pressure	160 barg

#### 5.7.4 Linepipe Dimensional Data and Properties

One line pipe specification is foreseen for the complete pipeline which is based on DNV-OS-F101. The linepipe dimensional data and properties are summarized the following table.

**Table 5.15 Pipe Dimensional Data.**

Parameter	Symbol	Value
Pipe nominal outside diameter (note 1)	OD	32"
Pipe nominal inside diameter	ID	Constant along the pipeline route (74.78mm)
Internal or external corrosion allowance	$C_A$	0mm
Wall thickness fabrication tolerance	$t_{fab}$	$\pm 1$ mm
Maximum out of roundness – pipe body	O	0.0075D, but max 8mm
Thickness of the pipeline (indicative)	$W_t$	18.5/30.2mm

#### 5.7.5 Corrosion Protection and Coatings

The corrosion protection system of the pipeline is important to ensure pipeline integrity during its service life (30 years). It is necessary to select a proper protection system which is suitable during installation and operation of the pipeline in the specific environment.

The primary corrosion protection for the offshore pipeline will be by an external anti-corrosion coating and associated field joint coatings. As a supplementary protection system sacrificial anodes are applied to function in case the protective coating is damaged. In the onshore pipeline section the corrosion protection is typically provided by external anti-corrosion coating in combination with an Impressed Current Cathodic Protection (ICCP) system. Both systems have to be isolated from each other to avoid interference.

The inside surface of the pipeline will have an internal flow coating. The offshore pipeline section in shallow water will be coated with a concrete weight coating of 120mm thickness for pipeline stability.

- Anti-corrosion Coating

Three-Layer-Polypropylene, 3LPP, is selected to protect the steel line pipe from external corrosion. The 3LPP coating combines excellent mechanical properties and

heat resistance with a high degree of resistance to chemical attack and cathodic disbondment.

The thickness of the external coating is selected to be 3.0 mm minimum in order to provide additional mechanical strength for handling and high reliability protection against the environment.

- Field Joint Coating and Infill Material

Field joint coating (FJC) will be applied at the girth weld location where two pipe sections are joined. The field joint coating has the same function as anti-corrosion coating, only it will be applied after the girth weld has been made and therefore will take place in the field. The field joint coating consists of a polymer coating layer and filler material to provide a uniform coating thickness with the concrete coating (if applied) or with the anti-corrosion coating.

- Internal Flow Coating

Internal flow coatings are typically applied for corrosion protection and enhancement of the flow rate. With respect to corrosion the internal coating is not indispensable since the content is classified as sweet dry gas.

- Weight Coating

Weight coating will be applied on pipeline sections in shallow water, typically for water depths up to approximately 500 m. In deeper waters the hydrodynamic loads are smaller and the pipeline is expected to be stable without weight coating. The weight coating will have a density of 3040 kg/m<sup>3</sup>.

### **5.7.6 Cathodic Protection**

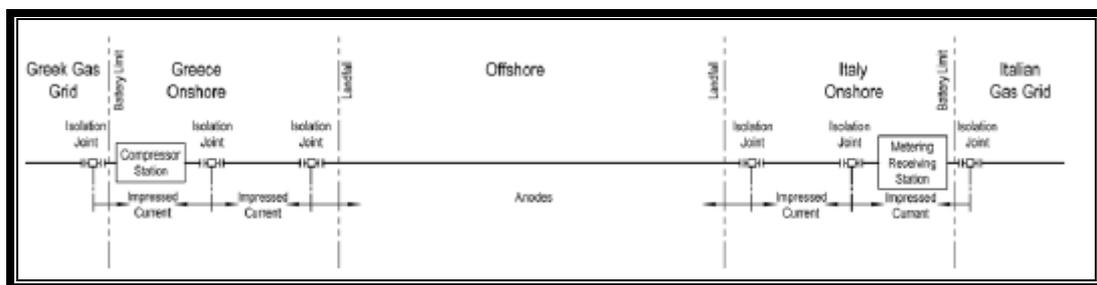
The cathodic protection of the offshore pipeline system will be achieved by placing sacrificial anodes at regular intervals along the pipe. This provides a dual level of corrosion protection in combination with the anti-corrosion coating.

The sacrificial anodes material will be aluminum based alloy (Al-Zn-In). Bracelet anodes consisting of two half-shell anodes which can be clamped directly on the pipeline will be used. An isolation joint at the beach may be included in the onshore trunkline in order to separate the onshore protection system from the offshore sacrificial anode Cathodic Protection systems.

For the onshore pipeline sections, an Impressed Current Cathodic Protection (ICCP) system will be applied. This system has to be isolated from the offshore system and the onshore stations by means of isolation joints.

Note that both the compressor station and the receiving station have to be isolated from the cathodic protection systems of the Greek and Italian gas networks. These isolation joints are included in the following figure.

**Figure 5.5 Cathodic Protection.**



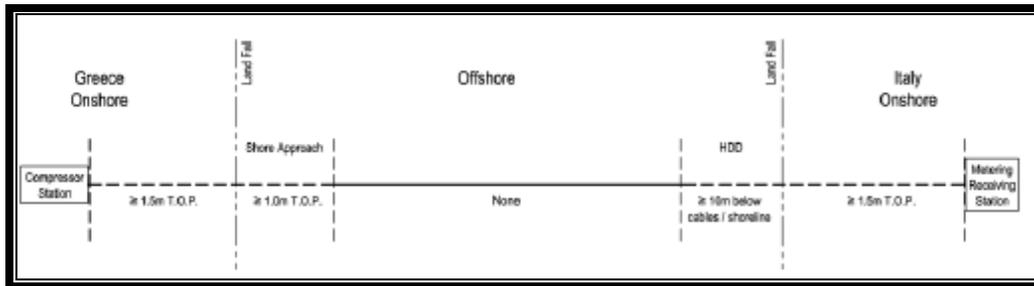
### 5.7.7 Pipeline Burial

The deep water, offshore pipeline section will not be buried.

The offshore pipeline sections will be buried in the near shore and landfall areas for protection against external factors and for pipeline stability, up to a depth of 25m. For this phase a typical burial depth of 1.5 m cover on top of the pipe will be adopted till the depth of approximately 16m. The burial depth will then be gradually reduced to 0, at the depth of approximately 25m. This typical burial depth is only increased in case of highly dynamic nearshore seabed. The typical burial depth is considered adequate. However, burial depth may be adapted later as a result of developed insight or engineering and design results.

The onshore pipeline sections will be buried for protection against external factors. For this phase a common burial depth of 1.5 m cover on top of the pipe will be adopted. This burial depth may be adapted later as a result of developed insight or engineering and design results.

**Figure 5.6 Pipeline burial requirements.**



### 5.7.8 Pipeline Design Studies

Currently the Front End Engineering Design (FEED) study is being performed. The purpose of this study is to progress the design to a suitable level of detail that allows efficient Equipment and Materials tendering & supply management and E(P)IC / EPC Contracts tendering and management.

The studies that have been prepared or are under preparation in the scope of the FEED, are the following:

#### 5.7.8.1 Flow Assurance

The flow assurance activities for the FEED phase of the project addresses the key drivers and risks related to the pipeline size, compression capacity, cost and operability for the pipeline system from Greece to Italy. The main activity focuses on the steady state pipeline system hydraulics in order to present a robust technical solution, meeting the required operational flexibility in the most cost effective manner. Transient analysis is also performed to allow the envelope of design conditions to be established.

#### 5.7.8.2 Hydrate Formation Assessment

Hydrate formation is not envisaged during normal operation based upon an assumption of transport quality gas composition. However, a Hydrate Dissociation curve is produced for the gas, based upon worst-case saturation conditions. Hydrate mitigation procedures are also developed.

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### **5.7.8.3 Line Pipe Material Selection**

Selection of steel grade can affect the entire design, installation and cost scenarios. The objective of this activity is to select optimum steel grade for project, from trade-off of manufacturing, installation, operational and other factors.

### **5.7.8.4 Route Selection**

Recent experience shows that pipelines that were thought unfeasible fifteen years ago are now being installed. This is a result of refinement in data collection, better understanding of marine processes (hazards), deeper investigations into pipeline failure modes, and good risk assessment.

The objective of this activity is to establish project requirements and find the best route to satisfy them.

### **5.7.8.5 Bathy-morphological Characterization**

The objective of this activity is to build up reliable, complete geophysical and geo-technical characterization of entire route, including shore approaches.

### **5.7.8.6 Metocean Study**

The objective of this task is to establish reliable metocean design parameters along the entire offshore route using best available information.

### **5.7.8.7 Fishing and Shipping Interaction Studies**

The objective of this activity is to characterize the intensity and type of fishing and shipping activity along the pipeline route. This data will then be used as input to a) the Risk Assessment to establish the probability of fishing and/or shipping hazards occurring, b) the Pipeline Integrity Assessment and C) the Pipeline Protection Design.

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#### **5.7.8.8 Geohazard and Seismic Risk Assessment Studies**

The objective of this task is to consider the geohazard and seismic risk. For the offshore section, this study includes a probabilistic seismic hazard assessment (PSHA) to establish earthquake design criteria (EDC) and a detailed geohazard assessment of the pipeline route based on the results of the Detailed Marine Survey.

In addition, for the Greek onshore section the following items are studied:

- Geological / tectonic study; this includes the preparation of a detailed geological and tectonic model along the Greek onshore section of the Poseidon gas pipeline and highlighting sites prone to the occurrence of geological hazards. The model includes the facility area.
- Seismological study; evaluation of the ground-shaking hazard parameters (PGA, PGV and Permanent Displacement) on fault crossings with the designate pipeline route and facility area as well as from close located faults
- Geotechnical earthquake engineering study
- Onshore pipeline seismic design

#### **5.7.8.9 On-Bottom Strength Analysis**

The objective is to perform a pipeline On-bottom Strength Analysis considering the following:

On-bottom stress analysis - Pipeline on bottom static stress analysis is carried out along the selected route in order to check the pipeline integrity with respect to possible local buckling due to high bending induced by seabed unevenness.

Free span assessment - The dynamic assessment of free spans due to seabed unevenness' and scouring, if applicable, is performed for temporary and operational conditions.

#### **5.7.8.10 Pipeline Integrity Analysis**

A detailed pipeline integrity analysis will be performed to integrate the results of all relevant design activities into an overall structural integrity assessment of the

pipeline. This analysis provides a detailed characterization of the overall effect of various failure modes identified, such as geohazards, loss of stability, spanning, global buckling, and third party impact.

#### **5.7.8.11 Pipeline Mechanical Design**

The pipeline mechanical strength design is performed in accordance with the offshore standard DNV OS-F101 supplemented by specific national requirements of Greece and Italy and with special requirements for deep-water application.

#### **5.7.8.12 Anti-Corrosion Design**

This defines type and minimum requirements of external corrosion coating, field joint coating and field joint infill, as applicable. Furthermore, it includes design of the cathodic protection system (selection of type, size and spacing of the sacrificial anodes).

#### **5.7.8.13 Stability Design**

The objective of this activity is to determine on-bottom stability of pipeline, and, where necessary, to design cost-efficient methods to achieve this, by trenching, weight coating, route deviations or other.

#### **5.7.8.14 Pipeline Protection Design**

The objective of this activity is to quantify the hazard of fishing and shipping activity in the overall risk assessment and to analyze interaction loads as required to define a safe pipeline design.

#### **5.7.8.15 Seabed Intervention Design**

The objective of this activity is to summarize all such intervention works requirements from the pipeline design tasks and to integrate them into a common construction

plan. Intervention works are defined for this activity as all necessary pre- and post-lay activities which are required to ensure the pipelines' integrity and compliance with authority requirements

#### **5.7.8.16 Cable Crossing Design**

The objective of this activity is to prepare a preliminary design for the cable crossings that are practical, effective and reduce the installation time for constructing the crossing and is acceptable to the cable companies.

#### **5.7.8.17 Shore Approach Design**

The objective of this activity is to prepare the preliminary design of landfalls on the Greek and Italian sides in compliance with authority and code requirements.

#### **5.7.8.18 Hot End Analysis**

The objective of this activity is to perform a detailed analysis of the high pressure and temperature section immediately after the Greek compression station and through the nearshore area. These analyses consider the potential for upheaval and lateral buckling, particularly in correspondence with pipeline burial, seabed undulations, and horizontal curves.

#### **5.7.8.19 Installation Analysis**

The objective of this study is the estimation of pipelay tensions for assessing the vessels' capacities of laying the pipeline on the sea bottom, determining wall thickness, carrying out on-bottom stress analyses, assessing spanning potential, checking fatigue limits, among others.

In addition, for the onshore pipeline section, the following design activities are performed as part of the FEED study:

#### **5.7.8.20 Survey Activities**

The survey activities include for a) topographical survey, b) geotechnical survey and c) soil electrical resistivity measurements.

#### **5.7.8.21 Pipeline Mechanical Design**

The objective of this task is to develop the mechanical design of the onshore pipeline sections in accordance with international pipeline design standards and with applicable national regulations.

#### **5.7.8.22 Anti-Corrosion Design**

The objective of this activity is to design a cost-effective and fit-for-purpose corrosion protection system for the onshore pipeline. The design of the Greek and Italian onshore pipeline corrosion protection systems is included in this activity; however, location-specific aspects such as soil properties will be taken into account for the separate locations.

#### **5.7.8.23 Pipeline Protection Design**

The objective of this task is to identify, quantify and specify additional protection that may be required along specific sections of the onshore pipeline route. One such location is at crossings of existing pipelines, cables, rivers, roads or other similar feature. The pipeline must be designed at these locations to mitigate the risk of damage by impact, differential settlement or other external mechanism.

#### **5.7.8.24 Stability and Stress Analysis**

The objectives of this task are to determine the stress levels in and stability of the onshore pipeline sections for various loading conditions and to confirm the stability of the pipeline. This task includes design of the pipeline for seismic loading.

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### **5.7.9 Safety Study and Operation Risk Analysis**

For the Pipeline, a special Risk Assessment Study (Risk Analysis) is prepared, based on which accidental hazards along the routing and any accident's possible consequences to the population and its assets are assessed. For the onshore facilities, HAZOP studies are prepared, investigating, on scenario-based approach, failures during operation.

Their results are taken into account in the improvement of the mechanical layouts' design and the equipment's' dimensioning, as required.

## **5.8 Construction Phase**

### **5.8.1 Pipeline Construction**

#### **5.8.1.1 Onshore Pipeline**

The basic method of constructing gas onshore pipelines is generally known as the spread technique, which is an "open cut" method and is widely used throughout the world. The spread technique is considered as the best feasible and recommended pipeline installation methodology for the onshore sections of the Poseidon pipeline. A typical sequence for onshore pipeline construction is illustrated in Figure 5.7

This method can be broken down into several phases:

- Route survey and layout;
- Right of Way preparation;
- Pipeline Handling, Hauling and Stringing;
- Pipeline Bending;
- Trench Excavation;
- Pipeline Welding;
- Weld Testing, Applying Field Joint Coating;
- Pipeline Laying;
- Backfilling;
- Hydrotest;

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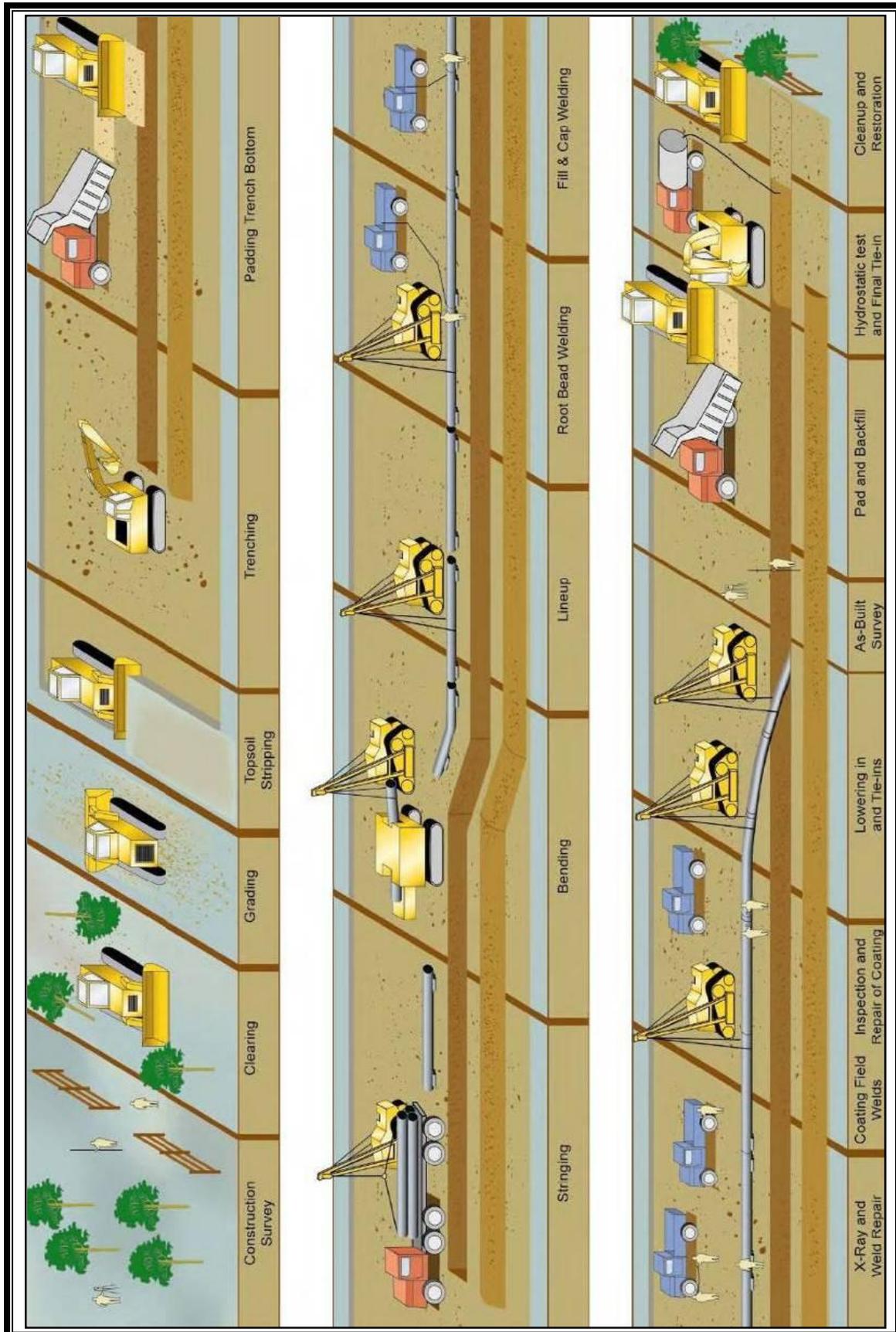
- Reinstatement.

A survey control system in the form of Permanent Ground Markers (PGM) will be installed. Subcontractor shall tie all survey works into this control system and shall satisfy himself as to the accuracy of the PGM control system.

The work shall include removal of all trees, bushes, hedges and other obstacles from the Right of Way (ROW) in order to provide a clear and unobstructed ROW. A restricted ROW shall apply where physical constraint applies or where contractor chooses to reduce the ROW to benefit particular operations. A greater ROW may apply where a particular operation may benefit from additional space. The Right of Way should be obtained before work commences.

In general, according to L.4001/2011 for the IGI Project the ROW will be 32m. In special points, such as crossing points, it is possible that the width of the construction strip is redefined. In addition, in forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.

**Figure 5.7 Typical Onshore Pipeline Construction Sequence.**



Apart from the ROW strip, the Contractor will require space to accommodate personnel, store materials and equipment and for temporary dump locations etc. Indicatively, such temporary construction sites are shown in the onshore plot plans (see Annex A – Maps (Volume II), Maps 7240-AU-LU-02). The main construction sites, however, will be the landfall site itself and the site of the Onshore Facilities. It is envisaged that the RoW itself will be used for access road for the onshore section of the pipeline. More details for accessibility are provided in the section 5.8.8.

The EPC contractor shall haul pipe from the storage depot to the project construction site. Subsequently the contractor shall offload and string pipes along the route of the pipeline.

In general, the trench can be created by making use of common excavators or, for some sections, a typical 'rotational' trenching machine. A major advantage of the trenching machine compared to hydraulic excavators is that the amount of excavated material is significantly lower. A disadvantage is that in-trench welding is not possible. Moreover, trenchers are only suitable for rocky soil types of limited strength.

Welding of the pipeline commences when the pipe has been strung. The contractor will most likely adopt an automatic welding process, given the diameter and wall thickness of the onshore pipeline. Following welding and NDT inspection, the pipeline joint is then cleaned and coated with the required field joint coating.

Pipeline lowering should follow as soon as possible after non-destructive weld tests have been successfully completed, after application of the field joint coating and when the anti-corrosion coating has been inspected and possible defects have been repaired. The pipeline should be installed on a uniformly supporting pipeline bedding, partially filled with sand. Lowering usually requires at least three lifting points to develop a sufficiently large radius of curvature so as not to strain or wrinkle the pipeline.

Backfilling shall proceed immediately or as soon as possible following the lowering of the pipe into the trench. The backfill material shall comprise of soil / crushed rock processed by way of a mechanized sieve to ensure uniformity of soil particle size to limit the risk of coating damage by sharp objects. Compaction should occur in layers, to reduce the settlement that normally occurs following backfilling.

The pipeline will be hydrostatically tested after backfilling, but prior to reinstatement.

After the pipeline has been lowered in the trench, anode ground beds and reference electrodes that are required for the operation of the cathodic system protection will be installed.

Reinstatement activities refer to the return of the ROW to a condition which is similar to the condition prior to construction. Any topsoil kept aside will be spread over the working width and the subsoil ripped with a cultivator to alleviate the compression caused by the construction traffic. The disturbed ROW (except for the 5m buffer safety zone) will be reseeded with plants suitable for the locality and climate conditions which will allow the pipeline route to become less obvious in time. Access to properties, fences, ditches, retaining walls, irrigation systems and other structures shall be reinstated in their formed condition, as recorded in the initial topographic survey. Reinstatement measures are described in the relevant section of chapter 6.

#### **5.8.1.1.1 Indicative Schedule**

The onshore pipeline will be constructed in 500m sections. From ROW preparation till backfilling and reinstatement the required time for each section is estimated at ~3 weeks. Consequently, for the ~8000 m onshore pipeline, the total required construction time is ~44 weeks.

#### **5.8.1.2 Shore Crossing (Landfall Site)**

##### **5.8.1.2.1 General**

The coastal section at the proposed landfall site is approximately 530m in length (from the landfall point OM<sup>3</sup>.2 up to the water depth of 25m).

The geophysical and geotechnical survey indicates that the Omprela coast is characterized by a rugged topography, with presence of a cliff dropping steeply into the sea.

From landfall point up to the 5 meter water depth, the seabed is marked by the presence of scattered fallen blocks of rock lying on a sandy seafloor with ripple marks. From 5 meter water depth up to 13 meter water depth, the bathymetry decreases in a gentle slope with a gradient of 20° and the seabed is sandy with ripple marks. From 13 meter water depth up to 20 meter water depth, the pipeline route passes over a rocky ridge oriented NW-SE. The slope decreases considerably with a maximum gradient of 170° at 18 meter water depth. Over the ridge, data indicates

the presence of sea grass (*Posidonia Oceanica*) growing over a thin veneer of sand deposited over the ridge itself with some patches of sand and rocky outcrops. From 20 meter water depth to 37 meter water depth, the seabed deepens with an average gradient of 4°. High meadows of sea grass are present and over a substrate of sand.

One borehole at 5.5 meter water depth near the pipeline route indicates that rock layer is encountered at 6.6 meter. It is composed of moderately weak to moderately strong slightly weathered white limestone with the Uniaxial Compressive Strength of about 20 MPa. The sand layer along the route is generally composed of medium dense to very dense grey to very dark grey calcareous silica fine to coarse SAND. The depth of sandy layer varies along the route. In the most cases, it is more than 10 meters except the locations with rock outcrops near the coastline and from 13 meter water depth up to 20 meter water depth.

#### **5.8.1.2.2 Execution Methodology**

In this paragraph, a general description of the construction for the landfall site Omprela2 is presented. The outline method of installation is as follows:

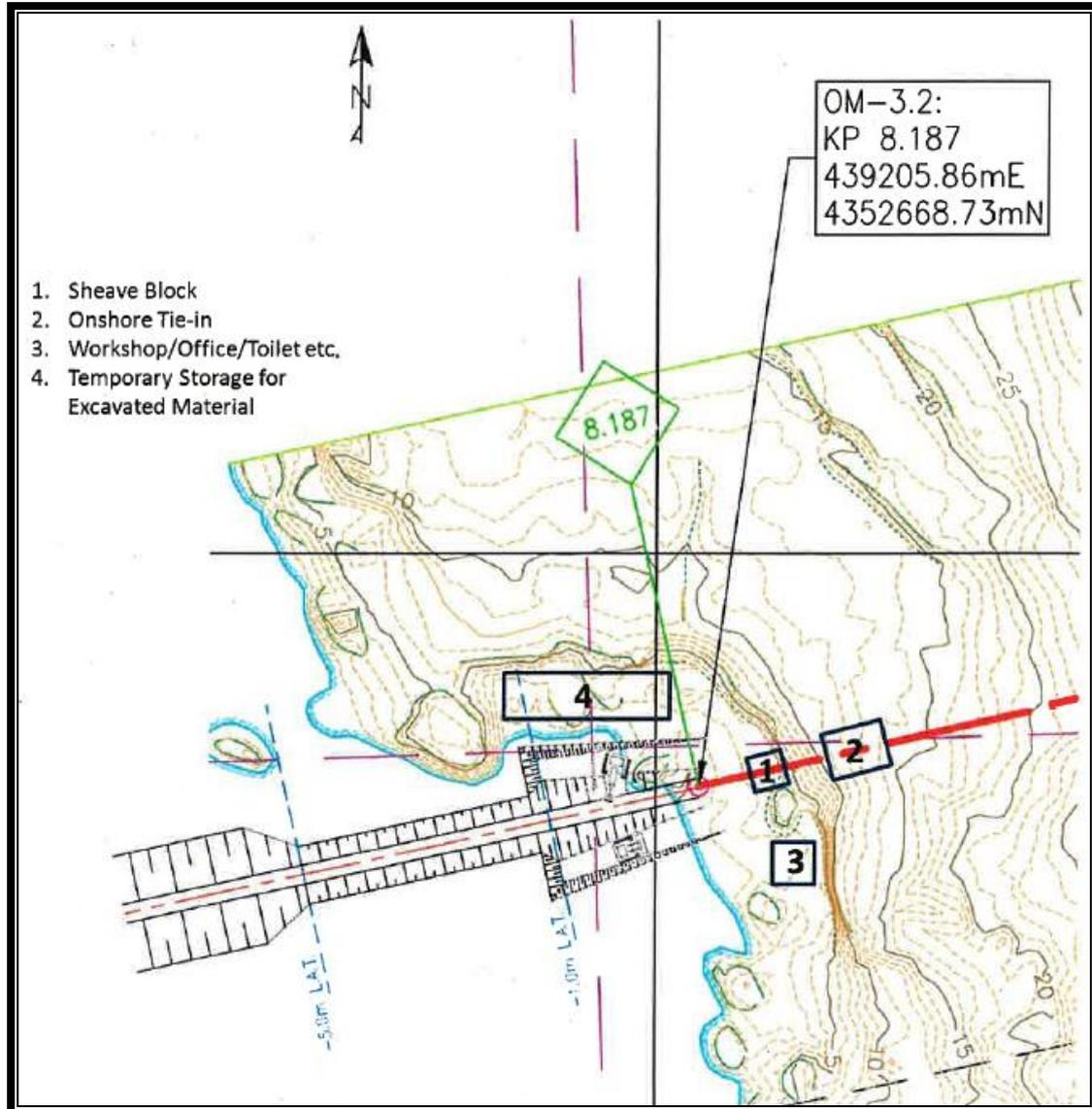
1. Site preparation (e.g., access road, site office, ground leveling, anchorage for land based return sheave block etc.);
2. Pre-excavation survey;
3. Causeways construction on both sides of the trench for the near shore dredging work up to -1m LAT;
4. Onshore and near shore dredging (up to -1m LAT) using land based equipment;
5. Offshore dredging work (up to -5m LAT) using a pontoon based backhoe dredger;
6. Offshore dredging work (up to -25m LAT) using a deeper water backhoe dredger or cutter suction dredger;
7. Preparation for pipe pulling operation (e.g., placement of bedding layer, as dredged final trench survey, laying of pulling cable or messenger wire, etc.);
8. Pipelay vessel mobilized to designated location for pipe string pulling operation;

9. Connect pull cable to the pipe string pulling head;
10. Commence pipe string pulling operation; see subsection below for more details;
11. Upon arrival of the pulling head to the designated location, the pipelay barge to continue laying to the designated lay down target area (at water depth of 35 m to 40 m);
12. Perform pipe string as built survey;
13. Hydrostatic testing of installed landfall sections of pipe;
14. Trench backfilling work to be performed once the as-built positions/conditions are accepted;
15. Remove pull head and perform tie-in to the land pipeline (if in SOW for offshore contractor);
16. Site clearance/re-instatement, including removal of temporary facilities and roads, erect pre-determined location boundaries, install means of future site monitoring or surveillance.

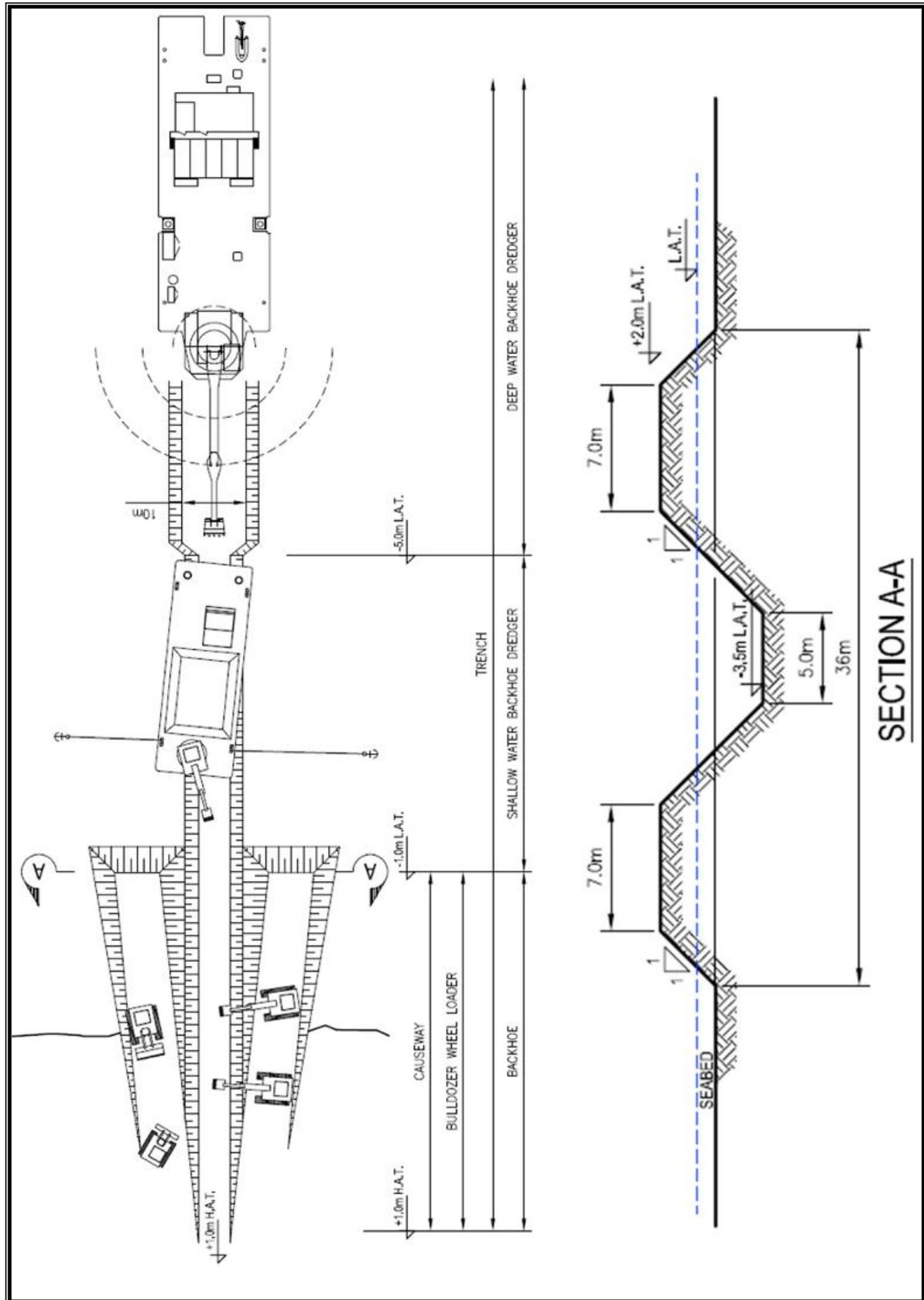
For a single 32-inch pipeline, the trench bottom width can vary from 5 meters up to 60 meters depending on the equipment selected, the depth of the trench, etc. The slope angle of 1:5 is considered feasible for the section deeper than 5m water depth.

The minimum onshore space requirement is 50m (width) × 20m (length) along the center line of pipeline route for the landfall construction. Considering the site specific geomorphology, the onshore layout of the landfall construction may require a larger footprint and should be finalized by the EPC Contractor with the available onshore pipeline construction site space. An indicative arrangement of the site layout is illustrated in the following figure. In the following figure are illustrated the sheave block (point 1), the onshore tie-in point (point 2), the temporary construction site (point 3) and the temporary storage site (point 4).

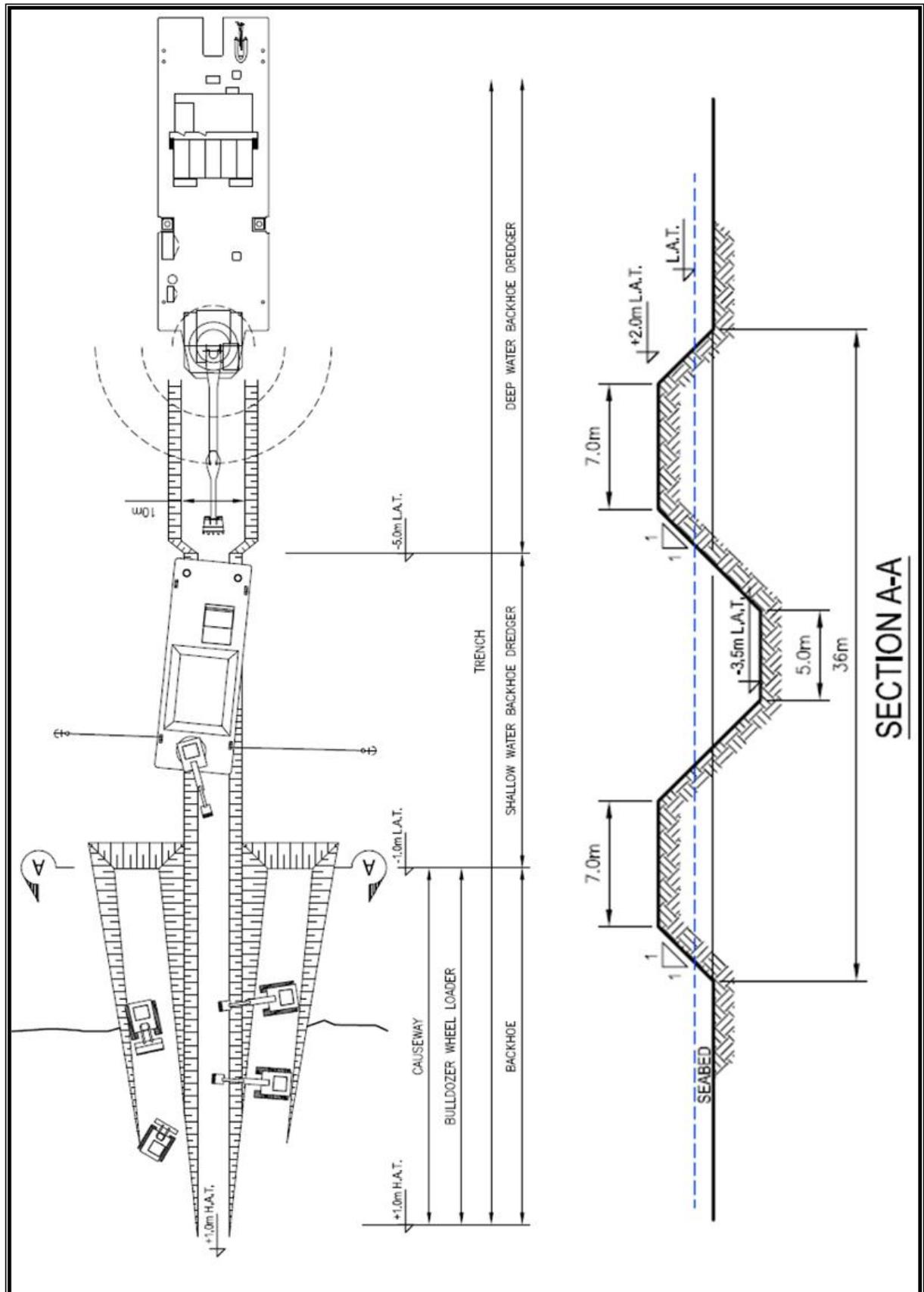
**Figure 5.8 Shore crossing construction site layout**



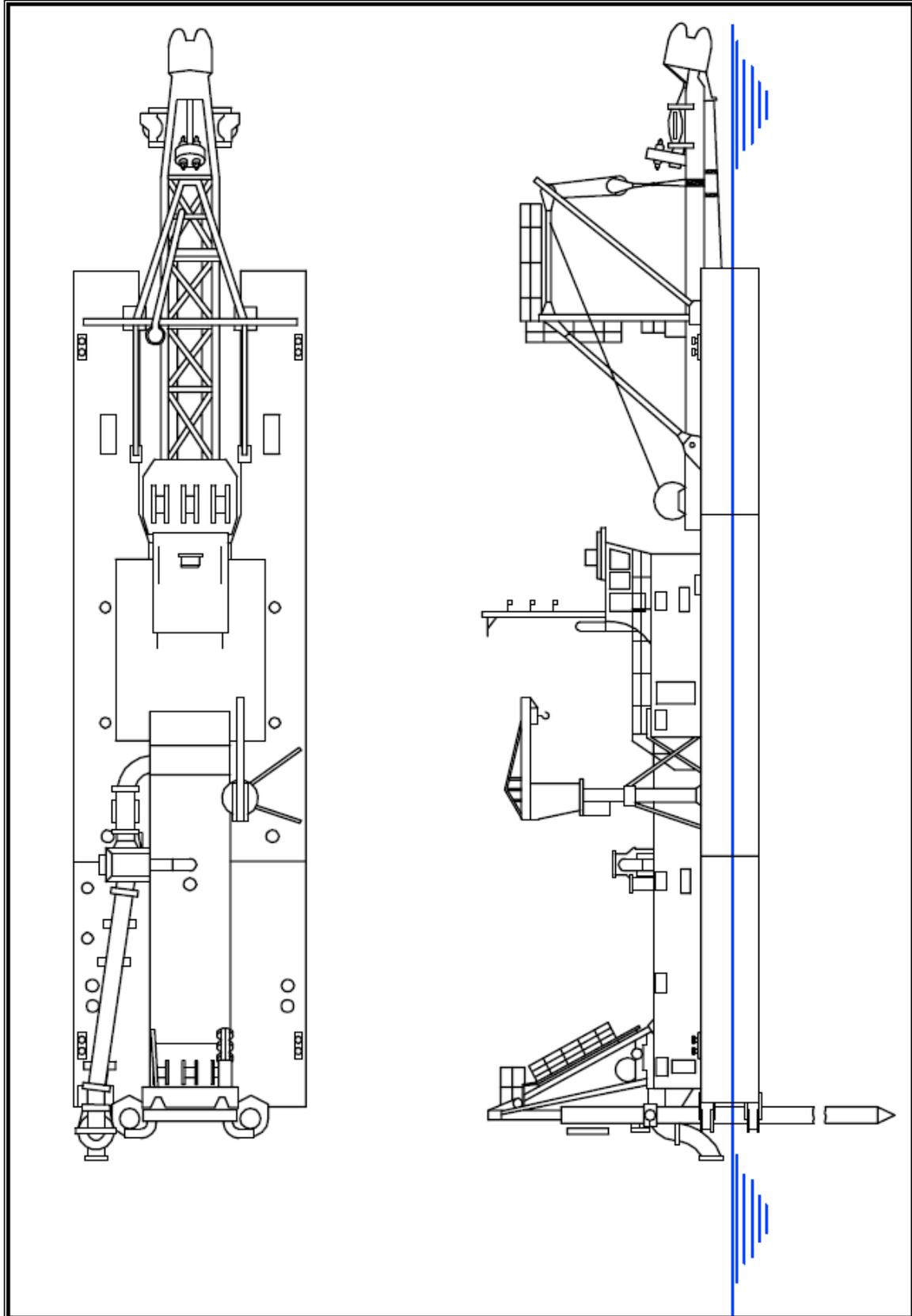
**Figure 5.9 Typical Layout of Causeway and Trench Scheme with Backhoe Dredger.**



**Figure 5.10 Typical Layout of Causeway and Trench Scheme with Cutter Suction Dredger.**



**Figure 5.11 Typical Cutter Suction Dredger.**

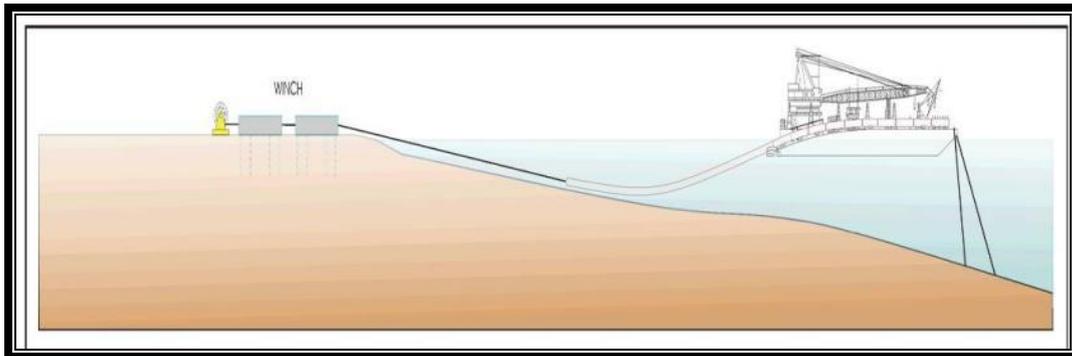


### 5.8.1.2.3 Pipeline Construction – Pulling Methods

Typically for the pipeline installation onto the sea bottom within a trench, one of the following methods can be used:

#### A. Shore Pulling Method

**Figure 5.12 Shore pulling method.**



Pipeline is assembled on a barge stationed offshore and the pipeline section is pulled through a pre-dredged trench using land based cable winches.

Typically, this method includes the offshore mooring of the barge and the stringing of the pipeline that has been assembled on the barge, being pulled towards the shore, using land based winches.

The site needed, onshore, for winches, cable drums, power generators, support equipment and construction installations, is approximately 2.000m<sup>2</sup>. Also, an additional area will be required for the temporarily storage of the trenched material.

This method has the following advantages:

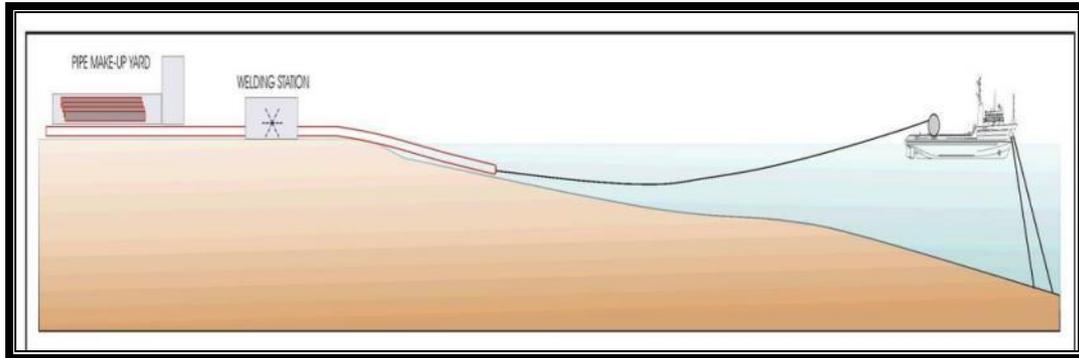
- It does not require onshore installations for the cable winches,
- The high pulling capacity land based winch, and the cable of sufficient length, can easily be installed onshore.

The main disadvantages of this method are:

- It requires close coordination between the onshore and offshore crew;
- Requires transportation and installation of one or more high pulling capacity winches.

#### B. Barge Pulling Method

**Figure 5.13 Barge pulling method.**



The pipeline sections are assembled and fully prepared, onshore, and then the pipeline string is pulled offshore by a barge, equipped with the required winches.

The necessary construction site for the pipeline's storage, welding, etc., is quite larger than the one required in the previous method, and it is estimated around 10.000m<sup>2</sup>. It is estimated that a land strip approximately 300 – 500m long is required for the placement of the pipeline's strings. This land strip could be located along the working strip of the onshore part's construction.

The main advantages of this method are:

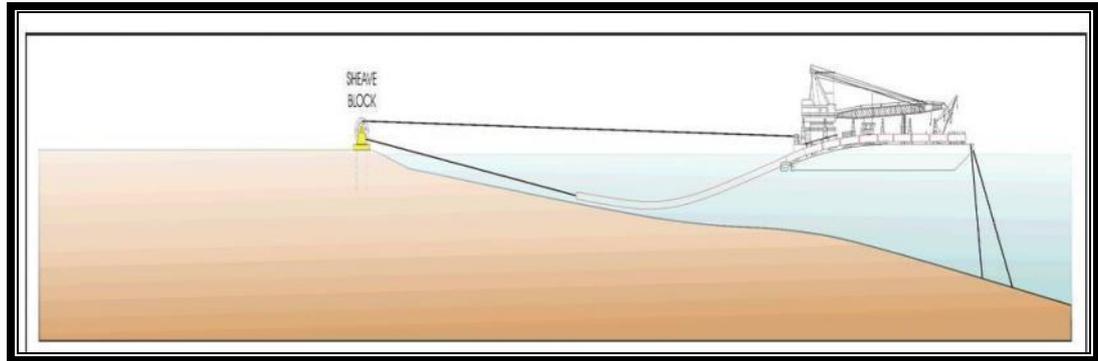
- The mobilization of the installation barge of the pre-constructed pipeline's parts can wait until the pipeline's strings are welded onshore and are ready for pulling.
- Short installation duration; hence cost's minimization.

This method has the following disadvantages:

- The available pulling capacity is limited by the onboard winches power.
- A large onshore construction site is required for the pipeline's string assembly (welding and preconstruction).

#### C. Barge Pulling via Sheave Block

**Figure 5.14 Barge pulling via sheave block.**



Pipeline's sections are assembled on a barge moored offshore and are pulled through a pre-dredged trench using land based winches.

The third method consists of the combination of the two previously mentioned methods, as it involves both pipeline construction and winching being performed onboard the barge.

Like the shore pulling method, the pipeline is constructed on the barge moored offshore and then pulled to shore through a pre-dredged trench. The pulling cable winch goes through an onshore sheave block and back to the barge.

The method is technically more demanding from the two ones mentioned above and is used only where there are serious restrictions regarding the available workspace at landfall locations.

The advantages of this method are the following:

- It does not require onshore winching installations;
- All key operations are controlled by onboard the barge.

The main disadvantages of this method are given below:

- The length required for the pulling wire is about twice the length required for the shore pulling method, with a land based winch.
- The available pulling capacity is limited by the onboard winches power.

The pipeline installation method that is proposed for this Project is the Barge Pulling Method via Sheave Block (Method C) due to the limited onshore space available at landfall site.

Regarding accessibility the following are noted: As mentioned, it is envisaged that no new access roads will be required. Existing roads that will be improved and the RoW will be used as the main access roads for the shore crossing construction site. Especially for the shore construction site, some heavy equipment could be transported by shallow vessels. However, given the specific works in the landfall site and the steep slopes in the area, the EPC Contractor may deem necessary to construct a temporary access to the landfall site for the personnel, materials, equipment, etc. In such a case (as well as in other places with special characteristics where the EPC Contractor may deem necessary the temporary access construction), all necessary permits will be acquired.

#### 5.8.1.2.4 Indicative Schedule

The estimated total duration of the shore crossing construction activities is 6 months:

**Table 5.16 Shore Crossing Indicative Construction Schedule.**

<b>Task Name</b>	<b>Duration</b>
<b>Landfall Construction - Greece</b>	<b>23 wks</b>
<b>Site Preparation</b>	<b>16 wks</b>
Construction Access Road and Work Area	10 wks
Installation Pull-in Winch / Sheaf	1 wk
Mobilization of Marine-Based Equipment	4 wks
Construction Shore Approach, incl. dredging / excavation	6 wks
<b>Shallow Water Pipeline Installation (Work Barge)</b>	<b>2.5 wks</b>
Remobilize Vessel	10 days
Pipe Pull from Work Barge to Shore	5 days
Laydown of Pipeline (at approx. 40m water depth)	2 days
<b>Site Reinstatement</b>	<b>6 wks</b>
Backfill Shore Approach and Remove Causeway	2 wks
Cleaning and Restoring Onshore Site	4 wks

In order to minimize impacts on the tourism of the area, during this short period, no construction activities will be performed during the touristic season (June – August) (see relevant section in chapter 6).

#### 5.8.1.3 Offshore Pipeline

This section provides an overview of applicable pipeline installation options for the offshore section of the Poseidon pipeline system and presents the pipeline general installation procedure.

There are various feasible scenarios for installation of the pipeline system from Greek landfall to Italian landfall. These scenarios depend largely on the specific capabilities of the vessels contracted to perform the installation.

Review of the seabed profile shows that the pipeline is routed in shallow waters depths (up to 150m) for approximately 20 km from the Greek landfall. The route then crosses the Greek continental slope and reaches the maximum water depth of approximately 1375 m at 60 km from the Greek shore. After a gradual climb, the route climbs up the Italian continental slope back into shallower water. The route then continues for approximately 40 km until reaching the landfall at Otranto.

This chapter focuses primarily on the installation of the pipeline sections in Greek waters.

#### **5.8.1.3.1 Pipeline Lay Categories**

From the pipeline installation point of view the route can be divided in 3 sections namely:

1. Shore approaches at both Italy and Greece shelves that run from onshore to offshore up to water depths around 30 meters. Pipeline in this first section can be installed in Greek waters by means of a pipeline pull in operation performed by a “Shallow draft installation vessel”. This type of vessel is a relatively small flat-bottom lay vessel capable of working in a water depth range of 5 m to about 40 m. These barges typically use anchors for positioning / propulsion and install the pipeline by the S-lay method; see Section 5.8.1.2 for more details on shore approach construction.
2. Shallow water (intermediate) sections at both Italy and Greece shelves that run from the shore approach offshore end up to water depths of about 600 meters. Pipeline in this second section can be installed by “Intermediate depth installation vessels”: These are larger semi-submersible or ship-shaped vessels capable of working in a water depth range starting in the range of 20 m to 40 m and continuing to approximately 600 m – 700 m. These vessels may be either anchored or dynamically positioned and install the pipeline by the S-lay method.
3. Deeper water section that reaches the water depth of about 1370 meters. Pipeline in this third section can be installed by “Deep water installation vessels”. These are large semi-submersible or ship-shaped vessel capable of

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laying pipe in water depths greater than approximately 400 m. These vessels are dynamically positioned and may apply either the J-lay or S-lay method.

Note that above classifications are made for discussion purposes only. Certain vessels may fit into more than one category. There are certain S-lay vessels capable of installing both the intermediate water depth and deep water sections.

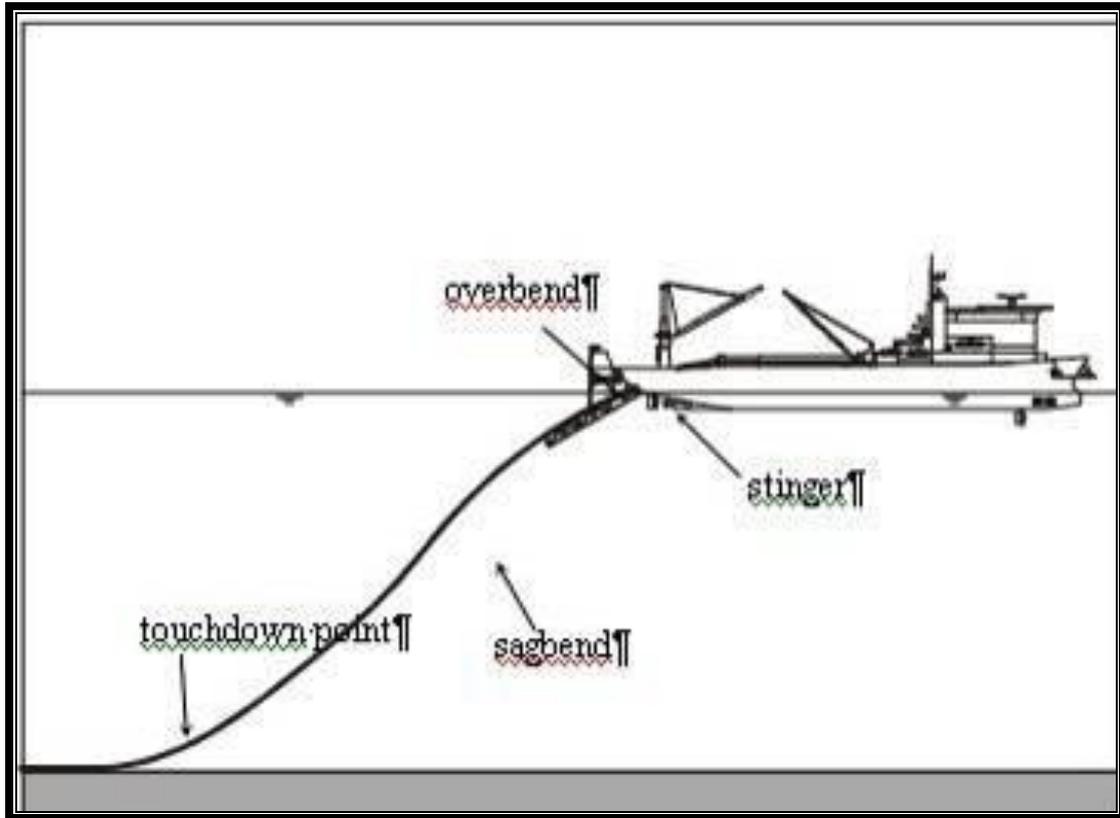
#### **5.8.1.3.2 Pipeline Installation Method**

The different pipeline installation methods can be recognized by the general shape of the pipeline during installation.

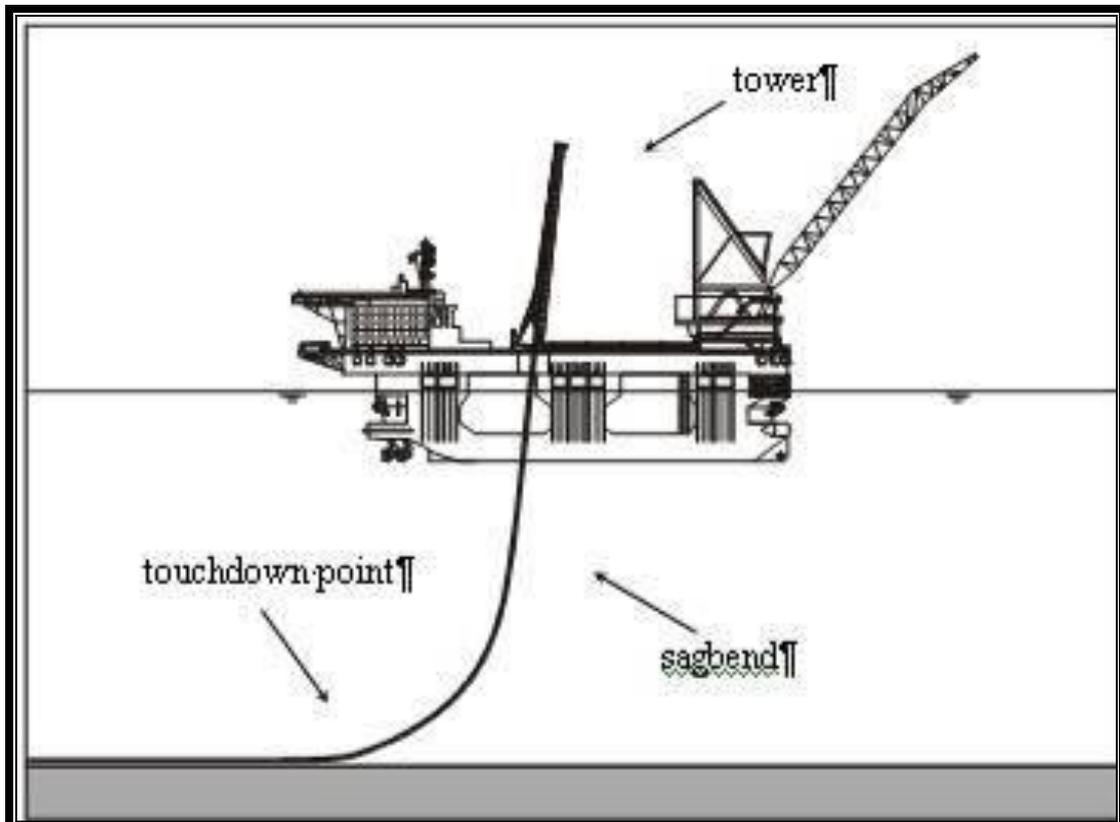
The most common offshore pipeline installation method is S-lay, where the pipe is spanning from the vessel to the seabed in an S-like shape (see Figure 5.15). To guide the pipe in this configuration, it is supported on rollers by a stinger structure extending from the vessel into the water. The stinger is generally constructed as an open truss framework and may be rigid or articulated. The welding stations on an S-lay vessel are placed along the vessel axis and are orientated horizontally, which allows for relatively efficient offshore pipe string fabrication.

The J-lay installation method is recognized by the absence of the stinger and the high departure angle (see Figure 5.16). The pipe is closer to the vertical on board of the vessel than to the horizontal axis. Pipe joints, usually pre-fabricated multiple-joint strings, are lined up in a tower construction that is called the J-lay tower. J-lay is only applicable for deep water, where a long section of the pipe is suspended below the vessel in a catenary shape. The capacities of these vessels are set to suit this functionality. Compared to the other installation methods, the tension capacity of the vessels is very high, but is specialized for holding the weight of the pipe string in deep water rather than for maintaining an acceptable pipe shape through the water column. J-lay equipment currently available can handle pipe diameters up to 32 inch.

**Figure 5.15 Concept of S-lay method.**



**Figure 5.16 Concept of J-lay method.**



### **5.8.1.3.3 Pipeline Installation Sequence**

In the base scenario, multiple vessels are used to install the offshore pipeline. One section of the pipeline is installed by the first vessel, and the second vessel then recovers the pipeline and continues the lay. Water depth limitations usually define the transition point between one vessel and the next.

Multi vessel operation can be desired due to flexibility in contracting and planning and costing benefits. Lower costs and better vessel availability are achievable when allowing more parties to participate. However this will require a proper interface management.

A typical multi-vessel installation sequence may be as follows (assuming initiation at the Italian side):

Step 1: shore approach at Italian section performed by means of shallow draft installation vessel (vessel 1).

Step 2: Vessel 1 lays away from the Italian shore and continues to a point on the Italian continental shelf where it abandons the pipeline in a controlled manner. The actual water depth at which the pipeline is laid down would typically be in the range of 40 m to 100 m. Vessel 1 may then transit to the Greek shore location.

Step 3: Vessel 2, a deep-water installation vessel recovers the pipeline and continues the pipelay toward Greece. Given the water depth at recovery location, this will be an S-lay vessel.

Step 4: In parallel with the deep-water lay activities by Vessel 2, Vessel 1 supports the installation of the shore crossing at the Greek landfall. Vessel 1 lays the pipeline from the Greek shore to a water depth of approximately 35 m – 40 m and abandons the pipeline onto the seabed. Vessel 1 can now demobilize from the project.

Step 5: Upon reaching the laydown location of Vessel 1, both ends of the pipeline are brought together at the surface to perform the final tie-in by Vessel 2. The final tie-in is performed on the laybarge, and the pipeline is laid down onto the seabed. Vessel 2 can now demobilize from the project.

Note that installation could also be started from the Greek side with the final tie-in being performed on the Italian shelf. However, given space limitation at the Greek landfall area, it is anticipated that in case of a wet buckle in the deep water section of

the pipeline, the contingency dewatering spread will be positioned in Italy. This governs the lay direction, i.e. from Italy to Greece.

The following sections describe the various aspects of pipeline installation.

### **Mobilization and Demobilization**

Procedures for onshore and or offshore operation Mobilization and Demobilization and reinstatement of sites for each scope of work shall be prepared.

Project and vessels mobilization will consist of preparing the vessels for start of the project related to corresponding scope that can include:

- Marine related mobilization activities
- Equipment and materials including those free issued items by company
- Calibration, certifications and trial plans and activities
- Project familiarizations to all involved parties (personnel/ subcontractors etc.)
- Project documentation and records

### **Normal Pipelay Operations**

“Normal pipelay” refers to the process of welding pipe joints on the lay vessel and lowering them to the seabed. Special operations to abandon the pipe lay and to lay the pipe end onto the seabed are addressed separately.

The S-lay method will be used to install the shallow and intermediate water depth sections on the Italian and Greek shore approaches and continental shelves, and possibly the deep water section as well. During normal S-lay, the pipe is welded onboard the vessel, and vessel advances along the lay route in accordance with the rate of pipeline welding. Tension is maintained on the pipeline to control the shape of the pipe in the water column.

Normal pipe laying operation for lowering of pipeline within the pipeline lay corridor includes various procedures. These are described briefly in this section for a typical pipeline installation operation.

#### **Linepipe handling:**

This will include aspects like:

- Inspection and testing

- Pipe joints load out plans including logistics and transport
- Offshore loading
- Stack height requirements (limits and locations onshore and offshore)
- Line pipe properties
- Pipe joints handling equipment such as cranes
- line pipe beveling and cleaning

**Working Stations for pipeline production on barge:**

Firing line on board of pipe lay vessel typically will include following working stations:

- Line pipe storage station
- Line pipe beveling, cleaning and inspection station
- Line-up station
- Bead weld stations
- Welding stations
- Tensioner(s)
- NDT station
- Blasting station
- Field joint coating station
- Coating repair station
- Anode installation station
- Loose material installation station (such as buoyancy tanks etc.)

**Pipeline Monitoring and control:**

On board of a barge the pipeline configuration monitoring can be realized by:

- In advance prepared stress/strain analysis (pipelay data for sagbend and overbend) for various lay configurations
- Barge station keeping data

- Barge ramp data (stinger and barge roller boxes set-up)
- Tension data in relation with stress/strain calculation results
- Roller boxes load data and control by e.g. load cells
- Tip clearance data (sonar scan of stinger tip) and camera monitoring of rollers
- Field weld (joint) sequential numbering/markings
- Touch down monitoring by ROV
- Weather forecast

**Survey activities:**

The following survey activities are envisaged to be performed as part of the installation:

- Pre-lay survey
- As-laid survey
- Remedial work survey
- As-trenched survey
- As-built survey

**Field Reporting**

During the course of the project field data books (e.g. detailed survey information needs to be compiled on board the survey vessel covering the various survey tasks) shall be collected. From these data books the relevant information could be extracted for inclusion in the final as-built reports. The data books will cover a number of topics such as:

- Mobilization report containing certificates and documentation pertaining to port and sea trials as well as calibrations. Copies of manufacturers or test house calibration certificates will be included.
- As-laid, as-trenched and other surveys will be carried out on a daily basis as the construction program progresses. The survey results will contain the position, KP value and a brief description on the status of field joints, anodes, freespans, damage, depth of burial after trenching, debris, etc.

- Quality histograms and statistics in order to provide evidence with regards to the adherence to accuracy specifications.

### **Pipeline Laydown**

Upon reaching the pre-determined target location on the seabed, the pipeline will be terminated, lowered onto the seabed and left ready for a subsequent recovery; for example, for midline above/surface tie-in operation. General laydown procedure will include:

- Installation of transponders and determining pipeline final cut to length while approaching to laydown target.
- Insertion of pipeline pup pieces and welding the laydown head (possibly completed with (flange assembly) onto the pipeline as required.
- Finishing NDT check on all pipeline welds, anode installations and field joint coating.
- Checking the laydown head and make sure that the check valve and ball valve are in good condition and properly installed.
- Weld the laydown head to the flange assembly.
- Laydown the pipeline using the dedicated hook, winch, cable, rigging set and transponder in laydown target box in line with laydown parameters.
- Conducting final check of pipeline position on seabed (survey)

### **Pipeline Abandonment and Recovery**

If during pipeline installation severe weather or a component failure (or any contingency scenario) within the pipelay system occurs, it may become necessary to abandon the pipeline and leave it on the seabed, until weather improves or until the pipelay vessel become operational again. The Superintendent and/or Master will decide if the pipe is to be abandoned and the procedure to be followed. Pipelay will continue when the weather improves or until the vessel is operational again.

Typical procedure is after welding the A&R head and attachment of the A&R cable, pipeline is laid down and A&R cable is totally spooled off and attached to a messenger wire with a surface buoy. Recovery will then include retrieving of the messenger wire and A&R cable connection to A&R winch and normal recovery of the pipeline continued by normal pipelaying after dis-attachment of the A&R/All weather

head and transferring to tensioners. Recovery operation is normally the reverse operation of the laydown operation. The A&R parameters at corresponding water depth shall be used.

### **Above Water Surface Tie-in**

An above water tie-in is the means of connecting two pipe ends to complete the pipeline system installation. For Poseidon pipeline at least one such tie-in will be required. Typically, the tie-in will be performed in relatively shallow water.

Prior to the tie-in operation, the pipeline ends will have been laid onto the seabed in a controlled manner. A certain amount of overlength will have been added to the pipeline segments such that they can be recovered and joined on the installation vessel. Prior to abandoning the pipeline ends onto the seabed, clamps are pre-installed for subsequent recovery of the pipeline using davits.

To perform the tie-in, davits are used to pick up the pipe ends and to bring them to a work platform along the side of the lay vessel. The abandonment / pull heads are removed and the pipe is prepared and aligned. Hereafter the tie-in weld above water is executed and after weld acceptance and field joint coating, the pipeline is lowered on the seabed. The barge is moving sideways to avoid overstressing of the pipe steel. The excess length of pipeline at the tie-in results in a “bulge” in the route.

Figure 5.17 shows an actual surface tie-in being performed. A surface tie-in for a 32-inch diameter pipeline is preferably performed at water depths of approximately 30 m.

**Figure 5.17 Surface Tie-In.**



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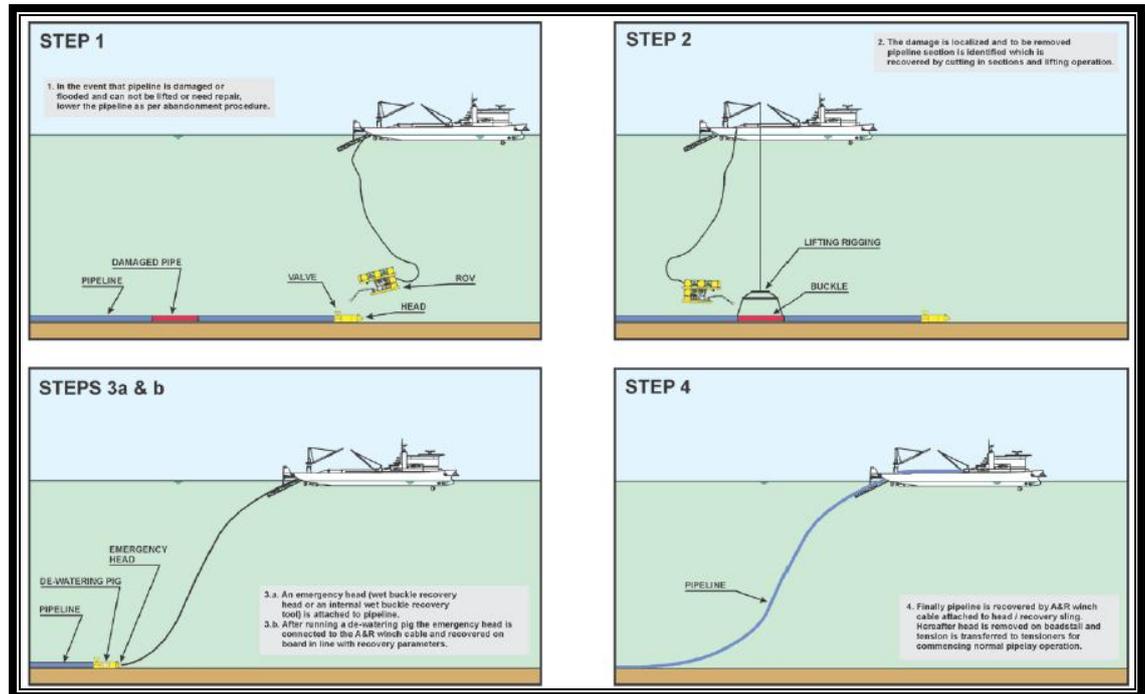
## **Contingency (Pipeline Damage Repair) Procedure**

In the unlikely event of damage to the pipeline during the installation works, contingency procedures will be implemented to repair the damaged sections.

Typical contingency scenarios include:

- **Dry Buckle:** is a buckle or a damage (dent) to pipeline that is caused by unknown accidental loads where pipeline wall is not broken and it is not resulted in any leakage of the product pipeline. An unacceptable dry buckle will be assessed and if possible pipeline will be retrieved on board by cutting back until dry buckled section is retrieved. Hereafter, normal pipelay will be continued. When a dry buckle occurs that cannot be recovered onboard the vessel safely, the pipe is laid onto the seabed (abandoned) in a controlled manner and flooded with water. When the pipe is completely filled with water, the buckled section is removed and Pipe Recovery Tool is installed to recover the pipeline on board. From this point the procedure is identical to the wet buckle recovery procedure.
- **Wet Buckle:** is a buckle or damage to pipeline that leads to uncontrolled flooding of the pipeline with water. When a wet buckle occurs, the pipe is cut beyond the buckled section and recovered using e.g. a diverless Pipeline Recovery Tool. Typically, after the recovery the pipe is hung off to the vessel and the dewatering head is welded onto the pipeline. Subsequently the pipe is laid down and dewatered by sending a pig from the dewatering head. After dewatering operation completed pipeline will be recovered and normal lay will be continued. Note that in deep water, the flooded pipeline cannot be recovered by the pipelay vessel. By means of a contingency dewatering spread positioned onshore, the pipeline will be dewatered prior to recovery by the lay vessel. Given space availability this spread is foreseen at the Italian side, which in turn governs the pipelay direction in deep water (from Italy to Greece to allow utilization of the contingency dewatering spread).

**Figure 5.18 Pipeline contingency dewatering and recovery.**



#### 5.8.1.3.4 Indicative Schedule

Typical pipelay rates are in the order of 2km per day. For a pipeline length in Greek waters of approximately 145 km, a duration of 2 to 3 months is expected for the offshore pipeline construction activities. Note that this excludes the shore crossing construction activities.

It is noted that all works in deep waters (i.e. in depths greater than 400m approximately) will be performed with ships that will be using the dynamic positioning procedure; consequently it is not expected that these ships will anchor at these depths. Ships that will be anchoring are expected to be used only in the shallow offshore sections.

Based on the pipeline installation procedure, the anchoring of these ships will be performed in predefined locations which will not engage with identified findings on the sea bottom. For this purpose, before the commencement of the construction works, items of interest, such as identified ship wrecks will be illustrated in the diagrams and incorporated in the navigation system of the ships.

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### **5.8.2 Working Strips of the Natural Gas Pipeline**

For the construction of the onshore pipeline, L.4001/2011 dictates the use of a 32m general working strip and a 5m buffer safety zone. However, in special areas of crossings, this working strip may need to be increased in order to minimize traffic nuisance or increase construction safety. The exact dimensions will be determined by the EPC contractor prior to construction works commencement. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the working strip; however, the working strip shall not be less than 26m.

For the construction of the offshore pipeline the usage of Working Strips at the Shore and Beach Zones of the landfall site will be temporarily required for about 6 months. The above-mentioned Working Strips (on both sides of the pipeline) will be used only for providing access to the construction machinery and will not be used for their maintenance. For these Working Strips (on both sides of the offshore part), the simple usage concession of the relevant Shore and Beach Zones must be given to "I.G.I. POSEIDON" by the Ministry of Finance. The shoreline and the beach at the proposed landfall area have been determined according to HGG D' 359/15.04.2003 "Determination of shoreline and beach at 'PRAPAMALI', of Perdika Community, Prefecture of Thesprotia".

For the operation of the offshore pipeline, the Ministry should provide permit for installation.

### **5.8.3 Onshore Facilities (Compressor and Metering Station) Construction**

The Greek C/S-M/S station will be constructed as per industry standard techniques and methods to minimize environmental impacts during construction and eliminate impacts during operation. The use of scarce ecological resources during this work will be restricted, to safeguard the ecologically sustainable development for future generations.

For the workforce and construction tools there will be temporary facilities and utilities. The wastes resulting from the construction work shall be collected, contained and disposed of in accordance with the local laws, rules and regulations. Upon completion, all the temporary facilities, construction materials, utilities and wastes will

be removed and the construction locations will be reinstated, with the exception of the permanent works.

The existing dirt road (from the asphalt road Karteri – Perdika) will be improved, i.e. enlarge and strengthen, to allow for safe transport of men, construction tools, equipment and materials. Prior to the commencement of the works, a proper survey of the existing access road and site is planned and executed to determine the local environmental constraints related to the mobilization and erection of temporary facilities and utilities.

At the start of the work and in agreement with the local authorities, an area for temporary facilities enabling the road construction works will be allocated. Here, the access road construction equipment, tools and some consumables will be placed and stored for an approximately duration of 4 months. Materials for the access road enlargement and strengthening will be mobilized from regional depots and transported by trucks.

Some initial temporary site facilities, such as portable office, canteen cabins, mobile sanitary units and parking, will be placed adjacent to the planned facility site, to enable the excavation and backfilling works and construction of the roads foreseen in the final construction phase of the stations, including the sewer- and drainage system related to these facility road works. The area for these initial facilities is estimated at approximately 2.000m<sup>2</sup> and will be occupied for approximately 3-4 months. When the facility area is leveled as per lay-out, these temporary facilities are relocated to within the site perimeter and the initial location for these initial temporary facilities will be reinstated.

Temporary facilities such as the main site offices, canteens, sanitary housings and tanks, parking, warehouses, temporary erection / storage, fences, etc. will be erected within the facility sites plot areas for the duration of the work and demobilized upon completion. Waste from these facilities, whereby scrap, fluids and debris will be collected and segregated in compliance with environmental regulations in skips, containers or tanks and they will be transported to regional disposal facilities by trucks. It is expected that weekly 2-4 trucks will be required for this work.

Mobile and stationary equipment, such as, traffic control, excavators, dozers, compactors, surveying tools, piling, cranes, trucks, trailers, forklifts & material handling, utility vehicles, molds, concrete / masonry, trench shoring, aerial work

platforms, scaffolding and ladders, weather and noise protections, hoisting equipment and tools, welding units and screens, pumps, blasting & painting, grinding machines, hammers, spanners, torque wrenches, hydraulic bolt tension, pipe layers, welding tractors, bending machines and other pipeline construction machinery, chippers, cable pullers, lighting, pressure test and accessories are mobilized via the access road to the site.

Utilities for the temporary facilities, such as power, fuel, compressed air and water is provided for by mobile and stationary equipment (power generators with distribution cabinets, air compressors with vessels, manifolds and hoses, water and fuel tanks) and these will be mobilized via the access roads to the sites and connected by temporary piping or cables to their users. Fuel for this mobile equipment will be transported by trucks to the sites and stored in tanks for distribution and filling. These tank locations at the site will be arranged with drip trays and leak collection and as such will protect the environment. Possible spills and contaminated soil, if any, will be removed and the grounds will be reinstated. Water used for the sanitary units, will be collected in grey water tanks and disposed of using tank trucks.

Noise produced by mobile and stationary equipment will be restricted to industry accepted standards and national legislation.

Dust and overspray resulting from blasting and painting at the site will be avoided as much as practicable and done in temporary facilities protected from the environment. Spray painting after installation of fabricated pipes pools and structures will be minimized and protected from the environment by temporary protections.

#### **5.8.4 Block Valve Station**

The design and construction of the block valve station shall be in full compliance with EN framework.

**Table 5.17 Block Valve Standards.**

EN 1990	Basis of structural design
EN 1992	Design of concrete structures
EN 1993	Design of steel structures
EN 1994	Design of composite steel and concrete structures
EN 1997	Geotechnical design
EN 1998	Design of structures for earthquake resistance
EN 1594	Gas supply systems – Pipeline for maximum pressure over 16 bar – Functional requirements.

The block valve assembly allows the onshore section pipeline to be isolated from the offshore section. This may be necessary in different scenarios such as:

- The unlikely event of an onshore pipeline breach
- Maintenance and repair operations
- Isolate the onshore section during the initial construction activities.

The block valve shall be installed in a valve pit which is a semi buried reinforced concrete structure. The valve pit structure protects the valve and associated equipment from the environment and from third-party activities. The block valve assembly will be composed of the following elements:

- A main 32-inch ball valve welded into the pipeline.
- Ancillary pipework as required, including 2-inch piping (and valves) cross-over to allow pressure balance across the main valve and nitrogen purging operations.
- An actuator assembly.
- Signal cabling to remotely monitor valve status
- Valve pit structure
- A security barrier/fence.
- Power supply for lighting.
- Access to the site

The block valve assembly design shall ensure that the main valve can be operated reliably in the event that operation of the pipeline so requires; including in the unlikely event of an incident requiring emergency isolation of the Greek onshore and offshore pipeline sections.

The block valve shall be a manually operated valve. In the event that operation is required, personnel shall mobilize to the site with the necessary equipment for valve operation. The valve actuator (gearbox) shall allow operation by a single person from a position at the surface; i.e. without need for entry into the valve pit. Eventual tooling required for operation of the valve (e.g. pneumatic tool for rapid turning of hand wheel) shall be powered by means of temporary equipment brought to the site by the

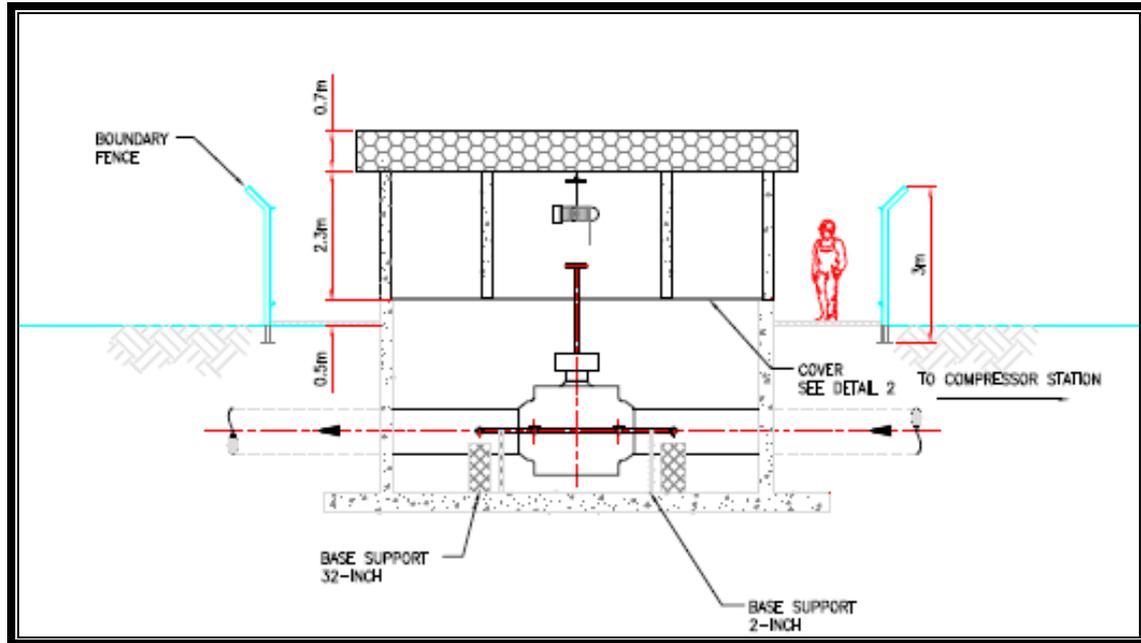
operator. Valve position shall be monitored on a continuous basis and shall be communicated to the control center at the Compression Station.

The valve assembly and piping are intended to be maintenance free during the design life. Regular testing of the valve function (e.g. through partial closure) is recommended to ensure acceptable performance when required. Entry to the valve pit may be required for maintenance. Specific safety precautions shall be implemented when entering the pit. A safety watch shall always be present at the surface to react in case of emergency. Handheld gas detectors shall be used to assess presence of gas in the facility prior to entering the valve pit. Regular maintenance of the valve site will be required to ensure safe access. Maintenance activities will include clearance of debris (leaves, etc), pest control, painting of eventual steel surfaces and general repair/refurbishment of fencing, replacement of lighting, maintenance of solar batteries, etc.

The block valve may have to be operated at any time of the day. In addition to that, the station must have appropriate lighting such that the valve and associated equipment can be maintained in days of low visibility. However, use of power at the facility is expected to be non-intensive and sporadic. Connection to the public energy grid is not deemed necessary. Lighting shall be battery powered. Solar charged batteries are recommended to reduce the need for maintenance visits. Monitoring of battery condition shall be by means of the same cable used to monitor the valve status.

The typical section of a block valve is illustrated in the following figure, abstracted from the general arrangement in the Annex while an installed one is illustrated in the following picture. It is evident that the visual impact is minimal.

**Figure 5.19 Typical section of block valve station.**



**Picture 5.7 Typical block valve station.**



### **5.8.5 Description of temporary construction sites and facilities**

As mentioned throughout the previous sections, the construction of the project will require temporary construction sites and facilities for the construction of the:

- Onshore Pipeline
- Shore Crossing
- Compressor and Metering Station

The purpose of these sites is to provide the EPC Contractor with the required space to accommodate personnel, store materials and equipment and for temporary dump locations and secure access to the site.

Prior to construction commencement, these sites will be prepared. This will include removal of all trees, bushes, hedges and other obstacles

Specifically for the Onshore Facilities, the main construction site will be the facilities site itself. However, since the existing dirt road that will be used for access will require some improvement, an area for temporary facilities enabling the road construction works will be allocated. Here, the access road construction equipment, tools and some consumables will be placed and stored for an approximately duration of 2-4 months. In addition, some initial temporary site facilities, such as portable office, canteen cabins, sanitary units and parking, will be placed adjacent to the planned facility site, to enable the excavation and backfilling works and construction of the roads foreseen in the final construction phase of the stations, including the sewer- and drainage system related to these facility road works. When the Onshore Facilities area is leveled as per lay-out, these temporary facilities shall be relocated within the site perimeter and the initial location for these initial temporary facilities will be reinstated. Temporary facilities such as the main site offices, canteens, sanitary housings and tanks, parking, warehouses, temporary erection / storage, fences, etc. will be erected within the facility sites plot areas for the duration of the work and demobilized upon completion.

It is assessed that these temporary construction sites will occupy ~2000m<sup>2</sup> and are illustrated, indicatively, in the 1:5.000 scale recording plans (see Annex A – Maps (Volume II), Maps 7240-AU-LU-02). They will be open for the construction of each relevant section (for approximately 6months). Upon completion, all the temporary facilities, construction materials, utilities and wastes will be removed and the construction locations will be reinstated, with the exception of the permanent works. The exact location of these construction sites will be determined by the EPC contractor.

### **5.8.6 Construction workforce**

It is estimated that for the construction of the onshore pipeline 30 people will be on site for a period of approximately 44 weeks. For the shore crossing, 20 people will be on site for approximately 6 months. For the offshore section, 250 people will be working onboard for approximately 3 months. For the station, it is estimated that an average of 200 persons over a period of 20 months will be on site. Most of the above mentioned personnel will be skilled workers. However, unskilled workers may be also required. The selection of the personnel falls in the jurisdiction of the EPC Contractor. However, the Owner will request the use of local labor to the maximum extent possible.

### **5.8.7 Construction Utilities**

- Power Supply

The pipeline crosses two overhead medium voltage power line, one near 2300m and one near 6500m of the proposed route (from the Onshore Facilities and seawards). Regarding existing high voltage power lines, the IPTO has informed about the ARAXTHOS-IGOUMENITSA 150kV power line.

The required power the Onshore Facilities construction and operation will be provided using a new power transmission line. The required power for the operation of the Onshore Facilities is ~3.5MW (~4100KVA); the same line will be used for the construction phase.

According to preliminary correspondence with PPC of Peloponnesus-Epirus (see Annex K – Contact with Authorities (Volume III)) a new medium voltage power line of 16km will be required (according to EN50160) from the Substation 150/20kV of Mourtou till Florovouni site. For back up another new medium voltage power line of 5km will also be required. The overall cost is ~1.000.000€.

It is possible that the same line shall be used for the construction of the onshore facilities.

Upon finalization of the power supply option, a separate licensing procedure will be followed, according to IPTO's and national legislation's provisions.

- Water Supply

Water will be trucked to site in order to cover the needs of the construction personnel and activities, from the near-by villages, except for hydrotesting water. This method was opted during the onshore geotechnical campaign.

### **5.8.8 Accessibility and Traffic Management**

The construction RoW will have a width of 32m, in general, according to L.4001/2011. In the forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m. . This RoW will be used as the main access road for the construction works.

Additionally, the existing dirt roads illustrated on the alignment sheets will be used as access roads for material and personnel. These existing dirt roads will most probably require improvement.

Especially for the landfall site, EPC Contractor shall investigate the possibility of either use the existing dirt road improved or use the sea for accessing the site. It is possible that the clearance of a temporary access road till the landfall site is required. In any case, this will be assessed by the EPC Contractor who will follow all legal procedures.

Specifically for the access to Florovouni Onshore Facilities, this will be realized through the existing dirt road. However, due to the heavy equipment that will be transported, this will require enlargement and strengthening. The specifics will be according to Directive 2002/7/EC as amended. Indicatively, this will include the widening of the road in order to accommodate 2 lanes plus shoulder allowing safe transportation of men, construction tools, heavy equipment and materials. Since the access to the Onshore Facilities will be constant, this road will be paved with asphalt, after the completion of the Onshore Facilities construction.

It is envisaged that no new access roads will be required. Existing roads that will be improved and the RoW will be used as the main access roads. However, if EPC contractor deem necessary the construction of additional access roads, all necessary permits will be acquired.

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EPC contractor will compile a Traffic Management Plan, prior to the commencement of the construction in order to minimize impacts to local commute.

### **5.8.9 Testing**

Various tests are performed on the pipeline during construction. Among these tests, the check of all weldings, according to the corresponding Codes and Regulations, is included, as follows:

During the tests (Non Destructive Tests, NDT) the completed weldings are visually checked.

The ultrasonic check is the main method of identifying any defects in the pipeline weldings. The check is performed according to the provisions of Code DNV-OS-F101. When the ultrasonic check is not practical, the radiographic check can be implemented. In that case, the EPC contractor is obliged to develop a procedure for the safe handling and storage of the radiation sources, according to national and international Regulations.

The above mentioned method is applicable to all weldings.

In addition, the approved procedures for ensuring the quality check (Quality Assurance/ Quality Control – QA/QC) are applied in the Project, ensuring its quality.

The EPC Contractor shall have to confirm and prove that the works are delivered according to the requirements of the Project. This includes inspection of the procedure, on site supervision during works and inspection of the Materials' Procurement and Construction.

The level of check and inspection that will be implemented (e.g. the frequency, the intensity, the level of detail, and the validation criteria, as designed in the Plan of Checking and Inspection) will be based on the risks and criticality of each Project's phase (Construction, mechanical completion, final check, dimensioning, water filling and hydraulic test, commissioning and operational tests).

The final check of the pipeline includes the hydraulic test (or hydrotesting) and the corresponding activities, which are executed before and after the hydraulic test and are described below.

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## **5.8.9.1 HYDRAULIC TEST (HYDROTESTING)**

### **5.8.9.1.1 Discussion**

#### **General**

From its fabrication to start-up, a pipeline system has to pass from hydrotest waiver. At this test, water is used as the pressure test medium in order to achieve the highest level of safety during the process and obtain reliable leak test data. The advantages of the hydrostatic test include:

- It represents a final check on all the quality steps leading to the finished pipeline;
- It motivates higher quality in all aspects, including materials and workmanship;
- It allows for system integrity verification before hydrocarbons are introduced in the line.

#### **Hydrotest set-up**

Seawater will be used for the hydrostatic test of the offshore pipeline section.

In order to limit environmental concerns with hydrotesting water sourcing the Greek onshore section will be hydrotested with sea water.

The activities to be carried out before and after the hydrotest repeated here:

1. Before hydrotest
  - Flooding and cleaning;
  - Gauging.
2. During hydrotest
  - Leak detection.
3. After hydrotest
  - Dewatering;
  - Drying;
  - Purging.

## Test Medium

The following options exist regarding the seawater composition for hydrotesting purposes:

1. Filtered seawater (50 micron) + UV sterilization;

Option 1 is not considered feasible since it is still a subject of study, not presently labelled suitable and not applied in any project as of yet;

2. Filtered seawater (50 micron) + UV sterilization + limited residence time (suitable only for residence time < 20 days);

Option 2 was applied on several occasions, including the Medgaz project (Natural Gas Pipeline from Algeria to Spain, similar to IGI pipeline). Although the environmental advantage is obvious, the disadvantage is the lack of flexibility due to the limited residence time. In the event of unforeseen delays, the requirement to displace the contents of the system on a regular basis is onerous and results in a larger total volume of water discharged to the environment.

3. Filtered seawater (50 micron) + UV sterilization + oxygen scavenger;

Option 3 was used in the NordStream and Shah Deniz stage 1 projects. The addition of oxygen scavenger makes it less favourable than option 2. However, the specific chemical inhibitor can be selected so as to minimize the environmental impact (i.e. local toxicity, biodegradability and bio-accumulation) from the PLONOR list. A typical dosage would be 250 ml of (NAHSO<sub>4</sub>) per m<sup>3</sup> of seawater;

4. Filtered seawater (50 micron) + full chemical mixture (biocides, oxygen scavengers and corrosion inhibitor).

Option 4 represents the traditional approach with the obvious disadvantage of the largest environmental impact; i.e. most chemical discharge. As a consequence, the industry is moving away from this alternative.

Selection of the water composition is mainly determined by permitting issues. Given the requirements of the IGI Poseidon Project, option 2 is recommended where the situation permits a residence time of 20 days or less. Otherwise, option 3 should be implemented.

Bacteria have the potential to cause corrosion in pipelines and equipment, which is called microbial corrosion. Sterilization using UV radiation is commonly used in wastewater and drinking water treatment applications, effectively stopping the replication of microorganisms and thereby bacteria growth.

A method to avoid another type of corrosion, caused by electrochemical oxidation, is to take away one of its components (oxygen), which is effectively what an oxygen scavenger does. Commonly used oxygen scavengers are Ammonium Bisulphite and Sodium Bisulphite.

#### **5.8.9.1.2 Discharge and disposal**

As previously mentioned, option 2 is the proposed one and has been successfully implemented in several cases, including recent projects, similar to IGI Poseidon.

When option 2 is applied there is no need for hydrotesting water treatment, prior to discharge. Nevertheless, water filtering is a standard practice. The water is headed to a tank, filtered, checked according to applicable statutory limits and after that is discharged. The water treatment is confined in abstracting potential solids, given that no chemicals are used during the whole procedure. The surface of the tank is calculated approximately 600m<sup>2</sup>. If this area is not available, close to the coast, the equipment can be placed on a barge, which is tied up close to the coast.

Option 3 can be used as an alternatives scenario, which will be implemented by the EPC Contractor, only in an exceptional case that the water is required to remain inside the pipeline for a period that could cause damage to the pipeline. Indicatively, such a case could arise if the hydrotest needs to be repeated, in which case the time the hydrotest water remains inside the pipeline, in a safe manner, is decreased due to oxidation of the pipeline caused by the residual oxygen from the previous filling.

In that case (that is not the proposed one but cannot be completely discarded), in which option 3 needs to be implemented, the addition of Ammonium Bisulphite or Sodium Bisulphite to the hydrotest water is suggested. Treatment is still not considered as a requirement since these chemicals are both mentioned on the PLONOR list (Pose Little Or No Risk to the environment) and have been discharged without treatment during other projects, including projects in the Mediterranean. However, it is possible to improve the quality of hydrotest water that has been treated with Ammonium/Sodium Bisulphite, before discharging.

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For instance the following common techniques can be implemented:

- Aeration. This process increases the oxygen saturation of the water, thereby compensating for the oxygen scavenger effect. The use of spray bars during discharging is a form of aeration that is easy to implement and can re-oxygenate the discharged water. The surface area of the sea will further assist this process;
- Dilution and/or diffusion. By mixing the hydrotest water with seawater and discharge it in a diffusive manner, the difference in qualities will be further limited.

In any case:

- The discharge will be performed in a controlled manner according to local environmental approvals. An assessment of the likely dispersion rate and extent should be evaluated as part of the pre-commissioning design activities during the EPIC stage of the project.
- Prior to discharging the hydrotest fluids, samples are collected and analyzed on-site to ensure compliance with permits and other regulations before being discharged to the open sea.

The discharge point will be selected based on:

- Results of dispersion analysis;
- Application of diffuser;
- Assurance of efficient dispersion into environment.

Continuous discharge is considered possible by developing a discharge plan taking into account the spread capacity of the entire discharge system

Regarding the PLONOR list the following are noted. As the environmental concern arises nowadays, the oil and gas industry are working on identifying and using environmental friendly chemicals. The PLONOR is a list of chemicals that are deemed to Pose Little or NO Risk (PLONOR) to the environment. The list has been developed by OSPAR committee (known as Oslo – Paris committee) for the

protection of the marine environment. All chemicals or mixtures on the PLONOR list are allowed to be discharged into the sea, as per international industry standard.

## **Conclusions**

Conclusively, regarding the hydrotest: of the IGI Project

- it is not recommended to waive the hydrotest, because of the limited application of the hydrotest waiver on past projects, the quality verification that is associated with the test and the general feasibility of hydrotesting for IGI Poseidon;
- Seawater will be used for the hydrostatic test of the offshore pipeline section and for the Greek onshore section, which require the use of lift pumps, filter units, break tanks and flooding pumps;
- High frequency pressure transducers and electronic data loggers will be used during the hydrostatic test;

Discharge of sea hydrotesting water at the Greek side will be performed in a controlled manner according to local environmental approvals. All necessary equipment can be located at or near the beach. An assessment of the likely dispersion rate and extent should be evaluated as part of the environmental impact assessment and/or pre-commissioning detailed design activities.

- **Relevant equipment**

This section presents an overview of the relevant hydrotest equipment, based on the following activities which include items for preparation and completion of the hydrotest:

1. Flooding and cleaning and Gauging;
2. Hydrotest;
3. Dewatering;
4. Drying.

After drying, commissioning of the pipeline can commence by means of the purging process.

#### **5.8.9.1.3 Flooding, Cleaning and Gauging**

After the pipeline is initially flooded, it will be cleaned and gauged. Typically, cleaning and gauging are performed as a single operation together with flooding. Cleaning involves sending a series of pigs through to remove any debris (typically weld slag and pipe mill scale, where the latter is expected only in a very limited amount due to the internal coating) from inside the pipeline. One pig bounds the air and water, and another series of pigs can be used to clean the internal pipe-wall. To moisten the debris, clean water should be pumped in front of the pig train.

Pipeline internal gauging is used to ensure the inner diameter of the pipeline is free from obstructions, and excessive ovality. A gauging pig should be equipped with a device to determine its location in case it would not reach the pig receiver. If a gauging pig becomes stuck in the pipeline it should be freed, the pipe defect should be located and eliminated, and the gauging operation should be repeated.

An alternative gauging method could be used – one that will pinpoint any defect. Gauging can be performed with an electronic calliper tool for this purpose, optionally combined with a geometry pig to confirm the pipeline as-built geometry. The gauging and geometry pigs may be run in the same train as the flooding and flushing pigs; pig speed for this operation should be between 0.3 m/s and 1 m/s.

The pipeline system configuration should be designed to allow for pigging in forward or reverse direction. This is achieved by barred tees, lock-open check valves, eliminating non-piggable wye pieces, and designing the pig receivers so that they can also be used as launchers. This philosophy provides benefits during pre-commissioning and possible future repair scenarios.

#### **5.8.9.1.4 Hydrotest process**

During a hydrotest, pressurization is achieved by pumping water into the tested pipeline section. According to DNV-OS-F101, the system pressure test should be 1.15 times the design pressure with a hold period of 24 hrs. In the case of the IGI Poseidon pipeline, this means a test pressure of 184 barg (= 1.15 \* 160 barg). The hydrotest main scope includes:

- Pressurization up to the test pressure;
- Strength testing and leak testing;
- Depressurization.

#### **5.8.9.1.5 Dewatering**

The recommended method for dewatering is the use of compressed air.

This method uses compressed air to drive a pig train through the pipeline while displacing the hydrotest water. The pig train will consist of multiple compartments separated by pigs. Some will be filled with freshwater, used to flush the salt from the pipe wall, and some will be filled with air.

The air shall be oil free and dry; the air dewpoint shall be at least  $-65^{\circ}\text{C}$  at atmospheric pressure and have an oil content of no greater than 0.01 ppmW.

#### **5.8.9.1.6 Drying and purging**

The dewatering pig train will leave a small film of water, approximately 0.05 mm thick, remaining in the pipe. The absence of water in the pipeline is necessary in order to prevent the possible formation of methane hydrate.

For drying the method is air drying: this method usually employs swabbing pigs to help spread out the water so that it has a larger surface area, in order to be more easily collected.

### **5.8.10 Construction Wastes**

#### **5.8.10.1 Solid wastes**

Solid wastes may include:

- Packaging material

This depends to a large extent on the specific supply method of the suppliers, but it is roughly estimated that it will be 1.5 % of the equipment weight i.e. 30 tons

- Earthworks and volumes of surplus soil or debris material

Theoretically, the Greek onshore pipeline volume is approximately  $4000\text{m}^3$  which will be the amount of surplus soil. However, most of it will be used for backfilling purposes. Any remaining excavated material will be spread out locally, after receiving the approval of the landowner; otherwise it will be disposed to proper areas as indicated by the local authorities. These will be used for disposal of any boulders that

are not allowed to be used as backfilling material or will not be used in the creation of the artificial reef described in the relevant sections.

For the Onshore Facilities there will be no surplus soil, since all the excavated material will be used for backfilling. Consequently, the balance of excavation and backfill will be nil.

- Welding works residuals

For the onshore pipeline, there will be approximately 650 welds in 8km of the onshore pipeline, which equates to approximately 7600kg of weld material. Assuming 10% wastage gives 760kg of waste weld material. It is assumed that the compressor and metering station construction shall produce a similar amount resulting in a total weld waste of 1520kg.

The contractor will carry off all waste material from the construction site apart from the septic tanks for sanitary purposes. The “net” amount of waste material remaining at the site is therefore essentially zero.

#### **5.8.10.2 Liquid wastes**

- Hydrotesting water

The main liquid waste generated during the construction of the pipeline is the hydrotesting water.

Based on the design data, the hydrotesting water required for the offshore (deep water and near coast) section is approximately 85.000m<sup>3</sup> and for the Greek onshore section approximately 3.500m<sup>3</sup>.

In the proposed by the Consultant solution, no chemicals will be added to the hydrotesting water; only water filtering and UV sterilization is applied before flooding of the pipeline.

The Consultant mentioned the case that chemicals with small or no risk (PLONOR) will be used, such as Ammonium Bisulphite or Sodium Bisulphite with an indicative dosage of 250ml/m<sup>3</sup> of seawater (Sodium Bisulphite – NAHSO<sub>3</sub>). This is not the proposed option but for clarification purposes this option was analyzed in the relevant section.

- Lubricants for machineries

For the machineries used during the Onshore Facilities construction an amount of 10m<sup>3</sup> is estimated to be produced. The same applies for the construction of the pipeline. Consequently a total of 20m<sup>3</sup> of lubricants are estimated.

- Domestic wastes (wastes generated by the construction personnel-workers)

This amount of waste is calculated based on the amount of persons and using 30lt of waste per person per day as unit amount. For the construction of the onshore pipeline, it is estimated that max. 40 people will be on site for a period of approximately 44 weeks. Consequently, 277m<sup>3</sup> are estimated as domestic wastes from the onshore pipeline construction personnel. For the station, it is estimated that an average of 200 persons over a period of 20 months will be on site. Consequently, 3600m<sup>3</sup> of domestic wastes are estimated from the Onshore Facilities construction personnel. All construction sites will be equipped with chemical toilets for proper disposal of the above described domestic wastes.

It should be noted that the 30lt of domestic wastes per person per day is a very conservative figure. The real amount of domestic wastes is expected to be significantly lower than the presented figures.

## **5.9 Operation Phase**

### **5.9.1 General**

During operation the Pipeline will transport Natural Gas from Caspian Region, the Middle East and Eastern Mediterranean to Italy and western European market. The initial quantities to be transported to Italy are estimated at 9BCM of gas per year, whilst the final capacity will be 12BCM of gas per year.

Natural Gas is transported at high pressure up to 140bars.

The transportation of Natural Gas is controlled by a telemetry/ remote control system, which records pressure at focal points of the system on a 24hour basis. This control takes place at special installations, in the Operation and Maintenance building, by qualified personnel using appropriate equipment for any damages' repair and regular inspection of the installed (underground) pipeline's sections. In this case, checks and controls will be performed by the Control Building of the onshore facilities.

## 5.9.2 Pipeline Operation

### 5.9.2.1 Normal Operations

The following describes the anticipated normal operating concept for the IGI Poseidon pipeline system:

- Volumes of gas to be transported will be nominated in accordance with the agreements established between the seller, the buyer and the shipper (IGI Poseidon) as appropriate. The IGI Poseidon control centre will be advised of the nominated flows to be transported.
- The upstream gas provider (DESFA) will adjust the upstream flow parameters as needed in order to supply the nominated flow at the IGI Poseidon inlet battery limit.
- Custody of the gas will be transferred to IGI Poseidon at the station inlet shutdown valve where after it will be measured by a fiscal metering system in the Greek compression station. Gas composition and water content shall be constantly monitored and an alarm shall be raised if out of specification gas is detected. Out-of-specification gas when detected will not be delivered to the IGI Poseidon pipeline.
- The compression system shall be calibrated to cope with delivered gas volume fluctuations. The volume of gas received by the compressors will determine the compressor output delivery pressure. A surge control method will be utilised to reduce inefficient compressor operation. The compressor suction pressure is not expected to fall below 40 barg at any time, otherwise the compressor will trip. Throughput shall be changed to match the required flow rate by varying the speed and number of operating turbo compressor units.
- Line packing is not expected in the IGI Poseidon pipeline system during normal operation.
- The IGI Poseidon pipeline system shall operate at high pressure and shall discharge gas into the Receiving Station at Otranto at a maximum pressure of 75 barg without recompression. The minimum arrival pressure at the Receiving Station shall be sufficient to ensure a

pressure of at least 60 barg at the outlet battery limit of the station. In case inlet pressures higher than 75 barg are encountered from the offshore pipeline due to changes in steady-state operating conditions, the Receiving Station shall provide pressure and temperature control functions, reducing the pressure to match the conditions of the onshore Italian gas grid down to 75 barg. In normal steady-state operation there should be no need to reduce pressure at the Receiving Station, and the Station's function is primarily to meter the gas and protect the onshore pipeline from overpressure.

### **5.9.2.2 Control System**

The main part of the transportation operation of the natural gas is the pipeline control system. The overall control system comprises the following functions:

- Pipeline flow regulation
- Pipeline parameter monitoring
- Pipeline pressure safeguarding
- Telemetry and telecommunications
- Pipeline leak detection
- Fire and gas detection and protection
- Emergency shut down
- Emergency response

A short introduction to each is given in following subsections.

#### **5.9.2.2.1 Pipeline Flow Regulation**

The flow regulation system ensures that the pipeline is always operated within its operating standards while fulfilling the contractual transportation obligations.

The flow regulation system of the IGI pipeline will automatically alert the dispatcher at the Greek compression station if the normal operating limits of the pipeline system are approached, so that corrective actions such as adjusting the gas flow can be initiated. These activities are coordinated by operators at the Greek compressor

station to ensure reliable and safe transportation of the (contractually) nominated natural gas volumes.

#### **5.9.2.2.2 Pipeline Parameter Monitoring**

Besides pressure monitoring, pipeline transportation system instrumentation continuously measures temperature, gas flow and gas composition at the inlet and the outlet.

These data are transmitted online via the SCADA (supervisory control and data acquisition) system and are continuously evaluated to ensure that all contractual requirements and nominations are fulfilled, to identify unexpected changes at an early stage and to ensure that design limits of the pipeline are not violated. For this purpose pipeline application software will be used that allows detailed simulation and forecasting of the operating conditions in the pipeline.

The SCADA system displays the pipeline operating parameters at the main control room in the Greek compressor station as well as at other locations where such information is required.

In case a design limit is approached, the system will automatically generate a pre-alarm to allow corrective actions. In case the design limit is reached, despite corrective actions, the safety function of the system will automatically initiate further corrective actions that ensure that the system stays in safe operational mode.

#### **5.9.2.2.3 Pipeline Pressure Safeguarding**

The pipeline pressure envelope is safeguarded by the Pressure Safety System (PSS); in other words, the PSS ensures that the pipeline cannot be operated outside its design limits. The PSS is a redundant fully automatic system that is independent of the main control room in the Greek compression station and cannot be manipulated manually.

The PSS will automatically close the pipeline inlet in the event of the pipeline system approaching the limit of its normal operating pressure envelope. Thereby over pressurization is avoided in case steps to adjust the operating conditions are not taken in time and the pipeline pressure continues to rise despite the further corrective actions taken by the supervisory control and data acquisition (SCADA) system.

#### **5.9.2.2.4 Telemetry and Telecommunications**

The pipeline system communications infrastructure will permit fast, reliable and secure exchange of data (telemetry) and voice messages (telecommunications) between the various facilities and control rooms, which are separated by significant distances.

#### **5.9.2.2.5 Pipeline Leak Detection**

A main focus for gas transportation is the safety of the pipeline. Thus considerable effort is undertaken during design and construction to minimize the risk of pipeline failure. Therefore the probability of a gas leakage during the lifetime of the pipeline is extremely low. Although such an event is highly unlikely to occur, a leak detection system will be installed to allow fast reaction. This system is based on continuous monitoring and evaluation of data from flow rate and mass balance measurements.

If the leak detection system detects a major leak, appropriate actions will be initiated immediately. The alert is sent via the supervisory control and data acquisition (SCADA) system.

#### **5.9.2.2.6 Fire and Gas Detection and Protection**

The Onshore Facilities in Greece and Italy will have local fire and gas detection and protection systems, as is standard in the oil and gas industry.

#### **5.9.2.2.7 Emergency Shutdown**

The Onshore Facilities in Greece and Italy will have local emergency shutdown and safety systems, again as is standard in the oil and gas industry. The systems will be triggered in the case of an emergency such as fire. The gas volume in the pipeline will then be automatically separated from the onshore facility by closing the emergency shutdown valve. Additionally the onshore facility will be isolated from the upstream or downstream facility and automatically depressurized by releasing the gas via dedicated vent stacks in a safe location to minimize the gas volume in the respective area. The underlying principle here is to stop the supply of gas to a fire.

#### **5.9.2.2.8 Emergency Response**

For the extremely unlikely event of a gas release, a pipeline emergency response plan shall be in place. Its details shall be developed in close cooperation with all relevant authorities. The plan will contain the first actions to be taken. The main activity is the communication of fast and correct information to affected parties. IGI shall therefore agree with the relevant authorities on how to distribute information and issue warnings as quickly as possible. All points of contact and possible further actions will be defined. Also any agreement on how IGI can quickly receive the necessary permits to evaluate the damage and carry out the necessary repair activities shall be implemented.

The emergency response center will be located at the Greek compression station

#### **5.9.2.3 Inspection and Maintenance**

The Poseidon pipeline maintenance and inspection program is developed to minimize risk associated with long term operation, while minimizing costs associated with inspection mobilization and lost production. Experiences of operators with maintenance and inspection of similar large diameter, long length gas pipelines has proven that a feasible program can be developed from existing technology. The inspection program considers both internal and external pipe surfaces for onshore and offshore pipelines.

The internal inspection and maintenance would be conducted by intelligent pigging, geometry pigging, profile pigging and cleaning pigs to monitor internal corrosion, cross section profile of the pipeline, pipeline profile and coating breakdown.

An external inspection and maintenance program is performed by an ROV spread for the offshore pipeline section capable of detecting the pipeline location, monitor spans, and measure the effectiveness of the cathodic protection system. The external inspection of the onshore pipeline should be incorporated in the inspection programs for the cross-country sections of the IGI project.

### **5.9.2.3.1 Internal Inspection**

The Poseidon pipeline will be internally inspected by pigs propelled by the produced gas. A suite of pig types are available for wall thickness inspection, geometry and alignment check, cleaning, or pre-commissioning.

Inspection of the wall thickness is conducted by intelligent pigs to monitor internal corrosion and external corrosion. Profile/mapping pigs are used to monitor the pipeline alignment; this will identify profile changes with respect to the base-line pipeline profile due to external impacts like geohazards. Geometry/calliper pigs are used to monitor pipe out of roundness. In order to establish a base line for future inspection it is considered prudent to conduct an intelligent, profile pig and geometry pig run during commissioning or soon after. It should be noted that all these functions may be available in a single intelligent tool. Pigging will allow any minor damage incurred during installation to be recorded and compared against subsequent inspection runs.

The gas to be transported will be sales gas quality with low water content and comparatively low hydrocarbon dew point. No liquid water or liquid hydrocarbons will be formed under any foreseen normal operating pipeline conditions. Consequently, routine pigging to remove liquid accumulation in the pipeline is not expected. However, it is common practice to run cleaning pigs prior to an internal inspection run to ensure that the pipeline is free from debris that could impede the inspection tool. In the event of process upset resulting in off-specification (wet) gas, cleaning pigging may be performed to sweep any liquids out of the pipeline. The pigs used for cleaning should have soft seals so as not to damage the internal coating.

### **5.9.2.3.2 External Inspection**

#### **Onshore Pipeline Section**

Inspection of the onshore pipeline sections may be conducted in coordination with the inspection programs for the cross-country sections of the IGI project. The relatively short sections of the onshore pipeline sections shall have regular inspections that at least cover the following verifications of the pipeline condition:

- Survey of the land profile from the shoreline (MLLW) to the onshore scraper station to check for soil erosion and monitor pipeline burial.

- Visual inspection of the above ground pipeline, and associated pipework and fittings for damage to their protective coatings and subsequent corrosion.
- Inspection of the cathodic protection system through voltage measurement and sampling if possible.
- Inspection of CP isolation joints and to test the integrity of these.
- Inspection of the surge suppression device between the compressor station and the pig launcher/receiver location.

Some sections of the pipeline may also be routinely excavated to verify the condition of the anti-corrosion coating. This should be coordinated with the internal inspection, which will also identify requirements for pipeline excavation in the event of excessive localized corrosion.

### **Offshore Pipeline Section**

External inspection of the offshore pipeline is a marine operation, which is typically conducted from an available subsea intervention vessel. The typical specification for an offshore inspection vessel is similar to that required for offshore marine surveys.

The vessel may typically deploy either a towed fish with sensors mounted in the fish or a Workclass Remotely Operated Vehicle (ROV). Primarily ROV's are used for inspection programs as they are available in many sizes and functions, and can perform both the tasks required for acoustic inspection as well as inspections requiring instrumentation contacting the pipe. The workclass series are equipped with a visual camera, positioning sonar, and robotic manipulator arms suitable for grabbing and manipulation of tooling.

A wide assortment of work packages is available for mounting under the ROV, which are capable of supporting the following required inspection activities:

- Pipeline Location and Positioning Surveys
- Visual Inspection for External Pipeline Damage
- Verification of Pipeline Coverage by Backfill
- Monitoring and Measurement of Pipeline Spanning Condition
- Measurement of Cathodic Protection System Potential

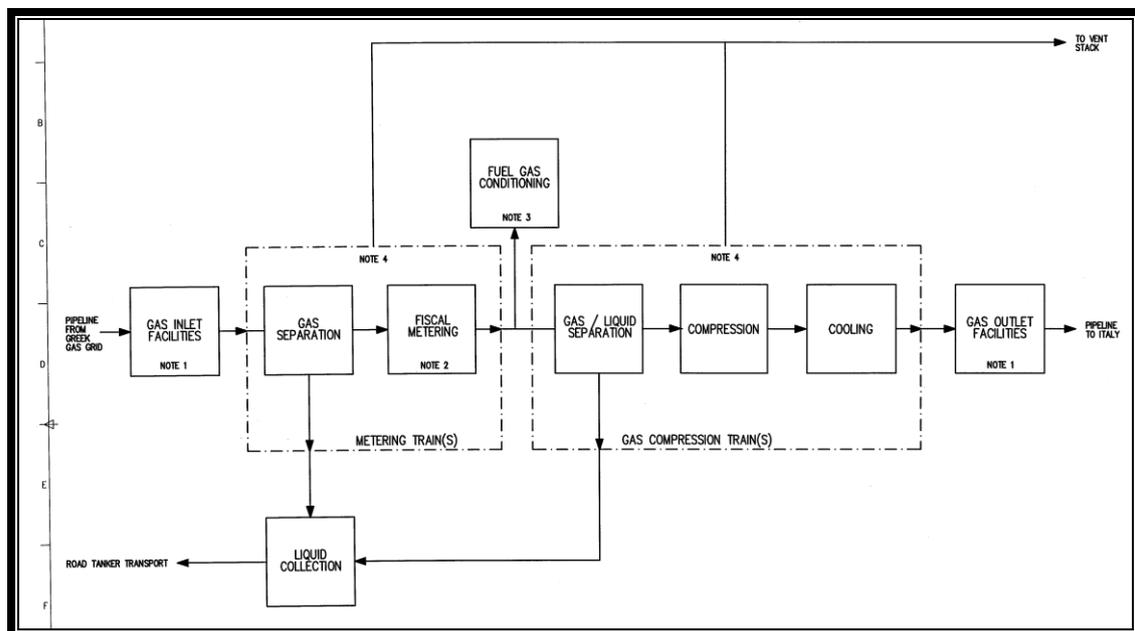
- Identification and Position Location Definition of Pipeline Leaks

### 5.9.3 Compressor and Metering Station Operation

#### 5.9.3.1 Main Process Description

The main process flow diagram of the compressor and metering station Onshore Facilities is illustrated below.

**Figure 5.20** Main process flow diagram of the compressor and metering station.

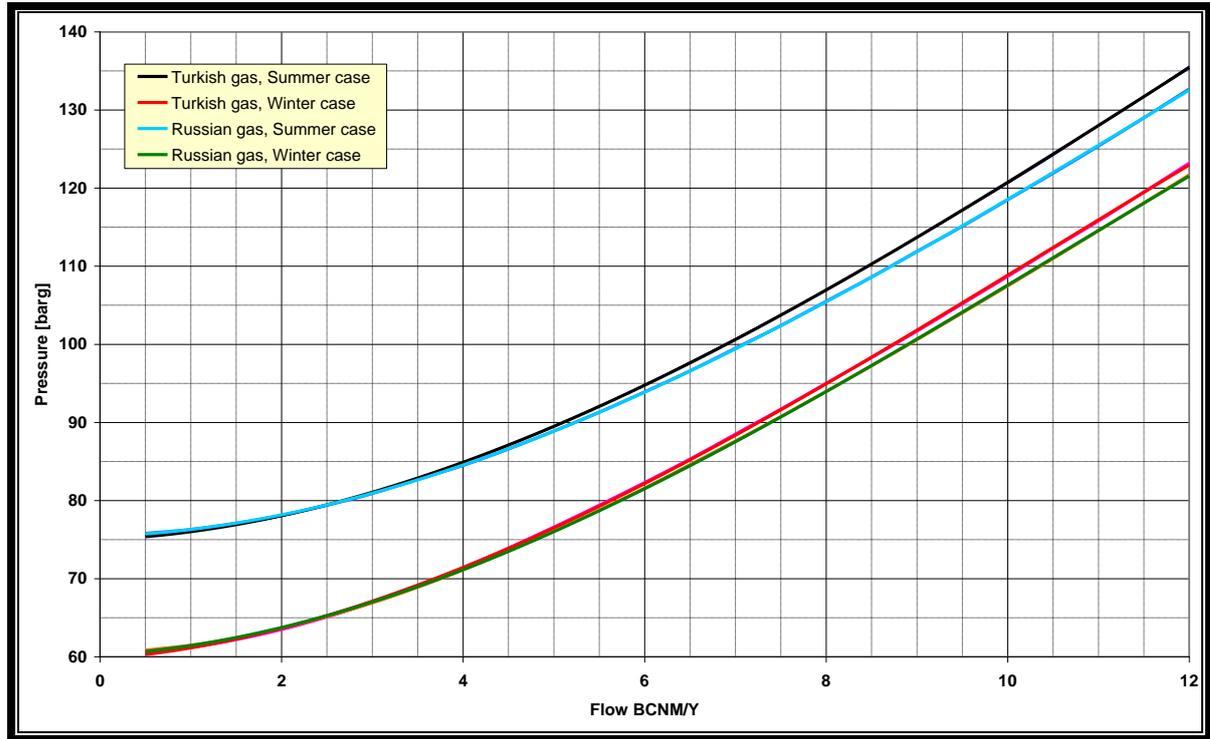


##### 5.9.3.1.1 Station operation

The compressor station will operate on high and low inlet pressure modes which are 75 and 40 bara respectively. In normal operating condition, the inlet pressure is 40 bara and 75 bara is an exceptional case. In addition, during low pressure (LP) operation, the energy demand from the compressors will be higher and consequently it will be taken as a basis for the determination of the average fuel consumption.

The required discharge pressure depends on hydraulics of the downstream system and the flow rate. The downstream system including the pipeline has been studied by INTECSEA and the resulting back pressures for various gas flow rates are presented in Figure 5.21.

**Figure 5.21 Station outlet pressure vs. gas flow rate.**



### 5.9.3.1.2 Station design basis

#### *Station Design capacity*

The design capacity of the IGI pipeline system is shown in the following table.

**Table 5.18 Planned transport volumes.**

Description	Annual flow rate <sup>(1)</sup>	Daily flow rate <sup>(3)</sup>
	(BNCM/year)	(MNCM/day)
Minimum capacity	1.5	4.5
Initial capacity	9	27.4
Future expansion	12 <sup>(2)</sup>	36.5

Note 1: Normal conditions applied are 1013.25 mbara and 0°C

Note 2: Pipeline design is based on 12 BNCM/year and facility design on 9 BNCM/year with the possibility of future extension to 12 BNCM/year.

Note 3: To convert annual flow rates to daily flow rates, a utilization factor of 0.9 has been applied

#### *Station Inlet Conditions*

**Table 5.19 Station inlet conditions.**

Item	Unit	Value
Minimum delivery pressure at tie-in point	barg	40
Maximum delivery pressure at tie-in point	barg	75
Minimum delivery temperature at tie-in point	°C	6
Maximum delivery temperature at tie-in point	°C	24 <sup>(1)</sup>

### ***Station Outlet Conditions***

The station outlet conditions are dependent on the flow, type of gas, back pressure in Italy and the outside temperature. Calculations have been performed for:

- Turkish gas and Russian gas
- High and low pressure in Italy (75 barg respectively 60 barg)
- Summer and winter (6 °C resp. 24 °C inlet temperature and the winter/summer extreme for the sea water temperature.)

This results in 8 cases for 1.5 BNCM/Y, 8 cases for 9 BNCM/Y and 8 cases for 12 BNCM/Y at an inlet pressure of 40 barg and the same number of cases for 75 barg inlet pressure.

The operating data for these  $3 \times 8 \times 2 = 48$  design cases are presented in the table below.

Gas arriving at the Greek compression facilities can be of varying composition depending on the place of origin. Two extreme gas compositions are available:

- Turkish gas, or a heavy composition
- Russian gas, a lighter composition

To be on the safe side, both options have been considered.

**Table 5.20 Station design conditions.**

		Station Inlet Conditions		Station Outlet Conditions			
				High Pressure (75 barg to Italian grid)		Low Pressure (60 barg to Italian grid)	
Composition	Season	Press. [barg]	Temp. [°C]	Press. [barg]	Temp. [°C]	Press. [barg]	Temp. [°C]
1.5 BNCM/Y							
Turkish Gas	Summer	40	24	76.9	60	62.6	60
	Winter	40	6	76.4	30	62.2	30
Russian Gas	Summer	40	24	77.1	60	62.7	60
	Winter	40	6	76.7	30	62.4	30
9 BNCM/Y							
Turkish Gas	Summer	40	24	113.7	60	104.6	60
	Winter	40	6	110.7	30	101.7	30
Russian Gas	Summer	40	24	111.8	60	102.6	60
	Winter	40	6	109.8	30	100.6	30
Future flow = 12 BNCM/Y							
Turkish Gas	Summer	40	24	135.6	60	127.7	60
	Winter	40	6	131.1	30	123.2	30
Russian Gas	Summer	40	24	132.7	60	124.8	60
	Winter	40	6	129.5	30	121.7	30
1.5 BNCM/Y							
Turkish Gas	Summer	75	24	76.9	60	62.6	60
	Winter	75	6	76.4	30	62.2	30
Russian Gas	Summer	75	24	77.1	60	62.7	60
	Winter	75	6	76.7	30	62.4	30
9 BNCM/Y							
Turkish Gas	Summer	75	24	113.7	60	104.6	60
	Winter	75	6	110.7	30	101.7	30
Russian Gas	Summer	75	24	111.8	60	102.6	60
	Winter	75	6	109.8	30	100.6	30
Future flow = 12 BNCM/Y							
Turkish Gas	Summer	75	24	135.6	60	127.7	60
	Winter	75	6	131.1	30	123.2	30
Russian Gas	Summer	75	24	132.7	60	124.8	60
	Winter	75	6	129.5	30	121.7	30

***Battery limits***

Requirements for gas arriving at the Greek compression facilities are shown below.

**Table 5.21 Battery limit conditions at Greek side.**

Item	Unit	Value
Minimum delivery pressure at tie-in point	barg	40
Maximum delivery pressure at tie-in point	barg	75
Design pressure of pipeline system upstream tie-in point	barg	80
Minimum delivery temperature at tie-in point	°C	6
Maximum delivery temperature at tie-in point	°C	24
Design temperature of pipeline system upstream tie-in point	°C	50

### 5.9.3.1.3 Process description

Dry gas arrives from the Greek gas transmission system at the compressor station at Florovouni in the Thesprotia area. The Florovouni compressor station consists of:

- An inlet manifold (a pig receiver, for the IGI beyond the Station, will be constructed and operated by others)
- 4 (+ 1 spare) flow metering train (this is for the final phase. For the initial phase, 3+1 flow metering trains will be operating)
- A compressor suction manifold
- 4 (+ 1 spare) compression train (this is for the final phase. For the initial phase, 3+1 compression trains will be operating)
- An outlet manifold
- A pig launcher connected to the pipe line to Italy

Each of the parallel compressor trains consist of:

- A gas/liquid separator
- A Gas turbine driven centrifugal compressor
- A discharge cooler
- A compressor recycle line

A common fuel gas system, 1 (+ 1 spare) for the gas turbines and for filling of piping systems, consisting of:

- A fuel gas pre-heater
- A pressure control valve

- A gas/liquid separator
- A fuel gas super-heater
- A fuel gas filter

Above trains and equipment are for the 9 BNCM/year configuration. A future extension of the facility to 12 BNCM/year is foreseen.

### ***Flow metering train Description***

The metering section consists of 3 (+ 1 spare) flow metering train, for the initial 9BCM/Y phase, and 4+1 for the final 12BCM/Y phase. Each train consists of 2 inlet separators that operate in parallel with one common flow metering line. Each metering run shall be capable of measuring 3 BCM/Y @ 40 barg & 24 °C. The inlet separators have been selected with a turn down factor 2. Together with the variation in pressure of 76 bara/41 bara (factor 1.85) the total turn down of the metering train is 2 separators x 2 turn down factor / 1.85 pressure ratio = 2.16. This results in the following extreme conditions per train:

Minimum volume flow = 1.5 BNCM/Y @ 75 barg

Maximum volume flow = 3 BNCM/Y @ 40 barg

As stated above 3 (+1) metering runs are provided for the 9 BNCM/Y case and 4 (+1) for the 12 BNCM/Y.

### ***Compression train Description***

The compression section consists of 3 (+ 1 spare) train, for the initial 9BCM/Y phase, and 4+1 for the final 12BCM/Y phase. Each train consists of 2 inlet separators that operate in parallel with one common compressor and air cooler. Each compression train is suitable for 3 BCM/Y @ 40 barg & 24°C. The inlet separators have been selected with the same dimensions as the separators of the flow metering trains, resulting in the same turn down.

The discharge pressure is dependent on the gas flow, gas composition and the delivery pressure in Italy. The required discharge pressure can vary between 62.4 barg (low pressure & no flow) and 135.6 barg (high pressure & 12 BCM/Y Turkish gas in summer).

With the given boundary conditions and the pressure drop over the inlet and outlet system the maximum compression ratio is 3.5 for the future 12 BCM/Y operation case with Turkish Gas. With this compression ratio single stage compression is possible. This means that single stage compression is possible for all current (9 BNCM/Y) and future (12 BNCM/Y) operating cases. For most of the low flow cases a suction throttle valve is required to bring the compressor in a possible operating condition.

In the discharge of each compressor an air cooler is required to cool the temperature to 60 °C in summer and 30 °C in winter.

### ***Fuel Gas train Description***

The Fuel gas supply consist of 1 (+ 1 spare) train. Each train consists of a fuel gas pre-heater, pressure let down valve, a scrubber, a fuel gas super heater and filters.

A pre-heater is included to prevent the formation of hydrates. The super-heater is included to ensure superheating of the gas as required by gas turbine suppliers. The fuel gas will be 30 °C superheated. The supply pressure is 28 barg but it will be finalized against the requirements of the selected gas turbine.

#### **5.9.3.1.4 Raw Materials**

The following table illustrated the raw materials required for the operation of the onshore facilities.

**Table 5.22 Raw materials consumption during Onshore Facilities operation.**

Material	Location	Components	CAS no.	Amount	Flash point [C]	Boiling point [C]	Relative Density (air=1)	LEL [%]	K-class
Natural Gas	Process equipment	82 -98 % C1 (methane)	68410-63-9	803,9 m <sup>3</sup> @ 75 barg 388,1 m <sup>3</sup> @ 140 barg 42,9 m <sup>3</sup> @ 29 barg	GAS	-162	0,55-0.68	3,6-4.4	K0
Condensate	Condensate storage tank	C2 -C10	68919-39-1	35 m <sup>3</sup>	-40	39 - 200	>1 0.62 - 0.76 (liq)	3	K1
Diesel	Diesel storage tank	C12 -C25	68334-30-5	20,1 m <sup>3</sup>	49 ->55	163 ->180	3 - 7 0,81 - 0,85 (liq @25C)	0,4 - 6.5	K2
Lubricants	Emergency generator Back-up generator Gas turbines	C15 - C50	mixture	< 1m <sup>3</sup>	200	315	>1 0.866 (liq @ 15C)	NA	K3
Air	Receiver vessel	Air	132259-10-0	24,2 m <sup>3</sup> @ 10 barg	NA	-194.3	1	NA	NA
Nitrogen	Receiver vessel	N2	7727-37-9	24,2 m <sup>3</sup> @ 7 barg	NA	-195.86	0.97	NA	NA
Water	Potable water storage tank Utility water break tank	H2O	7732-18-5	50 m <sup>3</sup> (potable) 1 m <sup>3</sup> (utility)	NA	100	>1 1,0 (liq @ 4C)	NA	NA
Argonite	Gas bottles storage fire fighting systems (electrical buildings)	Argon (50%) N2 (50%)	7440-37-1 (Ar) 7727-37-9 (N2)	5-10 m <sup>3</sup> (gas bottles)	NA	-190.1	>1	NA	NA

Material	Location	Components	CAS no.	Amount	Flash point [C]	Boiling point [C]	Relative Density (air=1)	LEL [%]	K-class
Carbon Dioxide	Gas bottles storage fire fighting systems (gas turbines)	CO2	124-38-9	5-10 m <sup>3</sup> (gas bottles)	NA	-78,4	1.65 (@ 20C)	NA	NA
Anti Freeze	Emergency Generator	Ethylene Glycol	107-21-1	< 1 m <sup>3</sup>	111	198	2.1-2,6 1,115 (liq @ 20C)	3,2	K4

### **5.9.3.2 Utilities**

The compression station in Greece will include the following utility systems:

- Fuel gas system for gas turbine drivers and back-up generator
- Vent (cold vent) system for emergency release and depressurization of the facilities
- Process drain system for collection of liquid hydrocarbons
- Open drain system for collection of rain / spilled fluids
- Sanitary drain system for collection of sanitary waste / fluids
- Instrument & Utility Air system for valve actuators, tool-air and the production of Nitrogen
- Nitrogen system for secondary seal flush of the compressors and purging of vent system
- Diesel system for diesel supply to emergency diesel gen set and the back-up generator
- Potable water system for domestic use
- Utility water for use in the plant

#### **5.9.3.2.1 Fuel Gas System**

- **General**

The fuel gas system is supplied to:

- The gas turbine drivers of the compressors.
- The back-up power generator
- To piping and/or equipment after maintenance for filling a system.

The composition of fuel gas used is identical to the gas compressed. For the compressed gas, two compositions have been provided; gas from Turkey and from Russia.

- **Compressor Drivers**

The fuel gas consumption for the compressor drivers has been based on the average of the following H&M balances:

- Russian Gas - high delivery pressure in Italy (i.e. 75barg) - winter
- Russian Gas low pressure winter in Italy (i.e. 60 barg)
- Russian Gas high pressure summer
- Russian Gas low pressure summer

The Russian Gas has been selected because this gas has a composition that is most similar to the compositions found in the Kipi Metering Station. This gas gives the highest consumption of fuel gas when expressed in Nm<sup>3</sup>.

The fuel gas consumption is calculated for a flow of 9 BNCM/Y and for the future flow of 12 BNCM/Y.

**Table 5.23 Fuel Gas Consumption of Compressor Drivers.**

Flow Case with Russian Gas	Unit	9 BNCM/Y	12 BNCM/Y
High Pressure Winter	kg/h	9240	14344
Low Pressure Winter	kg/h	8471	13606
High Pressure Summer	kg/h	10320	15817
Low Pressure Summer	kg/h	9575	14982
Average=Total/4	kg/h	9401	14688
Average Molar Flow	kmol/h	573,1	895,3
Fuel Gas flow	Nm <sup>3</sup> /h	12846	20068
Annual flow (kmole/hx365x24x22,41Nm <sup>3</sup> /kmole/1E6)	MNm <sup>3</sup> /year	112,51	175,76

- **Power Generator**

For the power consumption the following is assumed:

- Back-up generator is running 350 day/year; 98% (343 days) on 50% load and 2% (7 days) on 100% load.
- The total power load of the facilities is 1575 kW + N \* 225 kW; where N = number of compressors running.
- $Eff = 5,64 \cdot 10^{-12} \cdot Power^3 - 5,65 \cdot 10^{-8} \cdot Power^2 + 2,0610^{-4} \cdot Power - 1,08 \cdot 10^{-5}$
- Power = Generation power (kW)

- Fuel Gas Flow (kg/h) = Power / LHV (kJ/kg) / Eff. (%) x 100 x 3600 s/h
- Fuel gas and 9 BNCM/Y and 50% load is 490.3 kg/h;
- 9 BNCM/Y and 100% load is 682.6 kg/h
- 12 BNCM/Y and 50% load is 506.7 kg/h
- 12 BNCM/Y and 100% load is 728.1 kg/h

**Table 5.24 Fuel Gas Consumption back-up power generator.**

Flow Case	Unit	9 BNCM/Y	12 BNCM/Y
Electrical Load	kW	2250	2475
Power from back-up generator	kWh/year	1125x24x343	1238x24x343
LHV Russian Gas	kJ/kg	49090	49090
Fuel Gas for back-up generator 50% load	kg/h	490,3	506,7
Fuel Gas for back-up generator	Nm <sup>3</sup> /h	490,3/16,4x22,41=670	506,7/16,4x22,41=693
Power from back-up generator	kWh/year	2250x24x7	2475x24x7
Fuel Gas for back-up generator 100% load	kg/h	682,6	728,1
Fuel Gas for back-up generator	Nm <sup>3</sup> /h	682,6/16,4x22,41=933	728,1/16,4x22,41=995
Total from back-up generator	MNm <sup>3</sup> /year	(670x24x343+933x24x7)/1E6=5,67	(693x24x343+995x24x7)/1E6=5,87

- **Total Fuel Gas Consumption**

**Table 5.25 Total Fuel Gas Consumption.**

Flow Case	Unit	9 BNCM/Y	12 BNCM/Y
Total from compressor drivers	MNm <sup>3</sup> /year	112,51	175,76
Total from back-up generator	MNm <sup>3</sup> /year	5,67	5,87
Total fuel gas	MNm <sup>3</sup> /year	118,18	181,63
Fuel Gas consumption per half year	MNm <sup>3</sup> /half year	59,09	90,82

### 5.9.3.2.2 Diesel, unit 35

Diesel is used for the emergency generator and the back-up generator. The Emergency generator shall be tested by weekly for one hour. That makes 26 running hours/year. For the emergency generator the efficiency is assumed to be 30%.

It is proposed to start the back-up diesel generator on diesel fuel and then switch to Fuel Gas. For the purpose of calculating the consumption it is assumed that the

machine will be started 6 times per year and the average running time on diesel is 1 hour, which makes a total running time on diesel 6 hours per year. For the diesel consumption of the back-up generator 1800 kW load is assumed, as this is the load during start-up of one compressor train. This is a worst case scenario for the diesel consumption.

**Table 5.26 Diesel Consumption back-up power generator.**

Flow Case	Unit	9 BNCM/Y	12 BNCM/Y
Electrical Load	kW	1800	1800
LHV Diesel	MJ/kg	44800	44800
Diesel for back-up generator	Kg/year	$1800 \times 6 \times 3600 / 0,22 / 44800 = 3945$	$1800 \times 6 \times 3600 / 0,22 / 44800 = 3945$
Diesel Density	kg/litre	0,85	0,85
Diesel for back-up generator	Litre/year	4641	4641

**Table 5.27 Diesel Consumption emergency generator.**

Flow Case	Unit	9 BNCM/Y	12 BNCM/Y
Electrical Load	kW	720	720
LHV Diesel	MJ/kg	44800	44800
Diesel for Emergency generator	kg/h	$720 \times 3600 / 0,3 / 44800 = 203,6$	$720 \times 3600 / 0,3 / 44800 = 203,6$
Diesel for Emergency generator	kg/year	$203,6 \times 26 = 5293$	$203,6 \times 26 = 5293$
Diesel Density	Kg/litre	0,85	0,85
Diesel for Emergency generator	Litre/year	6227	6227

**Table 5.28 Total Diesel Consumption.**

Flow Case	Unit	9 BNCM/Y	12 BNCM/Y
Diesel for Emergency generator	Litre/year	6227	6227
Diesel for back-up generator	Litre/year	4641	4641
Total Diesel consumption	Litre/year	10868	10868
<b>Diesel consumption per half year</b>	<b>Litre/half year</b>	<b>5434</b>	<b>5434</b>

In general, the diesel storage will be based on 3 days running on the Emergency Generator or 12 hours on the Back – up Generator. The selected volume of the diesel storage tank is 20 m<sup>3</sup> with dimensions: D=2.04m and L=6.12m. The diesel tank shall be executed as double wall tank to prevent spilling diesel to the environment.

### **5.9.3.2.3 Vent system**

An important issue for the design of the vent system is the height of the vent stack or vent stacks. This height shall be limited for visual reasons. For this reason the flow will be divided over two vent stacks.

The vent system has been designed for the safe disposal of hydro carbon gas. The vent stacks will be provided with sonic vent/flare tips for an optimal mixing with air. In this way the flame in case of an ignition has the lowest emissivity, resulting in less height required to meet maximum radiation levels.

- **Blow Down Philosophy**

The highest load to the vent system is in case of a blow down of the whole facility. Blow down of the facility is foreseen in case of a confirmed fire in the facility. For the design of the facility the main piping has been located underground. The measurement and compression facilities will be above ground. In case of an automated blow down of the facility only the above ground part of the facility will be depressurized. The underground part of the facility will be blocked in and kept under pressure.

### **5.9.3.2.4 Condensate Collection, unit 45**

The discharge of liquids into the condensate collection system is intermittently (on/off control). The total amount of liquids to be expected is negligible. However, as an off spec situation may occur it is assumed that this will be  $\leq 0.1$  % of mass flow; that is  $\leq 2$  m<sup>3</sup>/h. The size of the condensate selection vessel is 30m<sup>3</sup>.

### **5.9.3.2.5 Instrument Air and Plant Air**

The main consumer of the Instrument Air is the Nitrogen generation system.

#### Instrument Air

The Instrument air system consists of:

- 2(+1) spare Instrument Air Compressor and 2 (+1) spare Instrument Air dryer.
- One buffer vessel
- Distribution system for control, blow down, and emergency shut down valves and feed for Nitrogen system and Plant Air system.

### Plant Air

Plant air only will be used during maintenance. The number and type of tools is unknown. In the plant air system 12 supply connections at utility stations are foreseen. Per utility system a capacity of 30 Nm<sup>3</sup>/h is estimated. For Plant air consumption a total amount for 9 utility stations, that is 270 Nm<sup>3</sup>/h, is foreseen. This capacity is sufficient for the most common used tools.

**Table 5.29 Total Air consumption.**

Destination		9 BNCM/Y Normal Flow	12 BNCM/Y Normal Flow	Maximum Flow
Nitrogen Generator	Nm <sup>3</sup> /h	525	525	635
Tool Air		0	0	280
On/Off valve	pc	73	83	83
Control valve	pc	42	46	46
Instruments		71,2	79,2	85
<b>Total</b>		<b>596</b>	<b>604</b>	<b>1000</b>

#### **5.9.3.2.6 Potable/ Utility Water**

Potable water is used in the buildings for normal domestic use and to feed the utility water system. The total water consumption is estimated to be 0.18 m<sup>3</sup>/d. This quantity is estimated based on the assumption that 6 persons will daily consume 30 liter/day. Utility water is only used at utility stations. Its consumption is estimated at 0.1m<sup>3</sup>/d. In addition, there will be potable bottled water.

**Table 5.30 Potable Water consumption.**

Flow Case	Unit	9 BNCM/Y	12 BNCM/Y
Domestic use	m <sup>3</sup> /d	0,18	0,18
Utility Water (average)	m <sup>3</sup> /d	0,1	0,1
Total Water consumption	m <sup>3</sup> /d	0,28	0,28
Average water consumption	m <sup>3</sup> /h	0,012	0,012
Total Water consumption/year	m <sup>3</sup> /y	102,2	102,2
<b>Total Water consumption/half year</b>	<b>m<sup>3</sup>/d</b>	<b>51,1</b>	<b>51,1</b>

The utility water is distributed to connections at utility stations. The maximum flow will be based on the concurrent use of 2 utility connections with a flow of 3 m<sup>3</sup>/h each resulting in a required flow of 6 m<sup>3</sup>/h.

The potable water will be provided through commercial bottles used in similar cases.

Other water needs will be supplied through water tanks which will be located under the building. This will prevent temperature increase of the water and thus prevent bacteria growth.

The water system consists of:

- 2 storage tanks of 25m<sup>3</sup>
- 1(+1 spare) circulation pump with a flow of 6m<sup>3</sup>/h
- distribution system

#### Utility Water

Utility water is used for flushing purpose. The use is intermittent and a total consumption cannot be estimated. If water is used, the pressure will drop and the utility water pump will start. The flow of the utility water pump is 6m<sup>3</sup>/h and a pressure of 3 barg. Two 100% centrifugal pumps will be installed. The feed to the utility water system is from the potable water system. A break tank is applied to inhibit any back flow from the utility water system to the potable water system.

#### **5.9.3.2.7 Nitrogen**

Nitrogen is used for secondary seal purge, vent purge and incidental flushing of process systems to remove the air from a process system. The main nitrogen consumption is for the secondary seal purge of the compressors.

The Nitrogen generation system consists of:

- 1(+1 spare) membrane type Nitrogen generator
- One buffer vessel
- Distribution system for secondary seal purges
- Distribution system for vent purges and utility stations

The nitrogen system will be designed for 100 Nm<sup>3</sup>/h & 99% purity and 190 Nm<sup>3</sup>/h & 97% purity.

**Table 5.31 Total Nitrogen consumption.**

Destination	9 BNCM/Y Normal Flow [Nm <sup>3</sup> /h]	12 BNCM/Y Normal Flow [Nm <sup>3</sup> /h]	Maximum Flow [Nm <sup>3</sup> /h]
Secondary seal flush compressors	60	75	75
Vent purge	24	24	24
Blanketing 45-V-010	2	2	2
Utility Stations (continuous)	0	0	89
Total	86	101	190 <sup>1)</sup>
<sup>1)</sup> Maximum flow based on 97% purity			

### 5.9.3.2.8 Power

The normal power supply of the station will be from the P.P.C. grid. The back-up power generator is normally not required for the power supply. To minimize interruptions in the gas transport the back-up generator is operated continuously on a load of 50%. The other 50% will then be supplied by the P.P.C. grid. In case one of the two sources of supply fails the other will take over.

For the power consumption the following is assumed:

- Back-up generator is running 350 day/year; 98% (343 days) on 50% load and 2% (7 days) on 100% load.
- Power supply 100% from P.P.C. grid is 15 day/year
- Normal Power supply.
- The power supply will be from the public grid. Not having availability figures of the public supply a back-up generator is foreseen to warrant continuous operation of the compression station.

- Back - up Generator

The back-up generator shall be suitable to supply the power to the whole site, with all Turbo-Compressor units running. For the 2,7 MW a minimal reserve of 10% is required to prevent unstable power supply. The Back-Up generator shall have an ISO capacity of  $\geq 3,5$  MW.

One of the great power consumers are the fuel gas skids. During a start-up no gas fuel is available, the Back-Up generator shall be executed as dual fuel machine (diesel or gas). The machine can start on diesel and when Fuel Gas is available, the

machine shall switch to Fuel Gas. The time required to run on diesel is limited to 1 hour per start.

- Emergency Generator

The Emergency -up Generator shall be suitable to supply the power to the whole site, with no gas processing in operation. The generator shall run on Diesel Fuel. The scenario with the highest load for this generator is supply of power to:

- All process control systems, required for safe start-up
- All lighting
- A Nitrogen generation skid for generation of Nitrogen for the secondary seal flush and the vent purge
- One instrument Air Compressor to feed the Nitrogen generator
- The Back-up Generator starting.

For this situation a load of 900 kVA (720 kW) is foreseen, a minimal reserve of 10% is required to prevent unstable power supply. The Back-Up Generator shall have a capacity of  $\geq 720$  kW.

**Table 5.32 Electrical Power Consumption.**

Flow case	Unit	9 BNCM/Y	12 BNCM/Y
Electrical Load	kW	2250	2475
Power from back-up generator	kWh	1125x24x343	1238x24x343
Power from back-up generator	kWh	2250x24x7	2475x24x7
Total from back-up generator	MWh	9639	10607
Power from P.P.C. grid	kWh	1125x24x343	1238x24x343
Power from P.P.C. grid	kWh	2250x24x15	2475x24x15
Total from P.P.C. grid	MWh/year	10071	11082
Total maximum from P.P.C. grid	MWh/half year	5036	5541

### **5.9.3.2.9 Drain Systems, unit 56**

- Sanitary Drains

Sanitary drains will be based on 30 people at site during maintenance campaigns. With an average consumption of 30 liter/day per person the capacity of this system shall be 0.037 m<sup>3</sup>/h (0.9 m<sup>3</sup>/day).

The sanitary drain system consists of a collection system and a septic tank. The effluent of the septic tank shall be led to a drain field with perforated pipes for irrigating.

- Open Drains

Open drains will be collected in area's with a potential spill. The areas are:

- Truck (un)loading area (outdoor)
- Diesel filters
- Round the turbines were potentially lube oil is spilled

The collected drains will be routed via a separator designed according EN-858, followed by a water/oil separator shall be designed to remove oil (diesel) to less than 15 ppm. The capacity of the separators shall be based on the outdoor area where liquids are collected based on 25 mm/m<sup>2</sup>/h supply from rainfall.

The discharge of the water can be combined with the rainwater collection discharge.

- Rain water collection

Rain water will on most locations penetrate into the soil. On locations where discharge to the soil is not possible the rain water will be collected in a sewer system and be discharged via a sand catcher to the natural receptor. The maximum hourly rainfall for design of these systems shall be 25 mm/h.

### **5.9.3.3 Firefighting systems**

Requirements regarding Fire safety and Fire protection set by the Greek authorities are laid down in regulations such as

- EN 12186: "Stations of the pressure control of gas transport and distribution of natural gas"

- Ministerial Decision (M.D.) Φ15/οικ.1589/104/2006 'Taking fire protection measures in industrial-manufacturing installations, professional laboratories, warehouses etc., falling within the scope of Law 3325/2005'(FEK B' 90/30.1.2006)
- Presidential Decree (P.D.) 71/1988 (Official Gazette 32A). Regulation on fire protection of buildings (article 11), 17/02/1988, Industries - Manufacturers
- Ministerial Decision (M.D.) 34458/1990 (Government Gazette, V846), 31/12/1990, Determination of technical specifications, configuration, design, construction, safe operation and fire, refineries and other oil industry.

The firefighting philosophy and selected provisions are subject to the formal approval (permit) of the local fire brigade. Additional requirements for provisions for the local fire brigade to combat fires on the station maybe set by local fire brigade.

The fire prevention and mitigation philosophy for the gas containing systems is mainly based on isolation of the leak source (Emergency Shut Down), removal of the flammable inventory (Emergency Blow Down) and isolation of all potential ignition sources.

In order to ensure a rapid initiation of the isolation and blow-down provisions after the occurrence of the release suitable systems for detection of gas clouds and fires shall be provided (See relevant chapter 8).

The maximum required time for blow down of the natural gas containing equipment is based on API 521, which is 15 minutes, down to a pressure of 7 barg. The potential of escalation is assessed on fire load calculations for systems directly exposed to high levels of heat radiation. For example, load bearing metal structure exposed to high levels of heat radiation will fail within approximately 10 minutes. Mitigation of the exposure and reduction of the escalation risk is either by reduction of exposure duration (blow down time) or the provision of passive fire protection.

Systems considered safety critical in protection of personnel; environment or assets may require additional fire protection when potentially exposed to high levels of heat radiation.

The potential of escalation of gas jet fires to adjacent systems and/or structures will be minimized further by creating physical distance between the systems. The required physical distance is based on the safety distances calculations.

Main piping will be installed underground as much as possible. ESD valves will be installed in pits. This will prevent or at least minimize exposure to fire and explosion events, and therefore minimize the potential for escalation. Aboveground main piping may be provided with passive fire protection when required. Buildings (compressor building, service building), that are potentially exposed to the effects of fires will be constructed to resist the expected fire loads for at least 120 minutes (REI 120).

Active fire protection systems (water based deluge systems) are not considered as an effective measure to extinguish or even mitigate the effects of gas fires on gas containing equipment. Therefore these systems are not considered as the preferred measures to protect equipment from the effects of an adjacent gas fire. The prevention of equipment being exposed (underground, passive fire protection) is the selected strategy.

The compressors and turbines will be placed inside compressor buildings to minimize noise. The turbine enclosure within the compressor building will be equipped with a Carbon Dioxide extinguishing system in accordance with NFPA 12 (Carbon Dioxide). Water based firefighting systems are not considered for the enclosure as this will damage the compressor.

The condensate vessel and the diesel storage tank containing flammable substances will be placed underground. This will provide containment, in case of vessel failure, and will provide protection from escalation of fire scenarios of adjacent systems. This will decrease the potential of a fire event occurring and will reduce the extent of the fire event, when it does occur. Therefore active fire protection is not considered to be necessary. Design and installation of the underground storage tank shall be in accordance with section 23 of NFPA 30.

The loading facilities of condensate and diesel will be provided with wheeled or portable, dry powder or and/or foam extinguishers.

The emergency diesel generator room will be equipped with an automated Argonite (mixture of 50% argon and 50% nitrogen) extinguishing system in accordance with NFPA 2001 (Clean Agent). Water based firefighting systems are not considered for the enclosure as this will damage the equipment.

The CCR (Central Control Room), the Electrical room and the Instrumentation room will be provided with an automated Argonite extinguishing system in accordance with NFPA 2001 (Clean Agent). As the CCR is occasionally manned, signs and warning

systems shall be in place to ensure personnel will not enter or be trapped in the CCR, when the system is activated upon fire detection.

The HVAC system of these rooms shall be provided with fire dampers, to be closed prior to activation of the extinguishing system. This is to ensure the effectiveness of the extinguishing system, and prevent migration of inert gas to other areas.

Under floor spaces for cabling will also be connected to the extinguishing system.

The canteen, workshop and storage will be only be provided with handheld fire extinguishing equipment

Handheld fire extinguishing equipment, portable and wheeled, will be provided at strategic locations over the plant both outside and inside buildings. The type and size are specified in line with the fire risk at the location.

#### **5.9.3.4 Safety measures**

The main hazard on the Compression Station facilities is the hazard of natural gas in the process equipment. Natural gas, when released from high pressure sources, can result in large gas release that, when ignited, will cause large jet fires or fireballs / explosions (immediate or delayed ignition). Gas releases inside buildings (e.g. compressor buildings) represent a risk of explosion when ignited.

The overall strategy for protection against fire and explosions is to evacuate personnel (when present, the site is normally unmanned) on site to a safe haven and to prevent further escalation by detection, isolation, blow-down, and active & passive fire/explosion protection. Provisions for active firefighting activities exposing personnel are not foreseen for fire protection on the plant site. Where active firefighting outside the plant site may be applicable external fire brigade services will be used. The integrated strategy for the protection against fire and explosion consists of the following key aspects:

- The most effective manner of mitigating a release of high pressure gas and (when the release is ignited) jet fires is isolation of the leak and remove the flammable gas as quickly as possible by rapid depressurization (blow-down) and remove or limit all possible ignition sources (electrical isolation and explosion proof equipment / Ex-zoning);

- In order to ensure a rapid initiation of the isolation and blow-down provisions after the occurrence of the release suitable systems for detection of gas clouds and fires shall be provided;
- In the period between the initial release followed by ignition (immediate or delayed) and the actual completion of the depressurization of the isolated section in which the leak occurs, personnel and assets can be affected by the effects of a fire or explosion. Provisions for protection of personnel and assets shall be selected on the basis of both effectiveness and suitability;
- For small incipient fires in and near buildings and near equipment manual firefighting equipment shall be provided at strategic locations;
- Provisions for active fire protection are:
  - In electrical rooms and in compressor, turbine and diesel generator enclosures automatic gaseous (CO<sub>2</sub>) extinguishing systems shall be provided (asset protection);
  - Firefighting activities using active fire protection systems on site for fires other than gas fires shall only be executed by emergency services such a fire brigade when possible. The necessary firefighting equipment on site shall be provided according requirements of local fire brigade.
- Protection of safety critical equipment against gas fires or explosions shall be achieved by passive fire and explosion protection, either by physical distance between source and target, by physical barriers such as fire or blast resistant walls or by protective coating on equipment. These provisions shall also be applied to prevent escalation of the fire or explosion to other main process equipment (subject to asset protection philosophy)
- In any emergency situation of gas release or fire provisions for proper escape (escape routes, signs, lighting, etc.) shall be available for persons on site for a reasonable period in which escape to a safe haven (e.g. assigned muster area) is achieved.

For the purpose of the plot layout development for the Greece compression and metering station safety distances are recommended.

These recommended safety distances serve as a guideline in the plot layout development of the plant. Any deviations from the recommended distances are still accepted if the escalation risks are assessed and proper additional measures (e.g. passive fire protection) are taken to prevent escalation.

All the above have been taken into consideration in the various design philosophies and are described in detail in chapter 8.

#### **5.9.3.5 Maintenance**

Maintenance for all equipment on the plant will be defined in the Maintenance plan based on the information and specification of the manufacturer, the availability and reliability requirements and the sparing philosophy.

The maintenance strategy is based on the execution of preventive maintenance which program is defined on the maintenance plan and the inspection/and testing program. In later operational life the maintenance program follows the principle of Reliability Centered Maintenances (RCM) by which the maintenance activities depend on collected reliability and failure data of the equipment of the plant.

The specific maintenance activities will be described in the Maintenance manual to be based on actual installed equipment and containing Vendor's guidelines.

#### **5.9.4 Operational workforce**

For the operation of the Compressor and Metering Station, it is estimated that 2 employees per shift will be required.

This number does not include services regarding the patrolling of the onshore pipeline section, or special services (security, catering, etc).

#### **5.9.5 Operational wastes**

The pipeline itself has no wastes during operation. The wastes during the operation of the Onshore Facilities are yet to be calculated. However, these are estimated to be around 1000kg per year consisting mainly by lubricants. Oily waters are assessed as zero. Domestic (sanitary) wastes are assessed to amount to 6persons x 30lt per day, operating 365 days per year. This means ~65.7m<sup>3</sup> per year.

### 5.9.5.1 Air Emissions

Constant and irregular air emissions are summarized in the following table. The following figure illustrates the major emissions components.

**Table 5.33 Constant and irregular air emissions.**

Source	Type	Load (kg/year)				
		HC	CO <sub>2</sub>	NO <sub>x</sub>	CO	PM
Emergency Generator (Diesel engine exhaust, duty 480kW)	I (note 1)	3.5 (unburned)	16702.3	7.5	65.5	0.5
Back-up Generator (Gas turbine exhaust, duty 3.5MW)	C (fuel gas) (note 2)	1667.6 (Note 4)	9530080	34742.2	2895.2	2316.1
Back-up Generator (Gas turbine exhaust, duty 3.5MW)	I (diesel) (note 3)	3.4 (note 4)	12450.5 (note 5)	38.1	5.9	15.9
Compressor (4+1) (Gas turbine exhaust, duty 32MW)	C (fuel gas) (note 2)	8025.7 (note 4)	283921333	167201.2	13833.4	11146.7
Compressor (4+1) (dry seals leakage)	C (note 7)	49804 to 298826 (CH <sub>4</sub> )	-	-	-	-
Vent Stacks (Emergency and Maintenance Depressurization)	I (note 6)	12217 (CH <sub>4</sub> )	-	-	-	-
Gas analyzers (Bleed)	C	774 (CH <sub>4</sub> )	-	-	-	-
<b>Total</b>		<b>321487.2</b>	<b>239480566</b>	<b>201989</b>	<b>16800</b>	<b>13479.2</b>
I	Intermittent					
C	Continuous					
Note 1	Operating time 26 hours/year					
Note 2	Operating 350 days per year					
Note 3	6 starts per year with 1 hour running per start					
Note 4	Unburned hydrocarbons assumed as CH <sub>4</sub>					
Note 5	2682,7 gram CO <sub>2</sub> per litre diesel combusted (99% combustion)					
Note 6	Depressurization one compressor train (above ground)					
Note 7	Dry seals leakage of the compressor is given as a range depending on the seal wear/age					

**Picture 5.8 Air emission sources.**



### 5.9.5.2 Water

As previously described, potable water is used in the buildings for normal domestic use and to feed the utility water system. Based on a manning of 6 persons and a consumption of 30 litres per day per person the total consumption will be 0.18 m<sup>3</sup>/d. Utility water is only used at utility stations. The consumption is estimated to be 0.1 m<sup>3</sup>/d.

### 5.9.5.3 Noise

At this design stage the required level of detail for acoustic design has not been achieved. Therefore, assumptions are made which need to be confirmed and verified in the detailed design stage.

The noise requirements defined for the project are as follows:

1. The noise (pressure) level of each piece of equipment shall not exceed 80 dB(A) at a distance of 1 m.

2. The limit of the total noise pressure level at the fence line is 50 dB(A).  
This is the lowest statutory limit.

Both requirements must be met.

At this design stage the required level of detail for acoustic design has not been achieved. Therefore, assumptions are made which need to be confirmed and verified in the detailed design stage.

There are planned 4 compression trains and a fifth “future” train. Acoustic relevant noise sources in each train are:

- Turbine/compressor buildings (especially the ventilation)
- Above ground pipelines on the site
- Gas coolers (21-15-E-#20) and oil coolers (21-15-E-#30)

There are other noise sources that support the processes in the trains:

- Backup diesel generator (21-84-G-020) and emergency generator (21-84-G-010)
- Air compressor package and Nitrogen generator set
- Truck traffic on the site

The time these sound sources are in operation (“representative operational time”, ROT) is assumed to be 100% in day, evening and night periods. Exception is the truck traffic which is assumed to be 4 trucks in the day-period.

The vent stacks are a potential sound source. However the vent stacks are only used for depressurization of the gas containing equipment on the metering station. Equipment is only depressurized for maintenance or in case of emergency situation. These events are very exceptional and are not included in the ROT.

#### **5.9.5.3.1 Turbine/compressor buildings**

Due to the noise requirement of 80 dB(A) at 1 m the turbine/compressor equipment has to be fully enclosed by a noise enclosure. The noise inside the entire building is expected in this case not exceed 80 dB(A). The building will at least consist of double-walled corrugated steel (or brick/concrete). Acoustic damping of ventilations and doors/windows should be similar to the damping of the facade. Proper draft

proofing is needed. The sound power level of the (acoustic most important) long wall of such a building is at most 60 dB(A) and thus acoustic irrelevant. To represent the noise of the mechanical ventilation, a source with a sound power level of  $L_{wr} = 77$  dB(A) is forecasted for each building (sound power level measured in a similar situation). A silencer on the engine exhaust outlet is required. The maximum sound power level of the exhaust should not exceed  $L_{wr} = 75$  dB(A), corresponding with a sound pressure level  $L_p = 60$  dB(A) at 2 m. (equals max.  $L_p = 30$  dB(A) at the fence at app. 70 m.)

#### **5.9.5.3.2 Pipelines (above ground)**

Noise produced in the compressor and beamed into the pipes (outside the compressor building) is determined by many factors:

- Electrical power
- RPM
- Impeller diameter
- Distance between the runner and guide vanes (turbulence)
- Turbulence in the suction and discharge

That pipeline noise is very difficult to estimate. Measures to reduce are within the scope of designers and manufacturers and cannot be retrofitted. However, if the noise of the piping seems to be a problem, it is conceivable applying an acoustic sheathing at the pipes. It is also to consider applying silencers to the inlet and discharge of the compressors.

Assumptions in this study:

- length above ground pipelines (diameter 16" (0.4 m)) is 80 m. for each train;
- no silencers in inlet and discharge;
- noise from the compressors beamed into the pipes leads to a averaged sound pressure level  $L_p = 67$  dB(A) at 1 m. distance of the pipe;
- no other noise generating restrictions/objects in the gas flow.

With these assumptions it is calculated that the sound power level of the above ground pipelines is  $L_{wr} = 86$  dB(A) for each 80 m.

#### 5.9.5.3.3 Gas- and oil coolers

Based on own measurement data base (low noise coolers), in this study the sound power level for a gas cooler is assumed to be  $L_{wr} = 87$  dB(A) and  $L_{wr} = 83$  dB(A) for an oil cooler.

#### 5.9.5.3.4 Backup and Emergency generator

These generators are placed next to the north fence. This causes that the overall sound power level may not be more than  $L_{wr} = 82$  dB(A) each. This means that the generators must be placed in a closed building, including insulation of the air supply. Also a silencer on the engine exhaust outlet is needed.

#### 5.9.5.3.5 Instrument air compressor packages/ Nitrogen generator set

This equipment is placed in the middle of the site. That means that the noise emission is not critical. In this study a (low noise) sound power level  $L_{wr} = 82$  dB(A) is assumed. This can be achieved by placing the two devices in a closed and acoustic isolated building.

The above mentioned noise sources are tabulated as follows:

**Table 5.34 Noise sources.**

Description	Sound Power Level (dBA)	Percentage operational time		
		Day	Evening	Night
Pipes above surface	86	100	100	100
Gas coolers	87	100	100	100
Oil coolers	83	100	100	100
Vents	78	100	100	100
Backup diesel generator	82	100	100	100
Emergency diesel generator	82	100	100	100
Air compressor and N2 generation	82	100	100	100

### **5.9.6 Protection Zone of the Natural Gas Pipeline (for usage concession of Shore, Beach and Sea Bottom)**

According to the provisions of article 166 of Law 4001/2011 (H.G.G. 179/A/22.08.2011) within a Zone of five (5) meters on both sides of the pipeline and within a Zone of 0.5m on both sides of the cathodic protection cable, and within an area of 60m<sup>2</sup> of the cathodic protection cable end, underground installations are restricted as well as any placement parallel, perpendicular and diagonally, of any pipeline that requires excavation of more than 0.50m, trench's or drain's opening, new rural road construction, planting of trees with roots going deeper than 0.60m, as well as the alteration of the soil morphology in any way is forbidden.

For the construction of the Offshore Natural Gas Pipeline in the trench from the shoreline up to the 25m deep contour, approximately 500m long, Concession of Shore, Beach and Sea Bottom for a 25m buffer zone is required. Moreover, for the operation phase, a protection buffer zone along the pipeline is required. This is required in order to protect the Natural Gas Pipeline from the construction of other utilities' networks close to it. In order to do that it is necessary "I.G.I. POSEIDON" to have obtained concession by the Ministry of Finance for the use the Shore, Beach and Sea Bottom along the onshore and offshore route part. It is noted that the shoreline and the beach have been determined with the HGG D 359/2003.

According to ar.165 of L.4001/2011 limitation for navigation are determined by a JMD (Ministries of Environment, Energy and Climate Change, Foreign Affairs, Finance, Development and Competitiveness, and Navigation and Civil Protection). These limitations may, mainly, include the restriction of anchoring around an adequate distance from the pipeline, e.g. 1000m.

### **5.10 Best Available Techniques and Mitigation Measures**

The overall design philosophy regarding emission prevention is to reduce the emissions to air, water and soil to zero or as low as reasonably achievable. The design has the following provisions to prevent emissions to air, water and soil.

#### Emission to air

The main process equipment has limited continuous emissions of natural gas or other process fluids. The main emission of natural gas is the leakage from the dry

gas seals of the compressors. The application of dry gas seals is the best available technology to minimize the compressor seal leakages. The leakage from dry gas seals is further minimized by adequate monitoring and maintenance programs of the compressors. The leakage rate is dependent on the amount of wear of the dry seals. In case the leakage rate is too high and is detected by the continuous measurement of the seal gas flow and pressure, the compressor is stopped automatically.

The expected leakage rate of a dry seal is around 0.7-4.2 kg/hr. It is assumed that each compressor has two dry seals. The leakage is given as a range because it depends on the amount of wear (and thus the age) of the seals. New seals will leak at rates near the lower range limit. Assuming timely replacement of the seals, the actual annual emission of CH<sub>4</sub> in the seal gas is limited to the minimum possible.

In addition small emissions of natural gas come from the gas analyzers required for the fiscal metering.

The compressors are driven by gas turbines running on natural gas as fuel gas. The exhaust of the gas turbines will represent the main emissions to air.

The vent stacks are used for emergency or maintenance depressurization. The vent system and stacks are purged with nitrogen.

Maintenance on the process equipment may require depressurization and should in these cases be carefully planned to minimize the need for depressurization. Design of instrumentation and equipment should be such that requirement of depressurization for maintenance is avoided as much as possible by either provisions allowing maintenance without depressurization or selection of reliable equipment and instrumentation required minimum of maintenance.

Electrical power is supplied from one external power supply cable. As a back-up a gas turbine driven generator is running on 50% load, to prevent the compressor station shutting down when the power supply by cable fails. The emissions from the exhaust of the gas turbine can only be avoided by providing a second independent external electrical power supply cable or allowing a reduced availability of the compressor station. Both options are not considered practicable considering the remote location of the compressor station and the contractual requirements on availability. The emergency generator will only run during emergencies and for testing purposes. The emissions from the diesel generator will comply with the European Emission limits.

### Emission to water

Areas with the potential of spills of chemical substances, such as diesel and condensate, are provided with a dedicated drain collection system in which collected liquids are routed via a water-oil separator before being discharged to the surface water. These areas are the rooms and areas with equipment containing chemical substances and truck (un-)loading areas.

Collected rain water is discharged to the surface water via a sand catcher. Sanitary waste water is discharged to the surface water via a septic tank. The outlet of the water-oil separator and outlet of the septic tank are combined with the discharge of the collected rain water.

### Emission to soil

Emissions to soil are caused by either leaks from underground equipment and piping or spills/leaks from above ground equipment containing chemical substances and truck (un-)loading areas.

Underground storage tanks of diesel and condensate are double walled and provided with leak detection. Both tanks and underground piping should be inspected regularly

Above ground equipment containing chemical substances and truck (un-)loading areas are placed on watertight paved areas to collect possible leaks or spills.

## **5.11 Project Budget**

Project's budget is tabulated below.

**Table 5.35 Project's Budget.**

Description	Amount (€)	%	Comments
Engineering Studies 1) Feasibility Study 2) FEED 3) Other studies	10,000,000		
Supporting studies 1) RMS 2) DMS 3) Environmental Studies	13,000,000		Most of it refers to the DMS
Land use acquisition and right of way easement	5.500,000		
Procurement cost	330.000.000		
Construction and Supervision cost	370,000,000		
Reinstatement cost			Included in Construction and Supervision cost
Safety measures cost			Included in Construction and Supervision cost
Other costs and miscellaneous	160.000.000		
<b>Total</b>	<b>890,000,000</b>		
*Note: Reinstatement cost and the cost of the mitigation measures are included in the Construction and Supervision cost. Specifically, some activities (reforestation, pilot program for Posidonia replantation, etc) can be executed either by the EPC Contractor or through other contractors that will be selected by the Project Owner.			

## 5.12 Project Scheduling

Projects schedule has been compiled for the whole project, i.e. for both Greek and Italian section. The following analysis is indicative and based on currently available best estimations. This should not be deemed as mandatory or binding. Indicative Project's major milestones are:

1. Delivery of Final Input Package for the Offshore and Onshore EPCIs: within 2012
2. Final Investment Decision –Summer 2013
3. Works commencement: first semester of 2014
4. System ready for commissioning: second semester of 2017
5. Commercial operation: 2018

Based on the available data, the Critical Path comprises of a) delivery of ITT package for offshore EPCI contract, b) completion of tendering activities for offshore EPIC

contract, c) lead time for deep water pipelay vessel mobilization, d) pipelay activities, e) seabed intervention activities and f) precommissioning of pipeline system

It is proposed that from June – August no construction activities will take place at the landfall area and nearshore (that is for the buried section of the pipeline at a sea depth of up to 25 m) in order to minimize impacts on local tourism.

The construction of the project is estimated to last approximately 20 months for the near shore section, approximately 6 months for the landfall site and approximately 11 months for the onshore pipeline.

### **5.13 Decommission of the Project**

The Project is designed for a lifetime of 30 years. Project's components may over the years be modified and upgraded and various measures may be taken to increase the life expectancy of the project. However, at some time in the future the maintenance of the project will become economically unfavourable and the technology obsolete; consequently the project shall be demobilised.

The plant and equipment will be dismantled or cut in manageable sections, wiring and electronic boxes are removed and handled in accordance with national legislation. Steel sections will be carted away for reuse or reprocessing. Building structures, including pits and culverts, and paved surfaces on the site are demolished and the used building materials are transported to an approved waste disposal site if they cannot be recycled.

Finally, the area is reinstated by contouring the site to its original slope and undulation, and any scrubs and vegetation are planted. The reinstatement will be planned and drafted in co-operation with the relevant authorities, whose approval shall be in hand prior to commencement of any fieldwork. A few years thereafter, the site should appear to be mingling in with the general landscape, and any traces from Project's operations would not be detectable.

Most probably the major components of the project will face the following fate:

- The pipeline will be stay in place.
- The Onshore Facilities will be removed.

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## 6 IMPACT ASSESSMENT and MITIGATION MEASURES

### 6.1 Methodology

The methodology used for assessing project's impacts discerns impacts during the following phases of the project:

- Construction Phase
- Operation Phase

For the parameters composing the baseline of the environment and were investigated in chapter 4, the impacts are assessed and presented, mitigation measures are suggested and the overall residual impact is assessed. The assessment concerns a significant number of various types of impact, including:

- Positive impacts: impacts that improve some parameters of the natural and social environment, as presented in baseline description
- Significant impacts: impacts that significantly affect habitats or populations or other element of the environment
- Permanent impacts: impacts that arise from an irreversible modification in the basic elements of the environment (e.g. area's hydrology)
- Temporary impacts: impacts that last during a certain time span, such as construction sites.
- Direct impacts: impacts that are directly related to the Project's construction and operation
- Indirect impacts: impacts that or nor caused by the normal operation of the project but are related to it (e.g. increase of traffic in the area)
- Cumulative and Combined impacts: impacts that are caused due to the correlation of the investigated project with other projects and activities or through the combination of the different projects.

Impacts are assessed by comparing the baseline conditions and the future conditions, during project's construction, and after its implementation. Four key stages in the assessment are followed:

1. Identifying the baseline conditions
2. Predicting the magnitude of impact on these receptors and resources, including the sensitivity of the receptor, duration, extent and likelihood of a change.
3. Proposal of impacts mitigation measures
4. Evaluating the significance of impacts so that decision-makers weigh the pros and cons

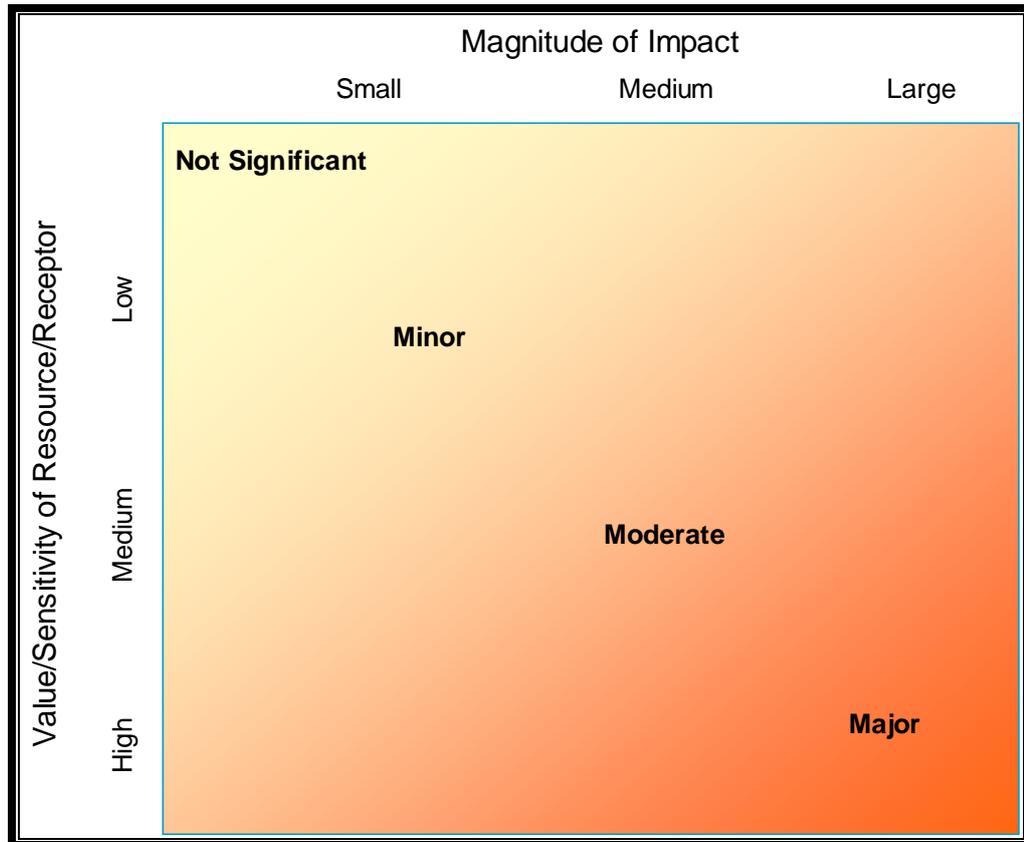
Regarding the overall assessment and evaluation of each impact, and after the implementation of the proposed mitigation measures, the following residual impacts classes are distinguished:

- Not significant (Zero/ None), in case the area affected (magnitude of impact) is small and the sensitivity of the receptors is also low
- Minor, in case the area affected is limited and the sensitivity of the receptor is low-medium,
- Moderate, in case the area affected and the sensitivity of the receptor are of local and approved importance, and
- Major, in case the area and the sensitivity of the receptor are of regional and approved big importance.

The importance of receptors depends on their number of people directly affected by the impact and their vulnerability, whilst the importance of the environmental resources - on their spatial distribution (local, national or international) and their magnitude. For example, noise during construction is of small duration and noise sources will be, mainly, in significant distance from vulnerable receptors; on top of that, all statutory limits shall be met; consequently, noise impact would be **Not Significant**.

It should be noted that in some cases, the magnitude of the impact and the sensitivity of the receptor is qualitative, whilst in other there are numeric data presenting quantitative assessment. In both cases, the evaluation and assessment is influenced by and based on the ESIA's team professional judgment.

**Figure 6.1 Impacts Matrix.**



Besides the assessed negative impacts, the project can also have positive impacts. These **Positive** impacts have similar classification. Nevertheless, further assessment for the positive impacts is deemed secondary or insignificant, because based on Liebeg's law of the Minimum, the important factor is the restrictive or negative one.

## 6.2 Construction Phase

### 6.2.1 Atmosphere

#### 6.2.1.1 Impacts Assessment on Atmosphere

During the construction phase, atmospheric impacts that are expected, along the pipeline's route and the onshore facilities, derive from the following reasons:

- Excavation and materials' transportation from the pipeline's and the onshore facilities; construction.

- Work by a number of vehicles (i.e. machinery for excavation, construction, transportation tracks, auxiliary vehicles, etc.).

The biggest part of atmospheric pollutants will come from the latter cause. The most important air pollutant that will emerge, during the construction phase, is dust. Dust will be caused by the following mechanisms:

- Scrapping and grinding of the surface of the materials at the construction site. The amount of dust produced is relevant to the vehicles' speed.
- Soil material fracturing.
- Scattering of light material from vehicles, during the transportation of the earthwork materials.
- Scattering of significant part of light soil material, due to the wind conditions, during the construction phase.

Air pollutants (NO<sub>x</sub>, CO, SO<sub>2</sub>, etc) will be emitted by the machineries' combustion engines and mostly vehicles.

The duration of the onshore construction phase for the pipeline is estimated at ~44weeks. This is not deemed significant time period, even so in relation to the scale of the project. The construction of the near shore section is estimated at 23weeks, consequently this is also deemed temporary.

During the construction phase of the offshore section, air pollutants will derive from boats and ships used in the pipeline laying. Assuming that they will meet all standards for marine traffic (IMO, EN, national, etc), their emissions are also deemed small. Taking into account that they will be in a great distance from any sensitive receptor and that they will be diffused along the offshore route their significance is decreased even more.

The duration of the offshore construction activities, for the Greek section, are estimated at ~3months. It is expected, that all vehicles, machineries and vessels will comply with national, European and IMO legislation and decisions concerning their emissions. Consequently, they will range at acceptable, low levels and their impact is expected to be insignificant, short-term, temporary and reversible.

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### 6.2.1.2 Mitigation Measures on Atmosphere

From what was described in the previous section, it is evident that, during construction, air pollution will be limited.

Mitigation measures that are suggested, in order to decrease the limited impacts, include:

- Avoidance of accumulating large volume of excavation material near residential areas
- Soaking of the accumulated excavation materials to prevent dispersal in case of strong winds
- Covering up of excavation and aggregate material during transport, using special covers
- Check of vehicles and machinery exhausts. In case of malfunction, the proper adjustments should be made.
- All vehicles' and machinery's exhausts must have the relevant certificate of exhausts' emissions compliance (*card of emissions control*)
- No machinery will be left running idly.
- Appointment by the EPC Contractor of a competent engineer as environmental inspector, for ensuring the implementation of the mitigation measures.

In any case, atmospheric impacts are temporary and easily reversible.

In general, regarding fumes' emissions, compliance with the existing legislation is required. Basic legal provisions are:

- M.D. 28432/2447/92 (H.G.G. 536/B/25.8.92), Mitigation measures for fumes' and suspended particles' emissions from diesel engines.
- M.D. 13736/85 (H.G.G. 304/B/20.5.85), Mitigation measures for fumes' emissions from diesel engines used in powering vehicles.
- M.C.A. 25/18.3.88 (H.G.G. 52/A/22.3.88), limits and guidelines for atmospheric qualities, regarding NO<sub>2</sub> and amendments of the articles 98 and 99/10.7.87 M.C.A..

- M.C.A. 99/10.7.87 (H.G.G. 135/A/28.7.87), limits and guidelines for atmospheric quality, regarding SO<sub>2</sub> and Suspended Particles

In order to minimize dust dispersion, the following will be applied:

- Vehicles' speed check. Vehicles' speed in dirt roads must be limited to 30km/h
- Check of vehicles' exhausts that they do not point to the road.
- Minimization of drop height during excavation works.
- Frequent soaking of roads, during dry season and any other surface that are vulnerable to wind erosion
- Immediate planting of empty surfaces, conditionally that planting is allowed. It is expected that no surface will remain empty for more than 6 months.

The measures suggested for mitigating impacts on air quality are applicable also for mitigating impacts on the acoustic environment, and vice versa.

The marine vessels must apply to all international standards of IMO and UN regarding air emissions and maintenance.

### **6.2.1.3 Residual Impacts on Atmosphere**

After the implementation of the above described measures, no residual impact is assessed to the air quality.

## **6.2.2 Wastes**

### **6.2.2.1 Liquid Wastes**

#### **6.2.2.1.1 Impacts Assessment**

Wastewaters will mainly originate through the following features of the construction phase:

#### **Hydrotesting water**

The main liquid waste generated during the construction of the pipeline is the hydrotesting water. The mechanisms of these impacts are:

## 1. Water abstraction

Abstraction from a water source using pumps, causing increase in the turbidity due to the suspending and dispersion of the bottom sediments and any pollutants they might contain in the area of the pump. Based on the design data, the hydrotesting water required for the offshore (deep water and near coast) and the Greek onshore pipelines is 85.000m<sup>3</sup> and 3.500m<sup>3</sup>, respectively.

Since sea water will be used and discharged back to the sea, no impacts on surface water bodies is expected. The sensitivity of the sea as regards water resource is low, since the in subject open sea (not bay) has many times higher renewal capacity and high hydrodynamism. The sea area of the hydraulic test has the potential to provide much more than the required water quantities for hydrotesting.

The likelihood of the impact from sea water abstraction is low, providing compliance with all technical and technological requirements. The potential impact is local, direct, adverse as well as temporary and reversible.

The location of the sea water abstraction should not be near the bottom of the sea, in order to avoid sediments suspension.

Any required permit will be received by the EPC Contractor.

## 2. Discharge of potentially polluted hydrotest water

The most likely option is the use of sea water for less than 20 days. In this case no water treatment is necessary prior to its discharge to the sea. However, as a precaution, best industry practice stipulates the filtering of the water prior of its discharge to the environment. The water will be guided to a break tank, where it will be filtered, checked and after that will be disposed to the recipient according to the applicable legislative limits. The objective of the water treatment is the removal of suspended solids. Consequently, no impacts are assessed.

In case that the sea water remains in the pipeline for more than 20 days, it is suggested to add chemicals included in the PLONOR (Pose Little Or No Risk) list that was developed by OSPAR committee (known as Oslo – Paris committee) for the protection of the marine environment. Specifically, the addition of Ammonium Bisulphite or Sodium Bisulphite is suggested. These two chemical compounds are included in the PLONOR list and can be discharged into the sea without any prior treatment, as implemented in the construction of other similar projects, including

other projects in the Mediterranean Sea. Consequently, the water of the hydrotest after the pipeline cleaning will include chemical compounds from the PLONOR list, such as Ammonium Bisulphite or Sodium Bisulphite with an indicative dosage of 250ml/m<sup>3</sup> of seawater (Sodium Bisulphite – NAHSO<sub>3</sub>).

It is noted that the PLONOR list of substances, as defined by the OSPAR Commission, is a very restricted list of substances that are considered to Pose Little Or No Risk to the environment. The 1992 OSPAR Convention is the current instrument guiding international cooperation on the protection of the marine environment of the Northeast Atlantic (corresponding to the Barcelona Convention for the Mediterranean and the HELCOM for Baltic). It combined and up-dated the 1972 Oslo Convention on dumping waste at sea and the 1974 Paris Convention on land-based sources of marine pollution. EU member states and Norwegian authorities use the OSPAR guidelines as one of their tools to regulate offshore activity. The guidelines grade all chemicals based on the risk each poses to the marine environment. PLONOR chemicals are suggested to be used without any testing or limitation, in contrast to all other chemicals that must be tested and assessed under OSPAR pre-screening protocols.

To address potential impacts from suspended solids that may be included in the hydrotesting water, the water will be filtered with proper means, prior of its discharge to the sea.

According to what was previously discussed, the likelihood of environmental impacts is low. However, due to the characteristics of the sea bottom ecosystem in the area of the hydrotesting, the impacts are assessed as significant, even though they occur for a small period. In this case and based on the study of HCMR, the impacts are characterized local, negative but temporary and reversible.

### **Lubricants used for the machineries and equipment**

In spite the fact that the onshore section is relatively small, lubricants originating from onshore machinery, if discharged to the natural environment, could cause significant impacts due to their toxicity. The sensitivity of the receptors is not relevant since even abiotic characteristics of the environment could be affected, primarily, and transmit the impact to biotic features. For example, if lubricants percolate to water resources, they would be polluted and consequently, any consumer of the polluted water would be secondarily affected.

For the machineries used during the Onshore Facilities construction an amount of 10m<sup>3</sup> is estimated. The same applies for the construction of the pipeline. Consequently a total of 20m<sup>3</sup> of lubricants are estimated.

This is not a significant figure but the potential pollution caused by some mistake is significant itself. For this reason, all the legislative provisions of managing such substances should be used.

#### **Domestic wastes (wastes generated by the construction personnel-workers)**

The amount of domestic wastes is calculated based on the amount of persons and using 30lt of waste per person per day as unit amount. For the construction of the onshore pipeline, it is estimated that max. 30 people will be on site for a period of approximately 44 weeks. Consequently, 277.2m<sup>3</sup> are estimated as maximum domestic wastes from the onshore pipeline construction personnel. For the station, it is estimated that an average of 200 persons over a period of 20 months will be on site. Consequently, 3600m<sup>3</sup> of domestic wastes are estimated from the Onshore Facilities construction personnel.

It should be noted that the 30lt of domestic wastes per person per day is an average figure.

Greywaters from the offshore workers will be managed on board through all applicable standards of maritime operations. This is also applicable for the people working on the nearshore construction (shore crossing) which will be based on sea vessels.

#### **6.2.2.1.2 Mitigation Measures Hydrotesting water**

The previous section, regarding the impacts assessment, has two approaches. The most likely option is the use of sea water without any chemicals addition. In this case the sea water abstraction does not cause any impact to the marine environment. The sensitivity of the marine receptor, as a water resource, is deemed low. It is a marine area with multiple capacity of water provision than the one required for the hydrotesting. Since the sea water that is required for the offshore section of the pipeline will be abstracted from the other side of the pipeline (from Otranto, Italy), approximately only 3400m<sup>3</sup> of sea water will be abstracted from the Greek coast for the hydrotesting of the onshore Greek section.

The significance of the impact of the sea water abstraction is characterized as low, taking all technological requirements of the abstraction. The sea water abstraction will not take place close to the sea bottom to avoid sediments suspension. Any necessary permit will be obtained by the EPC Contractor.

Every possible effort should be made in order to complete the hydrotesting of the offshore section within 20 days so as to avoid addition of chemicals. In the unlikely event that more than 20 days are required for the hydrotest, the use of chemical substances that are included in the PLONOR list is suggested in order to minimize impacts to the environment. Specifically, it is suggested to use Ammonium Bisulphite or Sodium Bisulphite. Since both substances are referred to the PLONOR list, no special treatment of the hydrotesting water is required prior to its discharge to the environment. The same approach was used in other, similar project in the Mediterranean and Northern Sea.

However, it is possible to improve the quality of hydrotest water that has been treated with Ammonium/Sodium Bisulphite, before discharging. For instance the following common techniques can be implemented:

- Aeration. This process increases the oxygen saturation of the water, thereby compensating for the oxygen scavenger effect. The use of spray bars during discharging is a form of aeration that is easy to implement and can re-oxygenate the discharged water. The surface area of the sea will further assist this process;
- Dilution and/or diffusion. By mixing the hydrotest water with seawater and discharge it in a diffusive manner, the difference in qualities will be further limited.

The discharge must be performed in a controlled manner according to local environmental conditions. An assessment of the likely dispersion rate and extent should be evaluated as part of the pre-commissioning design activities during the EPIC stage of the project.

The above mentioned discharge methodology, as proposed by the FEED engineer and HCMR, minimize the risk of impacts. This discharging method is illustrated on the following figure. The multitude of discharging points increases the diffusion rate. In addition the spray bars will increase oxygen concentration through aeration.

The hydrotesting water will be discharged through a plastic hose in the area located by HCMR not close to the bottom, so as to eliminate suspension of sea bottom sediments due to hydrotesting disposal. In addition, this point will be further than the *Posidonia oceanica* meadows present at the near shore section.

Prior to discharging the hydrotest fluids, samples will be collected and analyzed on-site to ensure compliance with permits and other regulations before being discharged to the open sea.

The discharge point will be selected based on:

- Results of dispersion analysis;
- Application of diffuser;
- Assurance of efficient dispersion into environment.

As supported by the study of HCMR (see Annex), such a location is situated at a depth between 13m and 17m, where a clear from *Posidonia* meadows passage exists, at a distance between 370m and 450m.

In conclusion, there are two possibilities:

- In case that during hydrotest only sea water (without chemical additives) is used, then the best technique is the water discharge close to the coastline, in on the sea bottom.
- In case chemical additives are used, the best technique is the use of a secondary pipeline that will pass through natural clearances of the *Posidonia* meadows. The findings of the marine survey illustrated that the only natural passage through the *Posidonia* meadows is the one described in section 2 of the HCMR study, i.e. in the area between the depths of 13m and 20m.

Supplementary, the water of the hydrotest will be filtered to retain any solid.

### **Lubricants used for the machineries and equipment**

To prevent pollution caused by fuels and lubricants the following measures are proposed:

- Dispersal to the sea or ground of used oils is forbidden. Used oils should be collected in barrels and treated properly according to J.M.D. 71650/3035 (H.G.G. 655B/85).
- In areas where machinery is washed, oils are changed and refuelling takes place the Contractor will provide special sites equipped with collection and sedimentation systems and inclined platforms.
- Supervision of the aforementioned measures by the competent authority, and also keeping the equipment in good condition.

In case of any water disposal (pumped out of the trench) is required, this shall take place to the river network or to the adjacent properties; conditionally the owners' consent has been obtained and the statutory terms regarding water disposal per receiver and user are met.

### **Domestic wastes**

The wastewaters produced during construction phase coming from the personnel on board the offshore vessels and the onshore construction crew comprise simple domestic wastes, treated as such. Chemical toilets for the construction personnel are deemed adequate to address the issue. The toilets will be emptied, as required, to a specific location appointed by the Regional Health Department. After the construction phase is completed, the toilets could be donated to the local administration of the area.

As previously stated, the offshore workers will use the marine vessels septic system, thus no impact is assessed to marine environment.

#### **6.2.2.1.3 Residual Impacts**

After the implementation of the above described measures, and only due to hydrotesting, the residual impacts are deemed minor, if not insignificant.

### **6.2.2.2 Solid wastes**

#### **6.2.2.2.1 Impacts Assessment**

Solid wastes will derive from the excavation works and from the wastes of the construction activities, mainly packaging material. Solid waste may include:

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### **Packaging material**

This depends to a large extent on the specific supply method of the suppliers, but it is roughly estimated that it will be 1.5 % of the equipment weight i.e. 30 tonne

### **Earthworks and volumes of surplus soil or debris material**

Theoretically, the Greek onshore pipeline volume is approximately 4000m<sup>3</sup> which will be the amount of surplus soil. However, most of it will be used for backfilling purposes. Any remaining excavated material will be spread out locally, after receiving the approval of the landowner; otherwise it will be disposed to proper areas as indicated by the local authorities. These will be used for disposal of any boulders that are not allowed to be used as backfilling material or not used in the creation of the artificial reef, described in the relevant section

For the Onshore Facilities there will be no surplus soil, since all the excavated material will be used for backfilling. Consequently, the balance of excavation and backfill will be nil.

As described in section 5, the excavation of the offshore section is limited to the coastal section, for approximately 500m and up to the depth of 25m. Although the exact method will be determined by the EPC Contractor, in next phases of the project, it is assessed that the maximum excavated materials quantity will be 83469m<sup>3</sup> (minimum 15969m<sup>3</sup>). This material will be placed on the side of the offshore trench, till they are reused for the backfilling of the pipeline trench. It is noted that the creation of the artificial reef described in the relevant section will require almost the entire if not all of the excavated material; consequently no need for further management of this material is required. However, this needs to be confirmed in the project's next phase and upon selection of the precise near shore section construction method by the EPC Contractor and the method of creating the artificial reef.

### **Welding works residuals**

For the onshore pipeline, there will be approximately 650 welds in 8km of the onshore pipeline, which equates to approximately 7600kg of weld material. Assuming 10% wastage gives 760kg of waste weld material. It is assumed that the compressor and metering station construction shall produce a similar amount resulting in a total weld waste of 1520kg.

#### **6.2.2.2.2 Mitigation Measures**

Although no excavation material surplus is assessed, in case there is some that will not be used for onshore backfilling, it will be:

- Dispersed to the nearby areas, after the approval of the land owner, or
- Used for filling borrow pits, indicated by the competent Region. The filling of borrow pits could be seemed as a Positive impact since it will help the reinstatement of these pits.
- Under no circumstance should products coming from the trench excavation be thrown to the adjacent water courses.

The EPC Contractor will carry off all waste material (packaging and welding residuals) from the construction site and dispose them according to the legislative framework, as amended at the time of construction, through licensed contractors. The areas of disposal will be either appointed by the competent authorities or agreed upon with them. It is obvious that the deposition of solid wastes that could produce toxic or non-toxic pollutants (empty fuel containers, solvents, various liquids, tyres, etc.), is under no circumstance allowed to take place beside domestic type wastes.

The EPC Contractor will have as first priority the reuse or recycling of the wastes.

The EPC Contractor must provide the construction site with litter bins, which will be emptied, regularly, with the domestic type wastes of the near-by residential areas to appointed landfills that are legally operating.

#### **6.2.2.2.3 Residual Impacts**

After the implementation of the above described measures, no residual impact is assessed due to solid wastes to the environment. Some positive impacts could be assessed in case any excavation material which is not used for backfilling is disposed, according to the local authorities, in order to reinstate borrow pits.

### **6.2.3 Noise**

#### **6.2.3.1 Impacts Assessment**

The reasons for noise pollution are:

- Traffic of heavy vehicles, i.e. earthworks tracks and construction materials tracks (cement, steel, raw materials etc.).
- Earthworks by heavy vehicles that will be working along the route (bulldozers, excavators, loaders, compressors, etc.)

The duration of the expected noise, close to residential areas, will be from 08:00 till 17:00, during winter, and till 18:00 during summer.

According to the current legislation, maximum noise limits are calculated based on the engaged land uses, as predicted in P.D.1 180/81 (H.G.G.293/A/6.10.81)

The legislative framework regulating noise emissions relevant to construction sites comprise the following:

- 9272/471/07, GG 286/B/2.03.07 “Modifying art. 8 of JMD 37393/2028/2003, in compliance with the provisions of Directive 2005/88/EC for the modification of Directive 2000/14/EC for the approach of the legislation of member states in relation to noise emissions to the environment from equipment used outdoors”, of the Council of 14th December 2005
- 37393/2028/03, GG 1418/B/1.10.03 “Measures for noise emissions in the environment by outdoor facilities and installations”.
- 56206/1613, GG 570/B/9.9.86 “On defining noise emissions of machinery and construction camp equipment, in compliance with Directives 79/113/EEC, 81/1051/EEC and 85/405/EEC”.
- 69001/1921, GG 751/B/18.10.88 “On EEC-type approval of noise emission limits for machinery and construction camp equipment”, as modified by MD 10399 Φ 5.3/361/91, GG 359/B/28.05.91 “Definition of noise emission limit for cranes, amending MD 69001/1921/88”.
- A5/2375, GG 689/B/18 “On the use of silenced air-hammers (hygienic regulation for the protection of public health and the health of air-hammer operators)”.

In addition, international best practice for similar activities is that noise levels should not exceed 75 dB at the nearest receptor for daytime construction activities. Noise in excess of this level would constitute a significant impact, with severity increasing as levels increase above 75 dB.

It should be noted that due to lack of available data and verified bibliographical resources, noise in worksites cannot be accurately measured. The following table provides the levels suggested by the manufacturing companies of some of the industry's suppliers.

Nevertheless, due to the geometry of the Project, the estimated impacts of the noise shall affect areas parallel and near the working strip. Impacts will reduce as the distance from the route is increased. A rule of thumb for such a decrease is 6dB for doubling the distance. Assuming that noise measurements are taken in 1m from the source it can be estimated that noise emitted at 100dB(A) is perceived as 70dB(A) at a distance of 32 m from the source. Taking into account that the closest residential area is over 3km from the pipeline or the facilities and that the onshore construction activities of the pipeline will be completed within few months, it can be concluded that the impacts from noise during construction will be of minor significance. The offshore pipeline section should not have any impact to social receptors.

For the onshore facilities, for which the overall construction time is 20months, the closest residential area (Karteri) is at a distance >3.5km. The hilly area will minimize any acoustic impact, although the construction period increases the significance of the impact.

Regarding impacts from construction noise to fauna see section 6.2.8.

**Table 6.1 Construction noise levels.**

Construction Phase	Equipment	Noise Level
Preparation of the working corridor	Excavator	70-84 dBA
	Shredder	70-84 dBA
Topsoil stripping	Excavator (Cat320)	84-99 dBA
	Dozer (Cat D8)	84-99 dBA
Pipe stringing along the corridor	Special Trucks vacuum lift	70 – 94 dBA
	Crane 40 t	70 dBA
Bending	Bending Machine	70 – 84 dBA
	Pipe-layer (Side-boom 583)	84-99 dBA
Pipe welding	Pay-welder (Cat D6)	84-99 dBA
	Pipe-layer (Side-boom 583)	84-99 dBA
	Pay-welder (Cat D6)	84-99 dBA
	Pipe-layer (Side-boom 583)	84-99 dBA
NDT	4-wheel-Truck + welding machine	70-84 dBA
Trenching	Excavator Cat 365	84-99 dBA
Pipelaying	Pipe-layer (Side-boom) 587	84-99 dBA
	Pay-welder (Cat D6)	84-99 dBA

Construction Phase	Equipment	Noise Level
Backfill and reinstatement	Padding machine	84-99 dBA
	Loaders (Cat)	84-99 dBA
	Excavators (Cat 320)	84-99 dBA
	Dozers (Cat D8)	84-99 dBA
	Excavator (Cat320)	84-99 dBA
	Dozer (Cat D8)	84-99 dBA
	Grader	70-84 dBA
Road crossings	Thrust Boring machine	84 dBA
	Excavator (Cat 320)	84-99 dBA
	Pay – welder (Cat D6)	84-99 dBA
	Rope - Excavator	84 dBA
	Winch 30 t	84 dBA
	Pipe-layer (Side-b. 587)	84-99 dBA
	Pay – welder (Cat D6)	84-99 dBA
BVS construction	Excavator	84-99 dBA
	Crane 50 t / Side boom	60 dBA

### 6.2.3.2 Mitigation Measures

According to previous paragraphs, limited noise will occur during the construction phase. The measures suggested for mitigating impacts on air quality are applicable also for mitigating impacts on the acoustic environment, and vice versa. Besides the compliance with the legislative framework, other mitigation measures for minimizing of the impacts and protection against noise are:

- The engines of the equipment (bulldozers, tracks, compressors etc.) will be checked. Whenever a malfunction is revealed the appropriate adjustments must be made.
- Determination of a speed limit of the vehicles along the working strip and relevant signing placement.
- Appointment of a competent engineer as environmental inspector, for ensuring the observance of mitigation measures.
- Construction will take place between 08:00 till 17:00, during winter, and till 18:00 during summer, near residential areas.
- In case explosives are required for the excavation works, all necessary permits will be acquired and the public should be notified timely (1 week in advance).

In any case, impacts from noise are temporary and easily reversible, using equipment complying with the above measures.

### **6.2.3.3 Residual Impacts**

After the implementation of the above described measures, no residual impact is assessed due to noise.

## **6.2.4 Project and Area's Seismicity**

### **6.2.4.1 Impacts Assessment**

The Project does not affect regional seismicity. According to the relevant section of chapter 4 of the present study, the investigated area is characterized as of medium seismicity. Seismic activity is expressed at the sites of the seismic faults, which usually form the earthquakes' epicentre.

Prior to the construction phase, the sites of the active seismic faults that are crossed by the pipeline or are close to it will be detailed, so as the proper construction measures to be taken in the zones of active faults. The same applies for the Onshore Facilities site.

### **6.2.4.2 Mitigation Measures**

As described in the relevant section of chapter 4 the present study, seismicity is expressed at its maximum in the active faults' locations. At these locations, as soon as a relevant study is prepared, locating the exact position of the faults, the following construction measures shall be applied:

- A zone will be defined within which the active fault is placed. Inside this zone all the necessary construction measures will be taken.
- In faults' crossings with the pipeline, the overall depth of the pipeline's trench can be increased. This applies for regular faults, which are common in Greece. Additionally, backfilling on top of the pipeline will be reduced to minimum. This measure ensures that landslide will take place inside the loose

backfill and not on the more cohesive surrounding ground, during the vertical ground movement caused by fault's activity.

- At the pipeline's crossings with faults, and if other reasons require the pipeline to be coated with cement, it is necessary to ensure the cracking of the concrete in order the tension to be distributed uniformly along the pipeline resulting to relevant small values of the developed stress.
- For additional safety, transversal joints at the concrete coating should be placed at short spans (i.e. 1m) along the pipeline.
- Crossing of the pipeline with a fault's trace in an angle should be avoided, by modifying the direction of the pipeline's axis, perpendicular to the fault's trace, as much as possible. This way, the developed displacements and deformations of the pipeline will be reduced.

Besides the construction measures applied in faults' zones, additional constructive measures were taken in areas where the geotechnical study revealed slopes stability or liquefaction issues during a seismic event.

To sum up, the following studies that are related to seismic protection were prepared:

- Study of relations between active faults and routing
- Seismic design study
- Seismic Risk Assessment

The following studies will be prepared in the following stages of the project:

- Assessment of seismic ground parameters on the surface
- Slopes stability study
- Liquefaction study

#### **6.2.4.3 Residual Impacts**

Residual impacts of the project to the area's seismicity are not applicable.

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## **6.2.5 Impacts on Soil**

### **6.2.5.1 Impacts Assessment**

Impacts on soil come from the removal of the topsoil, the excavation of the pipeline's trench, and the reinstatement and planting works of the working strip. Such consequences derive from the processes of the soil, compaction, de-compaction and reinstatement; from which compaction is the most important one.

The main impact from the construction of the pipeline on the soil comes from the modification of the soil's structure and mainly its compaction. Through the compaction process, the proportion of the air cavities of the soil decreases and consequently so does water storage capacity and soil's permeability.

Compaction happens when the applied pressure from the machinery exceeds soil's natural resistance. Both soil's bearing capacity and loading capacity vary depending on the season, but in general, the applied pressure during construction phase on the working site is expected to exceed the one applied by the usual agricultural works.

The possible compaction cannot be predicted for any site, without additional data; however compaction's range for various soil types and climates can be predicted. From the soil types located in the investigated area, Fluvi – Calcaric - Fluvisols (Category j) is the most sensitive soil type to compaction during the whole year. These are alluvial, thin soils, which are mostly affected by the water table fluctuations, as they remain wet for a long time after the irrigation. Additionally, these soils are considered of high agricultural value and so they should be managed very carefully.

Calcaric - Lithosols soils are shallow, rocky and hard drained and it is not likely to be compacted. Calcaric – Regosols, of thin to medium texture, are tertiary or quaternary alluvial deposits and are susceptible to compaction when being moist. The following Table 6.2 is indicative of the impacts for the various soil types.

**Table 6.2 Impacts and Soil Types**

Possible Impacts	Soil Types**	
Compaction due to vehicles traffic	7, 8, 9 84	(Fluvisols) (Vertisols)
Topsoil and subsoil alteration due to high moisture (rain and/ or high water table)	7, 8, 9 84	(Fluvisols) (Vertisols)
Disturbance of draining and irrigational networks (impact on a broader area than the working strip) *	7, 8, 9 84	(Fluvisols) (Vertisols)
Loss of thin topsoil with no reinstatement capacity	47, 51 32, 33 40-43	(Lithosols) (Luvisols) (Regosols)
* Irrigation disruption affects mainly cultivated lands and not the working strip		
** Codes correspond to the map of soil and soil capacity of Pargas' sheet.		

Soil characterized as forestrial, should be addressed with extra attention, during construction phase, in order the structure of the soil to be properly reinstated. Concerning agricultural soils, impacts are concentrated in farming activities through loss of crops.

### 6.2.5.2 Mitigation Measures

To avoid soil pollution, every maintenance work of the participating equipment, used for the construction of the pipeline, will take place in controlled, defined areas or regional car garages with valid licensing.

Litters from the construction sites will be collected by a responsible employee of the contractor and will be deposited to legally operating landfills.

It is obvious that the deposition of solid wastes that could produce toxic or non-toxic pollutants (empty fuel containers, solvents, various liquids, tires, etc.), is under no circumstance allowed to take place beside domestic type wastes.

In order to treat wastes produced by the personnel of the construction site, it is deemed fitting, portable chemical toilets to be used. These toilets will be placed by the Contractor on the construction site, prior to the construction's commencement, and will be transferred to the next site after works' completion. The toilets will be emptied, in a regular basis, to a specific location appointed by the Regional Health Department. After the construction phase is completed, the toilets will be donated to the OTA of the area.

To protect soil against urban type wastes produced by the personnel, the Contractor must provide the construction site with litter bins, which will be emptied, regularly, with the domestic type wastes of the near-by residential areas to appointed landfills that are legally operating.

Excavation works for the trench, of 2m depth approximately, will result in mixing biological active soil with the inactive, mineral, one. In order to get a better and faster implementation of the mitigation measures, the excavated trench's topsoil, up to 50cm depth, will be kept separately from the other excavation material and will be placed on its former layering, after the pipeline's placement and backfilling take place. Stockpiles will be a maximum of 2 m high to avoid compaction from the weight.

Financial impacts along the Project such as damages to the existing crops or future yields will be compensated, after the relevant cadastral table is completed for all the routing and according to national legislation.

Every work will be organized so as to minimize the working strip. The general working strip, according to L.4001/2011, will have 32m width. In the forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.

Construction works will be completed as soon as possible, so as the leave trenches open for the minimum time possible. Works will be suspended and will be programmed so as to avoid phenomena of extreme weather conditions.

After the reinstatement, if any surplus soil still exists, it will be scattered in the surrounding area. A permit from the landowners will be acquired prior to such activity. This way, conservation of microorganisms' biodiversity will be promoted.

Regarding the landfall site reinstatement, this will be performed with natural materials, as similar to the present condition as possible. The reinstatement of the nearshore section, where the pipeline will be placed in a trench, will be also performed with the use of natural material in such a way as to create an appropriate rocky substrate for the development of marine biodiversity. This will, essentially, create an artificial reef along the buried section of the pipeline. More details are presented in section 6.3.7 regarding marine flora.

### **6.2.5.3 Residual Impacts**

After the implementation of the above described measures, residual impacts to the soil are assessed as minor, due only to the unavoidable modification of soil's physical structure.

Regarding soil erosion, please refer to section 6.2.6 .

## **6.2.6 Water Resources and Hydrogeology**

It is noted, that this section should be assessed in combination with sections 6.2.2.1 and 6.2.5, regarding impacts from Liquid Wastes and impacts on Soil, respectively.

### **6.2.6.1 Impacts Assessment**

Impacts on hydrogeology, during construction phase, are limited in the following categories:

#### **Irrigation break.**

Impact on the area's water resources, such as springs, wells, water drillings, irrigation channel, etc which manage irrigation of the agricultural areas.

Pipeline's routing crosses two types of irrigated areas:

- Irrigated through water drillings
- Irrigated through irrigation systems.

In the irrigated areas through boreholes, the water is pumped from the subsoil, using electrical or diesel pumps, and is channelled through a plastic or metal pipeline network. In such areas, irrigation should be stopped for a while, before and during construction phase, in order to minimize surface's disturbance. If this cut of water supply lasts for long, it could cause temporary production decrease.

Disturbance is also possible by the cut of water supply of the irrigated land from the water source, due to the construction works. From this point of view, the area affected is quite larger than the working strip.

Irrigation networks have 3 different channels' categories: first class channels (central channels) are made of concrete, with 4.5m width at the top, and conduit water from

the source. Second class channels are also made of concrete, but they are smaller than the first class ones and supply the third class channels which are either made of concrete or are dug. Cutting of the central channels could affect a broad area. Cutting of the secondary channels affects a smaller area and, during irrigation period, can last up to two days. With proper planning and information of land owners, the cut of the water supply of the third class channels can last up to one week. In any case, it should be taken into consideration that irrigation period differs for various areas, depending on the season and the crop.

During the on-going FEED of the project, no irrigation channels, water courses or networks were assessed to be crossed. Consequently the impact assessment should be deemed insignificant. However, if such infrastructure is presented, or constructed until the time of the project's implementation, the impact on the water recipient would be significant. That is because water restriction could mean irrigation break and consequently crop loss or deterioration.

### **Water Supply Network**

Impact on water supply networks of the municipalities and the communities within the investigated area.

Water networks along the project's components were not assessed during the baseline nor the on-going FEED. Consequently, the impact should be deemed insignificant. On the same reasoning presented in the previous paragraph, eventual water supply break could have significant impact to the local community.

### **Water Pollution**

Pollution of the surface water and consequently pollution of the underground water resources is caused by the machinery operation, excavation debris, packaging materials and workers wastes. The range of this problem depends on the preventive observance of safety measures and, in case of an error, the magnitude depends on the capability of filtering of the soil, and it is not expected to be significant.

During construction phase, impacts are also expected due to the crossing by the pipeline of water courses. Water courses are formed by a sensitive balance between water transport and sediments (carried objects) and consequently, extra attention is required during construction at a river's bank and slopes, in order not to disturb this balance.

In case such impact is made, it should be deemed as major.

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## **Erosion**

Some parts of the routing pass through sites susceptible to erosion, such as river beds, steep slopes, etc. Natural erosion works by transport of solids usually due to transport by wind, water, or; by down-slope slide of soil and other material under the force of gravity. Anthropogenic erosion is caused mainly by the soil structure modification and vegetation clearance which rooting system holds the soil in place. After these modifications, the natural mechanisms of erosion are implemented.

In very steep slopes, where the structure not only of the surface soil but also the substrate is affected, landslides can be caused by the construction of the pipeline.

Concerning the surface soil the magnitude of the impact is deemed large, since it concerns all the construction zone. Considering the 32m ROW and approximately 8000m of onshore pipeline this results in a 256000m<sup>2</sup> of soil being susceptible to erosion, due to project's construction. For the onshore facilities an approximately 90.000m<sup>2</sup> will be required consequently this will be the susceptible to erosion soil magnitude. The sensitivity of the resource is, also, deemed large since no vegetation will protect the soil. The soil creation mechanisms require significant time periods and are the basis for vegetation development. However, the duration of the construction will be limited to 11 months for the onshore pipeline; nevertheless, for the Onshore Facilities the construction will take approximately 20 months.

### **6.2.6.2 Mitigation Measures**

#### **Irrigation break.**

Since no irrigation channels were assessed during FEED, no mitigation measures are necessary. However, if any such channel is constructed until the implementation of the project, the following preventative measures can be taken into consideration:

- In order to have a clear understanding of the possible irrigation breaks, a detail survey of the existing irrigation networks along the 32m working strip will be conducted, prior to construction.
- No main channel should be cut from April till September,
- Every planned crossing with secondary and tertiary channels must be announced to the Guilds (Cooperatives), at least four weeks earlier. Thus, the engaged land owners could increase irrigation before the water supply break

in order to minimize any loss. Secondary channel should not be cut for a period bigger than 48 hours, from April to September. Tertiary channels should not be cut for a period bigger than 7 days, from April to September.

- Affected farmers will be compensated for potential crop's loss, so as to avoid watering of any engaged farmland with the project construction.
- When irrigation is made by drillings and then flushing through a pipe network, provisions must be made for replacing the network's pipes that were removed with new ones, before reinstatement.
- Regarding springs and other water sources or drainage systems that are crossed by the proposed route they should be identified prior to the construction start and, if necessary, small modifications should be made.
- As Project's construction goes on in sections, every 500m, backfilling of the specific section will take place immediately, so as not to significantly disturb ground or surface water runoff.
- All affected irrigation networks, including drills and tanks, will be replaced or restored to their previous condition or to a similar condition which will be agreed between the owner and the Project. Details of the restoration will be defined in agreement with the owner of the system.

### **Water Supply Network**

Similar to irrigation break, no water supply networks were assessed in the proposed pipeline route or the onshore facilities. However, the same preventative measures as the ones described previously are applicable. Namely the following:

- In order to have a clear understanding of the possible irrigation breaks, a detail survey of the existing water supply networks along the 32m working strip will be conducted, prior to construction.
- In case significant water supply networks are identified prior to the construction start, small modifications of the pipeline route will be investigated in order to minimize water supply break.
- As Project's construction goes on in sections, every 500m, backfilling of the specific section will take place immediately, so as not to significantly disturb water supply.

- All affected water supply networks will be replaced or restored or even improved, according to the local authority provisions.

### **Water Pollution**

During construction phase, rainfall and its runoff shall tend to pool in the trench, while the latter is open (in case of high water table). This water must be removed prior to the pipeline's installation, in order to ensure a safe placement of the pipeline. To limit water that may pool in the trench, the Contractor shall build, where necessary, drainage systems. If, however, water pumping from the trench is required, its disposal will take place meeting the Regional decisions on water disposal, at the existing river network or at the adjacent areas, so as not to affect neighbouring areas.

In order to avoid surface and ground water pollution caused by operation and maintenance of the equipment, excavated materials, packaging and personnel's wastes, the following additional measures can be taken:

- Any waste produced by human activity (vehicles oils, pipeline's protection fluids, garbage etc.) should not be deposited on the ground or stay exposed out in the open for long. Instead, they should be gathered and removed to the relevant appointed spaces.
- Under no circumstance should products coming from the trench excavation be thrown to the adjacent water courses.

In general, to prevent decreasing the quality of ground water, due to fuel and lubricant leaks during machinery operation, the proper operational checks should take place and also, the relevant legislation should be met; the legislation's basics include the ones presented in the waste and soil sections (section 6.2.2.1 and 6.2.5, respectively).

To limit soil and sea pollution caused by fuels and lubricants the following measures are proposed:

- Dispersal to the sea or ground of used oils is forbidden. Used oils should be collected in barrels and treated properly according to J.M.D. 71650/3035 (H.G.G. 655B/85).
- In areas where machinery is washed, oils are changed and refuelling takes place the Contractor will provide special sites equipped with collection and sedimentation systems and inclined platforms.

- Supervision of the aforementioned measures by the competent authority, and also keeping the equipment in good condition.

Water disposal (pumped out of the trench) shall take place to the river network or to the adjacent properties; conditionally the owners' consent has been obtained and the statutory terms regarding water disposal per receiver and user are met.

Regarding potential marine pollution caused by the sea bottom excavation, the relevant Technical Instructions of the United Nations Environmental Program should be followed (UNEP, 2000).

Any crossing with surface run off will be performed by open cut techniques using methods such as flume pipes (as appropriate) to allow natural flow.

It is stressed out that although the impact of water pollution is deemed major, the likelihood of it is deemed very low if the above measures are implemented.

### **Erosion**

In general the previously described measures are applicable to avoid erosion. The main mitigation measure for small slopes is the reinstatement of each section, immediately after construction completion and the minimization of the construction zone in ecologically sensitive areas. Additional, major technical solutions are:

- Engineered structures (concrete, gabions, etc.);
- Immediate replantation of native, or other proposed by the competent authorities vegetation;
- Soil bio-engineering systems: living plant materials used as structural components, combined with natural or synthetic support materials (geo-grids, erosion control fabric).

A geogrid is geosynthetic material used to reinforce soils and similar materials. Geogrids are commonly used to reinforce retaining walls, as well as sub-bases or subsoil's below roads or structures. Geogrids are commonly made from polymer materials, such as polyester. They can be also made from reused or recycled materials. They may be woven or knitted from yarns, heat-welded from strips of material or produced by punching a regular pattern of holes in sheets of material, then stretched into a grid.

In locations with very steep slopes, the engineering solutions that are applied to minimize the problem are shortly described and figured here below. Besides geogrids (Figure 6.2), these solutions include anticorrosion protection using ditch breakers with cement – sand bags, illustrated in Figure 6.3, or diversion berms, illustrated in Figure 6.4, or slopes protection using gabions, illustrated in Figure 6.5.

For locations not covered by the standard drawings, and also, for combating soils' erosion and firm foundation of the pipeline, a slope stability study will be prepared, prior to project's implementation, describing special building solutions for each separate case.

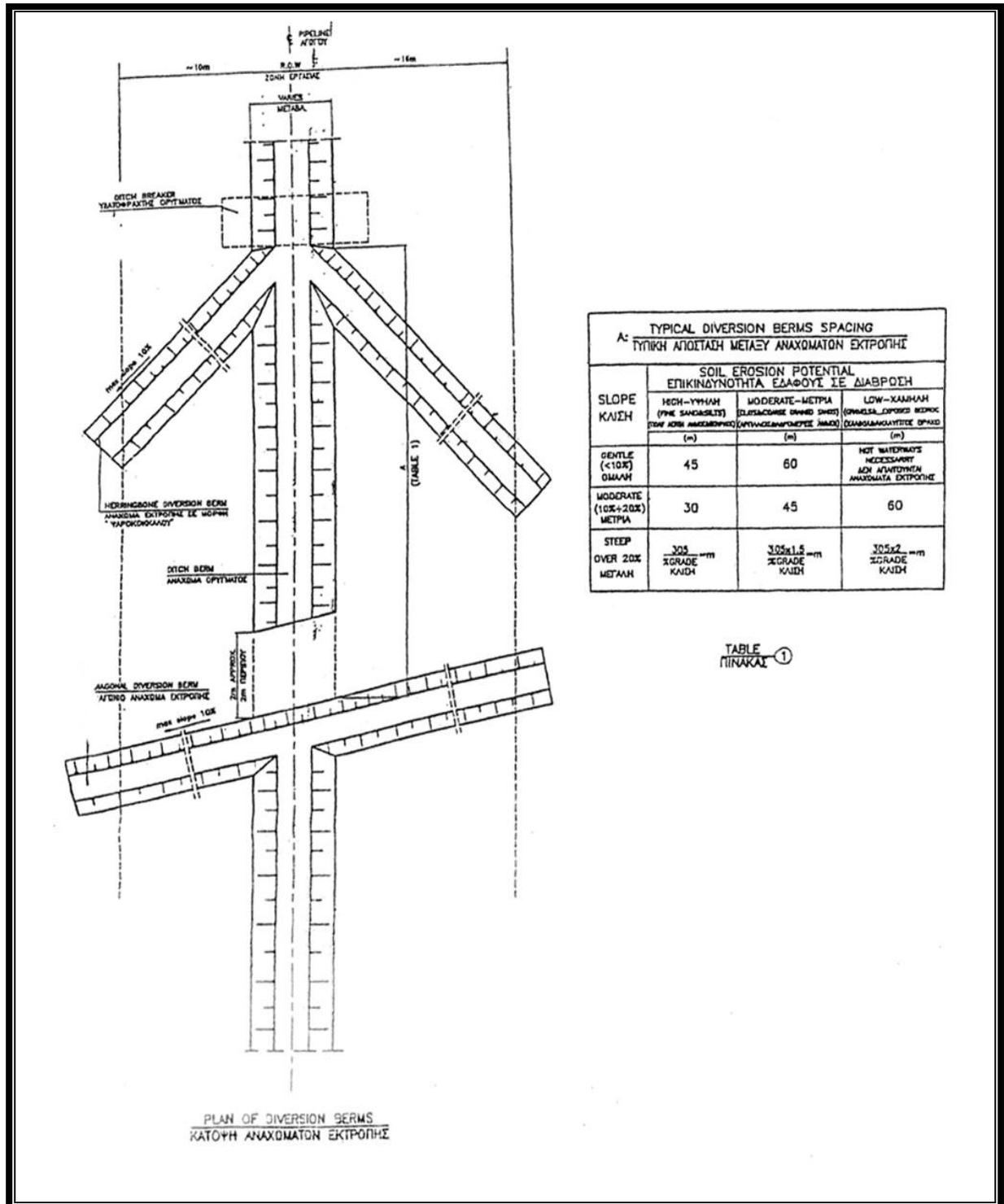
It is stressed out the local materials should be used for all reinstatements, including the engineering solutions described here in order to have a more visual friendly reinstatement.

**Figure 6.2 Geogrid reinstatement.**

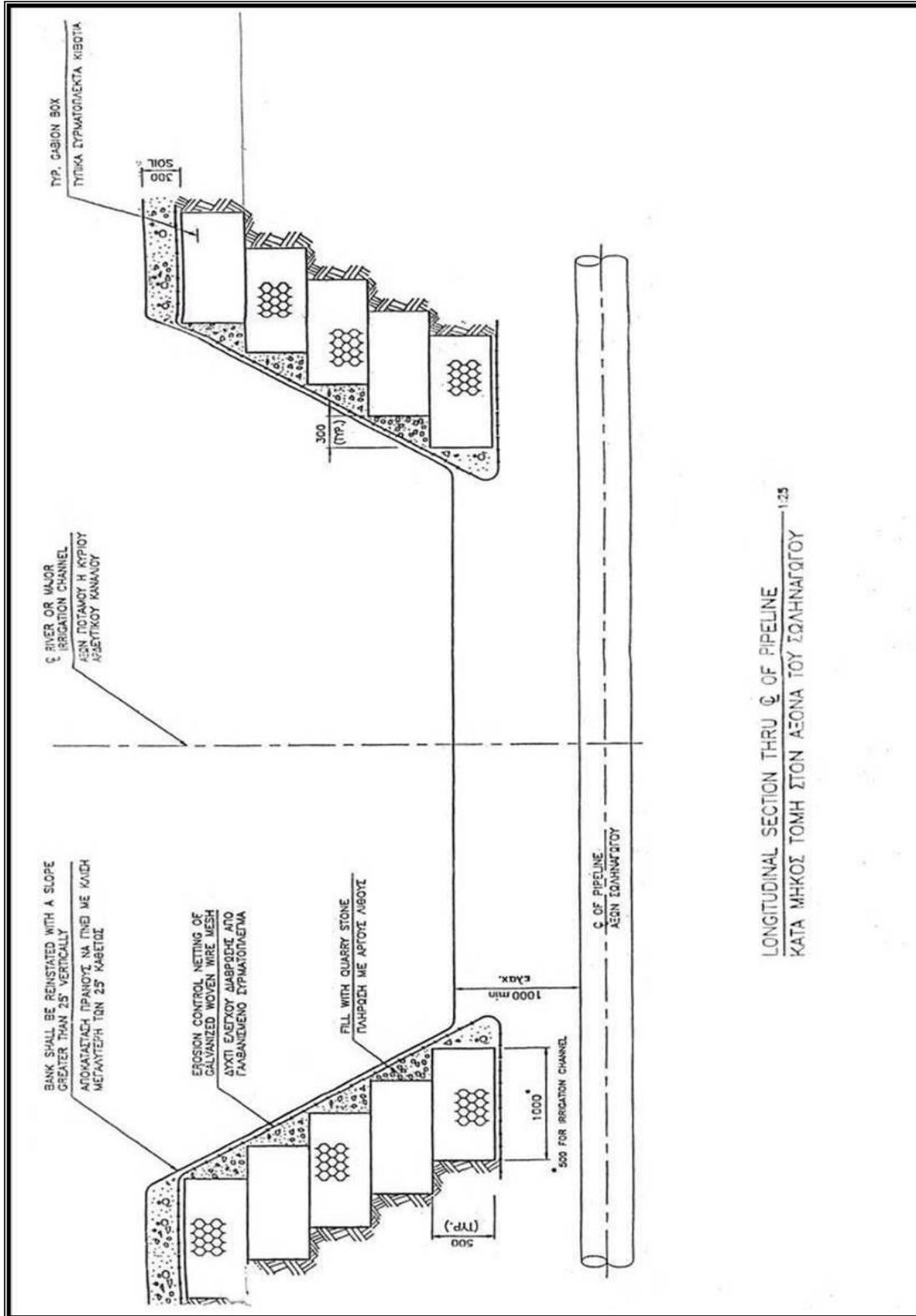




**Figure 6.4 Surface Runoff and Anticorrosion Protection Using Diversion Berms.**



**Figure 6.5 Slopes Protection using Gabions.**



### 6.2.6.3 Residual Impacts on Water Resources and Hydrogeology

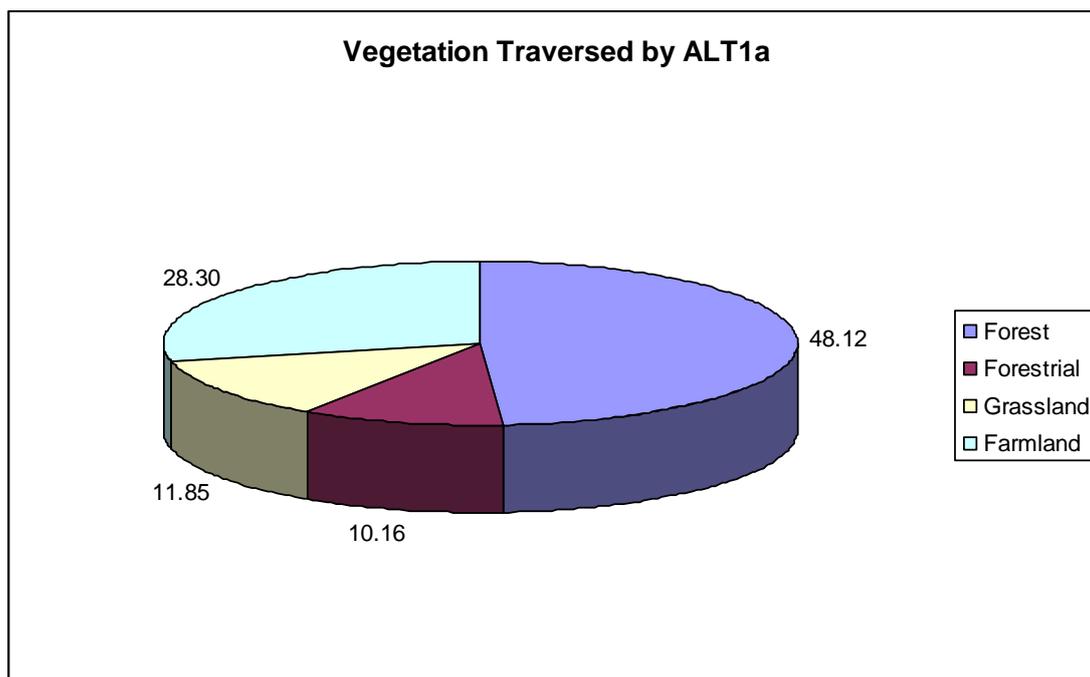
After the implementation of the above described measures, no residual impacts to water are assessed. However, some residual visual impact should be expected till the full development of the planted vegetation.

## 6.2.7 Flora

### 6.2.7.1 Impacts Assessment on terrestrial flora

The proposed routing traverses mainly maquis and brushwood vegetation, and secondary through agricultural lands and oak forests as illustrated on the following figure (the percentage of the landfall site is excluded). Any vegetation inside the construction zone will be cleared.

**Figure 6.6 Vegetation percentages crossed by the proposed pipeline route.**



Agricultural vegetation (farmland) traversed by the routing shall be affected during construction phase. Besides the crops' clearance, these impacts shall be more important if the works take place during crops' germination through dust settlement on top of the plants. Along the route, there are no crops of strategic significance or special environmental value. After the completion of the works, cultivated areas can be fully reinstated. On top of the installed pipeline, grapevine and other annual crops

can be cultivated. However, in a 5m buffer zone from the pipeline, no deep-rooted species are allowed to be planted.

Impacts on farmlands are of medium size (28.30% corresponds to 0.074km<sup>2</sup>) and since no strategic crops are engaged of small sensitivity. However, some of the areas are cultivated by olive trees which are perennial and their reinstatement will require few years.

Visual controversies will be produced, due to the breaking of natural vegetation. Other impacts will be caused by the dust generation, due to the excavation and backfilling works, and the vehicles traffic. During florescence, dust sits on top the flowers resulting in the pollinators' confusion due to the petals' colour loss and the disruption of entomophily (insect-pollination), in general. Dust setting on leaves causes a slowdown in photosynthesis process and consequently a decrease in primary productivity. In any case, the affected area by the construction works is limited.

Natural (not agricultural) plant species and their formations that shall be affected are common enough of the indigenous flora and no species cited in the Annexes of 92/43 E.U Directive shall be affected. Breaking of natural vegetation will result in vegetation types of precursor succession which can easily and speedily grow. The 10m buffer strip that will be restricted to deep rooted species is assessed in the relevant section of operation phase but it is not deemed wide enough as to fragment the environment or the vegetation.

Excluding the grasslands, the naturally covered areas, e.g. forests and bushlands, sum to 58.3% which means 0.153km<sup>2</sup>. This is not a large area but it is significant. The sensitivity of the plants is low, since none of them is under any protection status.

### **6.2.7.2 Mitigation Measures for Terrestrial Flora**

The mitigation measures that have previously described for dust reduction, irrigation continuance, soil protection, and water pollution prevention are also applicable here. On top of them the following analysis is presented.

Regarding crops, to mitigate the impacts on them, construction works is proposed to be occur outside cultivation season (before seeding or after harvesting). If that is not possible, due to construction time constraints, farmers will be compensated for

possible income loss due to the Project's construction, according to national legislation.

Natural vegetation that will be removed during construction phase is typical of the Greek flora and no endangered or protected by national or international protocols exist.

As it has been stated, the construction strip will be 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.

Special planting and reinstatement measures are proposed, in the framework of replanting the broader area. Plants that will be used should belong to the regional flora, so as to be better adjusted to the regional abiotic factors and blend with the existing environment. It is important to note that natural vegetation of the area has strong coppicing capacity (stamp sprouting) and that is why reforestation works should be made only where it is deemed necessary. Reforestation of a disturbed natural landscape, through the proposed works, should aim in the ecological and visual reinstatement of the former conditions or at their improvement upon request and with the cooperation of all competent authorities and stakeholders.

It is accepted that a successful reinstatement takes into account harmony, which is obtained through form, line, colour, texture and mild diversity, without creating strong contrasts, in the broader area. The elements comprising landscape are vegetation, fauna, geological formations and water.

- Vegetation's appearance varies depending on the species. Variations take place regarding leaves and flowers colour, foliage shape, texture etc.
- Fauna gives movement and life in the area
- Geological formations break landscape monotony,
- Water, besides being necessary for life, gives variety and beauty

Main scope of reinstatement plantation works is the reinstatement of the vegetation in the working strip to its former condition, and at the same time to stabilize susceptible to erosion locations. To achieve the above, proper planning and measures adoption is required, which will aim to (i) Ecological reinstatement along

the pipeline, (ii) Retention and protection of soils, and lastly, (iii) Mitigating visual intrusion. For successfully planning and taking the appropriate restoration measures, all the investigated parameters must be taken into account, including:

- Climatic conditions and micro-environment
- Plant community classification and stage
- Regional flora
- Soil, and finally,
- Irrigational water

Based on the above, the potential species that will eventually be selected for reforestation include yew (*Quercus coccifera*), gorse bush (*Ulex sp*), oleander (*Nerium sp*), and rosemary (*Rosmarinus sp*). To determine specific species and final planting spots, special landscape (phytotechnical, reforestation) study will be prepared. Protecting and irrigating measures will be agreed with the competent authorities. However, it is deemed appropriate that the contractor will have the responsibility of protecting and irrigating the replantations for a period of 3 years, or as otherwise dictated by the competent authorities.

However, the above mentioned species that are present in the project's area are known for the ability of natural reforestation through coppices (sprouting from the stumps) and more precisely sucking (sprouting through near surface branches). Thus the use of uprooted plants and vegetation from the excavation works can be taken into consideration during reinstatement, in order to facilitate planting works. The uprooted plants will provide seeds of local species.

It is important to backfill the pipeline with the same material that was originally excavated, in order to keep seeds of the local, adjusted, subspecies.

Prior to the detail study of the flora reinstatement is prepared, thorough cooperation with the Forest Authorities will be made, in order to support any managerial objectives of the authorities. That is, fire resistant species could be planted or fruit trees to provide food for fauna species.

It is suggested, that if any ecologically valuable trees are identified on top of the working strip, technically feasible solutions will be investigated so as to avoid cutting those trees, including minor route adjustments.

In case works take place during dry-hot season (summer time), special care for avoiding and combating fires must be taken. This should include fire fighting equipment on site.

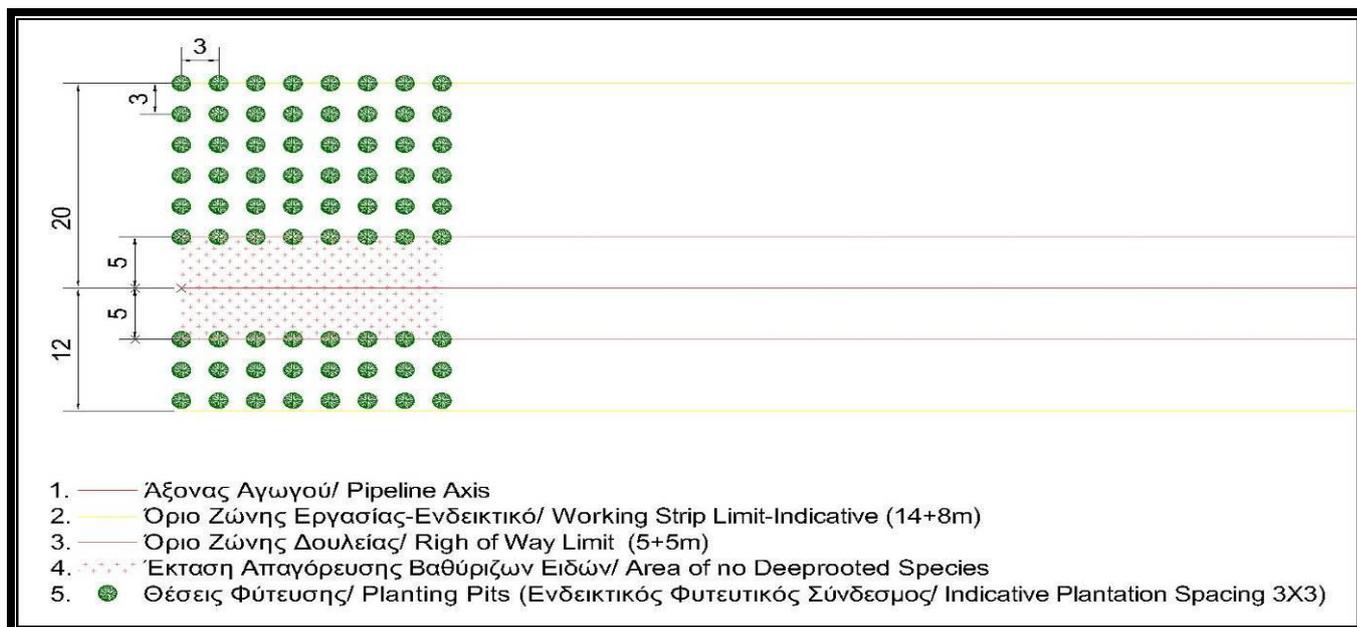
To combat atmospheric pollution, all machinery (vehicles and equipment) should be compatible with national legislation regarding emissions. For dust, in specific, soaking of the ground is recommended, as well as covering transport vehicles and reducing speed limit on dirt roads.

After the works are completed, the following projects are recommended:

- Area's cleaning
- Gathering and removal of useless materials
- Total soil reinstatement with the former layer structure
- Soil shuffling
- Protection and stabilization works of steep slopes and other sensitive areas.

Based on the data presented in chapter 4, Table 6.3 presents an indicative number of plants to be replanted whilst Table 6.4 presents a preliminary cost for the replantation, based on prices as dictated by the 4th semester of 2011 (HGG). It should be noted that the plantation spacing is indicative (3x3) whilst the assessed formation of the 32m working strip is illustrated in the following figure (Figure 6.7). The final decisions will be taken in cooperation with the authorities and during the elaboration of the phytotechnical study.

**Figure 6.7 Indicative replantation schema (dimensions in m).**



**Table 6.3 Plantations estimation.**

From KP	To KP	ROW	FOREST	BUSHLAND	TYPE OF PLANTATION SPECIES	NUMBER OF PLANTATIONS (approximately)
0.000	0.313	32		0.313	Bush	948
1.283	1.551	32		0.268	Bush	813
2.620	3.179	32	0.559		Tree	1686
3.376	3.468	32	0.092		Tree	285
3.679	5.931	32	2.252		Tree	6765
6.711	7.720	32	1.009		Tree	3036
7.781	7.808	32	0.027		Tree	90
7.808	8.059	32		0.251	Bush	762
<b>Total Trees</b>						11862
<b>Total Bushes</b>						2523
<b>Total</b>						14385

The plantation spacing for both Bushes and Trees was assumed to be 3x3.

**Table 6.4 Preliminary replantation cost.**

s/n	ACTIVITY	TARRIF INDICATOR	TYPE OF UNIT	UNIT PRICE (€) (4 <sup>th</sup> quarter of 2011)	NUMBER OF PLANTATIONS (approximately)	COST
<b>PLANTING ACTIVITY</b>						
1	Opening of pits 0.3x0.3x0.3 in rocky and semi rocky soils	E.2.1 (Π.Π.Σ. 5130)	piece	0.90	14385	12936.70
2	Category 1 bushes procurement	Δ.2.1 (Π.Π.Σ. 5210)	piece	2.14	2523	5388.83
3	Category 1 trees procurement	Δ.1.1 (Π.Π.Σ. 5210)	piece	3.37	11862	40003.93
4	Plantation of species with soil ball up to 1.5lt volume and filling with horticultural soil	E.9.3 (Π.Π.Σ. 5210)	piece	0.90	14385	12936.70
5	Creation of irrigation pits (d<0.6m)	ΣΤ 1.1 (Π.Π.Σ. 5330)	piece	0.45	14385	6468.35
6	Plants fertilization by hand	ΣΤ 3.1 (Π.Π.Σ. 5340)	piece	1.01	14385	14553.78
7	Irrigation of plants with tanker	ΣΤ 2.1.1 (Π.Π.Σ. 5311)	piece	0.13	14385	1940.50
<b>MAINTENANCE OF PLANTATIONS 1<sup>ST</sup> YEAR</b>						
8	Irrigation of plants with tanker	ΣΤ 2.1.1 (Π.Π.Σ. 5311)	piece	0.13	14385	1940.50
9	Plants fertilization by hand	ΣΤ 3.1 (Π.Π.Σ. 5340)	piece	1.01	14385	14553.78
<b>MAINTENANCE OF PLANTATIONS 2<sup>ND</sup> YEAR</b>						
10	Creation of irrigation pits (d<0.6m)	ΣΤ 1.1 (Π.Π.Σ. 5330)	piece	0.45	14385	6468.35
11	Irrigation of plants with tanker	ΣΤ 2.1.1 (Π.Π.Σ. 5311)	piece	0.13	14385	1940.50
12	Plants fertilization by hand	ΣΤ 3.1 (Π.Π.Σ. 5340)	piece	1.01	14385	14553.78
<b>MAINTENANCE OF PLANTATIONS 3<sup>RD</sup> YEAR</b>						
13	Irrigation of plants with tanker	ΣΤ 2.1.1 (Π.Π.Σ. 5311)	piece	0.13	14385	1940.50
14	Plants fertilization by hand	ΣΤ 3.1 (Π.Π.Σ. 5340)	piece	1.01	14385	14553.78
<b>Total</b>						<b>150179.99</b>
<b>Γ.Ε. &amp; Ο.Ε. 18%</b>						<b>27032.40</b>
<b>1<sup>st</sup> Subtotal</b>						<b>177212.39</b>
<b>Miscellaneous 15%</b>						<b>22527.00</b>
<b>2<sup>nd</sup> Subtotal</b>						<b>199739.39</b>
<b>VAT 23%</b>						<b>45940.06</b>
<b>OVERALL TOTAL</b>						<b>245679.45</b>

### **6.2.7.3 Residual Impacts on Terrestrial Flora**

Although deep rooted species will not be allowed on the protection strip, shallow rooted crops will be allowed. Regarding the remaining of the working strip, plantation no deep rooted species will be allowed. In any case, farmers will receive the legal compensation. Consequently, no residual impact on agricultural vegetation is assessed.

As it is detailed in the relevant section of operation phase, there is no fragmentation of natural vegetation caused by the construction of the pipeline (mainly by the safety zone of 5m buffer). The impacts during construction are temporary and apart from the safety zone fully reversible only visual discontinuity is affected. The visual impact is equivalent to a fire fighting belt that could be implemented. No ecological impact is affected. Consequently, the residual impacts to the vegetation are minor.

### **6.2.7.4 Impacts Assessment on marine flora**

The offshore pipeline is planned to be installed on the sea bottom, except for the part near the coast, up to approximately 25m depth, that will be placed inside a trench, which will then be backfilled, as best industry practice and as proposed by the General Navy Staff.

Installation works, for the deep water part, are expected to have some impact on the marine ecosystem due to sediments suspension as described in the relevant section of Oceanography.

The coastal section at the proposed landfall site is approximately 550m in length (from the landfall point OM2 up to the water depth of 25m).

Works that will potentially cause nuisance to benthic biodiversity are:

1. excavation and backfilling of the trench
2. barge's presence, anchoring and manoeuvring needed for the pipeline's installation near the coast.

Both activities will take place outside the touristic season and for a limited duration, so as to minimize any social impact.

Benthic organisms comprise the fauna (fishes, molluscs, crustaceans, sea urchins, sponges, etc.) and the flora (algae, marine angiosperms, etc.) living near or on top the sea bottom. Benthic plant communities are expected to be affected by the mechanical works on the sea bottom and by the sedimentation. Of the organisms comprising marine flora, *Posidonia oceanica*, a marine angiosperm, should be noted. During the DMS, it was revealed that only for approximately 255m, between the depths of 15m and 25m, there is engagement of the offshore pipeline with *Posidonia* meadows. The landfall site does not host any meadows of *Posidonia*. Based on the DMS study performed for the project, at the depth of 15m cemented elongated mounds with *Posidonia* and sand patches are located extending for ~120m (between ~K.P.0+360 and ~K.P.0+480). Further in sea, at depth of ~20m and for ~135m (between ~K.P.0+480 and ~K.P.0+615) seagrasses of *Posidonia oceanica* are formed. From then on only sandy bottom is present unfavoring marine growth.

Estimated impacts on the *P. oceanica* meadows from the laying works can be classified in two categories:

- Along the laying strip, where the biggest impact will take place by the pipeline.
- Around the laying strip, where the meadows will sustain temporary impact, due to the sand's and other suspended solids' setting on the leaves of *P. oceanica* and the decreased light diffusion. However, it should be noted that in correlation to the benthic communities, *Posidonia*'s meadows are adjusted to the bottom's disturbance, due to the high hydrodynamics of the area.

The meadows laying directly on the pipeline's route will have to be moved away.

Installation of the offshore pipeline section includes the laying of the pipeline on the sea bottom, after the depth of 25m, as well as the excavation and backfilling in the near shore section, till the depth of 25m. These activities result to stirring up sediments from the soft bottom. While the finer sediment fraction may remain suspended in the water column for some time, the coarser fraction settles rapidly and is dispersed over a wide area of the seabed, smothering benthic habitats and biota in the process. Certain important habitats, such as seagrass beds, are particularly sensitive to such disturbance, as this leads to alteration in the physico-chemical characteristics of the water column and, ultimately, to potential adverse impacts. The capacity of seagrasses to store carbohydrate reserves in their rhizomes allows them to withstand transient periods of reduced light availability, such as those resulting

from increased turbidity of the water column. However, over a long period characterized by frequent episodes of reduced light availability, as would occur when soft sediments are disturbed and the fine fraction is suspended in the water column, death of the plant eventually ensues<sup>23</sup>. Minimum light requirements according to literature, expressed as % of surface irradiance SI, are 7,8 – 16% SI for *Posidonia oceanica*. Seagrasses can survive in light intensities below their minimum requirements for periods ranging from a few to several weeks. Deterioration of seagrass meadows by smothering due to excessive sedimentation is also an important issue and impacts can be severe if the problem persists. The critical thresholds for sedimentation (cm/year) are 5 cm/yr for *Posidonia oceanica*<sup>24</sup>.

The nearshore dredging volume depends on the final trenching design, determined by the EPC contractor, as described in section 5.8.10, regarding construction wastes. Depending on the methodology and the width of the trench bottom, a minimum of 15969m<sup>3</sup> and a maximum of 83469m<sup>3</sup> will be dredged. The plume will extend to the nearby area due to high hydrodynamism of the area. However, the hydrodynamism of the area means that most likely, this plume is not estimated to last, in significant concentrations, for more than 1 week. The dredged material will be placed nearby in order to cover the pipeline after its installation in the trench. However, it should be assumed that a part of it will be dispersed by the currents.

As the special study of HCMR supports (see Annex I – HCMR Study (*Volume III*)), these impacts are temporary and comparable to the impacts of a storm event. It is assessed that the ecosystem is fully reinstated in a short period of time, since the affected species are naturally adjusted to bottom's and water column's disturbances.

In summary the offshore construction activities (near shore and offshore sections) will cause stirring up of seabed sediments which will be transported to close by areas and then re-deposited after a few days. This sedimentation is a negative, temporary and reversible, since it will last for a small period and only during the construction phase. Given that *Posidonia* has significant resilience capacity in conditions of increased turbidity in combination with the high hydrodynamism of the area makes the specific meadows accustomed to turbidity conditions and consequently the overall significance of the impact is thus assessed as minor.

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<sup>23</sup> Gordon & al (1994), Onuf (1996)

<sup>24</sup> Erftemeijer and Robin Lewis III (2006)

By using appropriate measures, the pipeline could be used as an opportunity to create an artificial reef, which shall enhance *Posidonia oceanica* and will boost the marine biodiversity.

Regarding the rest of the benthic organisms, since the affected by the pipeline's installation area is a narrow strip, it is expected that benthic communities will soon be back.

To sum up, the overall impact of the Project to the benthic communities, during construction phase, is expected to be limited, since only a narrow strip is affected, and the ecosystem is adjusted and capable of a fully natural reinstatement. *Posidonia* meadows could need a bigger time span for naturally reinstatement or require human intervention. Additionally, it should be noted that, after the completion of the construction works and due to the implementation of the specific measures described in the operation section (creation of artificial reef), it is possible *Posidonia*'s meadows to be expanded to areas over the installed pipeline that *Posidonia* did not exist before. In any case, *Posidonia oceanica* is a protected species meaning that its sensitivity is major.

#### **6.2.7.5 Mitigation Measures for Marine Flora**

Special measures for avoiding sediments suspension cannot be applied, since stirring up is a natural process that cannot be avoided. However, careful and quick construction of the offshore section can minimize the sediments suspension. Construction activities should be executed as described in chapter 5 and avoid failures and repeats, in order to decrease impacts to sea bottom. It is noted, however, that benthic communities of the area are adjusted to sand shuffling due to the high hydrodynamic of the area. Pipeline's impacts on benthic flora, during construction phase, will be very short, since the works will be short (approximately 3 months for the coastal area where *Posidonia* is engaged and another 3 months for the deep water section).

However, *Posidonia oceanica* is a priority species. In order to minimize the impacts the following measures are suggested:

- Thorough consideration regarding construction's timetable, so as to perform these works during periods minimizing nuisance and impact on *Posidonia*.

Although, Posidonia has a very small growth rate, it is assumed that most of its growth takes place from March till May and produces flowers and fruits (sea olives) for plantation in summer, i.e. July – August. During this period (July and August) no works should be performed near the Posidonia meadows.

- Anchoring of ships within identified Posidonia oceanica meadows should be avoided to the maximum possible. To this end, known Posidonia meadows will be notified to all ships, in order to be taken into account in anchoring procedures.
- Creation of a pilot nursery garden and transplanting of Posidonia meadows species laying directly on top of the working strip. To this purpose some of the most vigorous plants that will be included in the excavated material (of the seabed for the first ~500m) will be used for the pilot nursery garden and replantation stage. It is clarified that this is not practicable for all the area with Posidonia oceanica meadows, since natural reinstatement of Posidonia oceanica is expected, gradually. This pilot measure creates a significant opportunity for enhancement of marine biodiversity and research purposes, through monitoring of the development of the pilot replantations. Nevertheless, the success of the above methods depends on various factors. In order to increase the possibility of the success of the described measures, a marine specialist will have to be assigned for consulting the implementation and monitoring of the pilot nursery garden and replantation. Indicatively, the area occupied by the nursery garden, is suggested to be around 200m<sup>2</sup> of the nearby seabed. This nursery garden will provide species to colonize the envisaged artificial reef along the buried pipeline.
- At the excavation zone, from the coast to the contour of 25m depth, a small artificial reef could be created, using natural regional rocks and a trial replantation of Posidonia's rootstocks that were previously uprooted or transferred on top of the buried, backfilled pipeline. This way, biodiversity of the excavated area will be restored, up to certain amount, both on the rock bottom and the sand bottom of the sea. On top of that the marine ecosystem is enhanced by the creation of new rock substrate and the artificial reef. The structure and layout of the rocks covering the buried pipeline should be such

as to create multiple surfaces where marine flora could be developed, providing shelter for marine fauna in later stages.

In the above mentioned measures, the ones presented in section 6.2.2 regarding mitigation of impacts from abstraction and discharge of hydrotesting water. These measures are summarized below:

- Avoidance of abstracting water from the sea bottom to minimize sediments stirring up
- Completion of the hydrotesting of the offshore section within 20 days so as to avoid addition of chemicals. In the case that more than 20 days are required for the hydrotest, the use of chemical substances that are included in the PLONOR list is suggested in order to minimize impacts to the environment.
- The discharge must be performed in a controlled manner (sampling, filtering, aeration and dilution in case of chemicals' use), and
- Selection of appropriate discharge location at a depth between 13m and 17m, where a clear from Posidonia meadows passage exists, at a distance between 370m and 450m.

#### **6.2.7.6 Residual Impacts on Marine Flora**

It is reasonable to assess that the mitigation measures will be successful, since they are supported by the national specialist on marine issues. Keeping that in mind, the residual impact should be positive one. That is because the new rocky substrates that will be created, through the artificial reef, will provide *Posidonia oceanica* and all marine biodiversity a development substrate.

### **6.2.8 Fauna**

#### **6.2.8.1 Impacts on terrestrial fauna**

Impacts on fauna are due to the habitats' and feeding grounds' disturbance. Certain populations, present close to the under construction pipeline will migrate to neighboring areas.

Natural vegetation's breaking leads to precursor forms of plant's succession, of small environmental value. In general, within the investigated area, there are no species forming homogenous habitats or demanding large territories; hence impacts of the species' migration will not affect the populations' dynamics.

No big mammals exist in the area, (big carnivores, artiodactyls). Small mammals' populations (mainly rodents) are not expected to be affected, since the constructions sites area is small and so is the works' timeframe, but only locally stressed due to habitats' disturbance. Proper schedule of the construction works, outside reproduction period, is deemed adequate to protect the population.

Impacts on reptiles will be insignificant and reversible, due to the small scale of the construction's sites and timeframe. Additionally, the fact that vegetation's breaking will form grassland's types, preferred by reptiles, and that neighboring areas can provide refuge for reptiles, also mitigates any negative impacts on reptiles.

Possible losses of avifauna's nesting grounds due to tree felling will be reversible, since new grounds can be formed in the near-by trees. Many birds, including birds of prey and some protected species, are expected only to fly over the construction area and thus, no impacts on them are expected. Threatened species like *Milvus migrans*, *Neophron percnopterus*, and *Plegadis falcinellus* are not assessed to be present inside the project's area or along the working strip.

*Buteo buteo*, *Buteo rufinus*, *Ciconia nigra* and *Falco naumanni*, may be present in the projects area, whilst *Gyps fulvus* may be present in the landfall site. In order to avoid impacts on this species, a survey should be performed at the landfall site and along the construction strip, prior the commencement of the construction works, so as to identify if any nests exists. In that case, the nests should be transported.

Lack of sufficient research and data render the determination (both qualitative and quantitative) of the noise pressures' to the fauna very difficult or even impossible. Within the area where works shall take place, noise impacts will be small and, in any case, reversible, since the timeframe and area of the construction works shall be limited. It is estimated that the duration of the construction works will last ~11months, in total, meaning that the construction and reinstatement shall proceed 500m every 3 weeks. Consequently, for each site, no noise pressure will last for more than 3 weeks and thus, the impacts from noise to onshore fauna are deemed limited and temporary.

Dust setting on top of the leaves make these leaves less preferable for foraging by herbivores. Within the area where works shall take place, impacts by the dust setting will be insignificant and, in any case, reversible, since the timeframe and area of the construction works shall be limited.

No problems caused by other air pollutants are expected because of the animals' limited exposure to them.

Conclusively, animal species that shall be affected are common enough of the indigenous fauna. Any habitats' and feeding grounds' loss will be faced by species migration to adjacent to the working strip areas. For species cited in the Annexes of 92/43 E.U Directive proper measures exist so as to eliminate potential impacts, if these species are actually in the investigated area. It should be repeated that protected species were not sighted in the project's area during the site visits but are only referenced in the data sheets of the neighboring protected areas. As a proactive measure, these species were treated as present in the project's area.

### **6.2.8.2 Mitigation Measures for Terrestrial Fauna**

In general, no special management measures regarding fauna are required. Populations will return after the natural vegetation is restored and no additional measures are required, other than that relating to vegetation reinstatement. The mitigation measures described for terrestrial flora are also applicable, highlighting the restriction of the working strip to 32m and minimization to a width of 26m, in sensitive areas, wherever technically feasible.

It is recommended, wherever is possible, felled trunks and stamps remaining on site, thus creating habitats for small mammals and reptiles, whilst the speedy completion of the pipeline's placement shall contribute in the swift restoration of animals' pathways. Consideration should be given so as not to imprison any animal inside the pipeline or the auxiliary channels.

Even though, the presence of protected species is not verified, the owner illustrated significant environmental sensitivity. This is translated into adopting preventative measures for minimizing any impacts on the protected species, no matter how uncertain their presence and consequent disturbance are.

Specifically, in order to ensure minimum disturbance of *Ciconia nigra*, *Falco naumanni* and *Gyps fulvus*, prior to the construction works at the landfall site and along the working strip, a survey will be performed, by an ornithologist, in order to verify the presence or not of the above mentioned species. If any nests exist, they shall be relocated, at least for as long as the construction last. After the completion of the construction, the specialist should assess the replacement of the nest to its former location taking into consideration the adaptation of the species in the new nesting sites.

Additionally, if any animal is trapped inside the pipeline trench, they shall be removed and released back to the wild, so as to avoid unnecessary wildlife mortality.

### **6.2.8.3 Residual Impacts on Terrestrial Fauna**

No residual impacts are assessed for the terrestrial fauna. Regarding possible fragmentation of habitats, caused by the 5m safety zone, this is assessed in the operation phase but it is deemed not significant, if not positive.

### **6.2.8.4 Impacts on marine fauna**

During construction phase, any dredging or excavation required for the pipeline's placement on the sea bottom would change bottom's morphology and produce increased suspended solids and organic load. Nonetheless, it is noted that the daily volume of excavated materials shall be small and it is estimated that the suspended solids shall set in a few hundred meters zone from the excavation. Due to the excavations, plants' removal is expected and consequently, the relevant fish fauna. After works' completion, gradual reinstatement shall take place, as presented in the marine flora section (section 6.2.7).

Marine mammals are not expected to be directly affected by the excavation works, since these works will take place near the coast and the aforementioned animals prefer open seas and are not common in coastal waters. Fish and benthic fauna, indigenous of the construction strip, are not expected to be affected in direct. During construction phase, these species shall avoid the affected area and will return, as soon as the works end. Even though any temporary change to the *Posidonia oceanica*'s meadows, or the benthic plant communities, is expected to have an

indirect impact on the aforementioned species, the overall impact could be deemed insignificant due to the availability of similar areas in the broader area.

Regarding noise, even though marine mammals are very sensitive to noise, the construction activities are expected to last only for ~6 months (3 months for the deep water and another 3 months for the coastal part). The offshore section will be completed in about 3 months but will be constantly moving, at approximately 2km per day. Consequently, they will not pose significant impact on marine life. In general sea bottom activities will be very short, without posing any impact.

Consequently any impacts are deemed relatively moderate.

#### **6.2.8.5 Mitigation Measures for Marine Fauna**

The mapping of Posidonia meadows, resulted from the DMS, shows that there are some meadows between the depths of 15m and 25m, for ~250m of the pipeline. In order to avoid any impact on the marine fauna living on these meadows, the same restrictions as for Posidonia itself should apply.

Additionally, regarding biological parameters, a monitoring program shall be established to assess efficiency of the mitigation measures.

As stated in section 6.2.7, regarding marine flora, pipeline's impacts on benthic community, during construction phase are not significant. Consequently, no special measures are required, apart from the one already mentioned.

#### **6.2.8.6 Residual Impacts on Marine Fauna**

Quoting from the relevant section of marine flora, the residual impact should be positive one. That is because the new rocky substrates that will be created, through the artificial reef, will provide Posidonia oceanica a development substrate. The above residual impact would attract fishes' population and marine fauna, enhancing, thus, the marine ecosystem.

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## **6.2.9 Demographics**

### **6.2.9.1 Impacts Assessment on Demography**

The population dynamics of the project's area are not related to the project. The personnel working on the project's construction will remain for a limited time in the area, or it could even be from the area. Consequently, no impact on the demographics will arise from the construction of the project.

### **6.2.9.2 Mitigation Measures for Demography**

No impacts and no mitigation measures are assessed regarding area's demographics.

However, in order to provide the means of communication between the local community and the project's owner, IGI POSEIDON will establish a grievance mechanism which will receive, assess and respond to requests and issues raised by the public.

In addition, the EPC Contractor is expected to set a code of conduct to its workers in order to minimize conflicts with the local community.

### **6.2.9.3 Residual Impacts on Demography**

No residual impacts on demography are assessed.

## **6.2.10 Local Employment and Economy**

### **6.2.10.1 Impacts Assessment on Employment and Economy**

It is estimated that the workforce for the onshore section is 30 people who will be living in the area for a period of approximately 44 weeks. For the onshore facilities, it is estimated that ~ 200 persons over a period of 20 months will be on site. These figures for the shore crossing are respectively 20 people and 23 weeks, and for the offshore section 250 people and 3 months. Consequently, in all, construction of the project will result in the direct employment of 500 people.

Although, many of these workers will be skilled and regular personnel of the EPC Contractor, some unskilled jobs could be generated for the local community. Construction workers will most likely be organized in several separate teams along the pipeline route. The teams will be responsible for a number of successive tasks, i.e. clearing the working corridor, preparing the trench, preparing and installing the pipeline string, closing the trench and reinstating the land. Some of these tasks will not require skilled labor. Certain jobs could potentially be carried out by local excavator and bulldozer drivers and builders under the supervision of a qualified taskmaster. Alternatively, the main contractor may conceivably sub-contract these tasks to local companies.

In addition indirect impacts from the realization of the project to local economy could be relevant to:

- businesses providing the Project with goods and services (usually referred to as indirect employment); and
- Businesses supplying direct and indirect employees with goods and services (usually referred to as induced employment).

Indirect employment and induces employment may benefit local economy in terms of jobs in supply of goods and services to the Project and to its employees. This is likely to include use of local companies for transport services (transporting workers and materials to and from the construction sites), catering (at the construction camps) and security. Major construction equipment supplies are likely to be imported from outside the investigated area. As well as the sub-contracts noted above, the influx of construction workers and/or the increased disposable income available to the local workers employed on the project will have a minor multiplier effect on the economy of the residential areas situated along the route of the pipeline. There may be an increased demand for rented accommodation and meals.

Employment generation and an increase in opportunities for indirect income generation in the region during the construction phase are likely to have minor positive impacts for people living in the project area. The potential benefits will be maximized since the Owner will actively promote the opportunities for hiring local workforce and local procurement of services where appropriate, e.g. labor, catering, construction services, accommodation, restaurants, utilities support, etc.

The use of local workforce may increase professional capacity and expertise in engagement with other similar future projects, in other areas.

Lastly, the easement and compensation for land occupation for the RoW (including the construction strip) could be added to the impacts assessment of the Project to local Economy. The loss of land will be compensated according to national legislation and consequently to all extent.

The quantification of the above impacts is difficult but it is conservative to assess that the magnitude of the local workforce will be limited and temporary. But in any case, the impact will be positive.

#### **6.2.10.2 Mitigation Measures for Employment and Economy**

Based on the previous assessment of the construction workforce, a positive impact through free market's mechanisms is estimated. Although an estimation of spent income on local services cannot be risked, it can be safely assessed that it will be a positive impact.

The owner will actively promote hiring of local workforce and utilities providers by the EPC Contractor, as previously described. This can be performed through announcement of such opportunities to the local community.

Lastly, compensation according to Greek legislation and best industry practice will be provided to affected parties.

#### **6.2.10.3 Residual Impacts on Employment and Economy**

Positive impacts include the, at least temporary, income increase and the permanent capacity building of local workforce to similar projects. To be on the conservative side, discussed in the assessment section, the residual impact is assessed as minor.

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## **6.2.11 Fishing**

### **6.2.11.1 Impacts Assessment on Fishing**

Limitation to fishing activity during construction will be posed during the offshore and nearshore section construction. As described in chapter 5, the duration of the nearshore construction works would be ~23 weeks, whilst for the deep water, offshore, section 3 months.

However, the area restricted to fishing during construction is very small compared to the overall, available fishing area. Following project approval, the local Maritime Authority will issue a Notice to Mariners (Bulletin) indicating where construction activities will be taking place (with relevant coordinates). The announcement will notify mariners of the timing of the works (approximately 3 months) and the safety distance that all ships must maintain from the lay barge. Assuming a safety distance (exclusion zone) of 1,000 m (a 1,000 m radius around the barge) the temporary loss of fishable area at any one time during construction amounts to approximately 3.14 km<sup>2</sup>. Consequently, impacts are assessed as small compared to the available fishing grounds. In particular for the areas near Posidonia meadows, where fishing grounds are assessed as richer, the maximum total length engaged with Posidonia is 250m. Assuming that the 1000m safety distance is also applicable, this results to an area of 0.5km<sup>2</sup> of richer fishing grounds that will be excluded, temporarily.

Within the project area, fishing vessels (particularly smaller vessels) may be affected by pipe laying operations, but the area that will be temporarily unavailable due to these activities is very small in comparison to the overall area and the duration of the impact will be short term.

During construction the lay barge will progress relatively slowly and will communicate its position periodically throughout the working day to the local Port Authority and mariners (vessels) in the area (via radio).

Consequently minor impacts to fishing activities are expected to arise from a loss of fishable area. The sensitivity of the fishers is deemed medium taking into consideration that according to the local authorities 85 fishing boats are active in the area.

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### **6.2.11.2 Mitigation Measures for Fishing**

The following measures are suggested:

- 1000m safety zone around laying barges and consequently fishing restriction
- Communication of restricted areas through local port authorities and requisition of all necessary permits, mainly from Ministry of Economy, Competitiveness & Maritime, Directory of Port Infrastructure, all engaged Port Authorities and the General Navy Staff, for as long as the construction works last.
- Quick and careful execution of construction works to minimize construction time, avoiding structural failures and repetition of work.

### **6.2.11.3 Residual Impacts on Fishing**

No residual impact on fishing is assessed from construction of the project. Taking into account the proposed protective measures on marine flora and fauna (see relevant sections) the possibility of Positive residual impacts through fishing populations increase is assessed likely.

## **6.2.12 Tourism**

### **6.2.12.1 Impacts Assessment on Tourism**

Impacts on Tourism, in general, were an important issue for local community. The duration of the pipeline construction, in all, is limited. The offshore pipeline will be completed in 3 months; the onshore in ~11 months and the coastal at ~6 months. The precise planning will be developed by the EPC contractor in next phases of the project.

The onshore and the deep water pipeline construction is not assessed to pose any impact on tourism. The coastal section, including the landfall site, could, however influence the swimmers of the nearby sandy beaches, which according to the local authorities are accessible only by boat. In order to avoid that, special planning measures should be taken.

The Onshore Facilities will require 20 months. The Onshore Facilities site is far away from the coastal area where the hotels and other touristic enterprises are based consequently no impacts are assessed.

Although, the extent of the impact is small (only to a difficult accessible sandy beach in the wider area of the project), due to the sensitivity of local community the impacts are assessed as moderate.

### **6.2.12.2 Mitigation Measures for Tourism**

In order not to eliminate impacts to the local tourism construction of the coastal and landfall site will take place outside touristic season, i.e. June – August.

### **6.2.12.3 Residual Impacts on Tourism**

No residual impacts on tourism are assessed from the construction operations of the project. However, as proposed in the relevant section, some positive impacts could include the accessibility (see section 6.2.13.3).

The Onshore Facilities will be open for the public periodically, upon relevant arrangements. The visits will be regulated for safety reasons. Information posters could exist explaining the process, the impacts and the benefits of the local community and the environment.

### **6.2.13 Existing Infrastructure**

Regarding all infrastructure, the project will require the use of infrastructure in order to mobilize construction. Consequently, some break in the normal conditions might be required, e.g. during the transportation of the heavy equipment to the facilities' site. However, this will be timely notified to the public by the EPC Contractor. In addition, any damage caused by the project construction to the infrastructure of the area will be immediately remediated.

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### **6.2.13.1 Airports**

#### **6.2.13.1.1 Impacts Assessment on Airports**

No impacts on airports and airtraffic are assessed during construction. Use of the nearby airports will definitely happen but not in a scale that could affect the operation of these airports.

Onshore facilities' construction could have some interaction with airtrafficking though. The installation of the emergency release vent stacks of 40m could require airtrafficking regulations (signals). The aviation corridors availability is so plentiful, that even though flight safety has a very high sensitivity, the impacts are assessed as not significant.

#### **6.2.13.1.2 Mitigation Measures for Airports**

Emergency release vent stacks construction will be timely notified to Civil Aviation Authority and the General Airforce Staff and any requested measures shall be applied.

#### **6.2.13.1.3 Residual Impacts on Airports**

Civil Aviation Authority or the General Airforce Staff could pose some flight restrictions above or near the Onshore Facilities for aviation safety. In any case, these restrictions may be required for operational safety reasons as well but are considered negligible due to the airspace availability.

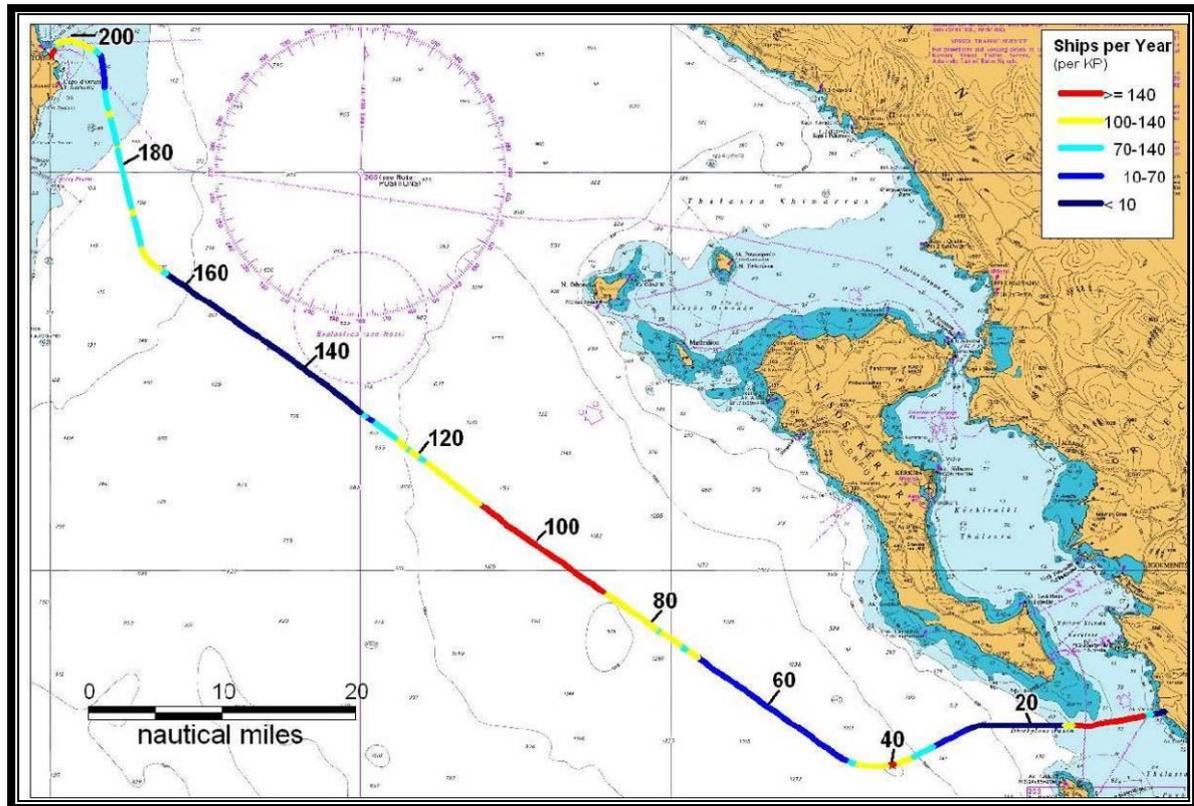
### **6.2.13.2 Seaports – Navigation**

#### **6.2.13.2.1 Impacts Assessment on Navigation**

During construction phase, some restrictions on international navigation, along the offshore section of the pipeline could be posed, through relevant announcements of the Greek Hydrographic Authority. These restrictions will be limited and only during the 3months period that the offshore pipeline construction will take. The most frequented offshore section presented in the following figure is near the Greek territorial waters, where extra attention should be given.

Regarding the coastal (near shore) section, the 6months period required for construction works could have some impact on the local routes. Regarding small fishing boats navigation the impacts were discussed in the relevant section (6.2.11).

**Figure 6.8 Annual ships per year crossing pipeline.**



Based on the assumption of 1000m safety zone around the laying vessels, the temporary loss of navigational area at any one time during construction amounts to approximately 3.14km<sup>2</sup>. Compared to the availability of navigational routes, this impact is assessed as small. Again, the navigation routes availability is so plentiful, that even though maritime safety has a very high sensitivity, the impacts are assessed as not significant.

#### **6.2.13.2 Mitigation Measures for Navigation**

In any case, based on correspondence with the Ministry of Mercantile Marine, Aegean and Islands Policy, the construction works of the offshore part of the Project are not expected to cause any significant impact on marine activities of the area. According to standard procedures of the Ministry, ships, traveling in the area will be informed of the construction works and limitations for approaching the area will ensure safety for both navigation and Pipeline.

All marine vessels used for the construction of the pipeline will bear indicators and markers according to the legal standards ('DKAS')

EPC Contractor will cooperate with the competent authorities and communicate all restricted areas through local port authorities for as long as the construction works last. All necessary permits will be acquired, mainly from Ministry of Economy, Competitiveness & Maritime, Directory of Port Infrastructure, all engaged Port Authorities and the General Navy Staff.

The EPC Contractor is expected to have an emergency response plan for offshore collisions during offshore pipelay.

Quick and careful execution of construction works to minimize construction time, avoiding structural failures and repetition of work.

Immediately after the completion of the offshore pipeline, all necessary data will be sent to General Navy Staff and the Hydrography Service in a format facilitating the authorities' purposes. These data include:

- As built coordinates of the landfall site
- As built coordinates of the offshore route
- As built – measured depths of the offshore route
- The theoretical accuracy of the above measurements

#### **6.2.13.2.3 Residual Impacts on Navigation**

After the installation of the pipeline and during the operation of the project, anchoring will be restricted in a 1000m, indicatively, radius. Given that, according to the dedicated shipping study, anchoring in the area was assessed as minor and that no other limitation will be set to navigation, no residual impacts are assessed.

### **6.2.13.3 Road network**

#### **6.2.13.3.1 Impacts Assessment on Road network**

As mentioned in chapters 4 and 5, the onshore pipeline routing crosses only one asphalt road (Parga – Sivota) and few dirt roads of the area. Although the ROW will be used as the main transportation road for materials and personnel, some traffic nuisance is expected during construction of the road crossings. However, this is assessed to last a few days, maximum. Total traffic interruption is not expected

although a traffic management plan should be prepared especially for the crossing of the asphalt road.

For the construction works, the existing rural and forest road network shall be used, and although the final decision will be taken by the EPC Contractor in the next phase of the project, no new road is deemed necessary.

The existing dirt roads illustrated on the alignment sheets in the annex (Annex B – Plot Plans (*Volume II*)) will be used as access roads for material and personnel transportation, additionally to the ROW. These existing dirt roads will most probably require improvement of their base material through the laying of rocks/ gravel.

Especially for the landfall site, EPC Contractor shall investigate the possibility of either use the existing dirt road, improved as previously described, or use the sea for accessing the site, or both. In case these are not enough, the construction of a temporary road, for the construction phase, will be investigated, according to all legal requirements.

Specifically for the access to Florovouni Onshore Facilities, this will be realized through the existing dirt road. However, due to the heavy equipment that will be transported, this will require enlargement and strengthening. The specifics will be according to Directive 2002/7/EC as amended. Indicatively, this will include the widening of the road in order to accommodate 2 lanes plus shoulder allowing safe transportation of men, construction tools, heavy equipment and materials. Since the access to the Onshore Facilities will be constant, this road will be paved with asphalt, after the completion of the Onshore Facilities construction. Present width of the road is ~3m and the 2lane road with shoulder would mean ~8m. The length of the road is ~800m, meaning that ~4000m<sup>2</sup> will be cleared for the improvement. The road is located at stockfarming area, covered with grassland and consequently the impacts to the vegetation will be minimum.

It is noted that the area of the Onshore Facilities include a small section of an existing dirt road. This section of the dirt road will be reinstated and rerouted in the periphery of the onshore facilities.

Crossing methods for all roads, according to the ongoing FEED, is the open cut method. This will demand the reinstatement of the road to its former condition.

It is possible to require wider construction strip than the 32m for the asphalt road crossing so as to minimize traffic nuisance and maximize safety of the construction works.

The roads themselves have no sensitivity. However, the service they provide is important and consequently the roads are deemed of high significance. The impacts refer to few existing dirt roads resulting in a small magnitude.

#### **6.2.13.3.2 Mitigation Measures on Road network**

The main mitigation measures are summarized below:

- The working strip will be used as the main transportation route for personnel and equipment
- For transportation of hazardous or of significant size loads, consultation with the local authorities will be made in order to develop specific routes that would minimize impacts on local commute
- Preparation of a Traffic Management plan, which will include
  - provisions for advance warning of construction works in the area,
  - details of any proposed diversions and road closures
  - Ensure constant access to commercial and residential
  - Enforce health and safety policy particularly in regard to vehicle maintenance, speed limits and the code of conduct of the construction personnel
  - Agreement on crossing method and reinstatement measures with the competent authority.
  - Obtain crossing license from the competent authority.
  - Notification of the competent authorities 2 weeks prior of the commencement of construction works along road crossings.

### **6.2.13.3 Residual Impacts on Road network**

Since roads will be improved, the Project will have a positive residual impact on the existing road network.

### **6.2.13.4 Power Supply network**

#### **6.2.13.4.1 Impacts Assessment on Power Supply network**

Based on the ongoing FEED, the pipeline crosses two overhead medium voltage power line, one near KP2+300 and one near KP6+500 of the proposed route (from the Onshore Facilities and seawards). Construction of the pipeline at these locations will be performed taking every necessary safety measure and license from the competent authority.

Regarding high voltage power lines, the IPTO has already been notified and the engagement with the ARAXTHOS-IGOUMENITSA 150kV power line is mentioned. However, this line lays outside the project's area and inside the area of DESFA competence (between the Onshore Facilities and the onshore section from Kipoi, Evros till the Onshore Facilities of the Project).

One of the above mentioned power lines could be used as a main power line route which would branch for the project's components. Otherwise, a new power line will have to be created from the nearest station from high to medium voltage to the Onshore Facilities site.

As described in chapter 5, the power supply line, during construction and during operation of the onshore facilities, is still investigated.

At the time of the present ESIA submission, not all required data were available. Consequently, upon finalization of the power supply option, a separate licensing procedure will be followed, according to IPTO's and national legislation's provisions.

Regarding the offshore section, according to the DMS study there are the following offshore power cables that are engaged with the proposed offshore route-corridor. These cables are operated by HTSO (previously by PPC) and TERNAL (previously by Enel).

- Paxos – Paramithia Power Cables (1 and 2)
- Italy Greece (Otranto – Epirus) Power Cable, and

- Otranto - Ftelia Power Cable.

The method of offshore crossing with these cables has not been finalized yet. However, no power supply break should be expected since this would impose international and regional issues.

Because power supply is the basis for most of modern life, its sensitivity is deemed high. Regarding onshore networks, only two instances are identified of engagement. Consequently it is of small magnitude. Regarding the offshore section, due to the significance of the cables and the technical difficulties of offshore crossings, they are deemed of large magnitude and of high sensitivity. In any case, by taking all necessary technical measures no impacts will be imposed.

#### **6.2.13.4.2 Mitigation Measures on Power Supply Network**

Regarding mitigation measures for the high voltage power lines, the correspondence of IPTO is very informative regarding mitigation measures (see Annex K – Contact with Authorities (Volume III)). Although, the investigated project is not engaged, presently, with any high voltage power line, the following are mentioned in short:

- IPTO has an easement of 20m and 25m buffer zones beneath 150kV and 400kV power lines, respectively.
- On these zones strict building restrictions applied, according to MD 161/24.11.81, 118/10.12.85 and 62/9.7.87 of YPEXODE, included.
- Prior to any work in the easement zone IPTO should be notified
- The owned by IPTO pylons parcels will be accessible 24/7
- Special care for cranes transportation underneath power lines is required (e.g. horizontal positioning of the vehicles' arm)
- Provisions of Quarries Regulation (HGG 931/B/31.12.84) are applied, including
  - No use of explosives in a 150m zone from the vertical axis level of the transmission lines and any quarrying activity at a distance smaller than 70m from the center of the pylons parcels.

- No industrial facilities within the easement of the power lines that could cause negative conditions for the safe operation of the transmission lines.
- Prior to construction works commencement IPTO will be formally informed and its requirements will be met

Regarding medium tension power lines the measures provided through Quarries Regulation are also applied.

Regarding the offshore section, the method of offshore crossing with these cables should be finalized prior to construction commencement.

For all power supply networks, every effort will be made so as not to interrupt the normal power supply. In case this is not feasible, all engaged parties will be informed timely.

Upon finalization of the power supply of the construction site of the Onshore Facilities and its operational power supply, a separate licensing procedure for this feature will be performed.

#### **6.2.13.4.3 Residual Impacts on Power Supply Network**

The creation of a new power supply line for the provision of electricity for the construction and the operation of the Onshore Facilities will improve the power supply network infrastructure.

Regarding the possible cumulative impact with the licensed Wind Farm please refer to section 6.6.

#### **6.2.13.5 Water Supply network**

This section should be reviewed in combination with section 6.2.6 on water resources and hydrogeology

##### **6.2.13.5.1 Impacts Assessment on Water Supply Network**

Since, according to the ongoing FEED, no water supply network exists along the pipeline, or near the onshore facilities, no impacts are assessed during construction.

#### **6.2.13.5.2 Mitigation Measures for Water Supply Network**

Because of the high importance of the water supply networks, prior to the construction works commencement a detail survey of the existing water supply networks along the 32m working strip will be performed. In case any such network is identified prior to the construction, the following steps will be followed:

- Agreement on crossing method and reinstatement measures with the competent authority.
- Obtain crossing license from the competent authority.
- Notification of the competent authorities 2 weeks prior of the commencement of construction works along road crossings.
- In case significant water supply networks are identified prior to the construction start, small modifications of the pipeline route will be investigated in order to minimize water supply break. However, as Project's construction goes on in sections, every 500m, reinstatement of the specific section will take place immediately, so as not to significantly disturb water supply.
- All affected water supply networks will be replaced or restored or even improved, according to the local authority provisions.

#### **6.2.13.5.3 Residual Impacts on Water Supply Network**

No residual impacts on water supply networks are assessed.

### **6.2.13.6 Telecommunication network**

#### **6.2.13.6.1 Impacts Assessment on Telecommunication Network**

Since, according to the ongoing FEED, no onshore telecommunication network exists along the pipeline, or near the onshore facilities, no impacts are assessed during construction. In case a future telephone pole is identified located on top the working strip this should be relocated, in order not to break communication lines.

The DMS performed identified two offshore telecommunication cables: the national Preveza – Glyfada, near KP40+300 of the offshore pipeline at 1150m water depth

and the international Corfu – Otranto one near KP106+240 of the offshore pipeline at 1140m water depth.

Because of the technical difficulties of offshore crossings and the international character of the second cable, the offshore telecommunication cables sensitivity is deemed high.

#### **6.2.13.6.2 Mitigation Measures for Telecommunication Network**

In order to assess the proper crossing method for the offshore telecommunication cables, the EPC Contractor will have to contact the operators of the two cables. In cooperation with them a safe crossing method will be identified in order to minimize impacts on telecommunication infrastructure.

#### **6.2.13.6.3 Residual Impacts on Telecommunication Network**

No residual impacts are assessed.

### **6.2.14 Land Uses**

#### **6.2.14.1 Introduction**

In general, these kinds of projects have temporary impacts on land uses, and mainly during construction phase. During pipeline's construction phase it is expected the opening of a working strip of 32m so as to minimize no land use deterioration or destruction. The construction strip will be 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m. However, the EPC Contractor could assess the need for larger ROW for crossings and other instances where for safety or other managerial purposes. In any case, construction will affect the land uses, in general, through working strip formation, excavation, backfilling, reinstatement and the use of the relevant machinery. These activities will cause impacts, which will be temporary since the land use will not change. After construction works, the working strip shall be reinstated.

For the nearshore and offshore section as presented in chapter 5, the concession of Shoreline, Beach and Sea Bottom will be requested from the Ministry of Finance. It is

estimated that a strip of at least 20m on each side of the pipeline will be required for the construction of the nearshore, buried section and the landfall works. Regarding the rest of the offshore section, where the pipeline will be simply laid on the sea bottom, the requested concession will be the minimum required, indicatively as wide as the pipeline diameter (~0.8m). It is noted that the shoreline and beach have been determined with the HGG 359/D/2003.

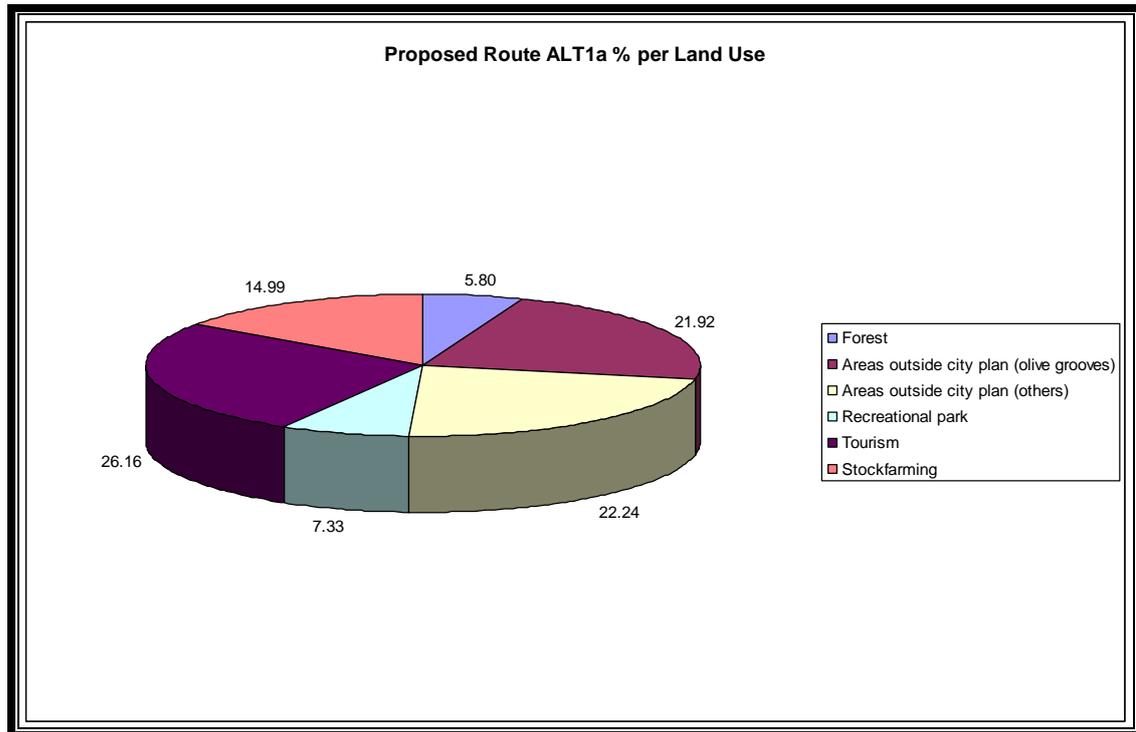
Regarding the onshore facilities, the construction will be temporary but, obviously, the operation will require the same site to change its land use.

Regarding mitigation measures, after the completion of each pipeline section construction, land uses will be fully reinstated to its former use, or otherwise agreed with the landowner-manager. In detail, during construction phase, special care should be given at the timely removal of rubbles, solid wastes, and other debris, as well as to the use of excavation materials for filling borrow pits, inert quarries or other areas indicated by the local authorities. Prior to construction commencement, the existing land use will be detailed and cadastral records will be approved, so as the proper compensation can be provided. It must be kept in mind that at any given time no onshore pipeline section larger of 500m will be constructed meaning ~3 weeks from clearance to reinstatement (backfilling).

In order to present a more reader friendly approach, the land uses have been classified to three categories: general land uses, forestial, and residential. By general land uses, the land uses designated for stock farming, tourism development, and agriculture (areas outside the city plan-other) are described. By forestial land uses, the land uses designated for forests, bushlands or tree crops (areas outside the city plan-olive groves) and the recreational park are described. Residential areas are areas classified as such in the data used in chapter 4. It is noted that no residential areas are crossed by the pipeline.

The following figure illustrates the percentage of each affected land use. It is noted that the Onshore Facilities are located entirely on stockfarming area.

**Figure 6.9 Percentage of Land Uses traversed by proposed route.**



The impact assessment per land use category follows.

## 6.2.14.2 General land use

### 6.2.14.2.1 Impacts Assessment on General land use

Along this land uses, the working strip will be 32m. At this stage of the project, it is not possible to verify areas requiring bigger ROW for managerial and safety reasons (such as the crossing with Parga- Sivota asphalt road). The only one requiring a specialized construction site is the shore crossing, as illustrated on the maps of Annex A (see Annex A – Maps (*Volume II*), Map 7240-AU-LU-02, Sheet 4 of 5) and describe in chapter 5.

In all, as assessed in the relevant section of chapter 4 and illustrated in Figure 6.9, areas of general land used amount to 64% of the total construction ROW, meaning 0.17km<sup>2</sup>. This is analyzed to 0.06km<sup>2</sup> (23%) of agricultural areas (excluding olive groves), 0.07km<sup>2</sup> (26%) of touristic areas and 0.04km<sup>2</sup> (15%) of stockfarming areas.

During construction phase and due to the need of a working strip formation, agricultural lands should face some measure of temporary obstruction, normal

practice difficulty (irrigation break) and crops' loss. More precisely, a temporary clearance of the crops within the 32m working strip will take place. For this reason, the proper construction season should be cautiously chosen, in order to minimize income loss and compensation cost. In some areas, access through fields will be required or road improvement will be needed. Some rural (dirt) roads will be briefly intercepted (as long as the construction works in the specific area last) which will probably cause difficulties to access local fields. Although no irrigation channels were identified, as discussed in section 6.2.6 some future or unidentified ones could break.

Regarding stock farming land uses, no impact is assessed, since the working strip will occupy a small area and consequently livestock could move accordingly. Of course, notification should be issued so as the herders to be able to program their activities. The Onshore Facilities lay entirely on such area.

Even though, the pipeline traverses land uses designated for tourism development, at Preveza Prefecture, in that area and along the proposed route ALT1a, during the preparation of the present study, no touristic facilities were present. This is due to various reasons, and mainly due to lack of infrastructure, steep slopes, and comparative disadvantages of the crossed areas in relation to neighboring areas (e.g. Karavostasi)

The receptor (local community) sensitivity is deemed high. However, this is a very conservative approach because the duration of the works for preparation-construction-backfilling of each 500m pipeline section will take only 3weeks, which decreases the overall sensitivity from high to moderate.

It must be kept in mind that at any given time no pipeline section larger of 500m will be constructed meaning ~3weeks from clearance to reinstatement.

#### **6.2.14.2 Mitigation Measures for General land use**

In addition to the general mitigation measures presented in the introduction of this section (section 6.2.14.1), the following measures can be applied:

- Working strip will generally not exceed 32m, unless differently required, i.e. in case of the landfall site or road crossings.
- Land reinstatement will start as soon as the pipeline is safely positioned.

- Regarding agricultural lands, because a delay could reduce the yield of the following year, harvest's loss along the working strip cannot be avoided, but it should be minimized. All crops' losses will be compensated according to national legislation.
- In general, 2 weeks prior to the construction works commencement local community will be notified, through the local council.

#### **6.2.14.2.3 Residual Impacts on General land use**

No residual impacts are assessed from pipeline construction to general land uses. For the operational residual impact see the relevant section 6.3.14

#### **6.2.14.3 Forestial land use**

##### **6.2.14.3.1 Impacts Assessment on Forestial land use**

Based on data from chapter 4, by forestial land uses, the land uses designated for forests, bushlands, including the recreational park, and tree crops (areas outside the city plan-olive groves) are described. As it has previously stated, the construction strip will be 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m. The working strip in areas with technical difficulties, such as steep slopes, special pipeline protection measures, etc., should not be decreased.

Especially for the landfall site, the minimum onshore space requirement for the shore crossing construction site, as assessed in chapter 5, is 50m (width) × 20m (length) along the center line of pipeline route. Considering the site specific geomorphology, the onshore layout of the landfall construction may require a larger footprint and should be optimized by the EPC Contractor with the available onshore pipeline construction site space.

In all, as assessed in the relevant section of chapter 4 and illustrated in Figure 6.9, areas of general land used amount to ~36% of the total construction ROW, meaning 0.09km<sup>2</sup>. This is analyzed to 0.02km<sup>2</sup> (~6%) of forest areas, 0.06km<sup>2</sup> (~22%) of tree crops and 0.02km<sup>2</sup> (~8%) of stockfarming areas.

Within forests and forestial lands, the previously described working strip is deemed technically acceptable and it minimizes impact on the environment. All works will take place along this strip, after the vegetation removal. In any case, no other impact on forestial land use is expected, such as deposition of excavated material, road construction, etc., since any deposition of excavated material will take place in suitable, recommended sites.

As detailed in section 6.2.7 regarding impacts on flora, the engaged species have high capacity of natural regeneration. In addition, they are typical of maquis vegetation, present all over Greece, with no species under special protection status. Thus their sensitivity is diminished. The same applies for the recreational park lays which is just inside the construction ROW and only at its outskirts.

Tree crops will require more time than the annual species and this increases their sensitivity.

Due to the arguments presented previously, in the whole section, the overall significance of the impacts on the forestial land uses should be deemed as moderate.

#### **6.2.14.3.2 Mitigation Measures on Forestial land use**

In addition to the general mitigation measures presented in the introduction of this section (section 6.2.14.1), the following measures can be applied:

- Working strip will not exceed 32m, as dictated by L.4001/2011, according to the FEED of the project and it will not be smaller than 26m wherever this is technically feasible. Possible exception includes sites where for technical or safety reasons an increased width of working strip may be required, e.g. the landfall site.
- The Working strip will be used as access road for most of the construction commute.
- No access roads are expected to be opened. In case that EPC contractor considers them necessary, as for example in the Landfall site, all relevant permits (including from Forestry Authority if required) will be obtained.
- The Working Strip will be reinstated according to the competent authorities' recommendations and the initial framework provided in section 6.2.7.

- The Right of Way shall be used as a fire belt by the Forest Authorities and modified as required, providing that the 5m safety zone on each side of the pipeline will be kept clear of deep rooted plants.
- The felled products will be promoted according to Forest Legislation.
- All necessary permits will be acquired, based on the legislation as it is amended.
- All reinstatement works will be paid by the project budget.

Specifically for the landfall site:

- the EPC Contractor will re-evaluate the required space so as to minimize shore crossing construction site.
- The reinstatement, as described in section 6.2.6 will include local material and soil bio-engineering systems such as geo-grids to minimize as much as possible visual impact

#### **6.2.14.3.3 Residual Impacts on Forestial land use**

Some negative residual impact should be expected until the reinstatement measures described throughout the whole ESIA and those that will be presented in the phytotechnical study which will be approved by the Forest Authority are fully implemented and developed.

It is the editors' estimation that this will require approximately 5 years.

#### **6.2.14.4 Residential land use**

##### **6.2.14.4.1 Impacts Assessment on Residential land use**

The routing traverses outside the limits of the General Town Plan of any Municipality and the limits of settlements and their expansions.

##### **6.2.14.4.2 Mitigation Measures on Residential land use**

No mitigation measures are required. The initial route selection, avoids the residential and planned residential areas.

#### **6.2.14.4.3 Residual Impacts on Residential land use**

In areas outside the town limit, no building will be permitted in a 20m buffer zone.

Details are provided in the relevant section for operation based in L.4001/2011.

### **6.2.15 Impacts on Landscape**

#### **6.2.15.1 Impacts Assessment on Landscape**

Some visual impact could be caused by the construction zone of 32m and most importantly by the easement strip of 10m (5m on each side of the route axis). The construction zone could be seen as a fragmentation of the landscape. Additionally, onshore pipeline construction will proceed by 500m sections every 3 weeks, approximately.

During construction phase of the Project, a working strip of 32m is required. Along this working strip the vegetation will be removed and a visible, coloring change will take place.

Changes to the area's relief, gradient, or other morphological elements are not expected, in general. ALT1a traverses mainly through natural areas of maquis vegetation and consequently, some visual intrusion should be expected. The construction at the landfall site could cause some change in the morphology of the site.

The aforementioned impacts of the Project on the landscape and the "visual resources" of the area are temporary and restricted mainly during construction phase.

From the above ground Compressor and Metering Station facilities, no negative impact to the landscape is assessed because the buildings have one floor, enclosing significant part of the stacks. In addition, the area selected for the siting of the Onshore Facilities is secluded and cause no visual impact to residential areas.

The overall area of the project's construction is ~ 262.000m<sup>2</sup> (for a 32m working strip), for the pipeline, plus 90.000m<sup>2</sup> for the onshore facilities. However, visual impact will not be posed at all of this area at the same time, since the construction will be performed in sections and therefore, the magnitude is medium. Local Landscape (evergreen broadleaved bushlands) has the capacity of incorporating

small intrusion resulting in a small sensitivity of the impact. Consequently, the overall significance of the impact to the landscape of the area is deemed minor.

### **6.2.15.2 Mitigation Measures on Landscape**

To minimize impacts, during construction phase, the following are recommended:

- All works should take what space is necessary and no more.
- Under no circumstance should the vegetation be removed, unless it is absolutely necessary.
- Localized land formations that could provide cover will be fully used
- Construction sites will be developed behind local visibility levels, horizons, reference sites (settlements, roads, etc.) etc.
- Existing road network will be used in maximum in order to access the routing.
- In case a road must be cut, this will happen beyond sensitive areas, avoiding high gradient areas, coppices of special aesthetic and ecological value, lips, horizons, etc. Clearance of new roads will be implemented by the EPC Contractor and will have the positive opinion of the competent authorities.
- The time period of the landscape's disturbance shall be the minimum possible; also scattering of construction sites and opening of multiple intervention fronts shall be avoided.

As soon as the works are completed, in each part, there will be:

- Reinstatement of the affected relief,
- Removal of the temporary construction facilities, if any,
- Immediate planning, programming and implementation of restoration works of the agricultural land use and the forestial vegetation.

The above mitigation measures are also applicable for mitigating impacts on Tourism, during construction.

### **6.2.15.3 Residual Impacts on Landscape**

No residual impacts on landscape due to construction are assessed. Any impacts are assessed in the operation phase.

## **6.2.16 Impacts on the Area's Profile and Cultural Environment**

### **6.2.16.1 Impacts Assessment**

During construction phase, the presence of construction works, for the pipeline and its facilities, will increase the locomotion within Project's influence zone. Nonetheless, the presence of workers mentioned above will be temporary and it is not expected to change the profile of the investigated area.

Impacts on the cultural environment are not expected. That is because both the route and the proposed installations do not cross any way archaeological sites or monuments, according to the baseline assessment and the relevant correspondence. The neighboring with Dimokastro Acropolis is acceptable according to the competent authority. Taking into account the limited construction time for the onshore pipeline the impacts is not significant. The more time consuming construction of the onshore facilities is distant to the archaeological site and consequently no impact is assessed.

Regarding the marine cultural environment, during the DMS performed in a corridor of 500m along the axis of the proposed offshore pipeline, some points were identified where the on-site visit with the use of ROV was deemed necessary. In May 2012 the above mentioned on site visit was performed by HCMR, under the supervision of the Marine Antiquities Committee in the broader are of the offshore pipeline section and three (3) archaeological features were discovered. Their assessment by the Ephorate of Marine Antiquities resulted in the following:

- At point IGI-1 (coordinates 400963, 4345569, in WGS84, 34N), there is a wreck from the roman period of the 3<sup>rd</sup> century A.D., in a depth of 1.180m
- At point IGI-7 (coordinates 400591, 4342821, in WGS84, 34N), there is a wreck of the 17-18<sup>th</sup> Century A.D. in a depth of 1.260m
- At point IGI-10 (coordinates 385098, 4352392, in WGS84, 34N) there is a wreck from the roman period, at the same age with the wreck of the first point, in a depth of 1375m

According to M.D. 3385 (HGG 1701/B/19.11.2003), a minimum distance of 300m is defined as protection zone for a series of activities, as per Article 15, par. 4 of Law 3028/2002.

The proposed offshore section OS-A, as this is illustrated on chapter 5 and the maps of the annex (see 7240-AU-OM-01 and 7240-AU-OM-02) meets this distance. Specifically, the OS-A is

- 322m from point IGI-1
- 2344m from point IGI-7, and
- 661m from point IGI-10

Consequently, regarding the marine antiquities, no impacts during the construction of the project are expected, since the proposed route passes at a distance greater than 300m; this distance, according to the previously mentioned legislation, is deemed sufficient for keeping the integrity of a ship wreck.

Given that the integrity of the ship wrecks is secured, due to their significant distance from the pipeline route, the discovery of these findings consists a positive impact of the project, since no similar findings were discovered in the Mediterranean Sea, in similar depths (according to preliminary data from competent employees of the Marine Antiquities Ephorate).

It should be noted that other major infrastructure projects have resulted in the finding, salvation and publication of cultural heritage monuments. Such an example is Athens' Metro. In case of monuments are found, they will be managed by the competent authorities.

#### **6.2.16.2 Mitigation Measures**

Impacts on the area's profile do not require the implementation of any special measure. Construction works will be temporary and as soon as installation of each pipeline section is performed, reinstatement will start.

The works will take as limited time as possible. As previously mentioned, it is envisaged that each pipeline section (onshore and offshore) will take 44 weeks to be completely reinstated. The works in the landfall site will take 23 weeks. All the

previously mentioned activities will take place outside the touristic period, i.e. from June to August.

Every excavation construction work will be licensed and supervised by the competent Archaeological Service and supervised by an appointed by the authority archaeologists if requested, burdening project's budget. In case any archaeological finding is revealed during the construction of the project, Project's owner will comply with the recommendations of the Service. In case of antiquities finding, the Owner will be charged with the cost of their excavation and maintenance (reinstatement). Of course, if required, small adjustments of the pipeline route will be performed.

In any case, the anchoring of the barges is forbidden in a radius smaller than 300m from the point of the identified ship wrecks. For this, these points of interest will be included in the navigation system of the ships.

### 6.2.16.3 Residual Impacts on Area's Profile and Cultural Environment

No residual impacts from construction are assessed.

### 6.2.17 Summary of Mitigation Measures during Construction

The time restrictions posed by the proposed mitigation measures, during pipeline construction are presented in Table 6.5. Mitigation Measures during construction are tabulated in Table 6.6. An overview matrix of impacts assessment and mitigation for both construction and operation phases is presented at the end of the chapter.

**Table 6.5 Time Restrictions during Construction along the coastal section.**

Parameter	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
Flora*						X	X	X				
Fauna						X	X	X				
Tourism						X	X	X				
* Compensation for crops loss is opted. Limitations were set because of Posidonia meadows.												
As coastal section is considered the onshore section, near the coast of approx. 600m length, and the offshore section till the depth of 25m, where the pipeline will be buried. The tie-in site will be constructed at a distance of approximately 600-700m from the coast and is not included in the above time restrictions, since is related with the rest of the offshore pipeline section. In any case, the works at the tie-in point are estimated to last for only a few days.												

**Table 6.6 Mitigation Measures during Construction.**

s/n	Description
1	Agreement on crossing method and reinstatement measures with the competent authority.
2	All dirt roads used for construction access will be improved and reinstated.
3	All works should take what space is necessary and no more.
4	All identified points of interest (ship wrecks) will be added to the barges/ ships navigation system. No anchoring at a depths >400m given that the dynamic positioning system will be used. In smaller depths, anchoring in areas of Posidonia oceanica meadows will be avoided as much as possible.
5	Announcement of crossings to the Competent Authorities and Stakeholders.
6	Approval for crossings
7	Artificial reef creation along the buried pipeline
8	Avoidance of felling mature trees, if possible
9	Careful construction works planning
10	Chemical toilets
11	Code of Conduct for EPC Contractor personnel
12	Collection of wastes and disposal at designated areas, meeting national legislation
13	Compensation for income loss as provided by law
14	Compliance with legal requirements
15	Construction of the coastal and landfall site outside touristic season, ie June – August
16	Construction sites will be preferably developed behind local visibility levels, horizons, reference sites (settlements, roads, etc.) etc.
17	Cooperation with local authorities for enhancement of natural environment
18	Covering up of excavation and aggregate material during transport
19	Detail survey of the existing irrigation networks along the 32m working strip, prior to construction.
20	Determination of speed limit of the working vehicles
21	Disposal of surplus soil at local areas for maintaining local biodiversity
22	Drainage system at the ROW
23	Engineering Solutions (Gabions, Diversion Berms, Concrete Sand Bags)
24	EPC Contractor will re-evaluate the required space so as to minimize shore crossing construction site.
25	Few felled trees left on site for biodiversity promotion, if requested, otherwise managed according to legislation
26	Fire fighting equipment on site
27	Grievance Mechanism
28	Immediate reinstatement per section according to the local authority provisions and other stakeholders. Local materials will be opted
29	Inspection for nests of Buteo rufinus, Buteo buteo, Ciconia nigra, Falco naumanni and Gyps fulvus along the pipeline ROW and the landfall site
30	Use of maintained vehicles and machinery.
31	Maintenance in controlled areas
32	Minimization of construction time
33	No machinery will be left running idly.
34	No main channel break from April till September,
35	Avoidance of secondary channel break for more than 48h, from April to September
36	Avoidance of tertiary channel break for more the 7days, from April to September
37	Onshore pipeline construction in 500m sections meaning 3 weeks from construction commencement to reinstatement (backfilling) per section.
38	No use of chemicals is envisaged for the hydrotesting. If this is deemed necessary, only PLONOR chemicals will be used.

s/n	Description
39	Pre-discharging analysis of hydrotesting water.
40	Filtering of hydrotesting water prior to discharge
41	Use of settlement ponds for hydraulic water prior to discharge
42	Preparation of a Traffic Management Plan prior to construction commencement
43	Availability of Emergency Response Plan for maritime safety
44	Separate environmental licensing procedure for power line
45	Preparation of special reinstatement study for forest areas and approval by the competent authorities.
46	Prior to construction commencement, preparation and approval of cadastral
47	Active promotion of local workforce engagement and services providers.
48	Quick and careful execution of construction works to avoid repetition of work.
49	Pilot nursery garden and transplantation of Posidonia oceanica laying directly on the pipeline route and relocate them on the sea bottom.
50	Reuse of excavated materials
51	Reuse or Recycle of materials
52	Route selection outside existing and planned residential areas limits
53	Safety and crossing methods in cooperation with competent authorities
54	Salvation of possible trapped animals
55	Separation of topsoil and separate reinstatement of it.
56	Small adjustment of the pipeline route if required, within the working strip (RoW).
57	Water spreading of roads and of accumulated excavation materials when required.
58	Soil Bioengineering (geogrid, erosion control fabric)
59	Stockpiles of maximum 2m.
60	Supervision by archaeological authorities payable by the Project and adjustments of construction works in case of archaeological concerns' findings along the pipeline route, if required.
61	Timely notification of all parties
62	Use of excavation materials for filling borrow pits or other purposes as requested by the competent authorities.
63	Working strip is restricted to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.
64	Working strip will be used as the main access road. No access roads are expected to be opened (excluding Landfall Site).
65	Appointment of competent engineer as environmental inspector
66	Construction works between 08:00 till 17:00, during winter, and till 18:00 during summer, near residential areas
67	Special engineering design and technical solutions for seismic protection of the project

## 6.3 Operation Phase

### 6.3.1 Atmosphere

#### 6.3.1.1 Impacts Assessment on the Atmosphere, during pipeline's operation

During pipeline's operation, no impact on the atmosphere is expected, since the pipeline is underground and there is no contact between Natural Gas and the atmosphere. Nonetheless, it is worth mentioning that due to the Project and the predicted supply of the local communities with natural gas, it is expected a long-term decrease in air pollutants emission, both locally and regionally.

Indicatively, comparing Natural Gas with other fossil fuels, Natural Gas is more advantageous than the others, concerning air pollution. Indicatively, as presented in the NordStream Fact Sheet 2011, Greenpeace argues that natural gas is the only viable bridge to an age of renewable energy<sup>25</sup>.

In continuance to the presented data in the No Action section of chapter 5, this decrease is verified based on the published by the OECD (1991) data regarding industrial pollutants, where NO<sub>x</sub>, SO<sub>2</sub>, CO, and Suspended particles emissions were calculated in mg/MJ of energy consumed. Table 6.7 illustrates the emission factors for the various industrial sectors.

**Table 6.7 Emissions Factors in Industry (mg/MJ).**

Pollutant	Carbon	Crude Oil	Diesel	Natural Gas
NO <sub>x</sub>	250	180	170	100
SO <sub>2</sub>	110	360	150	0.3
CO	80	15	15	15
Suspended Particles	460	115	10	2

Source: OECD "Greenhouse Gas Emissions" (1991)

Consequently, for every industrial sector, the pipeline's operation will present a significant environmental advantage.

<sup>25</sup> Greenpeace, 2010. Erdgas: Die Brücke ins regenerative Zeitalter. August 2010. Sited in Nord Stream, 2011, Fact Sheet, September 2011.

Having in mind that, based on the provisions of L.4001/2011, the Epirus and Western Macedonia Gas Supply Company will be established at the latest within one year from the commissioning of the pipeline, the project is expected to have a positive impact on the regional air quality. The gas supply networks will be first implemented in the main urban centers of Epirus, which are quite close to DESFA network and will be expanded, gradually, to all Epirus and Western Macedonia Regions. This impact is very important. It expands from the local investigated area, i.e. small parts of Thesprotia and Preveza Regions (Regional Unities) to all of Epirus and Western Macedonia Regions. It affects all consumers, being industrial and private. This could have secondary positive impacts to industry development and air quality of major significance. However, these positive impacts are not properly assessed, based on the assumption of Liebeg's law of the Minimum and of the negative factors importance, as described in the introduction of this chapter.

It is noted that the aforementioned legal obligation lays with DEPA (shareholder of the Project Owner) and not with the Project Owner IGI POSEIDON.

#### **6.3.1.2 Mitigation Measures for Atmosphere, during pipeline's operation**

No mitigation measures are necessary for the impacts on atmosphere during pipeline's operation. The Epirus Gas Supply company, dictated by L.4001/ 2011 is simply stated.

#### **6.3.1.3 Residual Impacts on Atmosphere, during pipeline's operation**

The Epirus Gas Supply Company and consequently the provision of Natural Gas to the Region of Epirus is a major positive residual impact.

#### **6.3.1.4 Impacts Assessment on the Atmosphere, during the operation of the Compressor and Metering Station**

Impacts assessment on air quality by the operation of the Compressor and Metering Station was performed by Environmental Research Laboratory INTR-P / NCSR 'Demokritos', of GREEK MINISTRY OF NATIONAL EDUCATION AND RELIGIOUS AFFAIRS. The full study of the air dispersion model "STUDY OF THE

ATMOSPHERIC DISPERSION OF AIR POLLUTANTS FROM INTERCONNECTOR GREECE-ITALY (IGI) POSEIDON” (March 2012) is presented in the relevant annex (Annex H – Air Emissions Model (*Volume III*)), whilst here below an executive summary of the model is presented.

#### **6.3.1.4.1 General**

For the emissions estimation a modeling study was performed by the Environmental Research Laboratory (EREL) of the National Centre for Scientific Research <<Demokritos>>. The modeling study investigate the dispersion of Nitrogen Oxides (NO<sub>x</sub>), Non-Methane Hydrocarbons (HC), Carbon Monoxide (CO) and Particular Matter (PM) on the atmosphere from the Compression Station IGI POSEIDON (Interconnector Greece-Italy) of natural gas, located at Florovouni (region of Thesprotia, Greece), using appropriate 3-dimensional computer modeling tools. The study included the modeling of CH<sub>4</sub> gas from the vents of the dry seal leakage from the compressors and the gas analyser.

The position and geometry of the IGI POSEIDON as well as the necessary data on stacks, emission rates of NO<sub>x</sub>, HC, CO, PM and CH<sub>4</sub> were provided to EREL by ASPROFOS S.A. based on construction information. The meteorological data were retrieved by EREL. The topography of the area was extracted from the Geographic Information System (ArcGIS) .The data on emission sources are presented to the following table

It must be stressed out that the model run was based on the foreseen final operational status of the Compressor Station, during which 4 compressor units will be operating with a capacity of 12BCM/ year. The project is planned to initially start with 3 compressor units and capacity of 9BCM/year.

Additionally, it is mentioned that 2 scenarios of chimney heights were investigated: (i) 19m chimneys height as presented in the ongoing FEED, and (ii) 25m chimneys height in order to assess the impact of the height to the level of emissions. As illustrated below, there is not substantial difference regarding pollutants concentrations between the two scenarios. Consequently, the height of 19m is opted having the smallest visual impact.

**Table 6.8 Data on emission sources from IGI Poseidon.**

Name of emission source	Number of stacks	Stack Geometric characteristics		Exit gas Temperature (°C)	Exhaust gas flow rate (kg/h)	Exhaust gas flow volume rate (Nm <sup>3</sup> /h)	Exit gas velocity (m/s)
		Height (m)	Diameter (m)				
Compressor (4 compressors)	4	19 or 25	3.5	528	338400	254492	21.7
Back-up generator	1	19 or 25	5	445	68365	51274	
Compressors' leakages (Emergency and Maintenance Depressurization)	2 vents on each compr.	15	-	-	0.7 – 4.264		
Gas analyzer (Bleed)	1	8	-	-	0.07	0.1	

**Table 6.9 Data of HC, CO, PM and NO<sub>x</sub>, from each Compressor of IGI.**

Pollutant	Pollutant concentration in exhaust mg/Nm <sup>3</sup>	Pollutant rate gr/h
HC	5	1272.46
CO	5	1272.46
PM	5	1272.46
NO <sub>x</sub>	10.5	8032.5 (assuming 212.5 Am <sup>3</sup> /sec)

**Table 6.10 Emission data of CH<sub>4</sub>.**

Name of emission source	CH <sub>4</sub> kg/h	Total CH <sub>4</sub> load kg/year
Compressors' leakages (Emergency and Maintenance Depressurization) 2 vents on each compressor	Range of: 0.7 – 4.264	Range of: 49804 - 298826
Gas analyzer (Bleed)	Average value: 0.07	Range of: 613 - 774

### 6.3.1.4.2 Results - Conclusions

#### 6.3.1.4.2.1 NO<sub>x</sub>, CO, PM & HC concentrations

This section focuses on the analysis of the HYSPLIT model results about the concentration values of NO<sub>x</sub>, CO, PM and HC from the compression station IGI Poseidon.

The concentrations of NO<sub>x</sub> were calculated on an hourly and annual basis to compare the modeled calculated results with the respective air quality limits as set by the legislation in force (MD 14122/549/E.103/2011 "Measures to improve air quality in compliance with the provisions of Directive 2008/50/EC "on the air quality and cleaner air for Europe" the European Parliament and Council of the European Union of 21 May 2008"). According to the current directive, the air quality limit for NO<sub>2</sub> for averaging period of 1 hour is set at 200 µg/m<sup>3</sup> not to be exceeded more than 18 times a calendar. On an annual average basis, the respective limit is 40 µg/m<sup>3</sup>. The CO values were calculated as maximum daily 8 hour running mean concentrations for comparison with the respective air quality limit of 10 mg/m<sup>3</sup> (Directive 2008/50/EC). It must be emphasized that there is no current EU Directive establishing air quality standards on HC. Yet, the EU Directive 2008/50/EC relating to limit values for Benzene in ambient air (annual average limit concentration of 5 µg/m<sup>3</sup>) could be adopted in the case when the percentage concentration of benzene in total emitted HC is known. The air quality limits for PM<sub>10</sub>/PM<sub>2.5</sub> are set by the Directive 2008/50/EC, as 50 µg/m<sup>3</sup> (not to be exceeded more than 35 times a calendar year) for the average daily concentration and 40 µg/m<sup>3</sup> for the average annual concentration.

The modeling approach was performed without the inclusion of the photochemical reactions which could reduce the concentrations of NO<sub>x</sub>, CO and PM in the atmosphere for the reason of obtaining the maximum possible values in the domain. Moreover, detailed data on the HC compounds would be needed for a photochemical model. It should be noted that the background air quality concentrations of the region have not been included in this study; therefore, the concentration values of the pollutants refer only to those from the compression station.

As far as background concentrations concern, reliable information on the air quality of the region of interest can be extracted from the database of EMEP, European Monitoring and Evaluation Program, which is a scientifically based and policy driven program under the Convention on Long-range Transboundary Air Pollution for international co-operation to solve transboundary air pollution problems (<http://www.ceip.at/emission-data-webdab/gridded-emissions-in-google-maps/>).

According to the EMEP data, the background of NO<sub>x</sub> emissions of the 50×50 km<sup>2</sup> area (where IGI Poseidon is placed) centered at the town of Paramithia is estimated at 1517.42 Mg/year (EMEP, reference year 2009, updated within 2012). These

emissions result from the existing anthropogenic activities in the area (e.g. traffic, agriculture, combustion industry, waste disposal, fossil fuel extraction and distribution). In comparison with the anthropogenic emission levels of NO<sub>x</sub> from the adjacent cell of 50×50 km<sup>2</sup> centered at Arta, estimated at 2237.41 Mg/year (EMEP, reference year 2009), where greater population and anthropogenic activities can be found, it can be concluded that the NO<sub>x</sub> background levels in the area of interest are low. In addition, the NO<sub>x</sub> emission rate from IGI of approximately 104 Mg/year is also found to be comparatively at low levels.

Similarly, the EMEP 2009 data for the CO background anthropogenic emissions show a total value of 7017.68 Mg/year in the area of the 50×50 km<sup>2</sup> centered at Paramithia. Hence, the CO contribution of approximately 13.0 Mg/year of IGI to the total emissions of the area is small.

The same area emits 1644.1 Mg/yr of HC (Non Methane VOC) from anthropogenic activities while HC emissions from IGI are estimated at much lower values of approximately 12.5 Mg/yr.

The PM<sub>10</sub> (PM coarse) EMEP emission data of the same referenced area and year are 235.46 Mg/yr while from IGI the estimated emission contribution is approximately 13.2 Mg/yr.

The results show that the maximum hourly average values of NO<sub>x</sub> concentrations from IGI Poseidon do not to exceed the air quality limit of 200 mg/m<sup>3</sup> for any assumed height of the stacks and during any weather type in the region even during those (WT 4 and 6) characterized by high stability in atmospheric masses and low wind speeds (see also Table 6.11). The maximum hourly average NO<sub>x</sub> concentrations remain low and well below the air quality limit even in the vicinity of the stacks. In fact, the highest maximum hourly NO<sub>x</sub> concentrations values were found to be equal to 106 µg/m<sup>3</sup> and 104 µg/m<sup>3</sup> for stack height 19m and 25m, respectively during WT 4 (Table 6.15). Additionally, the annual average values of NO<sub>x</sub> do not exceed the respective air quality limit (40 µg/m<sup>3</sup>) as very low values have been calculated for the two stack heights and weather types

The maximum 8-hour value of CO concentration was calculated to be equal to 4.2 µg/m<sup>3</sup> and 4.0 µg/m<sup>3</sup> during WT 4 (see Table 6.12). The CO values were found to remain very low compared to the legislative limit everywhere in the domain and no exceedance occurred.

Similarly, no exceedance in the PM hourly maximum and annual concentrations of the respective air quality limits were calculated for both stack heights and weather types. The PM calculated concentrations were found to be very low everywhere in the area of study (see also Table 6.12).

Table 6.13 and Table 6.14 summarize the average NO<sub>x</sub> maximum hourly and annual concentrations, the CO maximum 8-hour mean values and the PM daily and annual average concentrations, calculated by the dispersion model for the two assumed stack heights (19 m and 25 m), at the location of the compression station and over the residential areas of the domain. **It can be deduced, that no exceedance of the air quality limits of the pollutants occur over the populated regions; on the contrary, the values calculated are significantly lower than the allowed ones.**

The distribution of HC concentrations calculated as maximum hourly and annual averages for the two stack heights (19 m and 25 m) and weather types (see also Table 6.15 and Table 6.16). An inspection of the values yields that overall the HC concentrations are low. Even in the case of the average annual total HC concentrations, the values remain well below the level of 5 µg/m<sup>3</sup>, which is the air quality limit of Benzene. Hence, it is safe to conclude that the total HC concentrations from IGI Poseidon are very low on annual basis and do not in any case of assumed stack height exceed the only existing relevant limit that of benzene.

**Table 6.11 Maximum calculated values of hourly average NO<sub>x</sub> concentrations in the domain per weather type (height of stacks at 19 m and 25 m).**

IGI POSEIDON		
Typical weather type	19 m Stack	25m Stack
	Height Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Height Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )
1	31	32
2	61	55
3	37	32
4	106	104
5	28	22
6	46	45
7	65	38

**Table 6.12 Maximum calculated average concentration values of NO<sub>x</sub>, CO and PM<sub>10</sub> in the domain.**

Stack Height (m)	Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Annual average NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Maximum 8-h mean CO concentration (µg/m <sup>3</sup> )	Maximum average daily PM <sub>10</sub> concentration (µg/m <sup>3</sup> )	Maximum annual average PM <sub>10</sub> concentration (µg/m <sup>3</sup> )
	(Air quality limit 200 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )	(Air quality limit 10000 µg/m <sup>3</sup> )	(Air quality limit 50 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )
19	106	3.4	4.2	1.9	0.5
25	104	2.8	4.0	1.5	0.4

**Table 6.13 Calculated maximum concentration values of NO<sub>x</sub>, CO and PM<sub>10</sub> for 19 m stack height over the residential areas in the domain.**

IGI POSEIDON						
19 m stack height						
		Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Annual average NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Maximum 8-h mean CO concentration (µg/m <sup>3</sup> )	Maximum average daily PM <sub>10</sub> concentration (µg/m <sup>3</sup> )	Annual average PM <sub>10</sub> concentration (µg/m <sup>3</sup> )
s/n	Place of residence	(Air quality limit 200 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )	(Air quality limit 10000 µg/m <sup>3</sup> )	(Air quality limit 50 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )
1	Onshore Facilities	80.2	1.5	2.9	1.6	0.3
2	KARTERI	9.4	0.1	0.3	0.1	0.0
3	MARGARITI	3.6	0.1	0.1	0.1	0.0
4	PERDIKA	24.9	0.8	1.3	1.2	0.2
5	SIVOTA	0.5	0.0	0.0	0.0	0.0

**Table 6.14 Calculated maximum concentration values of NO<sub>x</sub>, CO and PM<sub>10</sub> for 25 m stack height over the residential areas in the domain.**

IGI POSEIDON						
25 m stack height						
		Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Annual average NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Maximum 8-h mean CO concentration (µg/m <sup>3</sup> )	Maximum average daily PM <sub>10</sub> concentration (µg/m <sup>3</sup> )	Annual average PM <sub>10</sub> concentration (µg/m <sup>3</sup> )
s/n	Place of residence	(Air quality limit 200 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )	(Air quality limit 10000 µg/m <sup>3</sup> )	(Air quality limit 50 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )
1	Onshore Facilities	99.3	1.3	3.1	1.2	0.2
2	KARTERI	4.5	0.1	0.2	0.1	0.0
3	MARGARITI	1.9	0.1	0.2	0.1	0.0
4	PERDIKA	11.5	0.4	0.5	0.5	0.1
5	SIVOTA	0.4	0.0	0.0	0.0	0.0

**Table 6.15 Calculated maximum average HC concentration per weather type for 19 m stack height.**

Weather Type	Maximum hourly average HC concentration $\mu\text{g}/\text{m}^3$	Maximum hourly HC concentration $\mu\text{g}/\text{m}^3$
1	0.8	4.9
2	1.3	9.7
3	0.4	5.9
4	1.8	16.8
5	1.0	4.5
6	0.9	7.3
7	0.5	10.3

**Table 6.16 Calculated maximum average HC concentration per weather type for 25 m stack height.**

Weather type	Maximum hourly average HC concentration $\mu\text{g}/\text{m}^3$	Maximum hourly HC concentration $\mu\text{g}/\text{m}^3$
1	0.8	5.1
2	1.0	8.7
3	0.4	5.0
4	1.6	16.5
5	0.6	3.4
6	0.4	7.1
7	0.4	6.1

#### 6.3.1.4.2.2 CH<sub>4</sub> concentrations

Methane (CH<sub>4</sub>) is a greenhouse gas and therefore, it is not related to air quality legislative limits. The dispersion calculations yielded the maximum hourly average concentrations and the maximum hourly value detected in the domain for each weather type (see Table 6.17).

**Table 6.17 Calculated maximum hourly average and maximum hourly CH<sub>4</sub> concentrations per weather type.**

Weather type	Maximum hourly average CH <sub>4</sub> concentration $\mu\text{g}/\text{m}^3$	Maximum hourly CH <sub>4</sub> concentration $\mu\text{g}/\text{m}^3$
1	33.6	91.3
2	42.3	115.8
3	45.7	133.4
4	60.5	146.7
5	37.6	94.3
6	63.0	207.9
7	70.9	255.6

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### **6.3.1.5 Mitigation Measures for Atmosphere, during the operation of the Compressor and Metering Station**

The design of the project has incorporated all Best Available Techniques for the prevention and mitigation of emissions to air as illustrated in chapter 5. The main process equipment has limited continuous emissions of natural gas or other process fluids. The main emission of natural gas is the leakage from the dry gas seals of the compressors. The application of dry gas seals is the best available technology to minimize the compressor seal leakages. The leakage from dry gas seals is further minimized by adequate monitoring and maintenance programs of the compressors. In addition small emissions of natural gas come from the gas analyzers required for the fiscal metering.

Maintenance on the process equipment may require depressurization and should in these cases be carefully planned to minimize the need for depressurization. Design of instrumentation and equipment should be such that requirement of depressurization for maintenance is avoided as much as possible by either provisions allowing maintenance without depressurization or selection of reliable equipment and instrumentation required minimum of maintenance.

Consequently, no additional mitigation measures are necessary for the impacts on atmosphere during the operation of the Compressor and Metering Station.

### **6.3.1.6 Residual Impacts on Atmosphere, during the operation of the Compressor and Metering Station**

As illustrated by the model, the legislative limits will be met during the operation of the onshore facilities. The legislative limits are such that no impact to health or the environment may be inflicted by the operation of the Onshore Facilities. Consequently, no residual impacts are assessed due to the operation of the Compressor Metering Station.

## **6.3.2 Wastes**

The operation of the pipeline does not produce any waste. Wastes are produced only by the operation of the onshore facilities.

### **6.3.2.1 Liquid Wastes**

#### **6.3.2.1.1 Impacts Assessment on Liquid Wastes**

Effluents to surface water comprise of:

- Rain water collected on site
- Sanitary water from the Service buildings

Rain water from paved areas (e.g. roads, roofs) is normally drained to the soil. Only at location where this is not possible the water is collected in a site sewer system and discharged via a sand catcher to a suitable point in the surroundings (e.g. surface water). At specific areas with the potential of spillage of chemical substances a dedicated open drain system is provided. These areas are:

- Truck (un-)loading areas
- Diesel filters
- Near the turbines where potentially lube oil is spilled

Although the oily waters are assessed zero, a proper design must be in place.

As stated in chapter 5, liquid wastes from the operation of the facilities are likely to include lubricants. The exact quantities of are not known but are assessed at ~100kg per year, mainly lubricants. These will be collected and treated as chemical wastes.

Regarding sanitary wastes, as described in chapter 5, these amounts to 65.7m<sup>3</sup> per year (calculating 6 persons using 30lt per day for 365 days a year). The sanitary drain system consists of a collection system and a septic tank. The effluent of the septic tank shall be led to a drain field with perforated pipes for irrigation of the area of the Onshore Facilities.

#### **6.3.2.1.2 Mitigation Measures for Liquid Wastes**

The embedded into the design of the project mitigation measures are the following.

- The water (and potential spills) will be collected and treated in a water-oil separator before being discharged to the natural receiver via a sand catcher.
- Oily waters will be treated as a chemical waste, and it will be collected only by licensed operators and disposed according to national legislation. The same applies for the lubricants.

- Domestic (urban) wastes will be collected in different drains within the Service building. The water is collected and routed to a septic tank. The discharge of the effluent from the septic tank is connected to a discharge point to the surface water. The capacity of the system is based on the presence of 30 persons, during maintenance campaigns. The effluent flow is in this case 0,9 m<sup>3</sup>/h.
- All relevant facilities will be properly maintained in order to ensure good effluents quality.

As preventative measures, and as it is detailed in section 6.2.2, the following measures have been applied:

- Underground storage tanks of diesel and condensate are double walled and provided with leak detection.
- Both tanks and underground piping should be inspected regularly.
- Above ground equipment containing chemical substances and truck (un-)loading areas are placed on watertight paved areas to collect possible leaks or spills.

#### **6.3.2.1.3 Residual Impacts from Liquid Wastes**

No residual impacts are assessed.

#### **6.3.2.2 Solid Wastes**

##### **6.3.2.2.1 Impacts Assessment from Solid Wastes**

No solid wastes during normal operation of the project are expected. Solid wastes, during maintenance, are not assessed either. The only solid wastes that will be produced will come from the personnel in the onshore facilities and treated as domestic sanitary wastes, as previously described.

##### **6.3.2.2.2 Mitigation Measures for Solid Wastes**

A sanitary collection system leading to a septic tank is common practice and will be used for the investigated project. This septic tank will be emptied regularly, through legal procedures.

### 6.3.2.2.3 Residual Impacts from Solid Wastes

No residual impacts are assessed.

## 6.3.3 Noise

### 6.3.3.1.1 Impacts Assessment from Noise

The significance of operational noise is evaluated by reference to Presidential Decree 1180/81 (GG 293/A/6.10.81), according to the use of the area concerned.

**Table 6.18 Maximum noise level at the boundaries of the onshore facilities.**

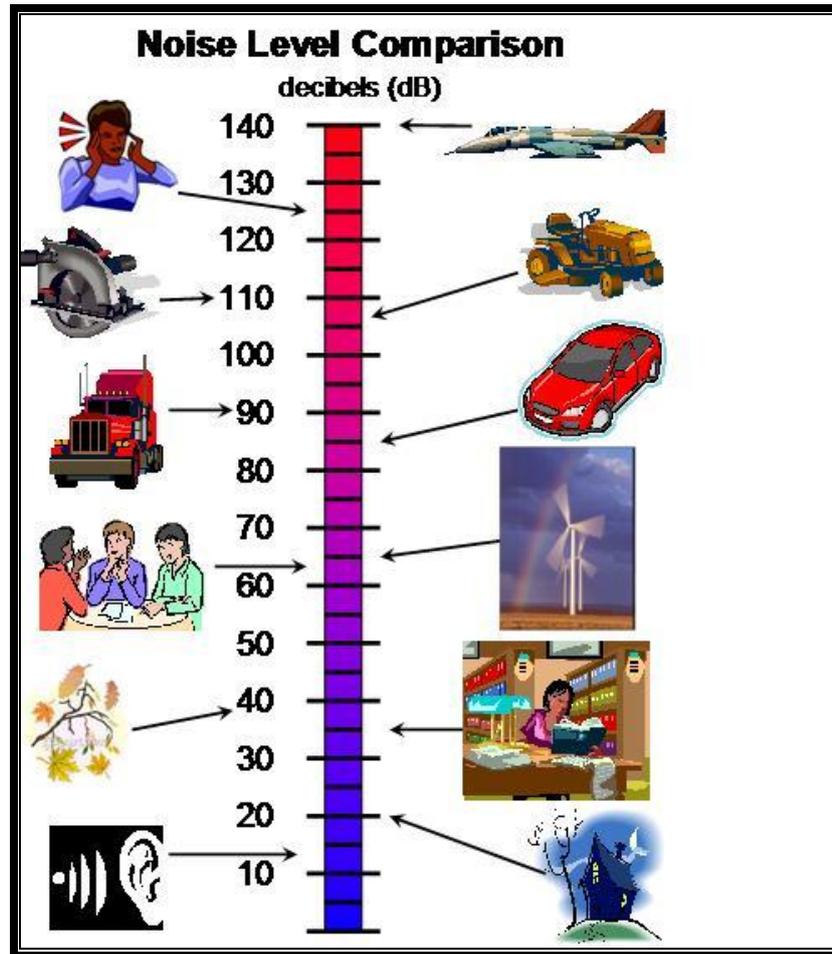
	Area	Maximum noise level dB(A)
1	Established industrial areas	70
2	Areas where the industrial element is dominant	65
3	Areas of balanced industrial and urban elements	55
4	Areas where the urban element is dominant	50

During operation phase, regarding the pipeline or the block valve station, no noise exists, since no noise from the flow of the natural gas is transmitted, due to the gaseous phase of natural gas, the depth of the pipeline and the above it backfilling material.

Contractual obligations of the Onshore Facilities contractors will include that the statutory limits will be met and the proper insulation for the installations will be installed.

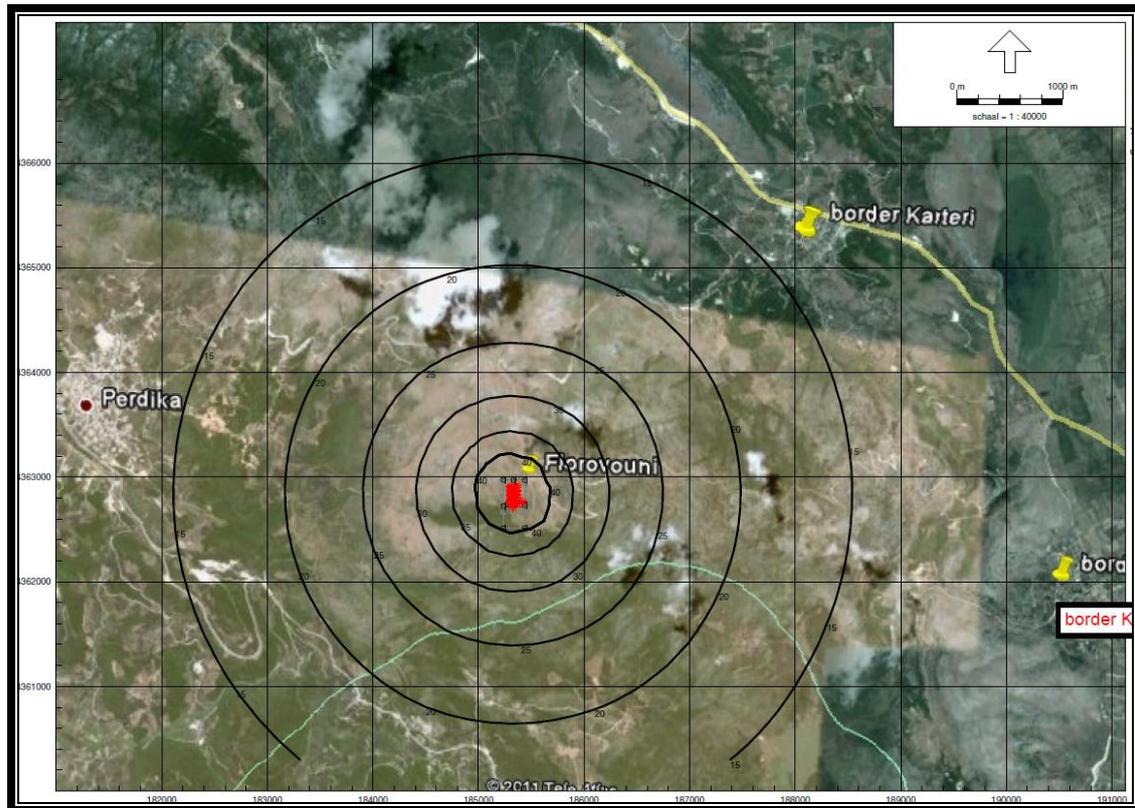
As a result of the above measures, it is deemed, internationally, that the operation of the Onshore Facilities do not increase the noise load of the adjusting area, or affects the residential development, even in short distance from the onshore facilities. The noise produced by the operation of the Onshore Facilities outside its fencing, will not exceed 50dB. This level corresponds to the noise produced by a mild rainfall or a low tone conversation. As illustrated in the following picture ([www.ruralenergy.wisc.edu](http://www.ruralenergy.wisc.edu)), the 50dB noise level is somewhat higher than the 40dB of the sound level originated by the rustling of leaves.

Picture 6.1 Noise level comparison



In order to properly assess the impacts from the noise originating from the compressor and metering station Onshore Facilities a noise model was run, during the ongoing FEED. Its conclusions are summarized in the following figure.

**Figure 6.10 Noise model contours**



It is illustrated that the nearest residential areas, i.e. Perdika and Karteri are not influenced by the operation of the onshore facilities. The 15dBA contour reaching the above mentioned areas is barely in the areas of human hearing.

The area affected by high level noise is small with no social receptor. In the area some animals will be affected but their sensitivity is assessed as low, since no protected species are positively identified in the facilities area. Consequently, the overall significance is deemed minor.

#### **6.3.3.1.2 Mitigation Measures from Noise**

The embedded into the design of the project mitigation measures of include:

- Placing the noisy equipment in closed buildings, especially when placed next to the fence.
- Requirements in the tender documents for use of low noise fans and equipment.

The noise produced by the operation of the Onshore Facilities outside its fencing, will not exceed 50dB

#### **6.3.3.1.3 Residuals Impacts from Noise**

The legislative limits will be met. However, since the area does not have any similar emissions, a slight increase of noise, in the surroundings of the compressor station, even in legislative acceptable limits, will happen. However, the residual impact is assessed as minor. This is because of the above reasoning. The legislative limits are such that no impact to health or the environment may be inflicted by the operation of the Onshore Facilities while no sensitive receptor exists in the area (social or protected fauna species).

### **6.3.4 Project and Area's Seismicity**

#### **6.3.4.1 Impacts Assessment on Project's Area Seismicity**

The natural gas pipeline project does not affect the seismicity of the area, during the operation of the project, but vice versa. The seismic activity of the broader region could cause damages to the Project, during operation phase. In order to avoid that, during construction phase, all the necessary building measures will be applied, wherever the pipeline crosses active seismic faults, and wherever the area could become unstable after a seismic event, such as vulnerable slopes, water bodies crossing, etc.

In general, the only way of avoiding damages caused by a seismic event is the strict and detail seismic design of the Project.

#### **6.3.4.2 Mitigation Measures on Project's Area Seismicity**

The usual construction measures that will be applied are presented in paragraph 6.2.4.

After every significant seismic event, a check of sensitive sites along the pipeline should be made, e.g. steep slopes, rivers' crossing, unstable geological formations, etc.

After the implementation of all necessary studies and the antiseismic design of the project, all risks of pipeline failure will be minimized.

The size of the earthquake and the maximum seismic velocity will be determined during the antiseismic design of the project.

#### **6.3.4.3 Residual Impacts on Project's Area Seismicity**

No residual impacts are assessed in the area's seismicity from the project's operation. The antiseismic design will be appropriate as to protect the project from possible seismic event in the broader area.

### **6.3.5 Soil**

#### **6.3.5.1.1 Impacts Assessment on Soil**

Under normal conditions, only rain water is normally penetrating into the soil. Emissions to soil are caused by accidental leaks from underground equipment and piping or spills/leaks from above ground equipment containing chemical substances. Underground storage tanks of diesel and condensate are double walled and provided with leak detection. Above ground equipment containing chemical substances and truck (un-)loading areas are placed on watertight paved areas to collect possible leaks or spills.

Assuming the proper design and maintenance of liquid containing equipment as well as of the spill collection systems, no emissions to soil are expected during operation and maintenance of the pipeline or the onshore facilities.

#### **6.3.5.1.2 Mitigation Measure for Soil**

The mitigation measures, embedded in the design of the project are the following:

- Underground storage tanks of diesel and condensate are double walled and provided with leak detection.
- Both tanks and underground piping should be inspected regularly.

- Above ground equipment containing chemical substances and truck (un-)loading areas are placed on watertight paved areas to collect possible leaks or spills.

#### **6.3.5.1.3 Residual Impacts on Soil**

No residual impacts on soil are assessed.

### **6.3.6 Water Resources and Hydrogeology**

#### **6.3.6.1 Impacts Assessment on Water Resources and Hydrogeology**

The Project has been designed in such a way, as not to have any ground water pollution, during operation. Specifically, during design phase, all the appropriate measures were taken into account, in order to:

- Ensure total impermeability of the pipeline (hydraulic test in vitro, non-destructive testing on 100% of the welds, etc.) at the welds.
- Fully anticorrosion protection of the pipeline.
- Apply all the necessary measures for checking pipeline's operability, after its placement.

In general, during operation phase, impacts on hydrogeology and on future irrigation networks are small. Pipeline's presence could affect future irrigation or water supply networks, since the pipeline will be installed in a 2m trench and every excavation above the pipeline, in order to construct any channel, shall not be allowed, without prior approval of the Owner. In case of no other alternative, a Special Study for the Natural Gas Pipeline Crossing with the Intended Channels shall be prepared, in order to reach the technically optimum solution avoiding any future problem.

It is reminded that according to the provisions of article 166 of Law 4001/2011 (H.G.G. 179/A/22.08.2011) within a Zone of five (5) meters on both sides of the pipeline and within a Zone of 0.5m on both sides of the cathodic protection cable, and within an area of 60m<sup>2</sup> of the cathodic protection cable end, underground installations are restricted as well as any placement parallel, perpendicular and diagonally, of any pipeline that requires excavation of more than 0.50m, trench's or drain's opening, new rural road construction, planting of trees with roots going deeper than 0.60m, as well as the alteration of the soil morphology in any way is forbidden.

Even in the unexpected event of the pipeline's crack in an area with high water table area, no pollution of the groundwater is expected because the natural gas shall escape through the soil's cavities and then disperse in the air. This is due to the fact that the solubility of natural gas in water is negligible.

In case of leakage of the gas, only the on spot vegetation will go dry. In any case, any leakage either will be detected during a scheduled check of the pipeline or will be recorded as a pressure fluctuation and controlled by the SCADA systems on the onshore facilities. Consequently, during operation phase there is no risk/ impacts on water resources.

The unlikelihood of water pollution through liquid wastes from the operation of the Onshore Facilities was previously assessed (see section 6.3.2)

The difficulties created by the pipeline for the creation of new infrastructure networks are deemed of small magnitude, only above the pipeline and totally surpassable; consequently of no significance.

#### **6.3.6.2 Mitigation Measures for Water Resources and Hydrogeology**

- The Owner of the Project should prepare an emergency response plan, which will present the sum of actions that will be taken in case of a Project's malfunction. However, due to the gaseous state of the Natural Gas, no impacts on water resources, even in an accident, are expected.
- As a preventative measure, any excavation for drainage purposes, on top of the pipeline, will not use mechanical means.
- Owner of the project will be cooperative in order to facilitate any new irrigation or water supply networks projects and the preparation of the necessary Special Study.
- Owner is obligated monitoring the entire pipeline, informing citizens and Authorities for the pipeline's passing and be informed of the developing or studied projects in the area.
- During monitoring of the pipeline, regular check of the slopes' condition and generally of the hazardous locations (such as sites with landslide, flood, seismic, etc., risks) should be made. In case of instability or significant

erosion is developed, the necessary measures of ground reinstatement should be taken to avoid pipeline's exposure and potential breaking.

The mitigation measures for the unlikely event of water pollution through liquid wastes from the operation of the Onshore Facilities were previously assessed (see section 6.3.2). In short, the following measures have been incorporated in the Project's design:

- Double walled with leak detection underground storage tanks of diesel and condensate are envisaged in the design of the project
- All tanks and underground piping should be inspected regularly.
- Watertight paved areas to collect possible leaks or spills will be constructed.

### **6.3.6.3 Residual Impacts on Water Resources and Hydrogeology**

No residual impact is assessed on water resources, during Project's operation. Regarding the erosion, the measures described in the relevant section for mitigating impacts during construction are applicable.

## **6.3.7 Flora**

### **6.3.7.1 Impacts Assessment on Terrestrial Flora**

Visual controversies from the area scalping during construction phase will be abated during operation by the appropriate mitigation measures and natural regeneration. The 5m buffer safety zone does not seem significant enough to fragment the maquis vegetation<sup>26</sup>. Grassland species (shallow rooted species) will be allowed to grow on

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<sup>26</sup> Relevant studies include:

Hogan, M. 2010 Habitat fragmentation Retrieved from [http://www.eoearth.org/article/Habitat\\_fragmentation?topic=58074](http://www.eoearth.org/article/Habitat_fragmentation?topic=58074)

OONS, M. B., MESSELINK, J. H., JONGEJANS, E. and HEIL, G. W. (2005), Habitat fragmentation reduces grassland connectivity for both short-distance and long-distance wind-dispersed forbs. *Journal of Ecology*, 93: 1214–1225. doi: 10.1111/j.1365-2745.2005.01064.x (Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2745.2005.01064.x/full>)

Drinnan I.N. (2005) The search for fragmentation thresholds in a Southern Sydney Suburb (2005) *Biological Conservation*, 124 (3), pp. 339-349. (Retrieved from <http://www.sciencedirect.com/science/article/pii/S0006320705000674#sec4>)

top the 5m buffer safety strip. Based on the ecological characteristics of the vegetation, such narrow linear open spaces are not deemed significant enough for obstructing pollination.

Consequently, the impacts are of small magnitude, low sensitivity and partially reversible. Since no fragmentation takes place, the magnitude of the pipeline's operation would not be scientifically sound to be assessed according to the 5m buffer zone. Grasslands' ecological services in natural ecosystems are not separated from those of bushlands or forests. Natural ecosystems behave as a whole.

Regarding the onshore facilities, the loss of vegetation will be permanent and a ~90.000m<sup>2</sup> does fragments an ecosystem. However, the area is plentiful of grasslands which compensates for the loss of specific vegetation type. Consequently, although the impact will be of relatively significant magnitude, the sensitivity is low and the overall importance will be minor.

### **6.3.7.2 Mitigation Measures for Terrestrial Flora**

Besides the natural reforestation and ecosystems' restoration to climax stage (or their former stage), trees and bushes, as described in section 6.2.7 will be planted assisting natural ecosystems recovery, where needed. Fencing of selected sites, along the pipeline, will protect sprouts and samplings from grazing. These measures should be clearly detailed in the Vegetation Reinstatement Study that will be prepared, in cooperation with the competent authorities, prior to the commissioning of the project.

It is suggested, however, a 3 years monitoring of the vegetation restoration to be provided in order to ensure re-vegetation success and/ or to proceed with any necessary additions-actions.

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Collingham, Yvonne C., and Brian Huntley. 2000. IMPACTS OF HABITAT FRAGMENTATION AND PATCH SIZE UPON MIGRATION RATES. *Ecological Applications* 10:131–144. [doi:10.1890/1051-0761(2000)010[0131:IOHFAP]2.0.CO;2] (Retrieved from <http://www.esajournals.org/doi/abs/10.1890/1051-0761%282000%29010%5B0131:IOHFAP%5D2.0.CO%3B2>)

### **6.3.7.3 Residual Impacts on Terrestrial Flora**

No residual impacts are assessed by the onshore pipeline's operation, whilst the residual impacts from the Onshore Facilities operation is deemed minor, based on the above reasoning.

### **6.3.7.4 Impacts Assessment on Marine Flora**

During pipeline's operation, benthic plant communities are not expected to face any negative impact

On the contrary, the artificial reef that is envisaged during the backfilling of the near coast offshore section (that is the first ~500m up to the depth of 25m) is expecting to have a positive impact on marine flora.

This impact is not further assessed since it is a positive one. However, this is a very important aspect of the project due to its secondary positive impacts to fishes' populations, diving activities and consequently tourism.

Additionally, the warmth emitted by the pipeline could positively affect the marine ecosystem. This is due to the small increase of temperature that without disturbing the ecology of the benthic ecosystem could increase its productivity.

### **6.3.7.5 Mitigation Measures for Marine Flora**

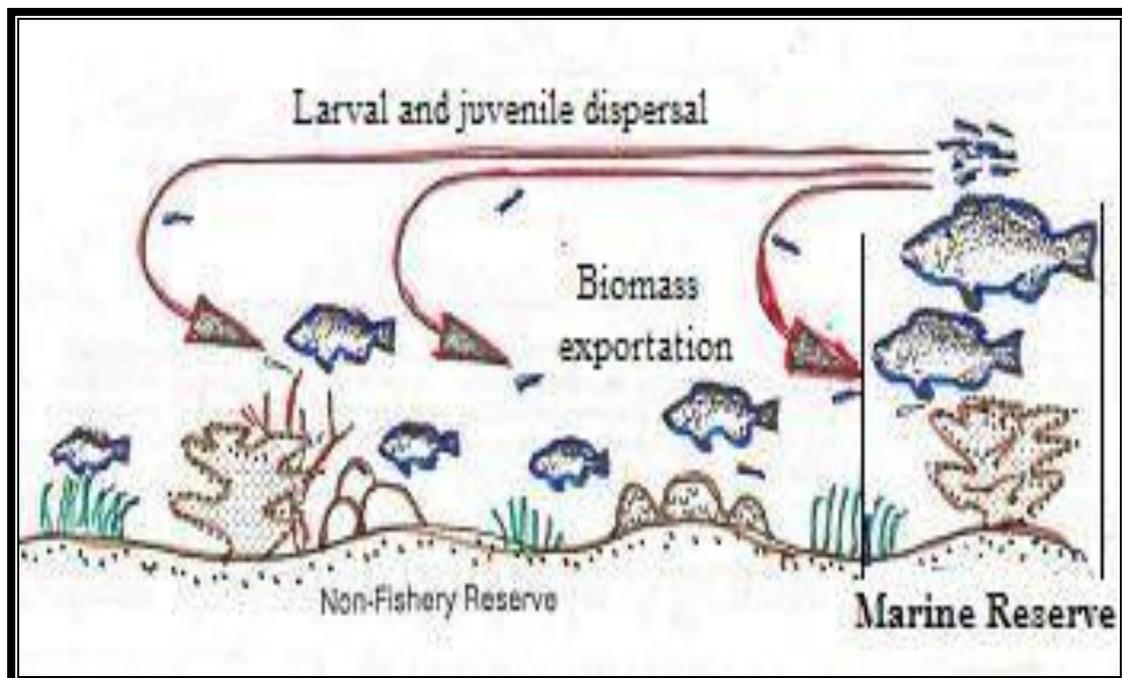
As previously stated, pipeline's operation is not causing any negative impact on benthic organisms (animals or plants).

As described throughout the study, the first ~500m of the nearshore pipeline will be buried. It is suggested that on top of the pipeline, aggregates should be placed in an irregular structure in order to create a rock substrate. This rock substrate is expected to be colonized by marine flora and fauna creating an artificial reef. The establishment of such an artificial reef could contribute in:

- Improving coastal ecosystems by increasing sea bottom's biodiversity; since the artificial reef is a solid construction, constituting an ideal bed for organisms living in rocky bottoms.

- Enhancement of important ecosystems, such as meadows of *Posidonia oceanica*, which are, among other things, significant breeding grounds and reserves of fish fauna and other benthic organisms.
- Recovery of fish stocks, through fishes' increase in size and age within the artificial reef, and consequent boosting of local professional and leisure fishing.
- Production's increase, as well as larvae and younglings dispersion in adjacent areas (Figure 6.11)

**Figure 6.11 Dispersion of larvae and younglings to neighboring areas of the park (source: Bohnsack, 1990 and Ramos 2005).**



Artificial reefs are installed throughout the world.

In addition, the pilot transplantation described in the construction phase is expected to facilitate and accelerate the reinstatement. Some of the plants that will be transplanted during construction phase will be returned near and on top of the artificial reef. This pilot relocation should be implemented and monitored by a marine specialist since it is a pioneer measure for Greece and similar projects.

### **6.3.7.6 Residual Impact on Marine Flora**

The positive residual impact is of major importance. Not only shall they protect marine flora and ecosystems in general, but it is reasonable to assess that they will contribute to local economy.

### **6.3.8 Fauna**

#### **6.3.8.1 Impacts Assessment on Terrestrial Fauna**

##### ***Impacts from the pipeline***

As described previously, terrestrial vegetation will fully recover in a short period of time.

Thus, in the long term, mammals and reptiles will face no problems, since arboraceous vegetation and the natural pathways shall be reinstated, and the disturbed populations shall return.

The assessed mammals in the area are not negatively affected by narrow strips. On the contrary they could be positively affected by the creation of fringes, vegetation edges and land cover diversification. This is specially the case for *Oryctolagus cuniculus* and *Lepus europaeus*.

Regarding avifauna, no loss of habitat or and nesting grounds is assessed. In case nests are discovered, during construction, they shall be reinstated. In any case, natural reforestation shall occur, and consequently, the populations shall return, in case they are affected by construction works. Taking into account the ecological information provided in chapter 4 and of course keeping in mind that no habitat or vegetation fragmentation takes place, most of the species are positively affected by the creation of open spaces along thick vegetation<sup>27</sup>.

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<sup>27</sup> In continuance to the references regarding flora, the following studies are relevant to habitats' fragmentation:

Johnson, Douglas H. 2001. Habitat fragmentation effects on birds in grasslands and wetlands: a critique of our knowledge. *Great Plains Research* 11(2):211-231. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/birds/habfrag/index.htm> (Version 21FEB2003). (Retrieved from <http://www.npwrc.usgs.gov/resource/birds/habfrag/index.htm>)

Species' populations that are closely associated with crops (such as passerines and rodents because they either are fruit-eating or hedges-dwellers) will fully recover, since during operation, crops are not affected.

Impacts on reptiles will be insignificant since human presence in the area will not be affected, nor any vibrations or other nuisance factors will be caused by the operation of the pipeline.

In general, habitats that will be affected during construction shall fully recover, hence no pressures on the fauna is expected during operation.

### ***Impacts from the onshore facilities***

The operation of the compressor and metering facilities could cause some impact if the noise levels were not within the statutory limits. But as illustrated by the noise model (see section 6.3.3), the level at the fence will not exceed 50dB. Consequently, no impacts from the operation of the Onshore Facilities should be expected.

The presence of the facilities would, of course, prevent species from using the specific site. Nevertheless, the spatial availability around the area is deemed adequate for compensating the loss of land occupied by the facilities. The land that shall be occupied by the facilities is not included on any protection status and are not priority habitats. The incorporation of the facilities in the landscape is another factor that could mitigate the impacts, especially to avifauna.

Conclusively, the operation of the Onshore Facilities will cause no impact on protected habitats (under Habitats Directive or National Legislation). There is enough space, of similar ecological characteristics for local migration of species while the buildings will have small visual impact. Thus the impacts on fauna from the Onshore Facilities are deemed minor.

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Franklin, B.A., Noon B. R., George L. T. 2002. What is Habitat Fragmentation? Studies in Avian Biology No. 25:20-29, 2002. (Retrieved from [http://www.globalrestorationnetwork.org/uploads/files/LiteratureAttachments/368\\_what-is-habitat-fragmentation.pdf](http://www.globalrestorationnetwork.org/uploads/files/LiteratureAttachments/368_what-is-habitat-fragmentation.pdf))

Laurance WF, Nascimento HEM, Laurance SG, Andrade A, Ewers RM, et al. (2007) Habitat Fragmentation, Variable Edge Effects, and the Landscape-Divergence Hypothesis. PLoS ONE 2(10): e1017. doi:10.1371/journal.pone.0001017 (Retrieved from <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0001017>)

### **6.3.8.2 Mitigation Measure for Terrestrial Fauna**

During pipeline's operation, no impacts are expected on fauna, since no habitats' fragmentation is assessed. Natural populations will recover as soon as the vegetation is restored and the former habitats are reinstated. Natural pathways will also be restored.

In order to minimize the nuisance of the onshore facilities, the most effective measure is the incorporation of the buildings in the natural environment. Additionally, trees should be planted outside the fence of the facilities. These trees are not likely to host nests but could decrease the visual intrusion and the noise immolated to neighboring trees where nests could be hosted.

### **6.3.8.3 Residual Impacts on Terrestrial Fauna**

As presented in the impacts assessment, residual impacts from the pipeline's operation are positive and are not assessed in more detail.

Regarding the onshore facilities' residual impacts, these are considered minor, especially after the implementation of the suggested measures.

### **6.3.8.4 Impacts Assessment on Marine Fauna**

Pipeline's operation is not expected to have any negative impact on benthic animal community (fishes, mollusks, etc.) living in the area.

On the contrary, in combination to the implementation of the appropriate measures, the pipeline could enhance the marine ecosystem. The buried pipeline is envisaged to become an artificial reef around which marine biodiversity would be boosted.

Additionally, these species could take advantage of the locally increased temperature on top of the offshore pipeline. This could increase their number and the ecosystem productivity.

The pipeline could indirectly contribute to the local professional and leisure fishing bust. Indirectly, this would also mean probable increase of ecotourism through diving activities.

#### **6.3.8.5 Mitigation Measures on Marine Fauna**

Measures presented for mitigating impacts on marine flora are applied regarding marine fauna, as well.

#### **6.3.8.6 Residual Impact on Marine Fauna**

Same as in marine flora, the positive residual impact is of major importance. Not only shall they protect marine flora and ecosystems in general, but it is reasonable to assess that they will contribute to local economy.

### **6.3.9 Demographics**

#### **6.3.9.1 Impacts Assessment on Demography**

The population dynamics of the project's area are not related to the project; consequently, no impact on the demographics of the area is assessed.

The personnel working on the onshore facilities, on a constant basis, is assessed to arise to 10 approximately persons. This is not a number that could have impact on the demography of the area.

#### **6.3.9.2 Mitigation Measures on Demography**

No mitigation measures are required.

#### **6.3.9.3 Residual Impacts on Demography**

No residual impacts are assessed.

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### **6.3.10 Local Employment and Economy**

#### **6.3.10.1 Impacts Assessment on Employment and Economy**

The personnel working on the Onshore Facilities is assessed to arise to 10 persons, mainly operators. The operators will be skilled. Additionally, on call up basis, skilled technicians would visit the project's area for maintenance and monitoring.

The numbers are small and consequently the impact is not significant. Nevertheless, supporting services for the operation of the onshore facilities, e.g. water supply, wastes disposal, irregular maintenance works, etc., could contribute to local economy. Specifically, the envisaged water supply through licensed private entrepreneurs would increase indirect employment.

In general, the number of employees (directly or indirectly) will be small and consequently whatever positive impacts will be limited.

However, the implementation of the Epirus Gas Supply Company would create opportunities for industrial development in the broader region. This fact is supported by the promotion of the project in the Regional Framework of Physical Planning and Sustainable Development of the Region of Epirus.

#### **6.3.10.2 Mitigation Measures for Employment and Economy**

Although the final decision for the manning of the Onshore Facilities will be performed on a much later stage of the project, it is envisaged that the guard position shall be occupied by local workforce. Local services providers (water, gardening, catering, etc.) are most likely to be positively affected by the project's operation.

Additionally, a call for operational training could be addressed to the local community. This way local workforce's capacity could be improved and an operator's place could be occupied by local people.

#### **6.3.10.3 Residual Impacts on Employment and Economy**

It is repeated throughout the present study that Epirus EPA is assessed to create macroeconomic benefits to Epirus region. This is of outmost importance since Epirus is one of the poorest regions in Greece. The magnitude reaches far beyond

Thesprotia or Preveza and it is also envisaged in the Regional Development Plan of Epirus. Consequently a positive residual impact is assessed.

### **6.3.11 Fishing**

#### **6.3.11.1 Impacts Assessment on Fishing**

Fishing will not be regulated due to the pipeline's operation. What will be definitely controlled will be the use of trawling as a fishing method which will have a positive impact on marine biodiversity and through that to fishing. Moreover, in case the proposed artificial reef is established, enrichment of the fishing population should be also anticipated.

These are deemed as positive impacts of small magnitude, since the number of fishers is small but of significant magnitude since it has indirect, multiple impacts to economy (through fishers visiting the area, tourism development, etc.) and to marine ecology.

#### **6.3.11.2 Mitigation Measures for Fishing**

No mitigation measures for fishing are assessed as necessary.

#### **6.3.11.3 Residual Impacts on Fishing**

Same as in marine flora and fauna, the positive residual impact is of major importance. Not only the pipeline shall protect marine flora and ecosystems in general, but it is reasonable to assess that they will contribute to local fishing populations and economy.

### **6.3.12 Tourism**

#### **6.3.12.1 Impacts Assessment on Tourism**

The pipeline will be buried along the onshore section and the near shore section, till the depth 25m. Consequently, no visual pollution could have impact on the tourism. The 5m buffer safety strip along the onshore section, could be used as a fire belt, thus overcoming any visual intrusion through the purpose of protecting the ecosystem.

The offshore water pipeline section, if used as an artificial reef could act as a touristic attraction, busting local tourism. There are many examples of artificial reefs that were used in order to increase tourism activities, including numerous reefs in Florida, USA, and Hong Kong.

The implementation of the artificial reef and the assessed positive impacts on the local tourism, and relevant sector economy, is in total agreement with the desire of the local community for tourism development in the area. The size of the impact cannot be fully assessed and quantified but, qualitative, it can be reasonably expected to be high. The sensitivity of the receptor is also high. Consequently, the significance of the impact is major.

Regarding the Onshore Facilities no visual impact is expected, since the buildings will have only one floor, encasing most part of the exhaust stacks, while the sites selected for the Onshore Facilities are secluded not provoking any visual pollution to residential areas. Besides, they are located on designated stock farming area.

The onshore facilities, due to the limited visibility and the incorporation of local architectural elements (roofs, etc.), do not pose a significant visual intrusion and consequently significant impact on the overall aesthetics, landscape and consequently tourism of the area.

Conclusively, taking into account the following:

- That the pipeline, both the onshore and nearshore (up to 25m depth) part, will be placed in a trench and the reinstatement will be with natural means
- The Onshore Facilities at Florovouni are sited in locations distant to the coast, touristic areas and settlements, having no visual contact with them and incorporating local architectural elements,

No impacts on tourism, during the operation phase, are expected.

It is noted that the implementation of similar Compressor and Metering Stations in other European countries does not interact with touristic or residential development. Such examples are the compressor stations at the areas of Toskani, Messina and Emilio Romania which were visited by representatives of local community along with project engineers, during 2008 and 2011.

### **6.3.12.2 Mitigation Measures on Tourism**

No impacts on tourism are assessed nor are mitigation measures required, as far as the pipeline itself is concerned. On the contrary, the proposed measures in section 6.3.7 and in other sections, regarding the artificial reef, and additionally the presence of a technologically advanced project could increase touristic activities. Especially, the artificial reef could increase marine tourism and consequently tourism income and specialized activities cycle, whilst a focus towards supporting marine activities could be made.

An additional measure could be the Onshore Facilities to be open for the public regularly. The visits will be regulated, for safety reasons but a visiting center – room could exist explaining the process, the impacts and the benefits of the local community and the environment.

The following measures embedded into the design of the project and presented throughout the present ESIA are summarized below:

- Immediate reinstatement with use of local materials of the construction strip which will not exceed ~500m (the pipeline will be constructed in sections of ~500m each).
- The RoW of 5m on each side of the pipeline will be used as fire belt, or other managerial purposes of Forest Authorities.
- Installation of coastal pipeline (till the depth of 25m) in a trench
- Creation of artificial reef
- Use of local architectural elements in the design of the Onshore Facilities buildings
- Plantation of hedges and tall trees around the fences
- Careful selection of Onshore Facilities location, with the approval of local community.

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### **6.3.12.3 Residual Impacts on Tourism**

The previously described mitigation measures and impacts assessment indicates that a major positive residual impact is reasonable to be expected from the operation of the project to local tourism.

### **6.3.13 Existing Infrastructure**

As mentioned in several sections of the present study, the Project has been included in the Regional Framework of Physical Planning and Sustainable Development of the Region of Epirus. Consequently, Project's implementation coincides with the development goals of the Region.

#### **6.3.13.1 Airports**

##### **6.3.13.1.1 Impacts Assessment on Airports**

During operation phase, the height of emergency depressurization vent stacks is 40m. Consequently, the Civil Aviation Authority and the General Airforce Staff might impose some flight restrictions in the area or special marking of the vent stacks. However, the availability of aviation routes is undisputable and consequently no significant impacts are assessed.

##### **6.3.13.1.2 Mitigation Measures on Airports**

After the approval of the environmental terms, and prior to the installation permit of the project the project Owner will contact CAA and General Airforce Staff in order to determine restrictions and marking measures of the vent stacks.

##### **6.3.13.1.3 Residual Impacts on Airports**

Due to the availability of aviation routes no residual impacts area assessed.

#### **6.3.13.2 Seaports – Navigation**

##### **6.3.13.2.1 Impacts Assessment on Navigation**

This far, the competent authorities have not provided any restrictions through relevant correspondence.

In order to secure pipeline's safety, no anchoring will be allowed near the offshore pipeline. This anchoring restriction zone is not yet determined but it is assessed that ~1000m buffer zone will be applied. The anchoring availability is quite big and consequently the significance is deemed minor.

#### **6.3.13.2.2 Mitigation Measures for Navigation**

The pipeline exact location will be forwarded to the competent authorities so that they admiral charts will be updated with the applied anchoring and possible other navigational restrictions.

According to article 165 of L.4001/2011, any restrictions to navigations are determined by a Joint Ministerial Decision (Ministries of (i) Environment, Energy and Climate Change, (ii) Foreign Affairs, (iii) Finance, Development and Competitiveness, and (iv) Navigation and Civil Protection). These restrictions may include, mainly, anchoring restriction at an appropriate distance from the pipeline, such as 1000m.

#### **6.3.13.2.3 Residual Impacts on Navigation**

Due to the availability of the anchoring area, the residual impacts are deemed insignificant.

### **6.3.13.3 Road network**

#### **6.3.13.3.1 Impacts Assessment on Road Network**

During operation phase, no impact on the traffic conditions or any road networks is expected. Any impact is limited during construction phase.

If in the future a new road is constructed, this should be notified to the project's owner and take into account all the restrictions and technicalities required for the safety operation of the pipeline.

It is reminded that according to the provisions of article 166 of Law 4001/2011 (H.G.G. 179/A/22.08.2011) within a Zone of five (5) meters on both sides of the pipeline and within a Zone of 0.5m on both sides of the cathodic protection cable, and within an area of 60m<sup>2</sup> of the cathodic protection cable end, underground installations are restricted as well as any placement parallel, perpendicular and diagonally, of any pipeline that requires excavation of more than 0.50m, trench's or

drain's opening, new rural road construction, planting of trees with roots going deeper than 0.60m, as well as the alteration of the soil morphology in any way is forbidden.

As in the case of irrigation and water supply networks, in case of no other alternative, a Special Study for the Natural Gas Pipeline Crossing with the Intended Road Network shall be prepared, in order to reach the technically optimum solution avoiding any future problem. Consequently, the impacts size is small and surpassable, hence insignificant.

On the contrary, the improvement of the existing dirt roads that will be used for accessing construction sites will definitely have a positive, small (due to the small length of the routes), impact.

#### **6.3.13.3.2 Mitigation Measures for Road Networks**

- Owner of the project will be cooperative in order to facilitate any new road networks projects and the preparation of the necessary Special Study.
- Owner is obligated monitoring the entire pipeline, informing citizens and Authorities for the pipeline's passing and be informed of the developing or studied projects in the area.
- During monitoring of the pipeline, regular check of the slopes' condition and generally of the hazardous locations (such as sites with landslide, flood, seismic, etc., risks) should be made. In case of instability or significant erosion is developed, the necessary measures of ground reinstatement should be taken to avoid pipeline's exposure and potential breaking.
- All used roads will be reinstated.

#### **6.3.13.3.3 Residual Impacts on Road Networks**

No negative residual impacts on existing or future road networks is assessed

#### **6.3.13.4 Power Supply network**

During operation phase, no impact on the power network will be posed. A new power line (medium voltage) will be constructed to supply electricity to the compressor and metering station.

Some residual positive impact could be assessed through the expansion of the power supply network. However, since the exact power line supplying the Onshore Facilities is not yet decided, this is no further assessed.

Regarding possible new offshore power supply cables, the Project Owner should be notified so that the optimum technical solution will be selected.

### **6.3.13.5 Water Supply network**

#### **6.3.13.5.1 Impacts Assessment on Water Supply Network**

As described in chapter 5, water storage tank will receive water with tracks of licensed private entrepreneurs that will be used for the water supply needs of the onshore facilities. The fact that these entrepreneurs will be licensed excludes any adverse, secondary impact, to water resources, due to increase of water extraction. Consequently, no impact is assessed on the area's water supply.

Only potable water will be used. This will be provided through 10lt bottles. The commission of these bottles includes the empty bottles disposal consequently no impact is assessed. Potable water consumption cannot be quantified and consequently, the impact is only qualitative assessed as minor.

#### **6.3.13.5.2 Mitigation Measures for Water Supply Network**

No mitigation measures are required. The following embedded into the design of the project measures are listed:

- Potable water supply through 10lt bottles
- Facilities utility water supply through licensed local entrepreneurs

#### **6.3.13.5.3 Residual Impacts on Water Supply Network**

In case of new networks design, which shall be crossed with the pipeline, in lack of alternatives a Special Crossing Study will be prepared, as in the case of other networks. This study will determine the optimum technical solution for avoiding any problem.

Consequently, no residual impact is expected regarding water supply network, during operation phase of the project.

### **6.3.13.6 Telecommunication network**

During operation phase, no impact on the public telecommunication network will be posed. One connection will be established through fiber optics for data communication, along the onshore route. This line will be connected to the DESFA pipeline and from then to the public telecommunication line. One satellite disk will be used as a backup communication system.

Consequently, no impacts are assessed and no mitigation measures are required.

Regarding possible new such networks, the Project Owner should be notified so that the optimum technical solution will be selected.

### **6.3.14 Land Uses**

#### **6.3.14.1 Introduction**

As described in the previous sections and chapters, existing and proposed land uses are examined. In general, the only limitation along the pipeline is the 10m safety strip (5m on each side of the pipeline). On top of this safety strip no deep rooted species may grow. Regarding buildings, no such constructions will be allowed in a 40m safety strip (20m on each side) due to safety and precaution measures.

Mitigation measures of possible environmental impacts on land uses, during operation phase, include:

- Reinstatement of the area
- Compensation of the RoW Easement, according to the National legislation
- Compensation for crops' losses due to project's maintenance
- Prohibition of deep-rooted trees planting in a 5m buffer zone along the pipeline for safety reasons
- Prohibition of buildings along a 20m buffer zone, along the pipeline for safety reasons.
- Monitoring of reinstatement and proper actions in case the replantations are not effective

For the operation of the Offshore Natural Gas Pipeline a protection buffer zone along the pipeline is required. This is required in order to protect the Natural Gas Pipeline from the construction of other utilities' networks close to it. In order to do that it is necessary "I.G.I. POSEIDON" to obtain concession by the Ministry of Finance for the use the Shore, Beach and Sea Bottom along the offshore route part, for a zone as wide as the pipeline's diameter. It is noted that the shoreline and the beach have been determined with the HGG D 359/2003.

It is noted that the Project was promoted in the Regional Framework of Physical Planning and Sustainable Development of the Region of Epirus.

Based on the classification used for impacts assessment during construction phase (section 6.2.14), the following assessment is presented:

### **6.3.14.2 General land use**

#### **6.3.14.2.1 Impacts Assessment on General land use**

By general land uses, the land uses designated for stock farming, tourism development, and agriculture (areas outside the city plan-other) are described.

The only limitation, during the operation phase, is the prohibition of planting deep-rooted trees in a 5m buffer zone. It is noted that on top of the installed pipeline the growing of grapevine and all other annual crops, of shallow rooting system, is allowed. Thus, impacts on agricultural land use during operation phase depend on the type of vegetation. Since most of the areas are olive crops, the size of the impact is medium.

The same applies for the stock farming land uses, where the Onshore Facilities are located.

Especially for touristic development designated areas, near the landfall site of Omprela 2, the limitation of 40m safety strip is assessed not to pose any significant impact because the area has no touristic development. On top of that, the area does not present the characteristics that would allow it to have significant touristic units developed, such as remoteness from road networks, morphology, forestial vegetation which would be prohibited for big touristic units.

#### **6.3.14.2.2 Mitigation Measures for General land use**

The mitigation measures presented in the introduction of this section are applied. The main mitigation measures are:

- Land reinstatement will start as soon as the pipeline is safely positioned.
- Legal compensation for crops' loss and easement of RoW

#### **6.3.14.2.3 Residual Impacts on General land use**

Some residual impacts are assessed from pipeline operation, since olive groves is the predominant cultivation. These include the prohibition of deep-rooted trees planting in a 5m buffer zone along the pipeline for safety reasons. However, proper compensation, as provided by national legislation is deemed enough to mitigate the impact.

Prohibition of buildings along a 20m buffer zone, along the pipeline for safety reasons will be also applicable. However, this is a general rule and in case of significant development project, the third party could contact the Project Owner. The third party accepting all the technical requirements and safety restrictions of the Project Owner could proceed in the implementation of the development. Consequently, minor residual impacts are assessed for buildings, also.

### **6.3.14.3 Forestial land use**

#### **6.3.14.3.1 Impacts Assessment on Forestial land use**

By forestial land uses, based on the data presented in chapter 4, the land uses designated for forests, bushlands and tree crops (areas outside the city plan-olive groves) are described.

After the completion of the project, reforestation of the felled areas will take place. However, the 5m buffer zone cannot be planted with deep-rooted trees; hence the zone will be planted with bushes and grasses, which modify the forestial texture but not the use. Conditionally that the Forest Department of the area has been contacted and consulted the working strips can be used as fire belts.

It is repeated, as it was detailed in the flora relevant section (see section 6.3.7) that the 10m grassland strip (5m buffer zone of deep rooted species restriction) is not wide enough to fragment the ecosystem. Consequently, no significant impacts are assessed.

#### **6.3.14.3.2 Mitigation Measures for Forestial land use**

The mitigation measures presented in the relevant section for construction are deemed sufficient for operational purposes as well. Mainly the following:

- The working strip will not exceed 32m, as defined in L. 4001/2011, and will not be decreased more than 26m, which is the minimum technically feasible width of the construction strip. Potential exception refers to the areas, where for technical or safety reasons, larger width may be required, such as the landfall site.
- No access roads are expected to be opened. In case that EPC contractor considers them necessary, all relevant permits (including from Forestry Authority if required) will be obtained.
- The Working Strip will be reinstated according to the competent authorities' recommendations and the initial framework provided in section 6.2.7.
- Monitoring of reinstatement and proper actions in case the replantations are not effective
- The Right of Way shall be used as a fire belt by the Forest Authorities and modified as required, conditionally that the belt of 5m on each side of the pipeline is kept free of deep rooted species,
- All reinstatement works will be paid by the project budget.
- The reinstatement, as described in section 6.2.6 will include local material and soil bio-engineering systems such as geo-grids to minimize as much as possible visual impact

Vegetation Reinstatement Study that will be prepared, in cooperation with the competent authorities, prior to the commissioning of the project, could detail additional measures for the managerial purposes of the Forestial and/ or other competent Authorities.

### **6.3.14.3 Residual Impact on Forestial land use**

No negative residual impact is assessed on forestial land uses, as argued in this section and the corresponding sections for flora and forestial land uses, during both construction and operation.

### **6.3.14.4 Residential land use**

#### **6.3.14.4.1 Impacts Assessment on Residential land use**

The routing traverses outside the limits of the General Town Plan of any Municipality and the limits of settlements and their expansions. In areas outside the town limit, no building will be permitted in a 20m, buffer zone.

It is repeated that the 20m buffer zone for buildings is posed under safety reasons. According to ar. 167, par.2 of L.4001/2011 this zone can be modified through a Ministerial Decision, in accordance to the design of the project.

#### **6.3.14.4.2 Mitigation Measures for Residential land use**

The main mitigation measures are described in the introduction of this section and repeated here below:

- Compensation for RoW easement
- Cooperation of the project owner in case of any significant development is required so as to come up with the safest and most appropriate solution in order to decrease the 20m building restriction buffer zone

#### **6.3.14.4.3 Residual Impact on Residential land use**

As described previously, prohibition of buildings along a 20m buffer zone, along the pipeline for safety reasons will be applicable.

It is repeated that the investigated project is mentioned in the Regional Framework of Physical Planning and Sustainable Development of the Region of Epirus.

## **6.3.15 Landscape**

### **6.3.15.1 Impacts Assessment on Landscape**

Landscape alterations will mainly be in the coloration and will be limited effectively only during construction phase. Agricultural scenery will immediately absorb any alterations during the first crop season, after the completion of the project.

Forestrial scenery, after the reinstatement measures that are described in the present E.I.A., will also absorb any alterations.

Natural reforestation will significantly contribute towards landscape reinstatement.

The onshore facilities, due to the limited visibility and the incorporation of local architectural elements do not pose a significant impact on the overall aesthetics and landscape of the area.

### **6.3.15.2 Mitigation Measures for Landscape**

During operation phase, it is deemed necessary to monitor the reinstatement works. Any lack or failure, including erosion, reforestation failure etc., will be reported and corrected immediately.

Surrounding Project's facilities, including the Onshore Facilities and the 5m safety buffer zone, tree planting of regional species will take place to minimize impacts on the landscape, unless otherwise requested by the competent authorities. Planted species should be tall tree species, which will gradually eliminate visual intrusion of the Onshore Facilities to the landscape.

### **6.3.15.3 Residual Impact on Landscape**

Eventually and gradually, the proposed trees will obscure any visual impact and landscape intrusion of the onshore facilities. Consequently, no residual impacts are assessed.

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### **6.3.16 Area's Profile and Cultural Environment**

#### **6.3.16.1 Impacts Assessment on Area's Profile and Cultural Environment**

The presence of the investigated Project in the area is expected to have a positive impact to the natural gas transportation status quo. As it is required by law 4001/2011, within a year of project's commissioning, DEPA will proceed to all necessary arrangements for Epirus and Western Macedonia Gas Supply Company to be established.

During operation phase, no negative impact on the financial profile of the area is expected; nor on its cultural environment. Every effort has been taken in order to incorporate the Onshore Facilities buildings in the architectural environment of the area.

The finding of any cultural monuments discovered during the construction and saved through the project's budgeting can have a positive impact on cultural heritage.

The magnitude of the assessed impacts exceeds the local area of the project, influencing all Epirus. It is a positive impact and no further assessment is made.

Finally, the location of Onshore Facilities is distant to any touristic venue and is concealed from most viewpoints. Consequently, the sensitivity of the receptor is deemed low, as the overall impact.

#### **6.3.16.2 Mitigation Measures for Area's Profile and Cultural Environment**

Mitigation measures to support local area and cultural environment include:

- Epirus and Western Macedonia Gas Supply Company establishment by DEPA
- Use of local materials for reinstatement
- Concealment of Onshore Facilities through proper site identification
- Salvation and promotion of any important, assessed by the competent authorities, cultural finding paid by the Project.

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### **6.3.16.3 Residual Impacts on Area's Profile and Cultural Environment**

The presence of the Onshore Facilities is not deemed significant to change the area's profile.

Having in mind that the Epirus and Western Macedonia Gas Supply Company will be established within one year from the commissioning of the pipeline, the project is expected to have a positive impact on the regional air quality. This impact is very important. It expands from the local investigated area, i.e. small parts of Thesprotia and Preveza Regions (Regional Unities) to all of Epirus and Western Macedonia Regions. It affects all consumers, being industrial and private. This could have secondary positive impacts to industry development and air quality of major significance.

Also, in case of any important cultural monument salvation, the Project will cooperate with the competent authorities in order to promote and share with the public the findings. The significance of the monuments cannot be assessed and consequently the magnitude of the impact.

## **6.4 Impacts Assessment and Mitigation Matrix**

The following table presents the assessed impacts during both construction and operation presenting the envisaged mitigation measures, respectively. This, in addition to the ESMMP presented in the following chapter would help the Owner to verify that its commitments to the protection of the environment are met by the EPC Contractor and also would facilitate all stakeholders engagement and monitoring of the project.

It is clarified that the matrix serves as a summary of this chapter. The monitoring program of the project is not included in the following table, but in the ESMMP, nor are the cumulative impacts or the decommissioning. This is because their impacts are very difficult to assess due to the significant timescale and the numerous uncertainties present.

**Table 6.19 Impacts Assessment and Mitigation Measures Matrix.**

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
Construction Phase												
1	Atmosphere	Excavation / Dust suspension	Construction	Negative	Temporary	Medium	Low	Minor	- Soaking of the accumulated excavation materials - Covering up of excavation and aggregate material during transport - Vehicles' speed check - Certified vehicles and equipment - Immediate reinstatement , per section, according to the guidelines of the local authorities and stakeholders - Appointment of competent engineer as environmental inspector	Complete	None	
2	Atmosphere	Emissions	Construction	Negative	Temporary	Medium	Low	Minor	- Maintained vehicles and machinery. - No machinery will be left running idly. - Legislative Compliance	Complete	None	
3	Liquid Wastes	Machinery lubrication	Construction	Negative	Temporary	Small	High	Moderate	- Legislative Compliance - Collection of used lubricants - Maintenance at special areas	Complete	None	
4	Liquid Wastes	Domestic Wastes	Construction	Neutral	Temporary	Medium	Low	Minor	- Chemical toilets	Complete	None	
5	Liquid Wastes	Hydrotesting	Construction	Negative	Temporary	Large	Medium	Major	- PLONOR Chemiclas if more than 20days are required - Controlled discharge - Carefull selection of Discharge point - Pre-discharging analysis - Filters - Use of settlement ponds, prior water discharge	Complete	Minor	
6	Solid Wastes	Packaging material	Construction	Neutral	Temporary	Medium	Low	Minor	- Reuse or Recycle of materials - Collection and disposal according to national legislation to designated areas	Complete	None	
7	Solid Wastes	Earthworks	Construction	Neutral	Temporary	Small	Low	Not Significant	- Use for backfilling - Dispersed to the nearby areas - Used for filling borrow pits, - Dollection and disposal at designated areas, according to national legislation	Complete	Positive	In case excavation material is used for backfilling of borrow pits, this could have a positive impact on the pit's reinstatement
8	Solid Wastes	Welding material	Construction	Neutral	Temporary	Medium	Low	Minor	- Reuse or Recycle of materials - Collection and disposal according to national legislation to designated areas	Complete	None	
9	Noise	Traffic	Construction	Negative	Temporary	Medium	Low	Minor	Measures for Atmosphere are applicalbe highlighting the following: - Maintained Vehicles and machinery. - No machinery will be left running idly. - Legislative Compliance	Complete	None	

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
10	Noise	Machinery operation (onshore)	Construction	Negative	Temporary	Medium	Low	Moderate	Measures for Atmosphere are applicable highlighting the following: - Maintained Vehicles and machinery. - No machinery will be left running idly. - Legislative Compliance - Construction works between 08:00 till 17:00, during winter, and till 18:00 during summer, near residential areas	Complete	None	
11	Noise	Machinery operation (offshore)	Construction	Negative	Temporary	Medium	Medium	Moderate	Measures for Atmosphere are applicable highlighting the following: - Maintained Vehicles and machinery. - No machinery will be left running idly. - Legislative Compliance	Complete	None	This refers to potential offshore mammals
12	Seismicity	Project construction/ General	Construction	n/a	n/a	n/a	n/a	n/a	- Implementation of special measures at faults crossing - Increased trench depth in faults zones - Backfilling on top of the pipeline will be reduced to minimum. - Special cement coating - Special design and engineering. - Special studies preparation	n/a	n/a	The project does not have any impact on the seismicity of the area. On the contrary, the mitigation measures suggested are for the project's safety.
13	Soil	Pollution (general, during construction)	Construction	Negative	Temporary	Medium	Low	Minor	- Maintenance in controlled areas - Collection of wastes and disposal at designated areas, according to national legislation - Chemical toilets - Minimum construction time - Working strip is restricted to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.	Complete	None	
14	Soil	Excavation/ Soil physical structure modification	Construction	Negative	Temporary	Medium	Low	Minor	- Stockpiles of maximum 2m. - Separation of topsoil and reinstatement of it - Reinstatement with local material - Minimum construction time - Working strip is restricted to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.	Partial	Minor	Even though every effort will be made, it is not deemed possible to fully reinstate the structure of the soil. However, the reinstatement is deemed adequate for the continuance of the ecological services of the soil.

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
15	Soil	Excavation/ Soil biological structure modification	Construction	Negative	Temporary	Medium	Low	Minor	<ul style="list-style-type: none"> <li>- Separation of topsoil and reinstatement of it</li> <li>- Reinstatement with local material (creation of artificial reef along the nearshore buried pipeline)</li> <li>- Disposal of surplus at local areas for maintaining local biodiversity</li> <li>- Minimum construction time</li> <li>- Working strip is restricted to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.</li> </ul>	Complete	None	
16	Soil	Occupation of Construction Zone	Construction	Negative	Temporary	Medium	Medium	Moderate	<ul style="list-style-type: none"> <li>- Compensation for income loss as provided by law</li> <li>- Restriction of working strip to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.</li> </ul>	Partial	None	Residual impacts are due to operation and not construction
17	Water	Irrigation break	Construction	Negative	Temporary	Small	Medium	Minor	<ul style="list-style-type: none"> <li>- Detail survey of the existing irrigation networks along the 32m working strip, prior to construction.</li> <li>- Announcement of crossings' works to all Competent Authorities and Stakeholders.</li> <li>- Avoidance of main channel break from April till September,</li> <li>- Avoidance of secondary channel break for more than 48h, from April to September</li> <li>- Avoidance of tertiary channel break for more the 7days, from April to September</li> <li>- Compensation for income loss as provided by law</li> <li>- Small adjustment of the pipeline route if required, within the working strip (RoW),</li> <li>- Immediate reinstatement per section, according to the guidelines of the local stakeholders</li> </ul>	Complete	None	No irrigation networks were identified, up till now. The assessment and mitigation measures concern the possibility of such networks to be created till the project's construction.
18	Water	Water supply break	Construction	Negative	Temporary	Small	Medium	Minor	<ul style="list-style-type: none"> <li>- Detail survey of the existing irrigation networks along the 32m working strip, prior to construction.</li> <li>- Announcement of crossings' works to all Competent Authorities and Stakeholders.</li> <li>- Small adjustment of the pipeline route if required, within the working strip (RoW),</li> <li>- Immediate reinstatement per section, according to the guidelines of the local stakeholders</li> </ul>	Complete	None	No water supply networks were identified, up till now. The assessment and mitigation measures concern the possibility of such networks to be created till the project's construction.

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
19	Water	Water pollution	Construction	Negative	Temporary	Large	Low	Major	<ul style="list-style-type: none"> <li>- Drainage system at the ROW</li> <li>- Legislative compliance</li> <li>- All wastes mitigation measures are applied</li> <li>- Collection of Wastes and disposal at proper locations, according to national legislation</li> <li>- Maintained machinery</li> </ul>	Complete	None	
20	Water	Erosion	Construction	Negative	Temporary	Large	Large	Major	<ul style="list-style-type: none"> <li>- Immediate reinstatement</li> <li>- Restriction of working strip to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.</li> </ul>	Complete	None	Some visual impact should be expected till the full growth of the planted species.
21	Flora (agricultural)	ROW Preparation/ Clearance and Dust	Construction	Negative	Temporary	Medium	Low	Minor	<ul style="list-style-type: none"> <li>- Mimimization of dust (see Atmosphere)</li> <li>- Careful construction works planning (avoiding seeding and harvesting periods), if possible.</li> <li>- Compensation for income loss as provided by law</li> <li>- Restriction of working strip to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.</li> <li>- Immediate reinstatement, per section, according to gudelines of the local stakeholders</li> </ul>	Partial	None	Since compensation will be provided, no residual impact is assessed.
22	Flora (terrestrial)	ROW Preparation/ Clearance and Dust	Construction	Negative	Temporary	Medium	Low	Minor	<ul style="list-style-type: none"> <li>- Minimization of dust (see Atmosphere)</li> <li>- Restriction of working strip to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.</li> </ul>	Partial	Minor	No ecological residual impacts since no fragmentation takes place. Visual discontinuity only.
23	Flora (marine)	Pipeline installation/ sedimentation	Construction	Negative	Temporary	Large	High	Major	<ul style="list-style-type: none"> <li>- Quick and careful execution of construction works to avoid repetitions</li> </ul>	Complete	None	

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
24	Flora (marine)	Pipeline installation/ Posidonia meadows	Construction	Negative	Temporary	Small	High	Major	Measures for Hydrotest are applicable and: - No works from July-August, near the Posidonia meadows. - Anchoring within identified Posidonia oceanica meadows will be avoided wherever possible. Posidonia meadows will be notified to and taken into consideration by the ships. - Pilot nursery garden and transplantation of Posidonia oceanica laying directly on the pipeline route and relocate them on the near by sea bottom. - Artificial reef creation along the buried pipeline	Complete	Positive	Taking for granted the effectivity of the mitigation measures, the residual impact will be positive since new rocky substrates will be created for Posidonia growth.
25	Fauna (terrestrial)	Habitat disturbance	Construction	Negative	Temporary	Small	Medium	Minor	- Working strip is restricted to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m. - Inspection for nests of Buteo rufinus, Buteo buteo, Ciconia nigra, Falco naumanni and Gyps fulvus along the pipeline ROW and landfall site - Some felled trees should be left on site for biodiversity conservation, if required by the authorities, otherwise will be managed according to legislation - Salvation of possible trapped animals	Complete	None	
26	Fauna (marine)	Habitat disturbance	Construction	Negative	Temporary	Small	High	Moderate	Measures for Flora (marine) are applicable:	Complete	Positive	Taking for granted the effectivity of the mitigation measures, the residual impact will be positive since new rocky substrates will be created for Posidonia growth.
27	Demography	n/a	Construction	n/a	n/a	n/a	n/a	Not Significant	- Grievance Mechanism - Code of Conduct for EPC Contractor personnel	n/a	None	The project does not have any impact on the demography of the area.
28	Economy (Employment)	Catering, Accommodation, Workforce, Services	Construction	Positive	Temporary	Small	Low	Not Significant	- Active promotion of local workforce engagement and services providers. - Compensation for easement as provided by law	n/a	Minor	The overall impact is positive, even without taking into account the potential capacity building for workers in similar

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
												future projects.
29	Fishing	Near shore and Offshore pipeline's laying	Construction	Neutral	Temporary	Small	Medium	Minor	- Temporary safety zone and fishing restriction, in a zone of indicatively 1000m - Communication of restricted areas - Quick and careful execution of construction works to avoid repetitions of work.	Complete	Positive	Taking for granted the effectivity of the marine flora and fauna mitigation measures, fishing populations are most likely to increase.
30	Tourism	Construction works	Construction	Negative	Temporary	Small	High	Moderate	- Construction of the coastal and landfall site outside touristic season, ie June – August - Carefull selection of Onshore Facilities location and pipeline route.	Complete	Positive	The Onshore Facilities will be open for the public periodically. An information poster could exist explaining the process, the impacts and the benefits of the local community and the environment.
31	Aviation	Emergency Vent Stacks	Construction	Neutral	Temporary	Small	High	Not Significant	- Timely notification of Civil Aviation Authority and General Airforce Staff and compliance with any requested measures.	Complete	Minor	The aviation corridors availability is so plentiful that even though aviation safety is of highest sensitivity, the overall impact significance is zero and the residual impact minor (due to operational flight restrictions)
32	Navigation	Offshore pipeline laying	Construction	Neutral	Temporary	Small	High	Not Significant	- Timely notification of competent Authorities - Availability of emergency response plan - Quick and careful execution of construction works to avoid repetition of work. - Compliance with maritime marking legislation - Immediate forward of required data to General Navy Staff.	Complete	None	

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
33	Road network	Transportation	Construction	Positive	Permanent	Small	High	Moderate	<ul style="list-style-type: none"> <li>- Preparation of a traffic management plan prior to construction commencement</li> <li>- Use of ROW as a main access road</li> <li>- All roads will be fully reinstated, immediately after crossing completion.</li> <li>- All dirt roads used for construction access will be improved.</li> <li>- Reuse of excavated materials</li> <li>- Approval for crossing</li> <li>- Notification of all competent stakeholders for crossing works</li> </ul>	Complete	Positive	
34	Power Supply Network (onshore)	Construction works	Construction	Negative	Temporary	Small	High	Minor	<ul style="list-style-type: none"> <li>- Separate environmental licensing procedure for power line</li> <li>- Compliance with legal requirements</li> <li>- Timely notification of all competent stakeholders</li> <li>- Selection of measures for safety and crossing in cooperation with competent authorities</li> </ul>	Complete	Positive	The creation of a new power supply line for the provision of electricity for the construction and the operation of the Onshore Facilities will improve the power supply network infrastructure.
35	Power Supply Network (offshore)	Construction works	Construction	Negative	Temporary	Large	High	Major	<ul style="list-style-type: none"> <li>- Compliance with legal requirements</li> <li>- Timely notification of all competent stakeholders</li> <li>- Selection of measures for safety and crossing in cooperation with competent authorities</li> </ul>	Complete	None	
36	Water Supply Network	Construction works	Construction	Negative	Temporary	Small	Medium	Minor	<ul style="list-style-type: none"> <li>- Detail survey of the existing water networks along the 32m working strip, prior to construction.</li> <li>- Agreement on crossing and reinstatement measures with the competent authority.</li> <li>- Obtain all necessary licenses.</li> <li>- Notification of all competent stakeholders</li> <li>- Small adjustment of the pipeline route if required, within the working strip (RoW),</li> <li>- Immediate reinstatement per section according to the local stakeholders provisions.</li> </ul>	Complete	None	
37	Telecommunication Network	Offshore pipeline laying	Construction	Negative	Temporary	Small	High	Moderate	<ul style="list-style-type: none"> <li>- Contact with operators in order to identify best crossing solution</li> </ul>	Complete	None	

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
38	Land Uses/ Introduction	Pipeline laying	Construction	Negative	Temporary	Small	High	Moderate	<ul style="list-style-type: none"> <li>- Consession of Shoreline, Beach and Sea-bottom</li> <li>- Immediate reinstatement per section according to the local stakeholders provisions.</li> <li>- Timely removal of rubbles, solid wastes, and other debris,</li> <li>- Use of excavation materials for filling borrow pits or other uses as required by the authorities.</li> <li>- Prior to construction commencement, a cadastral will be approved</li> <li>- Onshore pipeline will be constructed per section of 500m meaning that ~3weeks from construction commencement to backfilling will be required.</li> </ul>	Complete	None	Residual impacts are due to operation and not construction
39	Land Uses/ General	Onshore pipeline laying	Construction	Negative	Temporary	Small	High	Moderate	<ul style="list-style-type: none"> <li>- Restriction of working strip to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.</li> <li>- Immediate reinstatement</li> <li>- Compensation for income loss as provided by law</li> <li>- Publication of works commencement</li> </ul>	Complete	None	
40	Land Uses/ Forestial	Onshore pipeline laying	Construction	Negative	Temporary	Small	High	Moderate	<ul style="list-style-type: none"> <li>- Restriction of working strip to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.</li> <li>- Working strip will be used as the main access road. No access roads are expected to be opened (excluding landfall site).</li> <li>- The Working Strip will be reinstated according to the competent authorities' recommendations</li> <li>- The Right of Way shall be used as a fire belt by the Forest Authorities and modified as required, providing that the 5m safety zone will be kept</li> <li>- Some felled trees should be left on site for biodiversity conservation, if required by the authorities, otherwise will be managed according to legislation</li> <li>- All necessary permits will be acquired</li> <li>- All reinstatement works will be payable by the Project</li> <li>- EPC Contractor will re-evaluate the required space so as to minimize landfall construction site.</li> <li>- The reinstatement will include local material and soil bio-engineering systems to minimize as much as possible visual impact</li> </ul>	Complete	Minor	
41	Land Uses/ Residential	Onshore pipeline laying	Construction	n/a	n/a	n/a	n/a	n/a	<ul style="list-style-type: none"> <li>- Route selection outside existing and planned residential areas limits</li> </ul>	Complete	None	

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
42	Landscape	Project's construction/ General	Construction	Negative	Temporary	Medium	Low	Minor	<ul style="list-style-type: none"> <li>- All works should take what space is necessary and no more.</li> <li>- Under no circumstance should the vegetation be removed, unless it is absolutely necessary.</li> <li>- Construction sites will be developed behind local visibility levels, horizons, reference sites (settlements, roads, etc.) etc.</li> <li>- Existing road network will be used in maximum in order to access the routing.</li> <li>- Immediate reinstatement with local materials</li> </ul>			
43	Area's Profile	Pipeline construction	Construction	Negative	Temporary	Medium	Medium	Minor	<ul style="list-style-type: none"> <li>- Construction of the coastal and landfall site outside touristic season, ie June – August</li> <li>- Short construction period</li> <li>- Immediate reinstatement</li> </ul>	Complete	None	Even though sensitivity is medium, the construction time is limited.
44	Area's Profile	Onshore Facilities construction	Construction	Negative	Temporary	Medium	Medium	Moderate	<ul style="list-style-type: none"> <li>- Construction of the coastal and landfall site outside touristic season, ie June – August</li> <li>- Short construction period</li> <li>- Immediate reinstatement</li> </ul>	Complete	None	
45	Cultural Environment	Project's construction/ General	Construction	Neutral	Temporary	Small	Low	Not Significant	<ul style="list-style-type: none"> <li>- Notification of known archaeological points in the navigation system. Maintenance of a 300m distance from the location of the ship wrecks and restriction of anchoring in a 300m zone.</li> <li>- Supervision by archaeological authorities payable by the Project and</li> <li>- Adjustments of construction works in case of archaeological concerns' findings along the pipeline route, if required.</li> </ul>	Complete	Positive	The possibility of cultural findings is small since the onshore competent authorities have pre-approved the proposed route. the identification of marine antiquities at appropriate distance is already deemed as a positive impact of the project.
<b>Operation Phase</b>												
1	Atmosphere	Natural Gas regional provision	Operation	Positive	Permanent	Large	Large	Major	- Epirus and Western Macedonia EPA operation (obligation of DEPA, not IGI POSEIDON, according to L.4001/2011)	Positively Irreversible	Major	Epirus EPA operation provides positive economic and environmental impacts to all Western Greece.
2	Atmosphere	Onshore Facilities operation	Operation	Negative	Permanent	Medium	High	Moderate	- No measures are necessary	Irreversible	Minor	Pollutants concentrations are significantly

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
												lower than the statutory limits
3	Liquid Wastes	Onshore Facilities operation	Operation	Negative	Permanent	Small	Low	Not Significant	<ul style="list-style-type: none"> <li>- Separation of rain and oily water</li> <li>- Treatment of oily waters as Chemical waste</li> <li>- Sanitary collection system and septic tank</li> <li>- Regular maintenance of septic tanks</li> <li>- Double walled with leak detection underground storage tanks of diesel</li> <li>- Tanks and underground piping should be inspected regularly.</li> <li>- Watertight paved areas to collecte possible leaks or spills.</li> </ul>	n/a	None	
4	Solid Wastes	Onshore Facilities operation	Operation	Negative	Permanent	Small	Low	Not Significant	<ul style="list-style-type: none"> <li>- Sanitary collection system and septic tank</li> </ul>	n/a	None	
5	Noise	Onshore Facilities operation	Operation	Negative	Permanent	Small	Low	Minor	<ul style="list-style-type: none"> <li>- Placement of noisy equipment in closed buildings</li> <li>- Requirements in the tenders documents for use of low noise equipment.</li> <li>- 50dB noise limit outside fencing</li> </ul>	Irreversible	Minor	No sensitive receptor identified in the area.
6	Seismicity	Project's operation	Operation	n/a	n/a	n/a	n/a	n/a	<ul style="list-style-type: none"> <li>- Detail check after any seismic event</li> <li>- Proper antiseismic design</li> </ul>	n/a	n/a	The project does not have any impact on the seismicity of the area. On the contrary, the mitigation measures suggested are for the project's safety.
7	Soil	Onshore Facilities operation	Operation	Neutral	Temporary	Small	Low	Minor	<ul style="list-style-type: none"> <li>- Double walled with leak detection underground storage tanks of diesel</li> <li>- Tanks and underground piping should be inspected regularly.</li> <li>- Watertight paved areas to collecte possible leaks or spills.</li> </ul>	n/a	None	Impact assessment is based on the unlikelihood of small scale spillage.

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
8	Water Resources	Project's existence	Operation	Negative	Permanent	Small	Low	Not Significant	<ul style="list-style-type: none"> <li>- Availability of emergency response plan.</li> <li>- No use of mechanical means for above pipeline excavations</li> <li>- Special Crossing Study for new infrastructure projects</li> <li>- Monitoring of the entire pipeline and prompt reinstatement, if required</li> <li>- Double walled with leak detection underground storage tanks of diesel</li> <li>- Tanks and underground piping should be inspected regularly.</li> <li>- Watertight paved areas to collect possible leaks or spills will be constructed.</li> </ul>	n/a	None	
9	Flora (terrestrial)	Pipeline 5m buffer Right of Way	Operation	Neutral	Permanent	Small	Low	Not Significant	<ul style="list-style-type: none"> <li>- Reinstatement</li> <li>- Protection of reinstatement</li> </ul>	n/a	None	
10	Flora (terrestrial)	Onshore Facilities operation	Operation	Negative	Permanent	Large	Low	Not Significant	<ul style="list-style-type: none"> <li>- Reinstatement</li> <li>- Protection of reinstatement</li> </ul>	Irreversible	Minor	
11	Flora (marine)	Pipeline's operation	Operation	Positive	Permanent	Medium	High	Major	<ul style="list-style-type: none"> <li>- Artificial reef along the buried coastal pipeline</li> <li>- Pilot nursery garden and transplantation of Posidonia oceanica laying directly on the pipeline route and relocate them on the near by sea bottom.</li> <li>- Monitoring of pilot replantation by marine specialist</li> </ul>	Positively Irreversible	Major	
12	Fauna (terrestrial)	Pipeline 5m buffer Righth of Way	Operation	Positive	Permanent	Medium	Medium	Moderate	<ul style="list-style-type: none"> <li>- Creation of fringe ecosystems preferred by local species.</li> </ul>	Positively Irreversible	Moderate	
13	Fauna (terrestrial)	Onshore Facilities operation	Operation	Negative	Permanent	Medium	Low	Minor	<ul style="list-style-type: none"> <li>- Use of local materials for visual incorporation</li> <li>- Plantation of tall trees in the fence line</li> </ul>	Irreversible	Minor	
14	Fauna (marine)	Pipeline's operation	Operation	Positive	Permanent	Medium	High	Major	<ul style="list-style-type: none"> <li>- Artificial reef along the buried coastal pipeline</li> <li>- Pilot nursery garden and transplantation of Posidonia oceanica laying directly on the pipeline route and relocate them on the near by sea bottom.</li> <li>- Monitoring of pilot replantation by marine specialist</li> </ul>	Positively Irreversible	Major	Indirect impacts on tourism and local economy.
15	Demography	Onshore Facilities operation	Operation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
16	Economy (Employment)	Project's operation	Operation	Positive	Permanent	Small	Low	Not Significant	<ul style="list-style-type: none"> <li>- Active promotion of local workforce engagement and services providers.</li> <li>- Training of local workforce</li> </ul>	Positively Irreversible	Minor	
17	Economy (Region)	Project's operation	Operation	Positive	Permanent	Large	High	Major	<ul style="list-style-type: none"> <li>- Establishment of Epirus and Western Macedonia Natural Gas Company</li> <li>- Provision of Epirus and Western Macedonia with Natural Gas</li> </ul>	Positively Irreversible	Major	
18	Fishing	Project's operation	Operation	Positive	Permanent	Small	High	Major	<ul style="list-style-type: none"> <li>- Artificial reef along the buried coastal pipeline</li> </ul>	Positively Irreversible	Major	

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
19	Tourism	Project's operation	Operation	Positive	Permanent	High	High	Major	<ul style="list-style-type: none"> <li>- Artificial reef along the buried coastal pipeline</li> <li>- Onshore pipeline will be constructed per section of 500m meaning that ~3weeks from construction commencement to backfilling will be required.</li> <li>- RoW will be used as fire belt, or other managerial purposes of Forestal Authorities, keeping 5m on each side of the pipeline.</li> <li>- Installation of coastal pipeline in a trench</li> <li>- Incorporation of local architectural elements</li> <li>- Plantation of hedges and tall trees around the fences</li> <li>- Careful selection of Onshore Facilities location</li> <li>- The facilities will be open to the public periodically.</li> </ul>	Positively Irreversible	Major	
20	Aviation	Onshore Facilities operation	Operation	Negative	Permanent	Small	High	Minor	<ul style="list-style-type: none"> <li>- CAA and General Airforce Staff possible restrictions for installation permit</li> </ul>	n/a	None	
21	Navigation	Offshore pipeline operation	Operation	Negative	Permanent	Small	High	Minor	<ul style="list-style-type: none"> <li>- Illisutration of anchoring restrictions and navigation restrictions to admiral maps</li> </ul>	n/a	None	
22	Road network (existing/ future)	Onshore pipeline operation	Operation	Positive	Permanent	Small	Medium	Minor	<ul style="list-style-type: none"> <li>- All dirt roads used for construction access will be reinstated.</li> <li>- Special Crossing Study for new infrastructure projects</li> <li>- Monitoring of the entire pipeline and prompt reinstatement, if required.</li> </ul>	Positively Irreversible	Minor	
23	Power Supply Network	Onshore Facilities operation	Operation	Positive	Permanent	Small	High	Moderate	<ul style="list-style-type: none"> <li>- New separate power supply line (medium voltage), enriching the area's network</li> <li>- Possible future offshore power supply lines should be notified to the Project Owner so as to come up with the optimum technical solution.</li> </ul>	Irreversible	Positive	
24	Water Supply Network	Project's operation	Operation	Neutral	Permanent	Small	Low	Not Significant	<ul style="list-style-type: none"> <li>- Special Crossing Study for new infrastructure projects</li> <li>- Monitoring of the entire pipeline and prompt reinstatement, if required.</li> <li>- Potable water supply through plastic bottles</li> <li>- Facilities utility water supply through licenced local enterpreuners</li> </ul>	n/a	None	
25	Telecommunication Network	Project's operation	Operation	Neutral	n/a	n/a	n/a	n/a	<ul style="list-style-type: none"> <li>- Contact with Project Owner in order to identify best technical solution for future projects</li> </ul>	n/a	None	
26	Land Uses/ Introduction	5m Right of Way and 20m Building Restrictions Zone	Operation	Negative	Permanent	Medium	Medium	Moderate	<ul style="list-style-type: none"> <li>- Reinstatement of the area</li> <li>- Easement of the Construction Strip (including the Right of Way)</li> <li>- Compensation for income loss as provided by law</li> <li>- Prohibition of deep-rooted trees in a 5m buffer zone along the onshore pipeline for safety reasons</li> <li>- Restriction of building in a 20m buffer zone, for safety reasons</li> <li>- Monitoring of reinstatement works and prompt actions if required</li> </ul>	Irreversible	Minor	

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
27	Land Uses/ General	Onshore pipeline operation	Operation	Negative	Temporary	Small	High	Moderate	- Immediate reinstatement - Compensation of income loss and occupation of working strip (including the RoW) according to legislation.	Irreversible	Minor	
28	Land Uses/ Forestial	Onshore pipeline operation	Operation	Negative	Temporary	Small	High	Moderate	- Restriction of working strip to 32m, in general. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m. - Working strip will be used as the main access road. No access roads are expected to be opened (excluding Landfall Site). - The Working Strip will be reinstated according to the competent authorities' recommendations - Monitoring of reinstatement and proper actions if required - The Right of Way shall be used as a fire belt by the Forest Authorities and modified as required, providing that the 5m safety zone will be kept - Some felled trees should be left on site for biodiversity conservation, if required by the authorities, otherwise will be managed according to legislation - All reinstatement works will be payable by the Project - The reinstatement will include local material and soil bio-engineering systems to minimize as much as possible visual impact	n/a	None	
29	Land Uses/ Residential	Onshore pipeline operation	Operation	n/a	n/a	n/a	n/a	n/a	- Route selection outside existing and planned residential areas limits - Restriction of building in a 20m buffer zone	Irreversible	Minor	
30	Landscape	Onshore Facilities operation	Operation	Neutral	Permanent	Medium	Low	Minor	- Monitoring of reinstatement works and immediate actions if required - Tree planting of regional species around all project components	n/a	None	
31	Area's Profile	Onshore Facilities operation	Operation	Negative	Permanent	Small	Low	Not Significant	- Reinstatement with local materials - Concealment of Onshore Facilities through proper site location	Irreversible	Minor	
32	Area's Profile	Onshore Facilities operation	Operation	Positive	Permanent	Large	Large	Major	- Epirus and Western Macedonia Natural Gas Supply company	Positively Irreversible	Major	

s/n	Environmental Aspect	Project Activity	Project Phase	Impact Type (Negative, Neutral, Positive)	Impact Duration (Permanent/Temporary)	Impact Magnitude (Small, Medium, Large)	Receptor Sensitivity (High, Medium, Low)	Impacts Significance (Not Significant, Minor, Moderate, Major)	Mitigation Measures	Reversibility (Complete, Partial, Irreversible)	Residual Impacts Significance (None, Minor, Moderate, Major)	Comments
33	Cultural Environment	Project's operation	Operation	n/a	n/a	n/a	n/a	n/a	<p>The measures presenting for the construction phase are applicable, ie:</p> <ul style="list-style-type: none"> <li>- Notification of known archaeological points in the navigation system. Maintenance of a 300m distance from the location of the ship wrecks and restriction of anchoring in a 300m zone.</li> <li>- Supervision by archaeological authorities payable by the Project and</li> <li>- Adjustments of construction works in case of archaeological concerns' findings along the pipeline route, if required.</li> </ul>	Positively Irreversible	Positive	The identification of marine antiquities at appropriate distance is already deemed as a positive impact of the project.

## 6.5 Pipeline's Operation End–Decommission

During the phase of Project's decommission, Authorities can request the removal of the onshore facilities, partially or in full. It is noted that the foundations of the buildings cannot be moved, but the rest materials and equipment could be reused, recycled or managed in a different manner.

Regarding the onshore route part, the following solutions are sound:

- Filling the pipeline with special cement in order to avoid future damages caused by cavities' and openings' formation or erosion, etc., due to ground's collapsing inside the pipeline's hollow; a pipeline which will eventually be wrecked by the corrosion. It is noted that, as time goes by, the pipeline will be corroded and weakened;
- Removing the pipeline, but for certain parts, such as crossings with roads, where the removal would be very expensive and difficult. These sections could be treated as described above.
- Temporary decommission of the natural gas pipeline, vacation of the pipeline and filling with inert gas (nitrogen)

Additionally, conditionally that it is still in good condition, the pipeline could be used for different purposes (such as water supply).

Regarding the offshore route part, studies suggest that following its decommissioning, the pipeline can be used as a bed for microorganisms' development, first micro-flora and then micro-fauna, and thus creating artificial reefs and habitats for benthic organisms and ecosystems.

The details of the decommissioning phase are not included in the scope of the present ESIA and the above are only indicative. A dedicated ESIA will be performed, timely prior to the decommissioning of the project and will be submitted for approval to the competent authorities, based on the future legislative framework.

## 6.6 Cumulative and Combined Impacts

### 6.6.1 Impacts Assessment

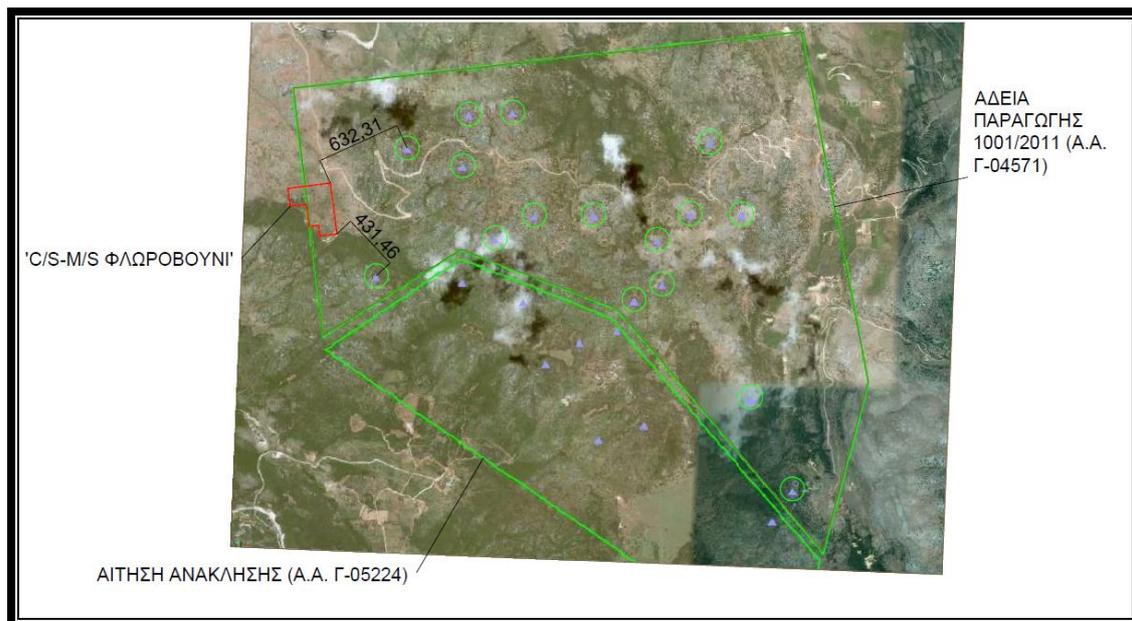
Cumulative impacts in the project region potentially occur from the combined effects of the offshore section of the IGI Project with other presently on-going or reasonably foreseeable future activities in the project area. Only one such project has been identified:

**Table 6.20 Identified planned projects.**

Investment proposal	Owner	Competent Authority	Status	Location	Municipality	Engagement
Wind Farm 32MW (16w/t of 2MW, d=90m each)	EDF EN GREECE A.E. & Co PREVEZA 1 ltd	RAE MEECC HTSO/ (DESMIE) IPTO/ (ADMIE)	Received: Production Permit Requiring: EIA, Installation-Operation Permit	Trigona (Adjacent to Florovouni)	Igoumenitsa	Wind farm polygon overlapping with onshore facilities.

The wind farm project has 16 wind turbines of 2MW power each, in an overall area of ~876ha and includes most of the Onshore Facilities parcel as illustrated in the following figure. The overlapping section does not include any wind turbines inside it.

**Figure 6.12 Wind farm and Onshore Facilities.**



The environmental impacts due to the IGI project are related mainly to the construction phase while regular operation results in no significant impacts. The installation of the offshore pipeline is estimated to take up to 3 months (depending on the weather conditions), the nearshore pipeline 6 months and the onshore section 11 months. The construction of the pipeline (onshore and offshore) and be carried out by several working divisions, so called “construction spreads”. Each spread will have a length of about 0.5km and the overall working phases of all spreads from preparation of the working strip to the restoration is approx. 3 months.

The construction of the Onshore Facilities will last longer – about 20 months.

In case construction times coincide with the IGI Project, this should be considered in the traffic safety plan of the EPC contractor. Currently, there is not enough information about the construction time frame of the wind farm project or the IGI. In addition, there is no well-defined picture of the areas that will be used during the construction and operation of the wind farm. The present status of permitting for the wind farm is placed very early in the overall implementation of similar wind farm projects.

Prior to IGI construction commencement more information about the wind farm project will be available. Based on the available data, at that time, there should be an assessment whether the simultaneous construction of the two projects is feasible or if a revision of the construction schedule of the projects should be made.

However, taking into consideration that the achieved permit by the wind farm developer is at the very beginning of the overall implementation of such projects it is most likely, that the IGI project will be completed prior to the wind farm installation permit issuance. Consequently, no simultaneous construction activities may be applicable.

From the non-linear character of the wind farm project, and the long time horizon requirement till the wind farm project reaches the necessary licensing status, it can be concluded that the potential for cumulative impacts with the IGI Project can be considered as low.

Regarding safety, in case of both projects’ operation, contacts with the engineering team of the wind farm development have already been established and the preliminary results are presented. The minimum safety requirements in case the

closest wind farm and the Onshore Facilities are at the same elevation is 500m. For each 100m difference in elevation, 100m of distance is added, proportionally.

Based on these calculations, the minimum safety distance is ~700m so the two closest wind turbines will be relocated, as accepted by the Windfarm developer.

### **6.6.2 Mitigation Measures**

A communication liaison between the two projects' engineers has already been established. This way the best solution for implementing both projects, regarding social, environmental and safety parameters is in process.

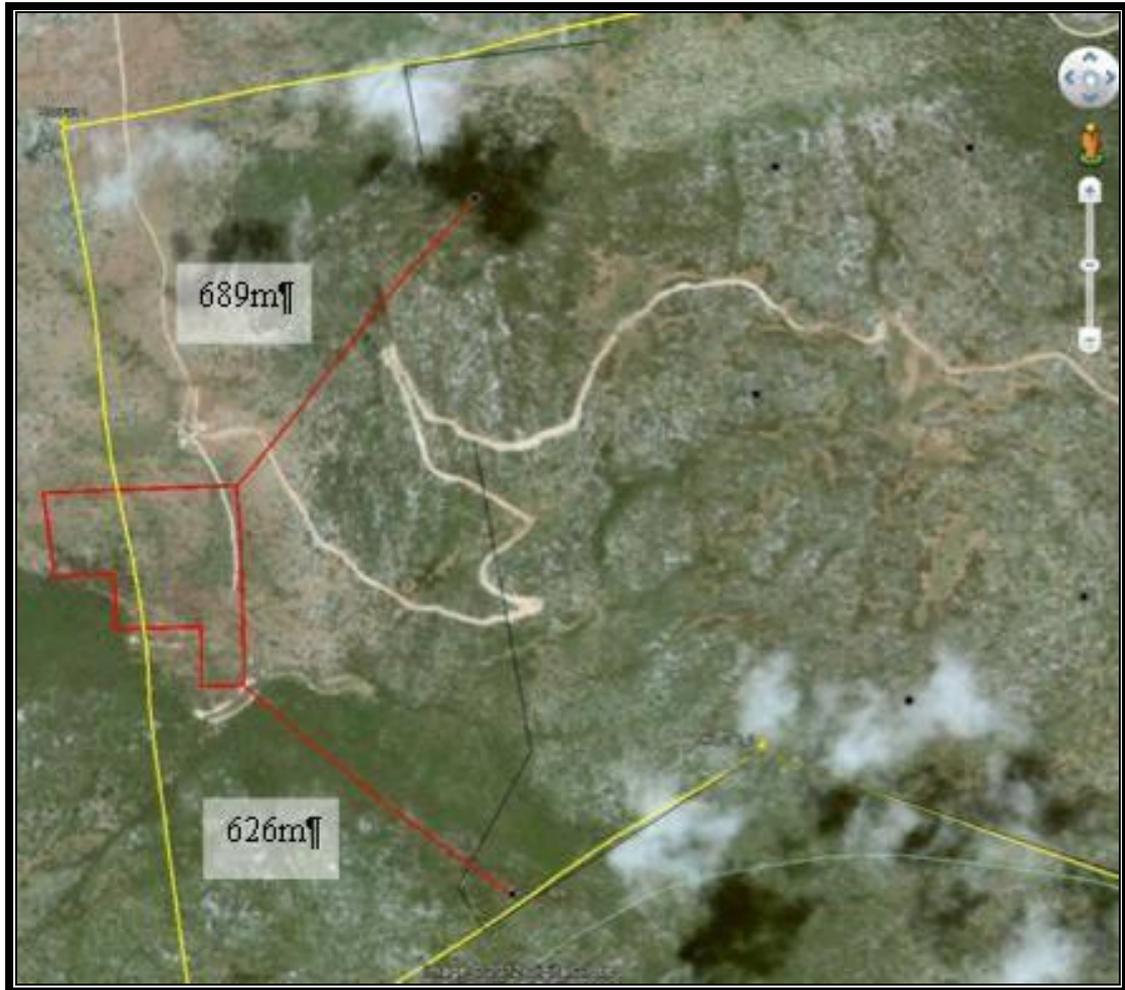
In particular, the two closest turbines have been moved as illustrated on the following figure based on data provided by IGI POSEIDON. The initial distance of the two closest wind turbines from the fence line of the Onshore Facilities site were 632m and 431m, whilst after the meetings the wind turbines were relocated to a distance of 689m and 626m, respectively. Consequently, no safety issues arise.

It is noted that map 7240-AU-LU-02, illustrates the boundaries of the licenced wind farm and its wind turbines. The two closest wind turbines are illustrated in their modified location, which were agreed with the owner of the park. This relocation is deemed insignificant and without any impact to the natural environment or the technical study of the licenced wind farm.

Through this liaison, the licensing engineers of the two projects will be able to communicate permitting progress and collaborate to minimize cumulative impacts. The most likely scenario is that IGI project's Onshore Facilities will be constructed by the time of the licensing issuance for the wind farm. Otherwise:

- The traffic management plan will be prepared in cooperation with both projects; EPC contractors
- Investigation of using the same access roads for both projects, in case simultaneous construction activities take place.

**Figure 6.13 Mitigated positions of wind turbines.**



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## **7 Environmental and social management and Monitoring plan (ESMMP)**

### **7.1 Introduction**

This section of the ESIA discusses IGI POSEIDON's approach to the management and monitoring of environmental and social issues. It also presents an outline of the requirements that the EPC Contractor will be expected to meet. The Owner will be expected to develop this plan throughout the life of the project. The ESMMP will cover the detailed design, construction, and reinstatement of the Project. IGI POSEIDON acknowledges an environmental and social management programme as being an essential part of the pipeline planning and construction process.

### **7.2 Environmental and Social Impact Assessment (ESIA)**

Environmental and social factors have been considered since the early stages of the planning of the project and will continue to be developed through the further stages of authorisations, detailed design, construction, reinstatement, operation and commissioning. The prime purpose of the ESIA is to identify environmental and social impacts and ways of dealing with them, particularly at the planning and design phase of a project. There are many ways in which the impacts of projects can be avoided, minimised and reduced. Collectively, these measures are usually referred to as mitigation.

The most effective form of mitigation is to design the project to avoid environmental and social impacts at source. In the case of pipeline projects, many environmental and social impacts can be avoided by sensitive routing and/or by the adoption of a particular construction technique. In addition, pipeline construction and reinstatement techniques, that minimize environmental and social impacts, are well-established. A properly executed pipeline project is unlikely to lead to any significant adverse long-term impacts. For example, in this project, the location of the onshore was indicated by the representatives of the local authorities.

The project design and planning to date has already significantly reduced the scope for adverse environmental and social impacts through a combination of sensitive route selection and good practice inherent in pipeline design and construction. The

ESIA has identified additional mitigation measures which are set out in this chapter and the previous one.

However, it is important to note that the process does not stop with the submission of this ESIA, for example:

- further site surveys may result in minor changes to the design, during detail design of the project; and
- further consultation may identify additional mitigation requirements.

Detailed design will define construction techniques, which will lead to more informed consultation and mitigation.

The full extent of mitigation measures, as determined by the ESIA, consultation, further studies, and consents will form the ESMMP for the project. This will be the delivery mechanism for the mitigation measures. A preliminary version of the schedule is presented below in Table 7.1. The table will be updated regularly as the design proceeds and the results of detailed further surveys, consultations and investigations become available. It is noted that this table is complementary (and vice versa) to the mitigation measures presented in the relevant chapter.

This ESIA contains information from the detailed background studies commissioned by IGI POSEIDON and its Contractors (INTECSea, Fugro, ASPROFOS, HCMR, Demokritos Institute, etc.), as well as other project information. Areas of particular concern and those considered to be of fundamental importance to the project have been identified and mitigation measures proposed.

To date the following studies and field surveys have been carried out:

- Flora and Fauna Desk Based Assessment and Surveys;
- Coastal and Marine Desk Bases Assessment and Surveys
- Reconnaissance and Detail Marine Survey;
- Archaeological Desk Based Assessment (onshore and offshore) and Offshore Field Survey;
- Desk Based Hydrological and Hydrogeological Assessment;
- Soils, Geological and Seismic Desk Based Assessment and Field Studies;

- Desk Based Collection of Social Data;
- Noise Immission Model
- Air Dispersion Model

### **7.3 Purpose of the ESMMP**

The broad purpose of the ESMMP is as follows:

- to provide a mechanism for ensuring that measures to mitigate potentially adverse environmental or social impacts are implemented and to highlight any positive environmental or social impacts;
- to ensure that good construction practices are adopted throughout the construction of the pipeline;
- to provide a framework for mitigating impacts that may be unforeseen or unidentified until construction is underway;
- to provide assurance to third parties that their requirements with respect to environmental performance will be met; and
- to provide a framework for compliance auditing and inspection to enable IGI POSEIDON to be assured that its aims with respect to environmental performance are being met.

### **7.4 Development of the ESMMP**

The ESMMP will be a document that continuously evolves throughout the life of the project. It will be further developed as further consultation and route investigations take place, and detailed design and working method statements are prepared. The ESMMP will be developed to contain:

- the IGI POSEIDON Environmental and Social Policy for the project;

- a statement of the environmental and social aims and policy objectives of the project;
- relevant legislation and regulations;
- potential environmental and social effects as identified in the ESIA and subsequently; and
- a schedule of environmental and social mitigation measures and commitments and how they will be met.

As detailed design proceeds, the ESMMP will continue to evolve and will expand to include, for example:

- roles and responsibilities of key individuals;
- environmental awareness programs;
- the reinstatement and restoration plan;
- environmental monitoring specifications;
- environmental contingency pollution control plan; and
- inspection and auditing programmes for the continual review of the project.

Associated to the ESMMP will be the following documents:

- an emergency response plan;
- a waste management plan; and
- a construction traffic management plan.

Any detailed working method statements produced by the EPC Contractor, and the subsequent construction and restoration practices, will be developed by:

- an iterative process between environmental specialists, and the Contractor at the planning and detailed design phase; and
- the provision of on-going supervision by IGI POSEIDON's management team who will be responsible for monitoring, inspection and audit functions through the construction and restoration phases.

**Table 7.1 Environmental and Social Management and Monitoring Plan.**

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
<b>Implementation Stage: Pre-Construction</b>					
1	Environmental and Social management	Revise the ESMMP in consultation with the Authorities on the basis of detailed surveys undertaken by the EPC Contractor	Best practice	EPC Contractor	Reporting revised ESMMP to Authorities
2	Impacts on Local Community / Grievance Mechanism	Establishment of grievance mechanism in order for local community to have a way of communicating its problems	Best practice/ IGI POSEIDON's commitment	IGI POSEIDON	Avoid conflict with local community
3	Impact on Local Community/ Construction site location study	Temporary construction facilities sites will be selected so as to minimize noise, visual and other impacts to local community	Legislative requirement	EPC Contractor	Avoid conflict with local community
4	Safety/ Emergency Response Plan	Prepare an Emergency Response Plan for construction and operation	Legislative requirement	EPC Contractor	Reporting plans to Authorities
5	Impacts on Natural Environment / Waste Management Study (Solid and Liquid)	Prepare a Waste Management Plan which will describe the type of wastes deriving during construction and operation of the project and their management	Legislative requirement	EPC Contractor	Reporting plans to Authorities

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
6	Impacts on Road Network/ Traffic Management Plan	Prepare a Traffic Management Plan which will include safety and deviations issues	Best practice	EPC Contractor	Reporting plans to Authorities
7	Safety/ Health and Safety	Construction workers training	Best practice and Legislative requirement	EPC Contractor	
8	Protection of water resources	Carry out a condition survey to assess field drains and irrigation networks within the 26m construction working strip	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON.
9	Protection of water resources	Installation of drains to prohibit water from entering the pipeline's trench	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON.
10	Impacts on Natural Onshore Environment/ Reinstatement Plan	Prepare a vegetation reinstatement plan	Legislative requirement	EPC Contractor	Timely reinstatement of the area
11	Landfall site survey	Preconstruction verification of presence along the RoW and the landfall site of the species Buteo rufinus, Buteo buteo, Ciconia nigra, Falco naumanni and Gyps fulvus	Best practice/ IGI POSEIDON's commitment	EPC Contractor	Assure protection of threatened species
12	Removal of trapped animals in the excavated trench	Removal of any trapped animals in the excavated trench and release of them to their natural	Best practice/ IGI POSEIDON's commitment	EPC Contractor	Avoidance of wildlife death

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
		environment			
13	Impacts on Economy / Local Workforce Recruitment	Active promotion of local workforce engagement and services providers.	Best practice/ IGI POSEIDON's commitment	IGI POSEIDON	Boost of local economy
14	Impacts on Infrastructure	Detailed crossings' lists and issuance of all necessary permits	Best practice/ Legislative requirement	EPC Contractor	
15	Changes to land uses and compensation/ reinstatement preparation	Survey and record the pre-construction situation with regard to land use/ Cadastral tables and drawings	Best practice/ Legal requirements	EPC Contractor	Communication with land owners and regular auditing of the EPC Contractor by IGI POSEIDON.
16	Land use	Compensate land owners for the right of way, according to legislation	Best practice/ Legislative requirement	IGI POSEIDON	Records of transactions
17	Impacts on Marine Natural and Cultural Environment	Incorporation of areas of interest (Posidonia meadows and ship wrecks) in the navigation system	Best practice/ IGI POSEIDON's commitment	EPC Contractor	Avoid impacts on sensitive points from anchoring.
<b>Implementation Stage: Construction</b>					

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
1	Impacts on Natural and Social Environment	An ESIA specialist will be appointed in order to supervise all aspects of construction that could have impacts to natural or social environment	Best practice	owner	Minimization of impacts during construction
2	Air quality	Cover vehicles carrying soil or materials from/to the construction sites	Best practice	EPC Contractor	Minimization of air pollution. Regular auditing of the contractor by IGI POSEIDON during construction.
3	Air quality	Spray the working area, when necessary, with water to minimise the occurrence of dust	Best practice	EPC Contractor	Minimization of air pollution. Regular auditing of the contractor by IGI POSEIDON during construction.
4	Air quality/ Noise	No machinery will be left running idly	Best practice	EPC Contractor	Minimization of air pollution and noise nuisance. Regular auditing of the contractor by IGI POSEIDON during construction.
5	Air quality/ Noise	All machinery and equipment will be according to national legislation regarding technology	Best practice	EPC Contractor	Minimization of air pollution and noise nuisance. Regular auditing of the contractor by IGI POSEIDON during construction.
6	Wastewaters/ Hydrotesting	Hydrotesting water will be treated accordingly (settlement, filtration and UV)	Best practice/ Legislative requirement	EPC Contractor	Minimization of impacts from hydrotesting water different consistency that the receiving water body. Regular auditing of the contractor by IGI POSEIDON during construction.
7	Wastewaters/ Hydrotesting	Hydrotesting water will be disposed in such a manner as to minimize impacts on the receptors	Best practice/ Legislative requirement	EPC Contractor	Minimization of impacts from discharging hydrotesting water. Regular auditing of the contractor by IGI POSEIDON during construction.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
8	Noise	In case of explosives usage, public will be notified 1 week in advance	Best practice/ Legislative requirement	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
9	Cultural Environment	Monitor topsoil stripping and trenching for archaeological findings. Restriction of anchoring in a radius of 300m from the ship wrecks location	Best practice/ Legislative requirement	EPC Contractor	Reporting to Archaeological Authorities. Regular auditing of the contractor by IGI POSEIDON during construction.
10	Protection of Water Resources/ crossing method	Crossing of watercourses by open cut techniques using methods such as flume pipes (as appropriate) to allow continual flow	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
11	Protection of Water Resources/ restoration	Local materials will be used for reinstatement	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
12	Protection of Water Resources/ soil erosion	Vehicles will be prohibited from driving through watercourses	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
13	Protection of Water Resources/ Drainage	Waters from dewatering activities will be discharged in a way that will minimise physical impacts to channel morphology, and with prior agreement and appropriate consents and approvals from the authorities.	Best Practice/ Legal requirement	EPC Contractor	Reporting to Prefectural Authorities for consents and approvals. Regular auditing of the contractor by IGI POSEIDON during construction.
14	Protection of Water Resources/ drainage	Fully reinstate land drainage features disturbed during construction	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
15	Protection of Water Resources/ hydrotesting	Prior to discharge, hydrotest water will be tested to ensure that its quality complies with local and international requirements	Best Practice/ Legal requirement	EPC Contractor	Test results to be reported to Prefectural Authorities. Regular auditing of the contractor by IGI POSEIDON during construction.
16	Protection of Water Resources/ Pollution	All contaminated water collected from construction sites will be forwarded to licensed contractors.	Legal requirement	EPC Contractor	Records of waste transactions to be reported to Prefectural Authorities. Regular auditing of the contractor by IGI POSEIDON during construction.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
17	Protection of Water Resources/ Irrigation channels	From April till September: -No main irrigation channels will be cut, unless otherwise agreed with the affected farmers -Secondary channels will not be cut for more than 48h -Tertiary channels will not be cut for more than 7 days. All irrigation channels break will be notified 4 weeks in advance to the Guilds.	Best practice	EPC Contractor	Communication with farmer associations. Regular auditing of contractor notifications by IGI POSEIDON during construction.
18	Protection of Water resources/ income loss' compensation	Compensations will be given, according to legislation, for income loss.	Best practice	Responsibility of IGI POSEIDON	Communication with farmer associations, provision of compensation records for lenders inspection

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
19	Protection of soil and subsoil/ topsoil	Restrict the construction working strip (and therefore topsoil stripping) to 32m working width along the pipeline route. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.	Best practice	EPC Contractor	Regular auditing of the EPC contractor by IGI POSEIDON during construction.
20	Protection of soil/ topsoil	Topsoil will be piled separately from the subsoil	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
21	Protection of soil and subsoil/ compaction	Stockpiles will be a maximum of 2 m high to avoid compaction from the weight	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
22	Protection of soil and subsoil/ fertility	The soil storage period will be kept to a minimum and will be restricted within each section so that no significant deterioration in soil fertility occurs	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
23	Protection of soil/microorganisms	Following reinstatement, spread any surplus (uncontaminated) soil over fields subject to agreement with the landowner and / or occupier or to other designated areas	Best practice	EPC Contractor	Communication with land owners. Regular auditing of the contractor by IGI POSEIDON during construction.
24	Protection of Water Resources, Soil/ Soil erosion	River banks stabilization with appropriate construction solutions	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
25	Protection of air quality	Wash vehicles to remove dust from the body and wheels immediately before leaving a construction area or temporary facilities	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
26	Protection of flora – onshore	Restrict the construction working strip (and therefore topsoil stripping) to 32m working width along the pipeline route. In forestial areas, with dense vegetation, and in organized tree crops, every effort will be made to reduce the width of the construction strip; however, the construction strip shall not be less than 26m.	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
27	Protection of flora – offshore	Creation of a nursery garden for future transplanting on the artificial reef	Best practice/ IGI POSEIDON's commitment	EPC Contractor	Minimization of impacts and enhancement on Posidonia oceanica meadows and marine ecosystems.
28	Protection of flora – offshore	Avoid construction works near the Posidonia oceanica meadows from June till August	Best practice/ IGI POSEIDON's commitment	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
29	Protection of flora – offshore	Avoid anchoring near Posidonia oceanica meadows, as much as technically possible	Best practice/ IGI POSEIDON's commitment	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
30	Protection of Habitat/ mature trees	When crossing woodland, every effort will be made in order for mature trees to be fenced off and worked around	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
31	Protection of Habitat/ restoration	Full restoration of the construction zone after completion of the works, according to the framework that will be agreed by the competent authorities	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
32	Restoration of Habitat	Replanting of trees where removed outside the 10m safety zone. If requested by the Forest Authorities the safety strip could be used as a fire protection belt	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
33	Restoration of Habitat/ microorganisms	Some felled chunks will remain on site in order to help habitat natural restoration and minimize impacts on microorganisms	Best practice/ IGI POSEIDON's commitment	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
34	Enhancement of Habitat	Plant fruit trees or specific species requested by the competent authorities if any managerial purposes are served	IGI POSEIDON's commitment	EPC Contractor	Communicate to competent authorities and regular auditing of the contractor by IGI POSEIDON during construction.
35	Protection of Fauna	Avoid pipeline construction works from June till August, at the nearshore section	Best practice, Legislative Requirement, IGI POSEIDON's commitment	EPC Contractor	Auditing by IGI POSEIDON

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
36	Protection of protected species	In case of any population of Buteo rufinus, Buteo buteo, Ciconia nigra, Falco naumanni and Gyps fulvus are identified along the RoW or the landfall site, their nests will be temporarily removed, for as long as the construction works and will be relocated as soon as the reinstatement is completed, if necessary	Best practice, Legislative Requirement, IGI POSEIDON's commitment	EPC Contractor	Auditing by IGI POSEIDON. (possibly also by Hellenic Ornithological Society)
37	Fisheries	Notification of local fisherment of the offshore and nearshore construction works	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
38	Infrastructure/ general	In case any break of the normal operation of the infrastructure networks is required, 2 weeks notification will be provided.	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
39	Infrastructure/ general	Immediate reinstatement of infrastructure networks	Best Practice/ Legislative requirement	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
40	Road Networks/ Traffic	Working strip will be used as the main transporation route for personnel and equipment	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
41	Road Networks/ Traffic Management Plan	Consult with local authorities to develop specific routes for hazardous or big loads	Best practice	EPC Contractor	Consultation with Municipal Authorities. Regular auditing of the contractor by IGI POSEIDON during construction.
42	Road Networks/ Traffic Management Plan	Provide for advance warning of construction works in the area, including details of any proposed diversions and road closures	Best practice	EPC Contractor	Consultation with Municipal Authorities. Regular auditing of the contractor by IGI POSEIDON during construction.
43	Road Networks/ Traffic Management Plan	Ensure that access to commercial and residential properties is maintained at all times	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
44	Road Networks/ Traffic Management Plan	Enforce the project health and safety policy particularly in regard to vehicle maintenance, speed limits and the code of conduct	Best Practice/ Legislative requirement	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
45	Land use/ restoration	Agree site reinstatement measures with the land owners / users and the local administration	Best practice	EPC Contractor	Communication with land owners. Regular auditing of the contractor by IGI POSEIDON during construction.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
46	Land use/ compensation	Compensate landowners or respective users for damage or losses related to construction or maintenance, including any unanticipated or accidental damage by contractors	Best practice/ Legislative requirement	IGI POSEIDON/ EPC Contractor	Provision of evidence.
47	Tourism	Conduct construction activities at the landfall location and near the coast (onshore) outside of the summer period (June - August).	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
48	Landscape	Restriction of working strip to the minimum possible	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
49	Landscape	Restriction of construction time to the minimum possible	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
50	Landscape	Properly selection of temporary construction facilities	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
51	Landscape	Immediate restoration after construction completion	Best practice	EPC Contractor	Regular auditing of the contractor by IGI POSEIDON during construction.
52	Safety	Properly educate and train the workforce for emergency response plan and strategies	Best practice/ Legislative requirement	contractor	Minimization of impacts during an emergency
<b>Implementation Stage: Operation</b>					

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
1	Air quality	Monitoring of air emissions from the onshore facilities. The records will be available to the competent authorities	Best practice/ Legislative requirement	IGI POSEIDON	Monitoring of regular operation of the project. Assessment of used mitigation measures and additional ones requirements.
2	Wastewaters	Maintainance of Onshore Facilities at the optimum operational condition, through regular inspections and chects and precautionary maintenance	Best practice/ Legislative requirement	IGI POSEIDON	Monitoring of project's impacts on the environment through wastewaters. Assessment of used mitigation measures and additional ones requirements.
3	Wastes (Solid and Liquid)	Compliance with the approved Wastes Management Plan	Best practice/ Legislative requirement	IGI POSEIDON	Monitoring of project's impacts on the environment through wastes. Assessment of used mitigation measures and additional ones requirements.
4	Maintenance and Inspection (onshore)	During pipeline's inspection and maintenance, patrols will be made using terrestrial means and through the safety strip.	Best practice	IGI POSEIDON	Minimization of additional impacts to biodiversity. Assesemnt of pipeline's safety, and area's reinstatement.
5	Maintenance and Inspection (offshore)	During pipeline's inspection and maintenance, regular inspections will take place with the use of ROV	Best practice	IGI POSEIDON	Minimization of additional impacts to biodiversity. Assesemnt of pipeline's safety.
6	Onshore Flora/ Reinstatement	Monitoring of the reinstatement of onshore vegetation	Best practice/ Legislative requirement	IGI POSEIDON	Monitoring of habitats' reinstatement. Assessment of used mitigation measures and additional ones requirements.

Action Item #	Issue	Description of Commitment	Best Practice/ Legislative requirement/ IGI POSEIDON's commitment	Responsibility	Checking/ Monitoring/ Purpose
7	Protection of coast and marine flora and fauna	Establishment of an artificial reef along the buried nearshore pipeline.	IGI POSEIDON's commitment	IGI POSEIDON	Enhancement of fishing population and marine environment.
8	Monitoring of the marine environment	Monitoring of biological parameters along the artificial reef	IGI POSEIDON's commitment	IGI POSEIDON	Monitoring for reinstatement success assessment and implementing additional measures if required.
9	Safety/ Training	Regular training of personnel in order to be prepared for an emergency response plan.			

## **7.5 Monitoring program**

The monitoring program will include measurements and monitoring of qualitative and quantitative characteristics of the environment.

Its aims are to:

- Timely identify any adverse impacts;
- Foresee any future adverse impacts;
- Prevent adverse impacts;
- Determine the effectiveness of the undertaken mitigation measures.

### **7.5.1 Offshore section**

A regular monitoring of the effectiveness of the reinstatement measures along the nearshore, buried section up to 25m depth (approximately 500m from the coast) is suggested. The parameters that should be monitored are the biological parameters, including *Posidonia oceanica* development and marine biodiversity. This specialized monitoring program should be prepared by a marine expert. As suggested by HCMR, the basic elements of this program are:

For the first 10 years upon construction of the pipeline, it is suggested to check that the Project cause no degradation of the meadows, from possible failures in the coating that may cause corrosion of sediments along the route. Such a possibility is small, but given the high hydrodynamism of the landfall area, is not null.

It is suggested to select two points on each side of the pipeline, at a depth of 15m (close to the shallowest limit of the meadows development) and other two at a depth of 30m (close to the deepest limit of the meadows development), as well as two points at the corresponding depths away from the pipeline (as points of reference).

In the six above mentioned points density of *Posidonia* rhizomes shall be measured and the leaves surface, with a frequency of once per year (every summer) for the first two years upon completion of the Project and every two years after that. In parallel, the colonization by marine organisms of the pipeline's coating should be checked.

It is possible that after 2-3 years, the pipeline is fully covered by marine organisms and that the section of the meadows caused by the pipeline is disappeared. The monitoring of this development shall constitute a publication of the environmental friendly character of the Project.

Regarding the offshore section of the pipeline, given that the pipeline installation method includes only laying of the pipeline on the sea bottom, no negative impacts are expected during construction or operation and no monitoring program is deemed necessary.

## **7.5.2 Onshore Monitoring**

### **7.5.2.1 Ambient Air**

During construction and operation no monitoring of the ambient air quality offshore is needed as regards the used facilities and machines offshore.

During construction no monitoring of the ambient air quality is deemed necessary since construction will be completed in short time.

During operation, constant monitoring of the emissions of each compressor unit, by automatic air pollution control systems, is suggested at the Onshore Facilities sites at Florovouni, on each of the compressors' exhaust stack. Indicatively, the following parameters are to be analysed: SO<sub>2</sub>, NO<sub>x</sub>, particle matters (PM) carbon oxide (CO) by automatic air pollution control systems. The records will be available to the competent authorities at all time.

### **7.5.2.2 Wastes**

Monitoring of the solids' volume inside the septic tank will be carried out, regularly, in order to plan the maintenance of the tank.

### **7.5.2.3 Noise**

Once per year, noise monitoring will be applied to verify that the legislative requirements are met.

#### **7.5.2.4 Safety Monitoring**

There will be continuous monitoring of safety standards on-site during construction and operation activities. To ensure compliance with all existing and forthcoming statutory requirements and industry good practice is adhered to, the principles will be formalized in a health and safety plan in line with Greek and international construction, design and management regulations. This will include, but not limited to:

- Public safety;
- Operational safety;
- Handling hazardous materials and chemicals;
- Operating procedures;
- Work permits; and
- Emergency response.

The Health and Safety performance of the contractors will be the subject of regular review by IGI POSEIDON.

#### **7.5.3 Inspection and Auditing**

During construction EPC Contractor shall demonstrate how the provisions of the ESMMP are being complied with to IGI POSEIDON's satisfaction. This will include a programme of monthly audits and daily site inspections by the Contractor's HSE staff. For the operation phase this responsibility is on behalf of the Operator.

IGI POSEIDON will reassure itself that the Operator is complying with the ESMMP by instigating inspection and monitoring and will appoint an inspector to carry out audits to ensure that good environmental practice is being followed in all working areas. In addition, regular site inspections will be conducted.

Project's Owner, in order to assert if the Contractor/ Manager complies with the provisions of the ESMMP, shall perform inspections and checks and will define an inspector for these activities and certify that the proper environmental techniques are implemented. In addition, regular on-site inspections will be performed.

Where problems are identified, corrective action will be instigated by the IGI POSEIDON's inspector and undertaken by the Contractor/Operator. This could take the form of, for example:

- further direct mitigation,
- changes to procedures or
- additional training.

In addition to the inspection, the environmental and social compliance will be checked against an audit checklist. The audit checklist (which will form part of the ESMMP as it develops) will provide a mechanism to monitor and assess compliance against all IGI POSEIDON's requirements and standards as described above.

Both inspection and auditing results will play an important part in reviewing and updating the ESMMP as the project develops.

These results will be available to the public and the public authorities.

## **7.6 Roles, Responsibilities and Reporting**

### **7.6.1 The Role of IGI POSEIDON with Respect to Environmental and Social Management**

As project proponent, IGI POSEIDON will have ultimate responsibility for the implementation of the ESMMP. This includes:

- Ongoing management of environmental issues as detailed design proceeds;
- Monitoring of the EPC Contractor's performances;
- Development of mechanisms for dealing with problems;
- Acting as a point of contact for consultation and feedback with landowners, the public and interested parties such as statutory consultees; and
- General environmental monitoring and reporting.

IGI POSEIDON will ensure that the activities of its EPC Contractor are conducted in accordance with the standards outlined above; this will be a contractual requirement. In order to monitor this and to ensure compliance with the ESMMP, IGI POSEIDON

and the EPC Contractor's management teams will conduct regular site inspections and audits, the results of which will be documented.

#### **7.6.2 The Role of the EPC Contractor with Regard to Environmental and Social Management**

The EPC Contractor will be required to develop and comply with the provisions of the ESMMP and to take responsibility for its continual development throughout the detailed design and construction stages of the project. The EPC Contractor will be responsible for ensuring compliance with:

- All relevant legislation;
- The environmental and social controls and mitigation measures contained in the ESIA and the ESMMP; and
- Any environmental, social or other codes of conduct required by IGI POSEIDON.

The EPC Contractor will be required to undertake regular environmental and social inspections and reporting to enable IGI POSEIDON to monitor and evaluate the EPC Contractor's performance. The EPC Contractor will need to demonstrate to IGI POSEIDON's satisfaction how he will ensure that the requirements of the ESMMP are being complied with during construction. The EPC Contractor will also be expected to demonstrate commitment to the ESMMP at all levels in the EPC Contractor's management structure.

The EPC Contractor's performance in complying with the ESMMP is to be monitored and audited by the IGI POSEIDON's Project Manager/Project Supervisor and an employed auditor. This person may be part of any engineering supervisory team but should be able to demonstrate competency in environmental management and be independent of any contractors involved in the construction.

Compliance and non-compliance (established during audits) with the provisions of the ESMMP will be recorded by the Project Manager / Project Supervisor and records will be held at the EPC Contractor's site office. These records will be made available for inspection by representatives of the EPC Contractor, IGI POSEIDON and the relevant authorities. The IGI POSEIDON Project Manager / Project

Supervisor will be empowered to stop the works if he is of the opinion that the provisions of the ESMMP are not being met.

### **7.6.3 Third Parties Communications**

The EPC Contractor will be responsible for formal communications with third parties and interested parties. The EPC Contractor may therefore be required to attend meetings as appropriate. Communication channels will be established in the ESMMP to ensure that good relations are maintained with parties potentially affected by the project. IGI POSEIDON and its EPC Contractor will liaise with local communities, landowners and other interested parties.

IGI POSEIDON will set out the procedure to be adopted when dealing with the media. The EPC Contractor will ensure that all media contact is passed to IGI POSEIDON's Query Manager. If reporters and those trying to short circuit the system turn up unannounced on site when work is being undertaken, the EPC Contractor will ensure that they are respectfully referred to IGI POSEIDON's Grievance Manager

The project Grievance Mechanism will continue to be implemented in the ESMMP to respond to complaints and enquiries and to provide regular updates on project progress.

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## 8 SAFETY

### 8.1 Hazard and Risk Management

The project overall design HSE goals are to engineer a safe, reliable and operable facility at minimum cost through simple and effective design. The project will be developed in compliance with legislative codes and standards.

The strategic HSE objectives applicable are stated below. They address at high level the project risks.

The design shall be risk driven with identified risks linked to hazards and effects that generate them and managed, using suitable control (hazard management) and recovery (mitigation and emergency response) measures, to ALARP risk levels.

- The design shall be driven, using a proactive approach, with output from hazards and effect studies functioning in harmony with the use of appropriate engineering experience, judgement and applicable codes and standards, to achieve the highest practicable levels of inherent safety;
- Systems and measures put in place to manage significant risks shall be designed with their functionality, availability, survivability and contribution to risk reduction performance criteria clearly defined;
- Design personnel from all engineering disciplines will be responsible for ensuring that design safety, environmental and operability considerations are taken fully into account when carrying out all design tasks (in all project phases and for all project components);
- Hazards and effect studies shall be carried out as early as practicable to optimise the front end loading of HSE activities, which will maximise the opportunity for risk reducing changes and minimise or eliminate cost and schedule impacts;
- The design shall meet the environmental performance standards assumed and stated in any environmental impact statements;
- The design will incorporate emergency response measures to the facilities and ensure that they are not compromised during the design and development process.

As safety tools and techniques such as HAZOP and HAZID are applied, recommendations will be generated. The HAZID can also be used to identify those hazards which can be classified as Major Accident Events and to produce a preliminary list of the Safety Critical Design Measures. These recommendations will impact on the activities being performed in each stage of development. They may also impact on later phases of the project.

Health, Safety and Environmental (HSE) and related recommendations that are identified during the execution of design phases and result in action items, will be tracked using a Hazard Register list which is a tracking register developed and controlled by the HSE engineers. This is a live document which shall cover all phases of the design. The HSE engineers will also work with all disciplines and the project team to update the current status and closure of action items throughout the design phases. The updated Hazard Register list will be issued as often as required so that everybody should be informed for the works in progress. Most of the required actions, in all phases, will result from the HAZID and HAZOP.

The project Risk Management philosophy is based on the principle of reducing risk to a level that is ALARP (As Low As Reasonably Practical). The identification, evaluation and control of risks are key aspects Risk Management. As a result Risk Assessment is considered an important feature to identify elements or activities of the project, which can harm Health Safety and Environment. Furthermore, Risk Assessment enables the implementation of the most appropriate control measures.

#### Risk Assessment approach

Independent of the scope and goal of a specific risk assessment, the approach includes the following steps:

- Identification of possible failures, incidents, unwanted situations
- Identification of hazards, being the reason for or root cause for a failure, incident or unwanted situation
- Determination of (possible) impacts
- Determination of the risk and assess against Acceptance Criteria
- Determination and implementation of control measures
- Determination of the residual risks

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## Control measures

When determining control measures, preventative measures focusing on (the elimination of) the hazards and threats prevail over reactive measures. The following hierarchy in risk control shall be adhered to:

1. Avoidance of or eliminating the risk through substitution or elimination of hazards, replacing hazardous aspects with those that are not or less hazardous;
2. Prevention of failures, incidents and unwanted (continuous) situations;
3. Measures to minimize the impact of incidents that cannot be prevented, giving preference to collective protection measures above individual protection measures (PPE).

When selecting control measures for reasons of prevention or mitigation, the different types will be considered in the following order of priority:

1. Technical: all (engineering) control measures related to the installation of certain equipment, hardware and software and/or other physically tangible objects.

Technical control measures are characterized by a onetime action to implement these measures, besides checking, maintenance and replacement.

2. Organizational: related to the organization structure, the allocation of people, tasks, authorities and responsibilities, job design, competence and training requirements, as well as communication structures.
3. Procedural: related to: standards, procedures, instructions, operating manuals and other regulations as well as contingency plans and procedures. Procedural controls are all (documented) regulations for the execution of activities.
4. Supervisory: supervisory controls include the measuring and monitoring of the process performance and compliance, as well as the way and intensity of Contractor supervision.

One of the main goals with respect to HSE is to ensure that the risks to people or to the environment arising from the installation, operation and maintenance of the

facilities are reduced to a level that is considered As Low As Reasonably Practicable (ALARP).

## 8.2 Risk Assessment (stations)

A comprehensive Risk Assessment of the IGI Poseidon onshore station in Greece and Italy has been performed.

The risk assessment of the major hazards indicates that the identified major hazards are mostly controlled by provisions taken in the design. The design of equipment and structures will be such that it can withstand the effects of or prevent exposure to the effects of environmental hazards such as earthquakes, flooding and bush fires. Also the design and operation of the vent stack and pig receivers/launchers prevent exposure of people to harmful effects associated with the operation of the vent stacks or pig receivers/launchers.

The most important major hazards that are identified for the onshore station in Greece are the hazards associated with Loss of Containment and Fire & Explosion. Their importance is explained by the large inventories of high pressure, flammables natural gas in the process equipment on the onshore stations. Therefore a detailed quantitative risk assessment has been performed for hazards.

For the compressor station in Greece the quantitative risk analysis showed that all project risk acceptance criteria are met for the third party individual risk, the societal risk and the first party individual risk.

Risk mitigation measures can reduce both the frequency and the consequence of leakages and in the quantitative risk analysis these measures are only taken into account to a limited extent.

The following risk reducing measures will be implemented at both onshore stations:

- Installation of large diameter pipelines (e.g. headers) underground, minimizing causes that lead to loss of containment and the possible effect of large release from leak (only in vertical direction)
- Gas detection, generally available in the process areas, ensuring a timely detection and thus isolation of leak and thus limiting the duration of the release and fire.

- Remote isolation of the station and specific sections of the process equipment to ensure the leak is isolated after detection and thus limiting the duration of the release and fire.
- Blow down of gas to safe location (flare and / or blow down vessels) leading to a rapid depressurization of the isolated section in which the leak has occurred and thus limiting the duration of the release and fire.
- Physical separation of compressors (leak source) provided by the compressor building suitable to withstand the effects of a fire or explosion inside the building, ensuring the effects of a fire or explosion have a reduced effect on the adjacent equipment and structures on the station and on the surrounding off-site.
- Minimum presence of operating personnel as result of a control and safeguarding system design suitable for fully remote operation, and thus also minimizing the possible exposure of people to fire and explosions.
- Sufficient spacing and redundancy of maintainable equipment to allow for a safe maintenance of the equipment, and thus reducing the possibility of a loss of containment events during maintenance whilst the desired station availability is still achieved.

Considering the risk assessment results and the measures, which represent risk reducing measures that are equal or exceed the industrial design standard for gas transport systems, the risks to people are reduced to level that is considered ALARP (As Low As Reasonable Practicable). Other risk reducing measures (e.g. fire fighting systems) are found to be not cost effective to reduce the risk any further.

Here below the HAZID is presented. For the project a qualitative risk assessment has also been prepared which will be submitted, along with every other necessary document and studies, to the competent authority in order to obtain the Installation Permit.

### **8.2.1 Hazard Identification and Qualitative Risk Assessment**

In the HAZID (Hazard Identification and Qualitative Risk Assessment) study the potential hazards associated with the design of the Greek Onshore Facilities are identified and the provided / required risk control measures evaluated.

For the Risk Assessment of the onshore stations the major hazards are selected from the HAZID study and evaluated.

The following major hazards are evaluated:

- Seismic activity (earthquakes)
- Flooding and landslides
- External fire (low vegetation)
- Loss of containment (release of hazardous substances)
- Fire and Explosion (gas, diesel, condensate, electrical fire)
- Venting and blow down operation
- Pig receiving/launching operation
- Construction activities

#### **8.2.1.1 Seismic activity**

Both the onshore stations in Greece and Italy are located in areas with increased risk on seismic activity, i.e. the onshore stations are subjected to an increased risk of earthquakes. As part of the FEED study a detailed risk assessment for the Seismic activity is performed.

The study will outline the risk on different strength of seismic activity and will assess the possible damage resulting from these different loads. One of the major consequences of the damage is the occurrence of loss of containment of high pressure gas containing systems (gas leaks) which in turn can escalate in fires and explosions. These fires and explosions are a risk to people on- and off-site.

Based on this assessment appropriate measures are defined to be included in the design of the onshore stations to ensure that constructions, buildings, equipment on the onshore stations will withstand the pre-defined loads generated by the earthquakes. These pre-defined loads used for the design are referred to design accidental loads.

The design accidental loads are laid down in the design basis of buildings, support structures for equipment, piping and equipment, underground pipelines, concrete surfaces, etc.

When the design is in accordance with the design accidental loads, it can be assumed that the probability of damage to structures and equipment and the resulting loss of containment (leaks) are not increased. In other words the onshore station safety is kept on the desired level by designed for the expected seismic activity.

Therefore in the detailed quantitative analysis for risk to people the seismic activity is not included as an additional risk to people with a low probability.

Therefore in the detailed quantitative analysis for risk to people the flooding/landslides is not included as an additional risk to people

#### **8.2.1.2 Flooding and landslides**

Flooding and landslides are identified as possible hazards with a low probability. These events can cause severe damage to Onshore Facilities with the potential of loss of containment of high pressure gas containing systems (gas leaks) which in turn can escalate in fires and explosions.

By extensive surveys of the surrounding geology and soil characteristics, the appropriate foundation and drainage design basis is defined. These should prevent the possibility of landslides or flooding near the stations and protect the structures and equipment from the effects of these events.

Therefore in the detailed quantitative analysis for risk to people the flooding/landslides is not included as an additional risk to people

#### **8.2.1.3 External fire**

In the areas of the onshore stations in Greece and Italy is the possibility of a bush fire near the station present. This is most likely in long dry periods during the summer.

A large bush fire would pose a real threat to the stations and can cause severe damage to the station. In case no adequate measures are taken on the station in such

event, the consequences to the equipment and subsequent the fire and explosion scenarios are unavoidable.

Fortunately a bush fire is generally detected in time, for external fire protection services to take appropriate measures to extinguish the fire or stop the fire reaching the station.

It is expected that there is sufficient time to isolate and blow down the equipment on the stations and to remove the majority of the flammable gas in the equipment. In addition the clear zone around the station is provided to stop any bush fire from reaching the station fence.

Considering the above the external fire is not taken as an additional scenario of loss of containment in the detailed quantitative analysis for risk to people.

#### **8.2.1.4 Loss of containment**

Loss of containment of the high pressure gas containing equipment, but also of the other equipment containing hazardous substances (diesel, condensate, nitrogen), have the potential to expose people to harmful effects of the released and dispersed substances. Especially the flammable natural gas, which represents the largest inventory of hazardous substances, can have a major effect on people and assets when ignited and causing major fires and explosions.

In order to assess the risks to people due to loss of containment (and fire/explosion) a more detailed quantitative assessment of the risk to people is performed as part of this Risk Assessment and presented in the next chapters. An important parameter in the quantitative risk analysis is the leak frequency determination, which ties back to the causes leading to a loss of containment.

The causes of loss of containment in process systems (including gas transport systems) can be generally divided in:

- Design errors (wrong material selection e.g. leading to external corrosion, wrong design conditions, defects within materials)
- Construction/Installation errors
- Operation/Maintenance errors (exceeding operating window, poor maintenance)

- o Environmental events (earthquakes, flooding, bush fires)

Environmental events are discussed above and evaluated.

The other causes are normally captured in the leak frequencies, which are generally derived from historical statistical databases. These databases contain for different type of equipment that is used in the process systems (including gas transport systems), leak data from which leak frequencies are determined. The basis of the use of these databases is that the design, construction, installation, operation and maintenance are performed according normal industry practices taking into account the local environmental conditions. The leak frequencies derived from these databases represent the possibility of a leak in any industrial process plant.

The possible harmful exposure of people to the effects of a nitrogen leak is very limited on both stations and therefore not further studied in this risk assessment.

#### **8.2.1.5 Fire and explosion**

Apart from the fire and explosion scenario's that can occur after a loss of containment event, fire of electrical origin can occur on both stations.

The frequency of fire and explosion scenarios depends on the leak frequency as discussed above and the ignition probability. Also for the determination of the ignition probability historical statistical databases are used.

For the quantitative analysis of the risk to people, the determination of the possible effect of fire and explosions is essential and generally expressed in the exposure to the heat effects and the blast wave effects from a fire or explosion. These effects are determined and used in the quantitative risk analysis given in the next chapters. The effect of isolation of sections after a station shutdown in case of a detected leak or fire is taken into account in terms of possible limitation of the duration of the fire (and thus exposure to personnel). Other fire protection systems, such as fire fighting systems, are - if present - not considered as providing a significant reduction of the risks to people in case of a gas fire or gas explosion.

Fire of electrical origin with effects that can pose significant risks to people can occur in electrical rooms or rooms with electrical equipment. In general these fires are contained in the room and detected by fire detected normally present in these rooms. Proper escape provisions will avoid harmful exposure of people in these rooms,

which are warned by the fire detection. Electrical rooms with increased risk of fire are generally provided with extinguishing systems using gaseous agents activated by the fire detection. These systems are primarily installed to limit the damage to equipment and building.

#### **8.2.1.6 Venting and Blow Down operation**

The major hazard resulting from a venting or blow down operation is the exposure to a large gas cloud and the heat radiation effects of an ignited vent stack.

The design of the vent stack is such that both aspects, dispersion of vented gasses and heat radiation of ignited vent stack, are not harmful to people working on the station or are present near the station. In the design the vent stack height and the spacing of the vent stack to areas that are accessible to people is sufficient to avoid harmful exposure to people.

#### **8.2.1.7 Pig Receiving/Launching operation**

The operation of the pig receivers or launchers on the onshore stations is an infrequent operation. Apart from the potential loss of containment and fire/explosion hazard, the pig receivers or launchers introduce an additional hazard when operating the pig trap door during which people can be exposed to the fluids inside the pig trap.

In the design of the pig receivers or launchers several safety provisions are included which must prevent that the equipment can be opened when the equipment is still pressurised. Operating procedures are normally in place to ensure that personnel working at the pig trap are sufficiently protected against possible exposure to small quantities of hazardous substances.

#### **8.2.1.8 Construction activities**

No major hazards specific to the project are identified during the HAZID study. During construction several standard hazards are present which can be seen on any construction site or yard. These hazards are related to lifting and crane operations, vehicle transport on site, working with chemical (e.g. welding agents), working at elevation or in enclosed areas, working with electricity, etc.

These activities and their associated hazards are also relevant for maintenance activities on the onshore stations, but present a much less risk to people due to the smaller size of the activity and the much less people involved in the maintenance activity. The risk to people may increase significantly if critical activities (e.g. lifting) occurs while the process equipment is still “live” (under pressure with natural gas). A dropped load may immediately cause of loss of containment and fire/explosion scenario. Proper planning and procedures and additional protection measures are normally adequate risk reducing measures for these activities during normal operation of the process equipment

### **8.3 Design Safety philosophy (stations)**

The Safety Philosophy is based on the principle that Safety issues can be managed, controlled and performed in accordance with project requirements and identified safety activities seen to be required at this time.

The aim of the plan is to ensure that sufficient engineering safeguards are in place, so that all identified safety hazards are suitably addressed.

This comprises:

- A. Identification of hazards and determination of their effects;
- B. Assessment of the safety risks associated with the hazards (either qualitatively or quantitatively, as appropriate);
- C. Specification of the prevention, control, mitigation and recovery systems which should be put in place to manage the identified safety hazards, in accordance with the following hierarchy;
  - Elimination and minimisation of hazards by design (inherently safer design, e.g. remove the hazard completely, or remove personnel from the area of hazard by design);
  - Prevention (reduction of likelihood of the hazard occurring, e.g. minimise leak sources);

- Control (limitation of scale, intensity and duration, e.g. provision of ESD systems, relief and blow down systems, fire fighting systems);
- Mitigation of consequences to personnel (e.g. provision of suitable evacuation systems).

D. Specification of the safeguards to control the hazards is in line with the overriding requirement of ensuring that risks as a whole are reduced to levels that are at least as low as reasonably practicable (ALARP) based on the project risk tolerability criteria;

The safeguards (safety equipment and production facility requirements) are selected based on the philosophy of using tried and tested existing measures and engineering judgement.

### **8.3.1 Technical Safety Philosophies and Strategies**

#### **8.3.1.1 Fire and Explosion Strategy**

The main hazard on the Compression Station facilities is the hazard of natural gas in the process equipment. Natural gas, when released from high pressure sources, can result in large gas release that, when ignited, will cause large jet fires or fireballs / explosions (immediate or delayed ignition). Gas releases inside buildings (e.g. compressor buildings) represent a risk of explosion when ignited.

The overall strategy for protection against fire and explosions is to evacuate personnel (when present, the site is normally unmanned) on site to a safe haven and to prevent further escalation by detection, isolation, blow-down, and active & passive fire/explosion protection. Provisions for active fire fighting activities exposing personnel are not foreseen for fire protection on the plant site. Where active fire fighting outside the plant site may be applicable external fire brigade services will be used.

The integrated strategy for the protection against fire and explosion consists of the following key aspects:

- The most effective manner of mitigating a release of high pressure gas and (when the release is ignited) jet fires is isolation of the leak and remove the

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flammable gas as quickly as possible by rapid depressurization (blow-down) and remove or limit all possible ignition sources (electrical isolation and explosion proof equipment / Ex-zoning);

- In order to ensure a rapid initiation of the isolation and blow-down provisions after the occurrence of the release suitable systems for detection of gas clouds and fires shall be provided;
- In the period between the initial release followed by ignition (immediate or delayed) and the actual completion of the depressurization of the isolated section in which the leak occurs, personnel and assets can be affected by the effects of a fire or explosion. Provisions for protection of personnel and assets shall be selected on the basis of both effectiveness and suitability;
  - For small incipient fires in and near buildings and near equipment manual fire fighting equipment shall be provided at strategic locations;
  - Provisions for active fire protection are:
    - In electrical rooms and in compressor, turbine and diesel generator enclosures automatic gaseous (CO<sub>2</sub>) extinguishing systems shall be provided (asset protection);
    - Fire fighting activities using active fire protection systems on site for fires other than gas fires shall only be executed by emergency services such a fire brigade when possible. The necessary fire fighting equipment on site shall be provided according requirements of local fire brigade.
  - Protection of safety critical equipment against gas fires or explosions shall be achieved by passive fire and explosion protection, either by physical distance between source and target, by physical barriers such as fire or blast resistant walls or by protective coating on equipment. These provisions shall also be applied to prevent escalation of the fire or explosion to other main process equipment (subject to asset protection philosophy)
- In any emergency situation of gas release or fire provisions for proper escape (escape routes, signs, lighting, etc.) shall be available for persons on site for a

reasonable period in which escape to a safe haven (e.g. assigned muster area) is achieved.

These aspects are captured in different design philosophy documents:

- Vent and Blow-down report
- Fire Fighting System Philosophy
- Process and Safety Control Philosophy

An assessment of the escalation risk shall be performed and the risk level shall be evaluated against the project risk acceptance criteria. In case the risk is considered to exceed the criteria, additional measures will be taken to reduce the risk of escalation.

#### **8.3.1.2 Safety Distances Calculations**

For the purpose of the plot layout development for the Greece compression and metering station safety distances are recommended.

These recommended safety distances serve as a guideline in the plot layout development of the plant. Any deviations from the recommended distances are still accepted if the escalation risks are assessed and proper additional measures (e.g. passive fire protection) are taken to prevent escalation.

The safety distances for the metering station and the compressor station in Greece are presented in a separate document.

#### **8.3.1.3 Ignition Control Philosophy**

Ignition of natural gas constitutes one of the most severe incident scenarios for the compression and metering stations. Consequently all ignition sources will be eliminated wherever possible or minimized to acceptable standards in areas where hazardous atmospheres may be expected. Sources of ignition include electrical equipment, internal combustion engines, hot work operation, static discharge and exhausts.

The risk on fires and explosions shall be minimized by the selection and installation of appropriate equipment within known hazardous areas. To aid this philosophy hazardous area classification drawings will be prepared and include the following:

- The classification and extent of all hazardous zones
- Sources of hydrocarbon release
- All ventilation inlets and outlets
- Engine air intakes and exhausts
- Location of all fuelled units (e.g. engines, turbines)
- Process vents

The hazardous area classification drawings shall be used as guidance for the selection and installation of equipment. All electrical equipment will be rated and certified according to the hazardous area classification. Area classification drawings shall be developed using IEC 60079-10.

Generally equipment for use in a hazardous area shall be specified in accordance with the appropriate zone requirement as per IEC 60079-14. Equipment required to be operating under emergency conditions is specified for Zone 1 operation except where protected by location or by isolation on gas detection;

Hazardous area classification drawings both plan and elevation will be prepared in sufficient detail to show all the main items of equipment in all areas of the station. The drawings are marked to show the boundaries of all hazardous areas and zones using the shading convention adopted in the IEC Standard.

Electrical equipment shall be automatically disconnected upon gas detection, as defined in the Process and Safety Control Philosophy and Fire & Gas Detection Philosophy. The power distribution shall be segregated to fit with the ignition source control. Only the emergency power supply will remain active in order to provide power to safety critical equipment during the emergency.

#### **8.3.1.4 Active and Passive Fire Protection Philosophy**

Requirements regarding Fire safety and Fire protection set by the Greek authorities are laid down in regulations such as

- EN 12186: "Stations of the pressure control of gas transport and distribution of natural gas"

- Ministerial Decision (Y.A.) Φ15/οικ.1589/104/2006 'Taking fire protection measures in industrial-manufacturing installations, professional laboratories, warehouses etc., falling within the scope of Law 3325/2005'(FEK B' 90/30.1.2006)
- Presidential Decree (P.D.) 71/1988 (Official Gazette 32A). Regulation on fire protection of buildings (article 11), 17/02/1988, Industries - Manufacturers
- Ministerial Decision (Y.A.) 34458/1990 (Government Gazette, V846), 31/12/1990, Determination of technical specifications, configuration, design, construction, safe operation and fire, refineries and other oil industry.

The fire fighting philosophy and selected provisions are subject to the formal approval (permit) of the local fire brigade. Additional requirements for provisions for the local fire brigade to combat fires on the station maybe set by local fire brigade.

The fire prevention and mitigation philosophy for the gas containing systems is mainly based on isolation of the leak source (Emergency Shut Down), removal of the flammable inventory (Emergency Blow Down) and isolation of all potential ignition sources.

In order to ensure a rapid initiation of the isolation and blow-down provisions after the occurrence of the release suitable systems for detection of gas clouds and fires shall be provided.

The maximum required time for blow down of the natural gas containing equipment is based on API 521, which is 15 minutes, down to a pressure of 7 barg. The potential of escalation is assessed on fire load calculations for systems directly exposed to high levels of heat radiation. For example, load bearing metal structure exposed to high levels of heat radiation will fail within approximately 10 minutes. Mitigation of the exposure and reduction of the escalation risk is either by reduction of exposure duration (blow down time) or the provision of passive fire protection.

Systems considered safety critical in protection of personnel; environment or assets may require additional fire protection when potentially exposed to high levels of heat radiation.

The potential of escalation of gas jet fires to adjacent systems and/or structures will be minimized further by creating physical distance between the systems. The required physical distance is based on the safety distances calculations.

Main piping will be installed underground as much as possible. ESD valves will be installed in pits. This will prevent or at least minimize exposure to fire and explosion events, and therefore minimize the potential for escalation. Aboveground main piping may be provided with passive fire protection when required. Buildings (compressor building, service building), that are potentially exposed to the effects of fires will be constructed to resist the expected fire loads for at least 120 minutes (REI 120).

Active fire protection systems (water based deluge systems) are not considered as an effective measure to extinguish or even mitigate the effects of gas fires on gas containing equipment. Therefore these systems are not considered as the preferred measures to protect equipment from the effects of an adjacent gas fire. The prevention of equipment being exposed (underground, passive fire protection) is the selected strategy.

The compressors and turbines will be placed inside compressor buildings to minimize noise. The turbine enclosure within the compressor building will be equipped with a Carbon Dioxide extinguishing system in accordance with NFPA 12 (Carbon Dioxide). Water based fire fighting systems are not considered for the enclosure as this will damage the compressor.

The condensate vessel and the diesel storage tank contain flammable substances and will be placed underground. This will provide containment, in case of vessel failure, and will provide protection from escalation of fire scenarios of adjacent systems. This will decrease the potential of a fire event occurring and will reduce the extent of the fire event, when it does occur. Therefore active fire protection is not considered to be necessary. Design and installation of the underground storage tank shall be in accordance with section 23 of NFPA 30.

The loading facilities of condensate and diesel will be provided with wheeled or portable, dry powder or and/or foam extinguishers.

The emergency diesel generator room will be equipped with an automated Argonite extinguishing system in accordance with NFPA 2001 (Clean Agent). Water based fire fighting systems are not considered for the enclosure as this will damage the equipment.

The CCR (Central Control Room), the Electrical room and the Instrumentation room will be provided with an automated Argonite extinguishing system in accordance with NFPA 2001 (Clean Agent). As the CCR is occasionally manned, signs and warning

systems shall be in place to ensure personnel will not enter or be trapped in the CCR, when the system is activated upon fire detection.

The HVAC system of these rooms shall be provided with fire dampers, to be closed prior to activation of the extinguishing system. This to ensure the effectiveness of the extinguishing system, and prevent migration of inert gas to other areas.

Under floor spaces for cabling will also be connected to the extinguishing system.

The canteen, workshop and storage will be provided with handheld fire extinguishing equipment. Handheld fire extinguishing equipment, portable and wheeled, will be provided at strategic locations over the plant both outside and inside buildings. The type and size are specified in line with the fire risk at the location.

Passive Fire Protection (PFP) is a non-dynamic method of providing fire/heat protection to structures, vessels etc. Once installed, it does not rely on any external signal to be actuated; it is, as the title suggests, a passive system.

Passive Fire Protection (PFP) shall provide essential fire protection where, either provision of active systems would be ineffective, or active systems failure is considered to be unacceptable. PFP will be provided to supplement the station's active fire protection systems. All PFP fire barriers shall have fire durability commensurate with possible fire exposure conditions.

The passive fire protection provisions are:

- To prevent failure of critical components including equipment, equipment supports, essential safety systems and structures for a predetermined time by providing a reliable, secure and effective system of fire;
- To restrict the spread of fire after an incident and to minimise the reliance of active fire protection systems.

#### **8.3.1.5 Emergency Shutdown Philosophy**

The Emergency Shutdown System (ESD system) is activated in the event of a hazardous situation arising. The system comprises dedicated equipment such as control facilities, valves, actuators and power supplies.

An ESD (Emergency Shutdown System) is a highly reliable shutdown system that in the event of a hazardous scenario occurring sectionalises hydrocarbon inventories

and enables safe and effective shutdown of plant and equipment in a controlled manner. The purpose of the Facility ESD system shall be:

- Segregation of equipment and pipe work by means of isolating valves;
- Blow-down of the gaseous hydrocarbons to the vent system as required;
- Controlled shutdown of rotating machinery.

The ESD system is essential to the overall safety of the station and shall act independently of all other systems. It must be capable of:

- Sensing any abnormal operation and equipment conditions;
- Reacting to this condition by shutting down and/or isolating the Facility or sections of the Facility to reduce the effect of the abnormal condition;
- Depressurising the entire station process systems or sections of these systems either manually or automatically;
- The ESD system shall be designed fail safe.

The ESD and F&G systems shall be designed to ensure the three (3) key criteria are met:

- Safety of personnel is maintained;
- Plant availability is maintained at the highest possible level by minimizing spurious plant shutdowns;
- Equipment is protected from damage.

#### **8.3.1.6 Vent and Blow Down Philosophy**

The EDP system is the Emergency Depressurisation system which is activated manually or automatically following an emergency shutdown. The system releases hydrocarbon gas from the process system via the vent.

The Emergency Depressurisation system shall further minimise process equipment inventories, following ESD isolation. The rapid reduction and removal of the trapped gas inventories serves to reduce the size of any gas leakage, decreases the probability of ignition and limits the duration and intensity of possible jet fires, reducing the likelihood of escalation, thus reducing the risk to personnel and limiting

asset damage. The initial blow down flow rates will be determined, using the criteria of the API-RP 521 standard: After 15 minutes the initial operating pressure is to be reduced to 6.9 barg or 50 % of the design pressure, whichever is lower.

The design of the vent system is described in the Venting and Blow Down Study.

#### **8.3.1.7 Emergency Power Philosophy**

Emergency power and UPS, is defined as the provision of the electrical power which is required to support critical electrical systems following the loss of normal power supplies. It will be supplied by an emergency power generator and batteries (UPS). This section only considers the provision of emergency power and not the emergency systems which depend upon its provision.

Emergency power is provided so that essential safety systems, including lighting can still function and maintain safe conditions following the loss of normal power supplies. These systems are primarily those associated with control and monitoring, ESD, the Fire & Gas detection system and communications.

All supply and main control equipment associated with the emergency power system will be situated outside hazardous areas and be independent and remote from the main power supply.

A detail description of the electrical connections including the emergency power supply system is given in the Description of the Electrical Systems.

#### **8.3.1.8 Escape and Evacuation Philosophy**

The purpose of the escape routes is to ensure that personnel may leave areas in case of a hazardous incident by at least one safe route and to enable personnel to reach the designated Mustering/Gathering Area from any position in the plant they are likely to occupy. The following escape and evacuation provisions are covered in this document:

- Elevated working platforms
- Ladders
- Stairways

- Gangways
- Building escape routes / doors
- Mustering/Gathering Area

The escape routes and evacuation system performance is dependent on availability of Emergency power and lighting to ensure lighting for escape and evacuation if main electrical power supply fails.

An emergency response plan shall be in place which describes emergency scenarios, the required response and facilities for safe evacuation of personnel on-site the station.

The requirements specified in the following sections are based on ISO 14122-2, EN 292-2 and EN 547-1.

### **Escape routes**

Escape routes, leading to the muster area, shall be provided to enable all personnel to leave an area in case of a hazardous incident. Escape routes shall be well marked, including signs. Marking shall show the preferred direction of escape to the muster /gathering area.

- There shall be two main escape routes from any regularly manned work site, situated as far apart as practicable;
- Required width of escape routes shall emphasize easy transport of injured personnel on stretcher;
- Minimum width of escape routes is 1m (0.9 m for doors). Escape routes intended for use by more than 50 persons shall be extended to 1.5 m width (1.2 m for doors);
- Minimum height of escape routes is 2.3 m (2050 mm for doors).

### **Escape exits**

There shall be no dead end corridors exceeding 10 meters in length;

Any room where more than 15 persons may assemble shall have at least two exits;

Any room larger than 10 by 10 meters shall have at least two exits;

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All doors shall be constructed so that one person can easily open them from either side. They shall open in the direction of escape and be self-closing.

### **Evacuation Means**

Requirements relating to safe evacuation shall be in accordance with the emergency plan.

### **Muster area**

The muster area shall be arranged and protected in order to evacuate the personnel in an organized and efficient way.

There shall be more than one muster area, and they shall be located outside process areas with free access to surrounding areas.

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## **9 ANTIPOLLUTION SYSTEM GUIDELINES**

In this chapter a general description of the antipollution systems is presented. It is noted that the offshore pipeline section is excluded from the requirement of any antipollution system since this is a closed system with no energies exchange or any other interaction with the environment. Thermal emission is very limited to cause any thermal pollution. Consequently, the following sections present the antipollution systems installed for the onshore pipeline and the Onshore Facilities components.

### **9.1 Construction Phase**

During construction phase, no antipollution systems are installed. It is stressed out that clean marine fuels (oils) will be used for construction of the near shore section. All equipment used will be modern construction equipment and machinery with low emissions whilst all IMO's provisions will be met.

#### **9.1.1 Certification**

Construction will be supervised by specialized and qualified personnel.

#### **9.1.2 Working Hours**

For works that take place near residential areas, the statutory working hours limits must be met. This way, the disturbance of the residents, during rest hours and night, will be avoided.

#### **9.1.3 Inspection Technology**

State-of-the-art technologies will be used for construction and checking of the Project, in order to minimize environmental impacts.

### **9.2 Operation Phase**

#### **9.2.1 Pipeline**

During the regular operation phase of the Natural Gas Pipeline, no negative impact to the atmosphere or the climate conditions is expected.

In order to minimize potential impacts to the atmosphere in case of an accident, a set of organisational and technical measures as well as requirements will be put in place,

aiming to ensure pipeline's reliability. These will be detailed in the Emergency Response Plan.

The block valve assembly allows the onshore section pipeline to be isolated from the offshore section. This may be necessary in different scenarios such as:

- The unlikely event of an onshore pipeline breach
- Maintenance and repair operations
- Isolate the onshore section during the initial construction activities.

The block valve shall be installed in a valve pit which is a semi buried reinforced concrete structure. The valve pit structure protects the valve and associated equipment from the environment and from third-party activities. The block valve assembly will be composed of the following elements:

- A main 32-inch ball valve welded into the pipeline.
- Ancillary pipework as required, including 2-inch piping (and valves) cross-over to allow pressure balance across the main valve and nitrogen purging operations.
- An actuator assembly.
- Signal cabling to remotely monitor valve status
- Valve pit structure
- A security barrier/fence.
- Power supply for lighting.
- Access to the site

The block valve assembly design shall ensure that the main valve can be operated reliably in the event that operation of the pipeline so requires; including in the unlikely event of an incident requiring emergency isolation of the Greek onshore and offshore pipeline sections.

The block valve shall be a manually operated valve. In the event that operation is required, personnel shall mobilize to the site with the necessary equipment for valve operation. The valve actuator (gearbox) shall allow operation by a single person from a position at the surface; i.e. without need for entry into the valve pit. Eventual tooling

required for operation of the valve (e.g. pneumatic tool for rapid turning of hand wheel) shall be powered by means of temporary equipment brought to the site by the operator. Valve position shall be monitored on a continuous basis and shall be communicated to the control centre at the Compression Station.

The valve assembly and piping are intended to be maintenance free during the design life. Regular testing of the valve function (e.g. through partial closure) is recommended to ensure acceptable performance when required. Entry to the valve pit may be required for maintenance. Specific safety precautions shall be implemented when entering the pit. A safety watch shall always be present at the surface to react in case of emergency. Handheld gas detectors shall be used to assess presence of gas in the facility prior to entering the valve pit. Regular maintenance of the valve site will be required to ensure safe access. Maintenance activities will include clearance of debris (leaves, etc.), pest control, painting of eventual steel surfaces and general repair/refurbishment of fencing, replacement of lighting, maintenance of solar batteries, etc.

### **9.2.2 Onshore Facilities**

The overall design philosophy regarding emission prevention is to reduce the emissions to air, water and soil to zero or as low as reasonably achievable.

The design has the following provisions to prevent emissions to air, water and soil.

#### Emission to air

The main process equipment has limited continuous emissions of natural gas or other process fluids. The main emission of natural gas is the leakage from the dry gas seals of the compressors. The application of dry gas seals is the best available technology to minimize the compressor seal leakages. The leakage from dry gas seals is further minimized by adequate monitoring and maintenance programs of the compressors. The leakage rate is dependent on the amount of wear of the dry seals. In case the leakage rate is too high and is detected by the continuous measurement of the seal gas flow and pressure, the compressor is stopped automatically.

The expected leakage rate of a dry seal is around 0,7-4,2 kg/hr. It is assumed that each compressor has two dry seals. The leakage is given as a range because it depends on the amount of wear (and thus the age) of the seals. New seals will leak

at rates near the lower range limit. Assuming timely replacement of the seals, the actual annual emission of CH<sub>4</sub> in the seal gas is limited to the minimum possible.

In addition small emissions of natural gas come from the gas analyzers required for the fiscal metering.

The compressors are driven by gas turbines running on natural gas as fuel gas. The exhaust of the gas turbines will represent the main emissions to air.

The vent stacks are used for emergency or maintenance depressurization. The vent system and stacks are purged with nitrogen.

Maintenance on the process equipment may require depressurization and should in these cases be carefully planned to minimize the need for depressurization. Design of instrumentation and equipment should be such that requirement of depressurization for maintenance is avoided as much as possible by either provisions allowing maintenance without depressurization or selection of reliable equipment and instrumentation required minimum of maintenance.

Electrical power will be supplied from one external power supply cable. As a back-up a gas turbine driven generator is running on 50% load, to prevent the compressor station shutting down in case the power supply by cable fails. The emissions from the exhaust of the gas turbine can only be avoided by providing a second independent external electrical power supply cable or allowing a reduced availability of the compressor station. Both options are not considered practicable considering the remote location of the compressor station and the contractual requirements on availability. The emergency generator will only run during emergencies and for testing purposes. The emissions from the diesel generator will comply with the European Emission limits.

#### Emission to water

Areas with the potential of spills of chemical substances, such as diesel and condensate, are provided with a dedicated drain collection system in which collected liquid are routed via a water-oil separator before being discharged to the natural receptor. These areas are the rooms and areas with equipment containing chemical substances and truck (un-)loading areas.

Collected rain water is discharged to the surface water via a sand catcher. Sanitary waste water is discharged to the surface water via a septic tank. The outlet of the

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water-oil separator and outlet of the septic tank are combined with the discharge of the collected rain water.

#### Emission to soil

Emissions to soil are caused by either leaks from underground equipment and piping or spills/leaks from above ground equipment containing chemical substances and truck (un-)loading areas.

Underground storage tanks of diesel and condensate are double walled and provided with leak detection. Both tanks and underground piping should be inspected regularly

Above ground equipment containing chemical substances and truck (un-)loading areas are placed on watertight paved areas to collect possible leaks or spills.

## 10 CONCLUSIONS

1. The Greek Part of the Offshore Natural Gas Pipeline is part of the Greece – Italy High Pressure Natural Gas Pipeline that will supply Western Europe with natural gas from the Caspian Sea area, the Middle East and Eastern Mediterranean. This project is expected to promote Greece to a key energy player, in the broader region and a natural gas route between East and West. Additionally, this project ensures future provision of Epirus and Western Macedonia with Natural Gas. According to L.4001/2011, the project is characterized as of Natural Significance. It is also included on the Regional Plan of Epirus.
2. The present study covers:
  - the Greek offshore part of the Natural Gas Pipeline, of 146km approximately, from the landfall point at the Greek shores of Thesprotia Regional Entity, south of Corfu Island, towards Otranto, Italy, and up to the middle of the sea crossing between Greece and Italy;
  - Compressor and Metering Stations, which constitute an indispensable operational element of the above mentioned route part; and
  - the onshore Pipeline, from the landfall point to the Compressor and Metering Stations.

The pipeline will have a 32” diameter and 140bar operation pressure (160bar design pressure).

3. Five (5) near shore (coastal) Alternative Offshore Routes were examined from a technical point of view. These correspond to the relevant onshore parts ending at the five (5) landfall sites (sites “Stamponi”, “Sofas”, “Stavrolimenas”, “Omprela 1” and “Omprela 2”). They all meet with the offshore (deep-water) pipeline OS-A that was qualified during the feasibility study. Alternative offshore routings OS-AA and OS-B refer to the deepest section of the offshore part and, although technically feasible, are not preferable. Alternative offshore routing D technically was rejected since it creates significant navigational and maritime safety issues and on top of that environmental and permitting issues (e.g. crossing in short width of numerous international

cables, sea bottom rough morphology, small width of available construction zone, etc.). The proposed offshore route OS-A keeps the necessary distances (300m) from ship wrecks that were identified thanks to the special marine archaeological survey that was performed in the scope of the project and consequently no impact on these is expected.

4. Nine (9) onshore routings were investigated; these are ALT1a (Proposed Route), ALT1b, ALT1 (corresponding to EX2 in the PEIA), ALT2 (corresponding to EX2A in the PEIA), ALT3 (corresponding to KX in the PEIA), ALT4 (corresponding to EX1 in the PEIA), ALT5 (corresponding to EX4A in the PEIA), ALT6 (corresponding to EX4 in the PEIA) and ALT7 (corresponding to EX3 in the PEIA) were investigated as alternatives routings and are all illustrated in 1:50.000 and 1:5.000 scale maps. Routings ALT1a, ALT1b, ALT1, ALT2, ALT5 and ALT6 traverse through Thesprotia and Preveza Prefectures, while ALT3, ALT4 and ALT7 traverse only Thesprotia Prefecture. The Proposed Route ALT1a has a landfall site in “Omprela 2” location, which is situated in the shores of Thesprotia Prefecture. Given that the components of this route as well as the corresponding offshore route had received the preliminary environmental approval, the on-going FEED as well as the completed Detailed Marine Survey have focused on them.
5. The proposed routing of the Natural Gas Pipeline complies with all International Codes of Design and Construction for safe construction and operation.
6. All investigated routings take into consideration the existing and planned land uses, and under no circumstance do the routings affect any communal or industrial activities in the area. Additionally, investigated routings have no significant impact on the regional flora or fauna, do not endanger biodiversity, and are not engaged with any areas of environmental interest or subject to special environmental protection.
7. No special crossings with significant water flows, natural or artificial, exist. Additionally, due to the small depth of the pipeline’s trench, 2m approximately, no breaking of the underground or surface water flow transfer is expected.

8. Investigated routings cross the existing transport network at selected locations, so as to ensure the unobstructed continuation of transportation.
9. Investigated routings do not cross through existing residential areas nor do they affect archaeological sites.
10. Limited impacts on the natural environment are expected, during construction phase.
  - Onshore, impacts are caused by the increase of air pollutants along the construction works, originated by the transport and construction machinery. These air pollutants will be emitted only during daytime and will present a linear, local, temporary and reversible development. In addition, limited, local fully reversible impacts on flora should be expected.
  - Offshore, up to the 25m depth contour, approximately 550m from the shore for the Proposed Route ALT1a, mechanical disruption of the depth shall take place, increasing the suspended particles of the water column. This impact is temporary and reversible. At bigger depths, no impacts are expected caused by the pipeline's placement. Overall, during construction phase, impacts on marine biodiversity are temporary, reversible while all the proper mitigation measures will be taken, in accordance with national and international standards and best available techniques.
11. During operation, limited air pollutants and noise emission is expected, which will comply with the existing legislation. Negative impacts on the human and natural environment and landscape aesthetics are deemed inconsequential. No habitats fragmentation is assessed.
12. On the contrary, major positive impacts to regional industry, tourism and fishing are assessed through the envisaged mitigation measures, mainly the following:
  - Provision of Epirus and Western Macedonia with Natural Gas and boosting of Regional economy
  - Creation of artificial reef and promotion of fishing and diving tourism

The project is of National Significance and presents strategic benefits for Greece. Considerable development opportunities are created for the Regional, not only local, community and economy; opportunities related to the future Natural Gas availability and its usage in sectors of commerce, energy, manufacturing and industry. This has been provisioned in L.4001/2011. It should be noted that, on the way to a clean energy future, Natural Gas is the most eco-friendly conventional fuel and the cheapest one. Finally, the project poses opportunities for touristic, marine, development.

Conclusively, for the above mentioned reasons the Approval of the Environmental Terms for the Project is suggested.

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**Annex A – Maps (*Volume II*)**

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## **Annex B – Plot Plans (*Volume II*)**

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## **Annex C – Photographic documentation of Near Shore DMS (*Volume III*)**

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## **Annex D – Photographic documentation of Offshore DMS (*Volume III*)**

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**Annex E – Photographic documentation of Onshore Sections (*Volume III*)**

**Annex E1 – Aerial Images of Project’s Proposed Elements**

**Annex E2 – Geological and Tectonic Documentation**

**Annex E3 – Onsite Visit**

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## **Annex F – Representative Shore Crossing Photos (*Volume III*)**

**Annex G – Photorealistics of Onshore Facilities (*Volume III*)**

## **Annex H– Air Emissions Model (*Volume III*)**

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**Annex I – HCMR Study (Volume III)**

1. Environmental Impacts and Response Measures of Installation and Operation of Natural Gas Pipeline – Solution for the Disposal of Water Hydraulic Test
2. Underwater Survey to Determine Location of Hydraulic Test Water Pipeline

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**Annex J– Sampling Locations of Offshore Geotechnical Investigation**  
***(Volume III)***

## **Annex K– Contacts with Authorities (*Volume III*)**

**Annex K1 – ESIA Correspondence**

**Annex K2 – Supplementary PEIA Correspondence**

**Annex K3 – PEIA Correspondence**

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## **Annex L – Supplementary PEIA Drawings (*Volume III*)**

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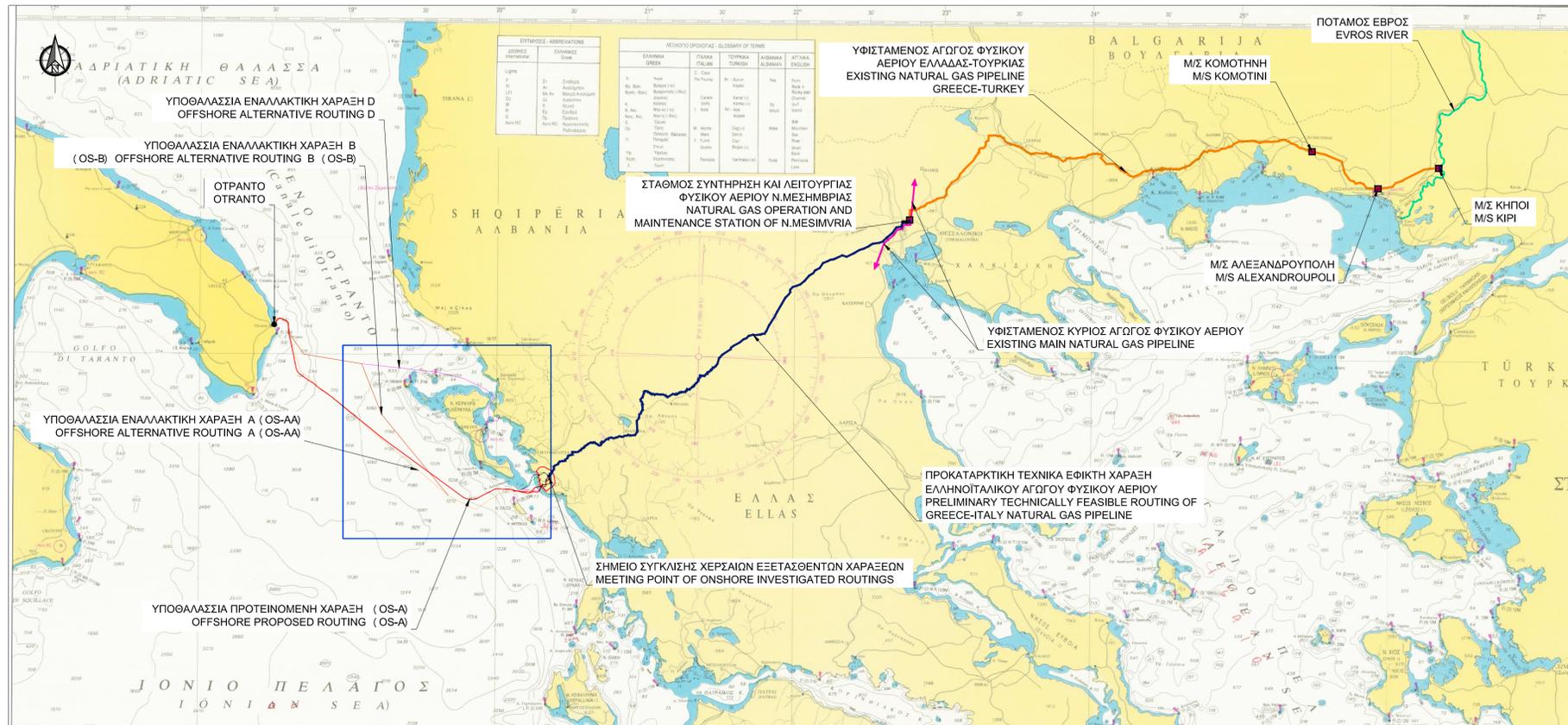
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## **Annex M – PEIA Drawings (Volume III)**

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## ANNEX A:

### MAPS



ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS	
ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8089-000-00-AU-13	ΧΑΡΤΗΣ ΕΓΡΤΤΕΡΗΣ ΠΕΡΙΟΧΗΣ/ OVERVIEW MAP

**ΥΠΟΜΝΗΜΑ**

**ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ**

1. ΠΕΡΙΟΧΗ ΕΡΓΟΥ/PROJECT AREA
2. ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ ΧΕΡΣΑΙΟΥ ΤΜΗΜΑΤΟΣ/ ONSHORE INVESTIGATED AREA
3. ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ PROPOSED ONSHORE ROUTE ALT1a
4. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT1b
5. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT1
6. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT2
7. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT3
8. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT4
9. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT5
10. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT6
11. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT7

0	31.08.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/FIRST ISSUE	DPH	DPH	EAP	PMS
ΑΝΑΒΕΡΘΗ	ΗΜΕΡΟΜΗΝΙΑ	ΠΕΡΙΓΡΑΦΗ	ΠΡΟΤΟΙΜΑΣΙΑ	ΣΧΕΔΙΑΣΗ	ΕΛΕΓΧΟΣ	ΕΓΚΡΙΣΗ
REVISION	DATE	DESCRIPTION	PREPARED	DRAWN	CHECKED	APPROVED

**Asprofos engineering**

TO ΕΓΓΡΑΦΟ ΑΥΤΟ ΕΙΝΑΙ ΠΝΕΥΜΑΤΙΚΗ ΙΔΙΟΚΤΗΣΙΑ ΤΗΣ ΑΣΠΡΟΦΟΣ Α.Ε. ΚΑΙ ΑΠΑΓΟΡΕΥΕΤΑΙ Η ΑΝΑΤΥΠΩΣΗ, ΑΝΤΙΓΡΑΦΗ ΚΑΘΩΣ ΚΑΙ Η ΜΕ ΟΠΟΙΟΔΗΠΟΤΕ ΤΡΟΠΟ ΧΡΗΣΙΜΟΠΟΙΗΣΗ ΤΟΥ ΕΚΤΟΣ ΑΠΟ ΤΟΝ ΣΚΟΠΟ ΓΙΑ ΤΟΝ ΟΠΟΙΟ ΕΚΔΟΘΗΚΕ.

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ΕΓΚΡΙΘΗΚΕ ΓΙΑ ΚΑΤΑΣΚΕΥΗ  
APPROVED FOR CONSTRUCTION

ΑΝΑΒΕΡΘΗ  
DWG REV.

ΗΜΕΡΟΜ.  
DATE

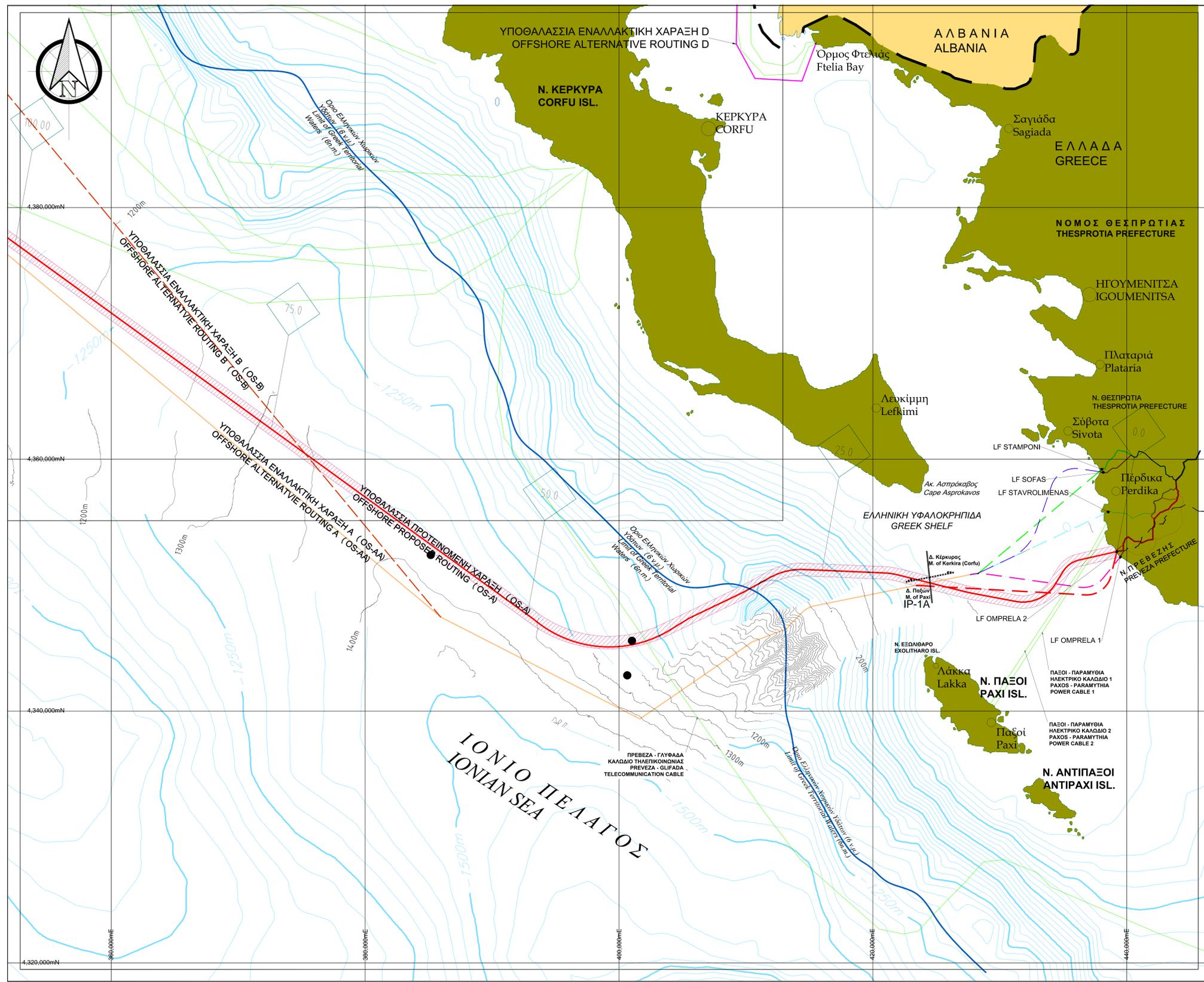
ΔΙΕΥΘΥΝΤΗΣ ΕΡΓΟΥ  
PROJECT MANAGER

ΤΥΠΟΓΡΑΦΗ  
SIGNATURE

ΟΝΟΜΑ  
NAME

PHILIPPOS SPANIDIS

ΚΛΙΜΑΚΑ SCALE	ΑΡ. ΣΧ. ΑΦ: AF. DWG No:	7240-AU-OM-01	ΦΥΛΟ SHEET	ΑΝΑΒΕΡΘΗ REVISION
1:1.750.000	ΑΡ. ΣΧ. ΠΕΛΑΤΗ CLIENT DWG No:		...1 of ...1	0
Κωδ. ΗΛΕΚΤΡ. ΑΡΧΕΙΟΥ ELECTRONIC FILE Code	7240-AU-OM-01, R0, ED0.dwg	ΤΕΛΕΤ. ΗΜΕΡ. ΠΡΟΣΒΑΣΗΣ LAST ACCESS DATE		31.08.2012



ΣΤΟΙΧΕΙΑ ΧΑΡΑΞΕΩΝ/ ROUTES' DATA

ΥΠΟΘΑΛΑΣΣΙΑ ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ Α (OS-A) (ΑΠΟ ΟΜΠΡΕΛΑ 2 ΣΕ IP-1)  
OFFSHORE PROPOSED ROUTING (OS-A) (FROM OMPRELA2 TO IP-1)

Point	WGS84-UTM 34N		Radius (m)	KP
	Easting (m)	Northing (m)		
OM2	439206	4352669	n/a	0,000
IP-1a	435400	4351800	2000	
IP-1b	433270	4348310	3000	
IP-1c	427500	4349400	5000	
IP-1d	421406	4350938	5000	
IP-2a	413104	4351291	5000	
IP-2b	409689	4349395	5000	
IP-2.1	405361	4347309	5000	
IP-2.2	404398	4346664	5000	
IP-3.1	398372	4343620	8500	
IP-4	348192	4380175	10000	
IP-5a	319867	4403220	10000	
IP-5b	316322	4405903	5000	
IP-5c	313589	4407995	5000	
IP-5d	310520	4409817	5000	
IP-5e	308421	4411897	5000	
IP-5f	305461	4413467	5000	
IP-6	298974	4418400	5000	
IP-6a	298033	4422841	5000	
IP-6b	297321	4426685	5000	
IP-7	294414	4440408	3500	
IP-8	294034	4447101	2000	
IP-9	288624	4449559	2000	
OLF	287153	4446993	n/a	204,809

AL1 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΟΜΠΡΕΛΑ 2 ΣΕ IP-1A)  
AL1 - OFFSHORE ALTERNATIVE ROUTING (FROM OMPRELA2 TO IP-1A)

ΕΓΣΑ ΣΤ	WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Χ (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Χ
OL-F-2	4.358.706m	180.415m	4.352.690m	4.39.206m
IP-B1	4.355.174m	179.462m	4.349.123m	4.38.371m
IP-1A	4.356.528m	164.535m	4.349.980m	4.23.427m

AL3 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΤΑΜΠΟΝΙ ΣΕ IP-1)  
AL3 - OFFSHORE ALTERNATIVE ROUTING (FROM STAMPONI TO IP-1)

ΕΓΣΑ ΣΤ	WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Χ (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Χ
OL-F-2	4.365.073m	179.447m	4.359.192m	4.38.022m
IP-1	4.357.351m	169.466m	4.350.964m	4.28.321m

AL4 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΟΦΑ ΣΕ IP-C2)  
AL4 - OFFSHORE ALTERNATIVE ROUTING (FROM SOFA TO IP-C2)

ΕΓΣΑ ΣΤ	WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Χ (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Χ
OL-F-1	4.365.073m	179.551m	4.358.948m	4.38.162m
IP-C1	4.365.672m	176.027m	4.359.488m	4.34.594m
IP-C2	4.359.119m	173.552m	4.352.865m	4.32.341m

ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ AL5 (ΑΠΟ ΟΜΠΡΕΛΑ 1 ΣΕ IP-1)  
OFFSHORE ALTERNATIVE ROUTING AL5 (FROM OMPRELA1 TO IP-1)

ΕΓΣΑ ΣΤ	WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Χ (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Χ
OL-F-1	4.358.250m	180.672m	4.352.233m	4.39.477m
IP-A1	4.355.753m	178.508m	4.349.669m	4.37.400m
IP-1	4.357.351m	169.466m	4.350.964m	4.28.321m

AL7 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΤΑΥΡΟΛΙΜΕΝΑ ΣΕ IP-1)  
AL7 - OFFSHORE ALTERNATIVE ROUTING (FROM STAVROLIMENAS TO IP-1)

ΕΓΣΑ ΣΤ	WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Χ (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Χ
OL-F	4.367.840m	179.837m	4.355.789m	4.38.525m
IP-1	4.357.351m	169.466m	4.350.964m	4.28.321m

ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ Α (OS-AA) (ΥΠΟΘΑΛΑΣΣΙΟΥ ΤΜΗΜΑΤΟΣ ΑΠΟ IP-1 ΣΕ ΟΡΑΝΤΟ, ΝΟΤΙΑ ΠΕΡΙΟΧΗ ΕΚΦΡΗΚΤΙΚΩΝ)

ΕΓΣΑ ΣΤ	WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Χ (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Χ
IP-1	4.357.351m	169.466m	4.350.964m	4.28.321m
IP-2	4.355.060m	155.793m	4.348.225m	4.14.750m
IP-3	4.353.387m	154.136m	4.346.500m	4.13.150m
IP-4	4.352.474m	151.449m	4.345.500m	4.10.500m
IP-5	4.346.643m	142.288m	4.339.380m	4.01.650m
IP-6	4.335.253m	126.958m	4.347.642m	385.972m
IP-B1	4.429.471m	44.718m	4.418.760m	301.443m
IP-10	4.452.459m	38.198m	4.441.647m	294.169m
IP-11	4.457.231m	38.360m	4.446.232m	294.169m
IP-12	4.462.195m	31.959m	4.450.906m	287.620m
OL-F-1	4.458.231m	31.359m	4.446.993m	287.153m

ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ Β (OS-B) (ΥΠΟΘΑΛΑΣΣΙΟΥ ΤΜΗΜΑΤΟΣ ΑΠΟ IP-6 ΣΕ IP-10, ΒΟΡΕΙΑ ΠΕΡΙΟΧΗ ΕΚΦΡΗΚΤΙΚΩΝ)

ΕΓΣΑ ΣΤ	WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Χ (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Χ
IP-5	4.355.253m	126.958m	4.347.642m	385.972m
IP-7	4.402.960m	90.345m	4.393.844m	347.847m
IP-8	4.432.521m	79.887m	4.422.983m	336.403m
IP-9	4.439.168m	46.746m	4.428.699m	303.142m
IP-10	4.452.459m	38.198m	4.441.647m	294.169m

Παρατήρηση: Ο κώνοντας αναφέρεται στο Σ.Σ. WGS 84/UTM-ZONE 34.

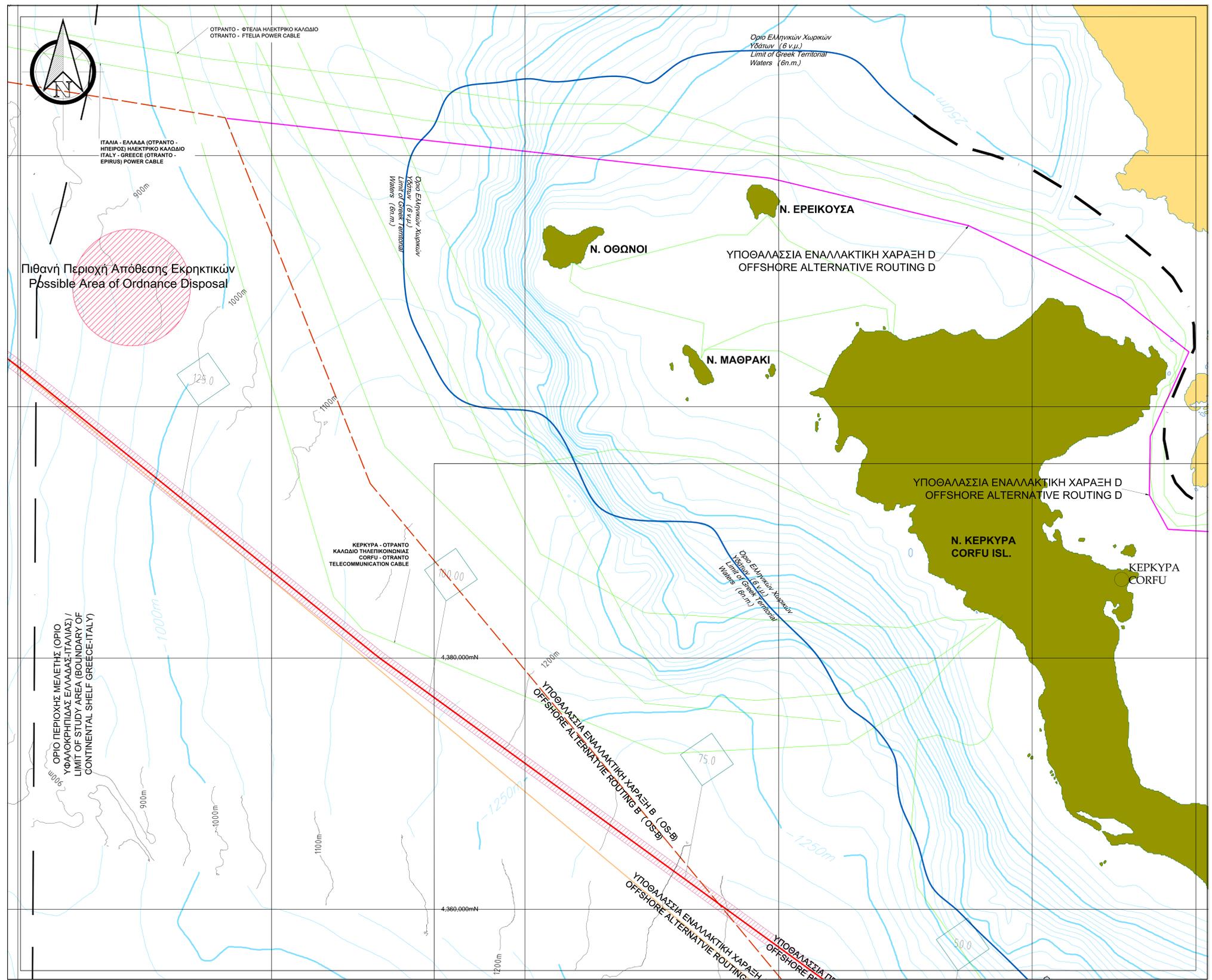


ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS

ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8089-000-00-AU-14	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN

ΥΠΟΜΝΗΜΑ/ LEGEND

- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ/ PROJECT COMPONENTS
- ΥΠΟΘΑΛΑΣΣΙΑ ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ OFFSHORE PROPOSED ROUTE (OS-A)
  - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ OFFSHORE ALTERNATIVE ROUTING A (OS-AA)
  - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ OFFSHORE ALTERNATIVE ROUTING B (OS-B)
  - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ OFFSHORE ALTERNATIVE ROUTING D (OS-D)
  - ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ PROPOSED ONSHORE ROUTE AL1a
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1b
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1c
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1d
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1e
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1f
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1g
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1h
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1i
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1j
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1k
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1l
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1m
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1n
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1o
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1p
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  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1u
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1v
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1w
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1x
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1y
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1z
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1aa
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ab
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ac
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ad
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ae
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1af
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ag
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ah
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ai
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1aj
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ak
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1al
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1am
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1an
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ao
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ap
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1aq
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ar
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1as
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1at
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1au
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1av
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1aw
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ax
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ay
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1az
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ba
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bb
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bc
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bd
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1be
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bf
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bg
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bh
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bi
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bj
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bk
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bl
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bm
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bn
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bo
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bp
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bq
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1br
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bs
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bt
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bu
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bv
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bw
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bx
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1by
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1bz
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ca
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cb
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cc
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cd
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ce
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cf
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cg
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ch
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ci
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cj
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ck
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cl
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cm
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cn
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1co
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cp
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cq
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cr
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cs
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ct
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cu
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cv
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cw
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cx
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cy
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1cz
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1da
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1db
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dc
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dd
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1de
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1df
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dg
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dh
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1di
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dj
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dk
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dl
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dm
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dn
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1do
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dp
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dq
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dr
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ds
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dt
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1du
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dv
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dw
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dx
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dy
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1dz
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ea
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1eb
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ec
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ed
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ee
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ef
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1eg
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1eh
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ei
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ej
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1ek
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1el
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1em
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1en
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE AL1eo
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣ



ΣΤΟΙΧΕΙΑ ΧΑΡΑΞΕΩΝ/ ROUTES' DATA

ΥΠΟΘΑΛΑΣΣΙΑ ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ (OS-A) (ΑΠΟ ΟΜΠΡΕΛΑ 2 ΣΕ ΟΛΦ)  
OFFSHORE PROPOSED ROUTING (OS-A) (FROM OMPRELA2 TO OLF)

Point	WGS84-UTM 34N		Radius (m)	KP
	Easting (m)	Northing (m)		
OM2	439206	4352669	n/a	0,000
IP-1a	435400	4351800	2000	
IP-1b	433270	4348310	3000	
IP-1c	427500	4349400	5000	
IP-1d	421406	4350938	5000	
IP-2a	413104	4351291	5000	
IP-2b	409689	4349395	5000	
IP-2.1	405361	4347309	5000	
IP-2.2	404398	4346564	5000	
IP-3.1	398372	4343620	8500	
IP-4	348192	4380175	10000	
IP-5a	319867	4403220	10000	
IP-5b	316322	4405903	5000	
IP-5c	313589	4407595	5000	
IP-5d	310520	4409817	5000	
IP-5e	308421	4411897	5000	
IP-5f	305461	4413467	5000	
IP-6	298974	4418400	5000	
IP-6a	298033	4422841	5000	
IP-6b	297321	4426685	5000	
IP-7	294414	4440408	3500	
IP-8	294034	4447101	2000	
IP-9	288624	4449559	2000	
OLF	287153	4446993	n/a	204,809

ALT1 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΟΜΠΡΕΛΑ 2 ΣΕ IP-1A)  
ALT1 - OFFSHORE ALTERNATIVE ROUTING (FROM OMPRELA2 TO IP-1A)

ΕΓΣΑ ΣΤ		WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Ε (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Ε	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)
IP-1A	4.355.174m	179.462m	4.349.123m	4.38.371m	39° 17' 21" N
IP-1A	4.356.528m	164.535m	4.349.980m	4.23.427m	39° 17' 45" N

ALT3 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΤΑΜΠΟΝΙ ΣΕ IP-1)  
ALT3 - OFFSHORE ALTERNATIVE ROUTING (FROM STAMPONI TO IP-1)

ΕΓΣΑ ΣΤ		WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Ε (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Ε	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)
IP-1	4.357.351m	169.466m	4.350.964m	4.28.321m	39° 18' 18" N

ALT4 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΟΦΑ ΣΕ IP-C2)  
ALT4 - OFFSHORE ALTERNATIVE ROUTING (FROM SOFA TO IP-C2)

ΕΓΣΑ ΣΤ		WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Ε (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Ε	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)
IP-C2	4.359.119m	173.552m	4.352.865m	4.32.341m	39° 17' 21" N

ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT5 (ΑΠΟ ΟΜΠΡΕΛΑ1 ΣΕ IP-1)  
OFFSHORE ALTERNATIVE ROUTING ALT5 (FROM OMPRELA1 TO IP-1)

ΕΓΣΑ ΣΤ		WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Ε (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Ε	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)
IP-1	4.357.351m	169.466m	4.350.964m	4.28.321m	39° 18' 18" N

ALT7 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΤΑΥΡΟΛΙΜΕΝΑ ΣΕ IP-1)  
ALT7 - OFFSHORE ALTERNATIVE ROUTING (FROM STAVROLIMENA TO IP-1)

ΕΓΣΑ ΣΤ		WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Ε (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Ε	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)
IP-1	4.357.351m	169.466m	4.350.964m	4.28.321m	39° 18' 18" N

ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ Α (OS-AA) (ΥΠΟΘΑΛΑΣΣΙΟΥ ΤΗΜΑΤΟΣ ΑΠΟ IP-1 ΣΕ ΟΤΡΑΝΤΟ, ΝΟΤΙΑ ΠΕΡΙΟΧΗ ΕΚΡΗΚΤΙΚΩΝ)  
ALTERNATIVE ROUTING A (OS-AA) (OFFSHORE ALTERNATIVE ROUTING A (OS-AA))

ΕΓΣΑ ΣΤ		WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Ε (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Ε	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)
IP-1	4.357.351m	169.466m	4.350.964m	4.28.321m	39° 18' 18" N
IP-2	4.355.060m	155.193m	4.348.225m	4.14.750m	39° 16' 45" N
IP-3	4.353.387m	154.136m	4.346.500m	4.13.150m	39° 15' 49" N
IP-4	4.352.474m	151.449m	4.345.500m	4.10.500m	39° 15' 15" N
IP-5	4.346.643m	142.888m	4.339.380m	4.01.650m	39° 11' 53" N
IP-6	4.335.253m	136.963m	4.347.620m	3.85.970m	39° 10' 38" N
IP-8	4.429.471m	44.710m	4.428.760m	301.443m	39° 53' 44" N
IP-10	4.452.459m	38.198m	4.441.647m	294.169m	40° 05' 54" N
IP-11	4.457.231m	38.360m	4.446.232m	294.169m	40° 08' 28" N
IP-12	4.462.195m	31.959m	4.450.906m	287.620m	40° 10' 54" N
IP-13	4.458.231m	31.959m	4.446.993m	287.153m	40° 08' 47" N

ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ Β (OS-B) (ΥΠΟΘΑΛΑΣΣΙΟΥ ΤΗΜΑΤΟΣ ΑΠΟ IP-9 ΣΕ IP-1, ΒΟΡΕΙΑ ΠΕΡΙΟΧΗ ΕΚΡΗΚΤΙΚΩΝ)  
ALTERNATIVE ROUTING B (OS-B) (OFFSHORE ALTERNATIVE ROUTING B (OS-B))

ΕΓΣΑ ΣΤ		WGS 84/UTM - ZONE 34		WGS 84	
ΣΗΜΕΙΟ	ΣΥΝΝΗΧ Υ (N)	ΣΥΝΝΗΧ Ε (E)	ΣΥΝΝΗΧ Υ	ΣΥΝΝΗΧ Ε	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)
IP-9	4.439.168m	46.716m	4.428.699m	303.142m	39° 59' 01" N
IP-10	4.452.459m	38.198m	4.441.647m	294.169m	40° 05' 54" N

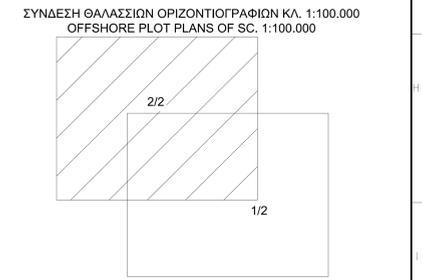
Παρατήρηση: Ο κώνοσ αναφέρεται στο Σ.Σ. WGS 84/UTM-ZONE 34.



ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS

ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8089-000-00-AU-15	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN

- ΥΠΟΜΝΗΜΑ/ LEGEND
- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ/ PROJECT COMPONENTS
- ΥΠΟΘΑΛΑΣΣΙΑ ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ OFFSHORE PROPOSED ROUTE (OS-A)
  - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ OFFSHORE ALTERNATIVE ROUTING A (OS-AA)
  - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ OFFSHORE ALTERNATIVE ROUTING B (OS-B)
  - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ OFFSHORE ALTERNATIVE ROUTING D
  - ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ PROPOSED ONSHORE ROUTE ALT1a
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE ALT1b
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE ALT1
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE ALT2
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE ALT3
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE ALT4
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE ALT5
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE ALT6
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE ONSHORE ROUTE ALT7
  - ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE OFFSHORE ROUTE ALT1
  - ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE OFFSHORE ROUTE ALT3
  - ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE OFFSHORE ROUTE ALT4
  - ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE OFFSHORE ROUTE ALT5
  - ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ ALTERNATIVE OFFSHORE ROUTE ALT7
  - ΣΗΜΕΙΟ ΠΙΠΕΡΑΙ/ΛΑΔΕΣ/ LANDFALL SITE
  - ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΒΡΥΧΗ ΧΑΡΑΞΗ PRELIMINARY TECHNICALLY FEASIBLE ROUTING
  - ΠΕΡΙΟΧΗ ΛΕΙΤΟΜΕΡΟΥΣ ΘΑΛΑΣΣΙΑΣ ΕΡΕΥΝΑΣ/ DETAIL MARINE SURVEY AREA (10km)
- ΔΙΟΙΚΗΤΙΚΑ/ ADMINISTRATIVE
- ΕΘΝΙΚΑ ΟΡΙΑ/ NATIONAL BORDERS
  - ΟΡΙΑ ΠΕΡΙΦΕΡΕΙΑΚΗΣ ΕΝΟΤΗΤΑΣ/ REGIONAL BORDERS
  - ΟΡΙΑ ΔΗΜΩΝ/ MUNICIPALITIES BORDERS
  - ΠΟΛΕΙΣ/ CITIES
- ΥΠΟΘΑΛΑΣΣΙΑ ΚΑΙ ΛΟΙΠΑ ΣΤΟΙΧΕΙΑ/ INFRASTRUCTURE and OTHER DATA
- ΥΠΟΘΑΛΑΣΣΙΟ ΚΑΛΩΔΙΟ
  - ΠΙΘΑΝΗ ΠΕΡΙΟΧΗ ΑΠΟΘΕΣΗΣ ΕΚΡΗΚΤΙΚΩΝ (ΠΕΡΙΟΧΗ ΥΨΗΛΗΣ ΑΝΑΚΛΑΣΤΙΚΟΤΗΤΑΣ) POSSIBLE UNEXPLODED ORDNANCE AREA (HIGH REFLECTIVITY AREA)



REVISION	DATE	DESCRIPTION	PREPARED BY	CHECKED BY	APPROVED BY
1	20.08.12	CULTURAL DATA ADDITION AND ROUTE MODIFICATION	DPH	DPH	EAP
2	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/FIRST ISSUE	DPH	DPH	PMS

Asprofos engineering

IGI Poseidon s.a.

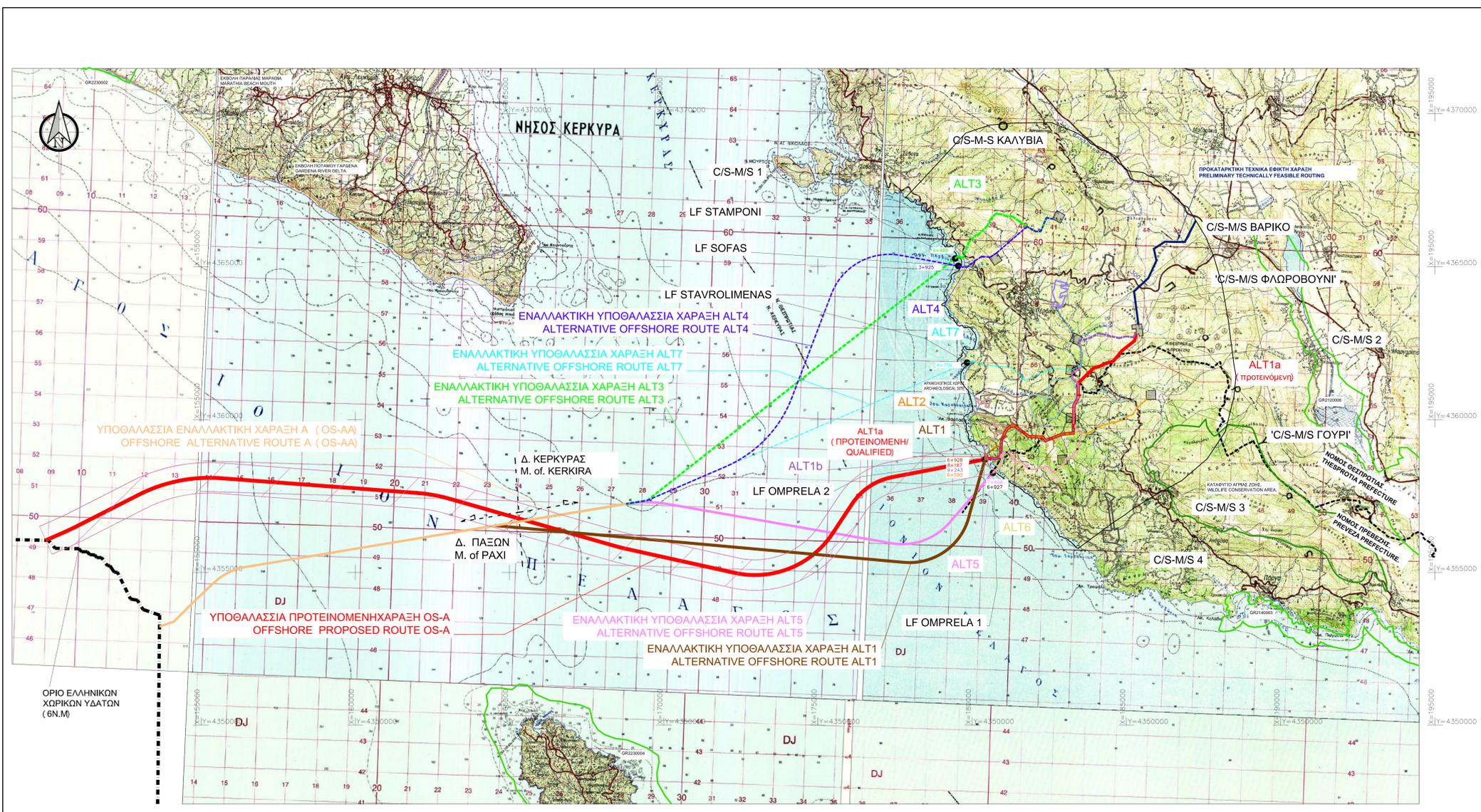
PROJECT MANAGER: PHILIPPOS SPANDIS

CONTRACT NO: AF-11-7240

SCALE: 1:100,000

CLIENT: IGI Poseidon

DATE: 31.08.2012



ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS	
ΑΡ. ΣΧΕΔΙΟΥ / DWG No.	ΤΙΤΛΟΣ / TITLE
8089-000-00-AU-01	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN

- ΥΠΟΜΝΗΜΑ / LEGEND**
- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ / PROJECT DATA**
1. ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ / PRELIMINARY TECHNICALLY FEASIBLE ROUTE
  2. ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ / PROPOSED ROUTE ALT1a
  3. ΠΡΟΤΕΙΝΟΜΕΝΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ / PROPOSED OFFSHORE ROUTE OS-A
  4. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ / ALTERNATIVE ROUTE ALT1
  5. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ / ALTERNATIVE ROUTE ALT1b
  6. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ / ALTERNATIVE ROUTE ALT2
  7. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ / ALTERNATIVE OFFSHORE ROUTE ALT1
  8. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ / ALTERNATIVE OFFSHORE ROUTE ALT3
  9. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ / ALTERNATIVE OFFSHORE ROUTE ALT3
  10. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ / ALTERNATIVE ROUTE ALT4
  11. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ / ALTERNATIVE OFFSHORE ROUTE ALT4
  12. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ / ALTERNATIVE ROUTE ALT5
  13. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ / ALTERNATIVE OFFSHORE ROUTE ALT5
  14. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ / ALTERNATIVE ROUTE ALT7
  15. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ / ALTERNATIVE OFFSHORE ROUTE ALT7
  16. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ / ALTERNATIVE ROUTE ALT7
  17. ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΧΕΡΣΙΝΩΝ ΕΓΚΑΤΑΣΤΑΣΕΩΝ / ALTERNATIVE ONSHORE FACILITIES SITE
  18. ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΠΡΟΔΙΑΓΜΑΤΩΝ / ALTERNATIVE LANDFILL SITES
  19. ΠΕΡΙΟΧΗ ΛΕΙΤΟΜΕΡΟΥΣ ΘΑΛΑΣΣΙΑΣ ΕΡΕΥΝΑΣ / AREA OF DETAIL MARINE SURVEY (10km)
  20. ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ ΧΕΡΣΙΝΩΝ ΤΜΗΜΑΤΩΝ / ONSHORE INVESTIGATION AREA

- ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ / ENVIRONMENTAL AND CULTURAL DATA**
19. ΠΕΡΙΟΧΕΣ ΑΚΤΙΝΟΥ / NATURAL SITES
  20. ΚΑΤΑΦΥΓΙΟ ΑΠΡΑΞ ΖΩΝΗ / WILDLIFE RESERVES
  21. ΠΑΡΚΟ ΑΝΑΨΥΧΗΣ / RECREATION PARK
  22. ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΩΡΟΙ / ARCHAEOLOGICAL SITES
- ΥΠΟΘΕΜΕΣ ΚΑΙ ΛΟΙΠΑ ΣΤΟΙΧΕΙΑ / INFRASTRUCTURE AND VARIOUS DATA**
23. ΒΙΟΜΗΧΑΝΙΚΟ ΠΑΡΚΟ / INDUSTRIAL PARK
  24. ΑΥΤΟΜΕΙΟ / QUERRY
  25. ΟΡΙΑ ΠΕΡΙΦΕΡΕΙΑΚΗΣ ΕΝΟΤΗΤΑΣ / REGIONAL BOUNDARIES
  26. ΑΣΕΙΩΣΤΗΜΕΝΟ ΑΙΟΛΙΟ ΠΑΡΚΟ ΤΗΣ EDF EN A.E. / PROPOSED WINDFARM OF EDF EN S.A.

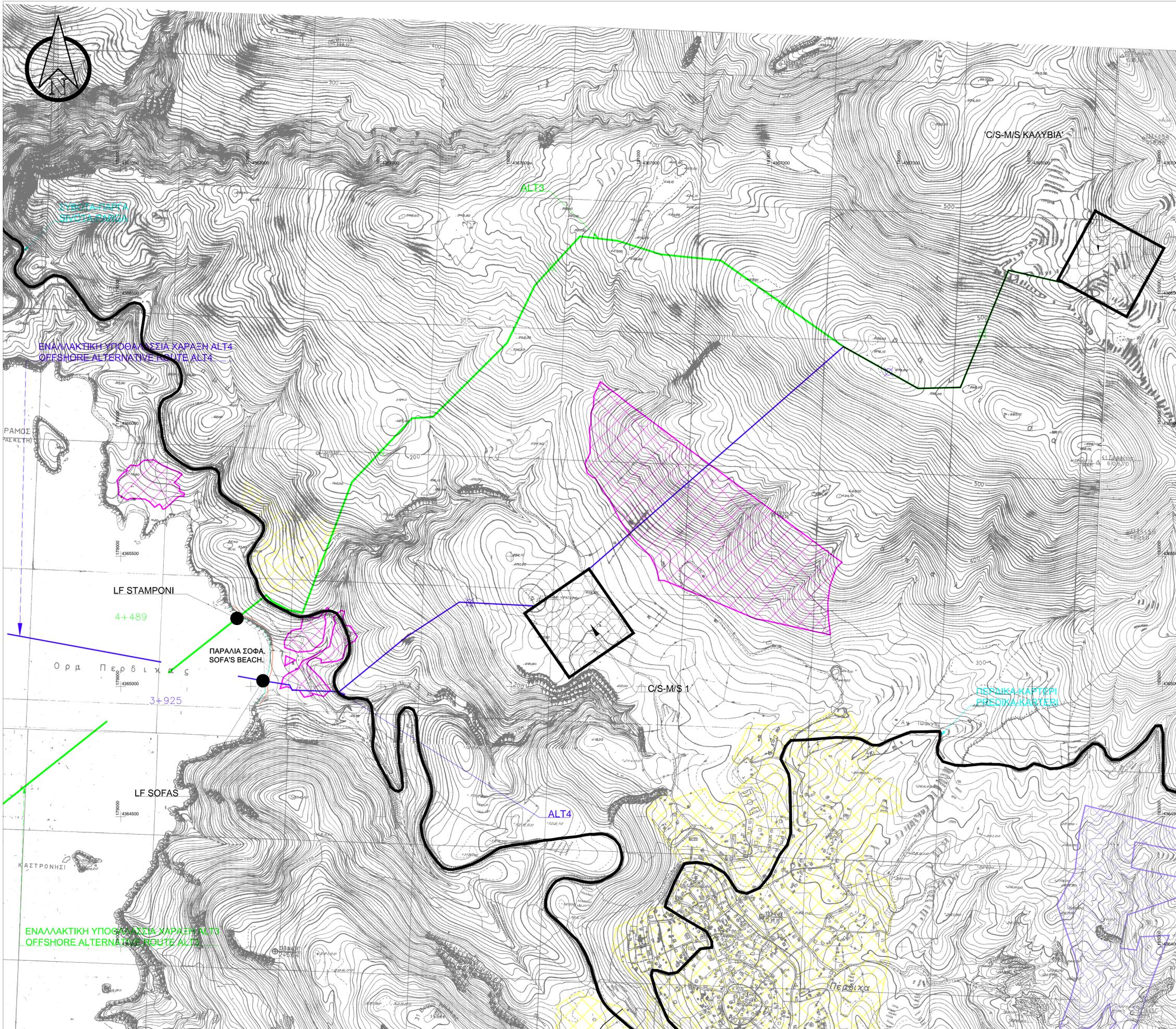
ΑΡΙΘΜΟΣ	ΗΜΕΡΟΜΗΝΙΑ	ΕΠΙΣΤΑΣΗ	ΠΕΡΙΓΡΑΦΗ	ΕΠΙΣΤΑΣΗ	ΕΠΙΣΤΑΣΗ	ΕΠΙΣΤΑΣΗ	
2	28.05.12	ΕΝΔΕΙΞΕΙΣ ΕΚΔΟΣΗΣ	COMMENTS INCORPORATION	ΕΠΗ	ΟΠΗ	ΕΑΡ	ΠΩΣ
1	28.05.12	ΑΔΙΑΤΗΡΗΤΕΣ ΜΕΛΕΤΕΣ	MODIFICATION	ΕΠΗ	ΟΠΗ	ΕΑΡ	ΠΩΣ
0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ	ISSUE	ΕΠΗ	ΟΠΗ	ΕΑΡ	ΠΩΣ

ΕΠΙΣΤΑΣΗ: ΕΠΙΣΤΑΣΗ ΔΩΚ. ΝΕΥ: ΔΩΚ. ΝΕΥ ΑΝΤΙΚΑΤΑ ΤΩΝ ΕΡΓΟΥ PROJECT MANAGER	ΕΠΙΣΤΑΣΗ: ΕΠΙΣΤΑΣΗ ΔΩΚ. ΝΕΥ: ΔΩΚ. ΝΕΥ ΑΝΤΙΚΑΤΑ ΤΩΝ ΕΡΓΟΥ PROJECT MANAGER
ΤΙΤΛΟΣ: ΤΙΤΛΟΣ ΑΡ. ΕΡΓΟΥ: ΑΡ. ΕΡΓΟΥ ΑΦ-11-7240	ΤΙΤΛΟΣ: ΤΙΤΛΟΣ ΑΡ. ΕΡΓΟΥ: ΑΡ. ΕΡΓΟΥ ΑΦ-11-7240
ΚΑΜΑΚΑ: ΚΑΜΑΚΑ ΑΡ. ΔΩΚ. ΝΕΥ: 7240-AU-ON-01	ΚΑΜΑΚΑ: ΚΑΜΑΚΑ ΑΡ. ΔΩΚ. ΝΕΥ: 7240-AU-ON-01
ΚΑΛΩΔΙΟ: ΚΑΛΩΔΙΟ ΑΡ. ΔΩΚ. ΝΕΥ: 7240-AU-ON-01, R2, EDO.dwg	ΗΜΕΡΟΜΗΝΙΑ: ΗΜΕΡΟΜΗΝΙΑ 28.05.2012

ΟΡΙΟ ΕΛΛΗΝΙΚΩΝ ΧΩΡΙΚΩΝ ΥΔΑΤΩΝ (6Ν.Μ)





ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS	
ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8089-000-00-AU-02	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-03	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-04	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-05	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-06	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-07	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-08	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-09	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN

- ΥΠΟΜΝΗΜΑ/LEGEND**
- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ/ PROJECT DATA**
- ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΗ ΕΙΚΤΗ ΧΑΡΑΞΗ/ PRELIMINARY TECHNICAL FEASIBLE ROUTING
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΠΡΟΤΕΙΝΟΜΕΝΗ) / ALTERNATIVE ROUTING (PROPOSED) ALT1a
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT1b
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0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/FIRST ISSUE	DPH	DPH	EAP	PMS

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ΑΡ. ΕΜΒΛΟΜΑΤΟΣ/ CONTRACT No: **AF-11-7240**

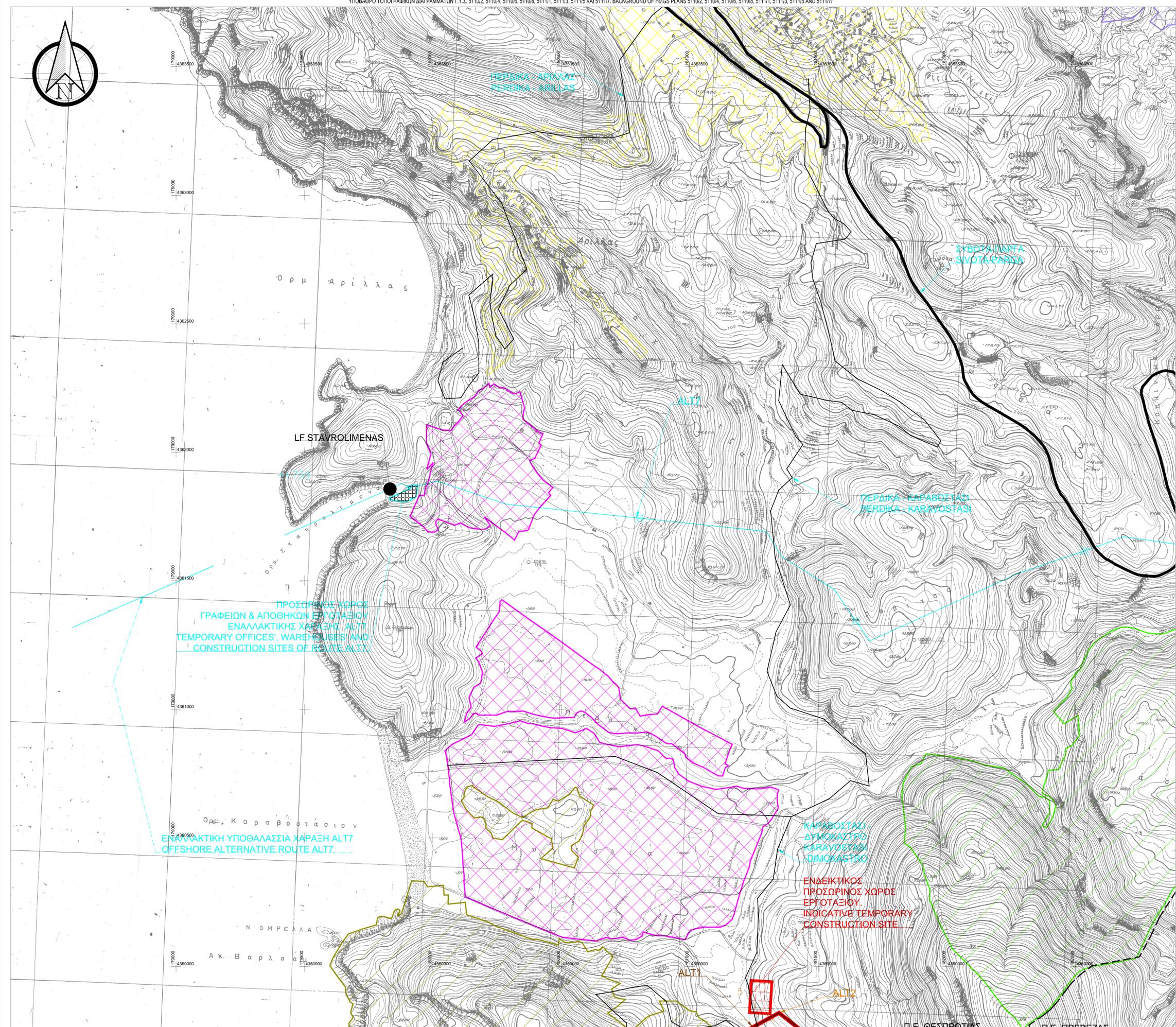
ΤΙΤΛΟΣ - TITLE: **ΠΡΟΒΛΑΣΤΙΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ "ΠΟΣΕΙΔΩΝ" OFFSHORE NATURAL GAS PIPELINE "POSEIDON" ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΠΤΩΣΕΩΝ ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT ΟΡΙΖΟΝΤΙΟΓΡΑΜΜΑ ΧΕΡΣΑΙΩΝ ΤΜΗΜΑΤΟΣ/ ONSHORE PLOT PLAN**

ΚΛΑΜΑΚΑ/ SCALE: **1:5.000**

ΑΡ. ΣΧ. ΔΩΜ. ΑΡ. ΣΧ. ΠΕΛΑΤΗ/ CLIENT DWG No: **7240-AU-LU-02**

ΚΩΔ. ΗΛΕΚΤΡ. ΑΡΧΕΙΟΥ/ ELECTRONIC FILE CODE: **7240-AU-LU-02, R2, EDO.dwg**

ΤΕΛΕΤ. ΗΜΕΡ. ΠΡΟΣΒΑΣΗΣ/ LAST ACCESS DATE: **28.05.2012**



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1	30.03.12	ΑΛΛΑΓΗ ΧΛΩΜΕΤΡΗΣΗΣ/ MILEAGE MODIFICATION	DPH	GLN	EAP	PMS
0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/FIRST ISSUE	DPH	DPH	EAP	PMS

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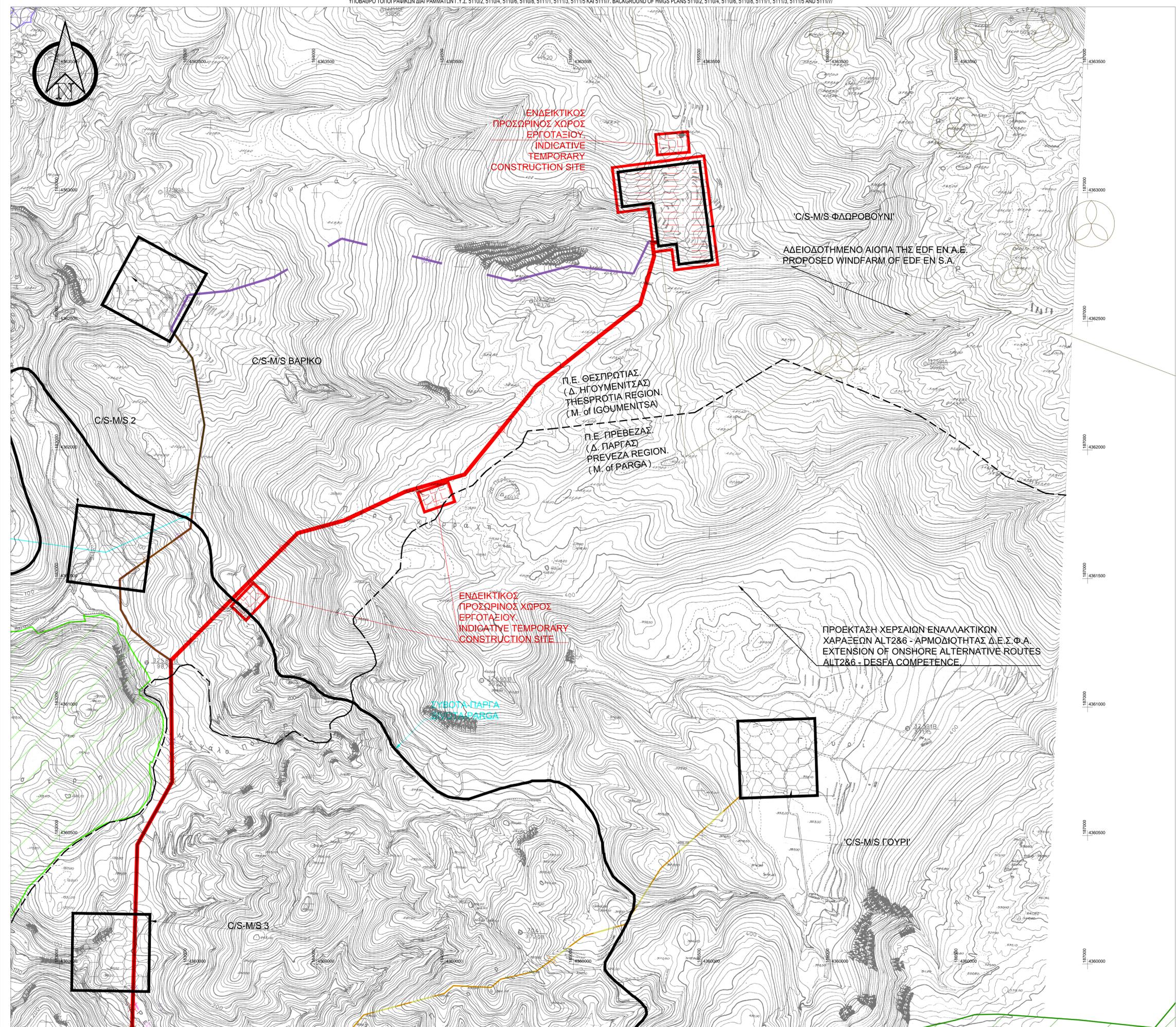
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ΦΙΛΙΠΠΟΣ ΣΠΑΝΙΔΗΣ

ΤΙΤΛΟΣ - TITLE: ΠΡΟΘΑΛΑΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ 'ΠΟΣΕΙΔΩΝ' OFFSHORE NATURAL GAS PIPELINE 'POSEIDON' ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΠΤΩΣΕΩΝ ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT ΟΡΙΖΟΝΤΙΟΓΡΑΜΜΑ ΧΕΡΣΑΙΩΝ ΤΜΗΜΑΤΟΣ/ ONSHORE PLOT PLAN

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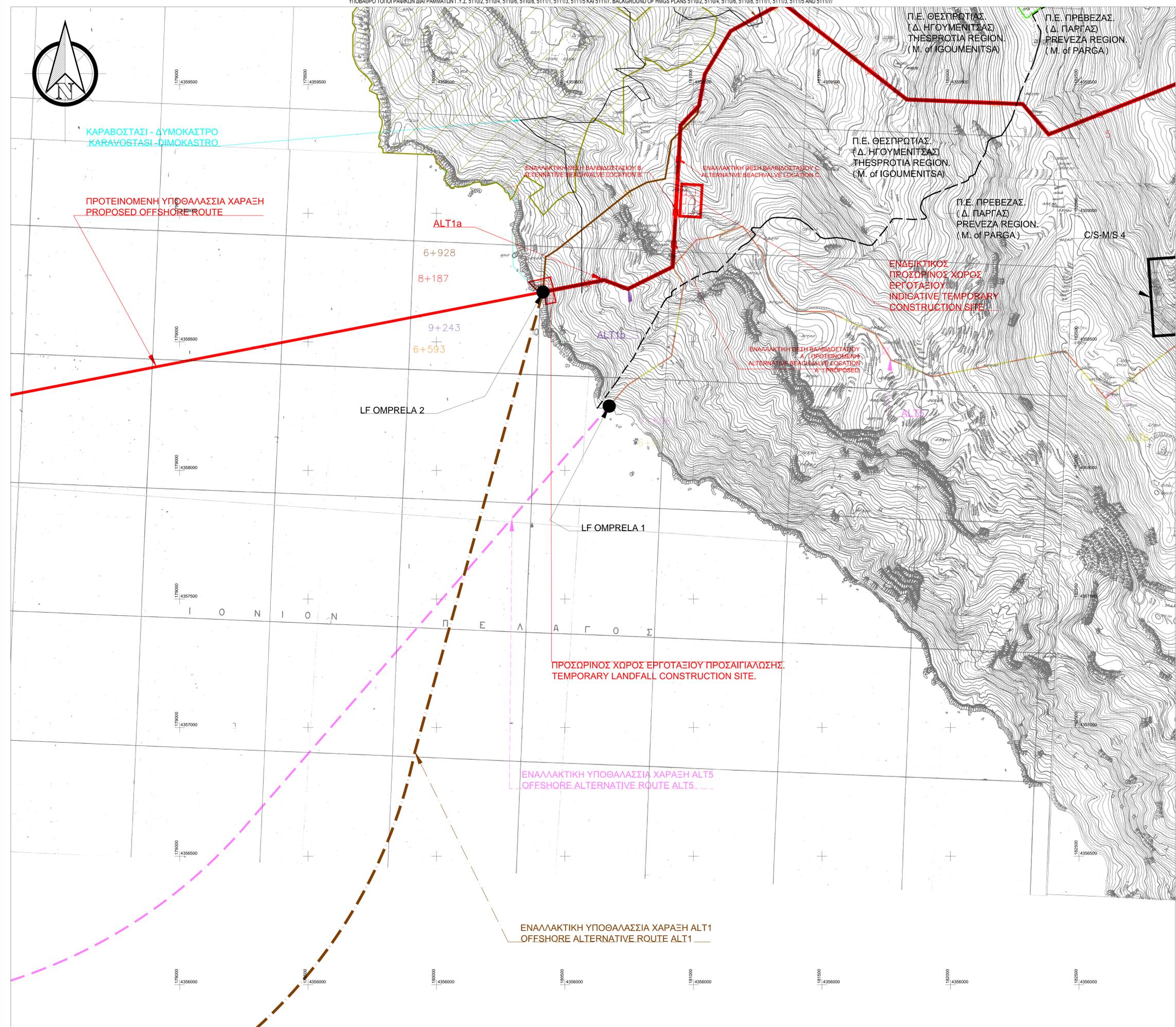
ΣΥΝΔΕΞΗ ΧΕΡΣΑΙΩΝ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΩΝ ΚΑΙ 1:5.000 ONSHORE PLOT PLANS SC. 1:5.000 INDEX

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0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ / FIRST ISSUE	DPH	DPH	EAP	PMS

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<p>ΤΟ ΕΓΧΡΩΜΑ ΑΥΤΟ ΕΜΠΛΕΜΜΑΤΟ ΕΙΝΑΙ ΕΙΣΗΛΘΟΝΤΑΣ ΣΤΟ ΠΛΗΡΕΣ ΣΕΤ ΑΝΤΙΣΤΟΙΧΩΝ ΕΓΧΡΩΜΑΤΩΝ ΚΑΙ ΜΕ ΟΡΟΛΟΓΙΟ ΤΥΠΟ ΟΡΟΛΟΓΙΣΜΕΝΟ ΤΟ ΕΡΓΟ ΔΕΙΧΝΕΙ ΤΟΝ ΕΚΟΣΤΟ ΤΩΝ ΕΡΓΩΝ.</p> <p>THIS DOCUMENT IS THE PROPERTY OF ASPROFOS S.A. AND IT SHALL NOT BE REPRODUCED, COPIED OR USED FOR ANY PURPOSES OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY ISSUED.</p>						
<p>Asprofos engineering</p>			<p>ΕΓΚΡΙΘΗΚΕ ΓΙΑ ΚΑΤΑΣΚΕΥΗ / APPROVED FOR CONSTRUCTION</p>			
<p>IGI Poseidon</p>			<p>ΔΙΕΥΘΥΝΤΗΣ ΕΡΓΟΥ / PROJECT MANAGER</p>			
<p>ΠΕΛΑΤΗΣ - CLIENT</p>			<p>ΥΠΟΓΡΑΦΗ / SIGNATURE</p>			
<p>IGI Poseidon</p>			<p>ΟΝΟΜΑ / NAME: PHILIPPOS SPANIDIS</p>			
<p>ΤΙΤΛΟΣ - TITLE</p>			<p>ΑΡ. ΕΜΒΟΛΟΤΩΝ / CONTRACT No: AF-11-7240</p>			
<p>ΠΡΟΒΛΑΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ "ΠΟΣΕΙΔΩΝ" OFFSHORE NATURAL GAS PIPELINE "POSEIDON"</p>			<p>ΑΝΤΙΚΑΤΑΣΤΗΘΗΚΕ ΑΠΟ / SUPERSEDED BY:</p>			
<p>ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΠΛΩΣΕΩΝ ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT</p>			<p>ΑΝΤΙΚΑΘΙΣΤΑ ΤΟ / SUPERSEDES THE:</p>			
<p>ΟΡΙΖΟΝΤΙΟΓΡΑΜΜΑ ΧΕΡΣΑΙΩΝ ΤΜΗΜΑΤΟΣ / ONSHORE PLOT PLAN</p>			<p>ΚΑΛΩΜΑ / SCALE</p>			
<p>1:5.000</p>			<p>ΑΡ. ΣΧ. ΠΕΛΑΤΗ / CLIENT DWG No: 7240-AU-LU-02</p>			
<p>ΚΩΔ. ΗΛΕΚΤΡ. ΑΡΧΕΙΟΥ / ELECTRONIC FILE CODE</p>			<p>ΤΕΛΕΤ. ΗΜΕΡ. ΠΡΟΣΒΑΣΗΣ / LAST ACCESS DATE</p>			
<p>7240-AU-LU-02, R2, ED0.dwg</p>			<p>28.05.2012</p>			

ΚΑΛΩΜΑ / SCALE	ΑΡ. ΣΧ. ΠΕΛΑΤΗ / CLIENT DWG No: 7240-AU-LU-02	ΤΡΑΧΥ ΣΦΟΔΡΟ / SHEET 3 of 5	ΑΝΑΦΟΡΑ / REFERENCE	2
1:5.000	ΑΡ. ΣΧ. ΠΕΛΑΤΗ / CLIENT DWG No:	ΤΡΑΧΥ ΣΦΟΔΡΟ / SHEET	ΑΝΑΦΟΡΑ / REFERENCE	
ΚΩΔ. ΗΛΕΚΤΡ. ΑΡΧΕΙΟΥ / ELECTRONIC FILE CODE	7240-AU-LU-02, R2, ED0.dwg	ΤΕΛΕΤ. ΗΜΕΡ. ΠΡΟΣΒΑΣΗΣ / LAST ACCESS DATE		28.05.2012



ΣΧΗΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS	
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8089-000-00-AU-02	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-03	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-04	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-05	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-06	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-07	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-08	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN
8089-000-00-AU-09	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ / RECORDING PLAN

- ΥΠΟΜΝΗΜΑ/LEGEND**
- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ/ PROJECT DATA**
- ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΘΙΚΤΗ ΧΑΡΑΞΗ/ PRELIMINARY TECHNICAL FEASIBLE ROUTING
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΠΡΟΤΕΙΝΟΜΕΝΗ) / ALTERNATIVE ROUTING (PROPOSED) ALT1a
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT1b
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT1
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT2
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT3
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT4
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT5
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT6
  - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT7
  - ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΧΕΡΣΑΙΩΝ ΕΓΚΑΤΑΣΤΑΣΕΩΝ/ ALTERNATIVE ONSHORE FACILITIES SITES
  - ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΠΡΟΣΑΓΓΑΛΩΣΗΣ/ ALTERNATIVE LANDFALL SITES

- ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ/ ENVIRONMENTAL AND CULTURAL DATA**
- ΚΑΤΑΦΥΓΙΟ ΑΓΡΙΑΣ ΖΩΗΣ
  - ΠΑΡΚΟ ΑΝΑΨΥΧΗΣ
  - ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΩΡΟΙ

- ΥΠΟΔΟΜΕΣ ΚΑΙ ΔΙΟΙΚΗΤΙΚΑ ΟΡΙΑ/ INFRASTRUCTURE AND ADMINISTRATIVE BOUNDARIES**
- ΟΡΙΑ ΠΕΡΙΦΕΡΕΙΑΚΩΝ ΕΝΟΤΗΤΩΝ/ REGIONAL BOUNDARIES
  - ΟΡΙΑ ΔΗΜΩΝ/ MUNICIPALITIES BOUNDARIES
  - ΑΙΓΑΛΟΣ/ SHORELINE
  - ΠΑΡΑΛΙΑ/ BEACH
  - ΚΥΡΙΟ ΟΔΙΚΟ ΔΙΚΤΥΟ/ MAIN ROAD NETWORK

- ΧΡΗΣΕΙΣ ΓΗΣ/ LAND USES**
- ΟΙΚΙΣΤΙΚΗ ΠΕΡΙΟΧΗ/ RESIDENTIAL AREA
  - ΠΕΡΙΟΧΗ Β' ΚΑΤΟΙΚΙΑΣ/ SUMMER HOUSES AREA
  - ΒΙΟΜΗΧΑΝΙΚΟ ΠΑΡΚΟ/ INDUSTRIAL PARK
  - ΛΑΤΟΜΕΙΟ QUARRY

ΣΥΝΔΕΣΗ ΧΕΡΣΑΙΩΝ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΩΝ ΚΑΙ 1:5.000 ONSHORE PLOT PLANS SC. 1:5.000 INDEX

1/5	
2/5	3/5
4/5	5/5

2	28.05.12	ΕΝΔΟΣΜΕΤΩΣΗ ΣΧΟΜΩΝ/ COMMENTS INCORPORATION	DPH	DPH	EAP	PMS
1	30.03.12	ΑΛΛΑΓΗ ΧΛΩΜΕΤΡΗΣΗΣ/ MILEAGE MODIFICATION	DPH	GLN	EAP	PMS
0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/FIRST ISSUE	DPH	DPH	EAP	PMS

ΑΝΑΦΟΡΑ ΜΕΤΡΗΣΕΩΝ/ REVISION	ΗΜΕΡΑ/ DATE	ΠΕΡΙΓΡΑΦΗ/ DESCRIPTION	ΠΡΟΤΟΜΑΧΑ/ PREPARED	ΕΣΧΕΔΩΣΗ/ DRAWN	ΕΛΕΓΧΟΣ/ CHECKED	ΕΠΙΚΡΗ/ APPROVED
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**Asprofos engineering**

IGI Poseidon s.a.

ΦΙΛΙΠΠΟΣ ΣΠΑΝΔΙΔΗΣ

ΤΙΤΛΟΣ - TITLE: ΤΠΟΘΑΛΑΣΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ 'ΠΟΣΕΙΔΩΝ' OFFSHORE NATURAL GAS PIPELINE 'POSEIDON' ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΠΤΩΣΕΩΝ ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT ΟΡΙΖΟΝΤΙΟΓΡΑΜΜΑ ΧΕΡΣΑΙΩΝ ΤΜΗΜΑΤΟΣ/ ONSHORE PLOT PLAN

ΚΑΛΩΣΚΑ/ SCALE	ΑΡ. ΣΧ. ΑΦ./ AF. DWG No: 7240-AU-LU-02	ΦΥΛΛΟ ΣΦΥΡΑ/ SHEET	ΑΝΑΦΟΡΗ/ REFERENCE
1:5.000	ΑΡ. ΣΧ. ΠΕΛΑΤΗ/ CLIENT DWG No:	4 of 5	2



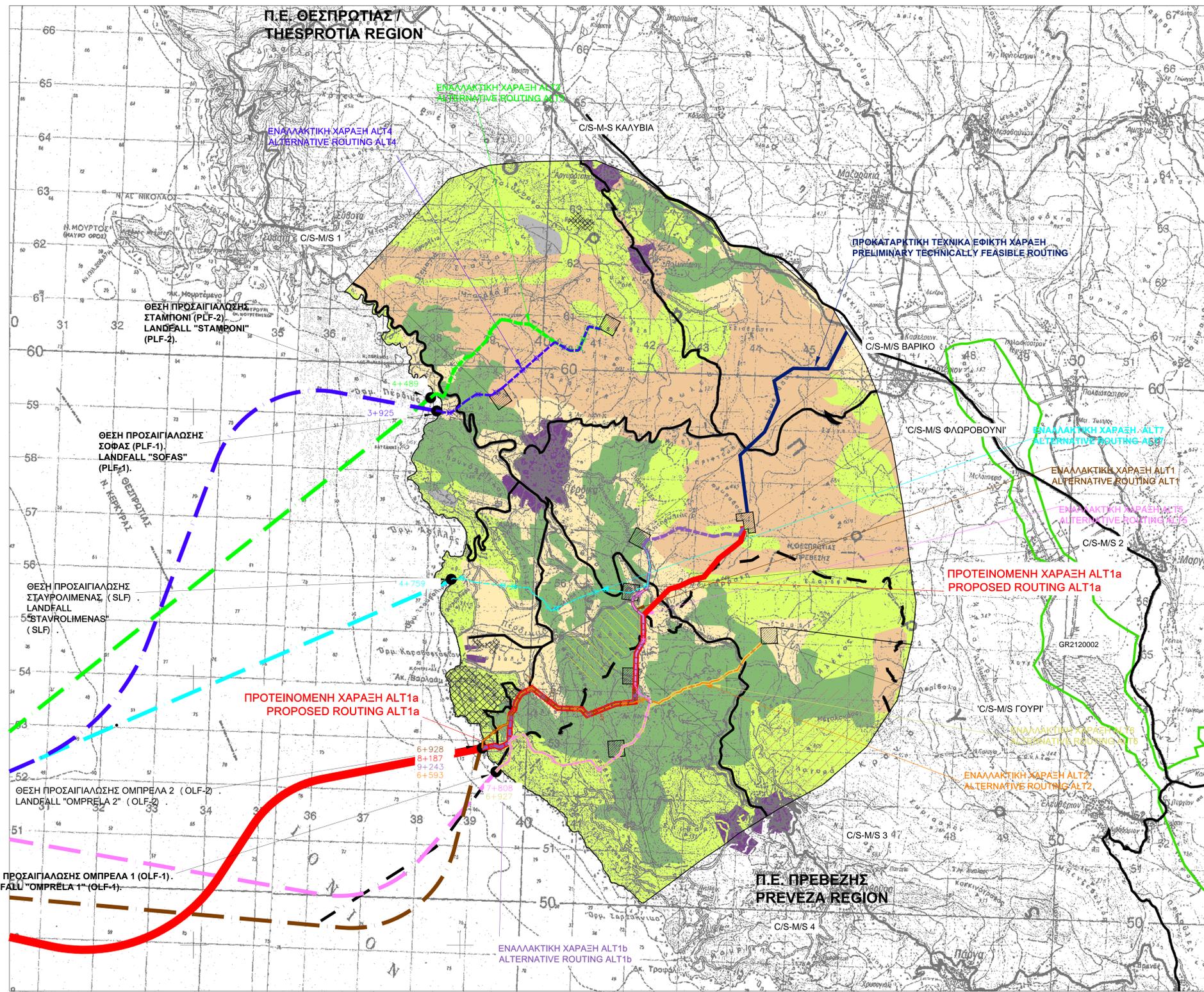


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ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8089-000-00-AU-10	ΧΑΡΤΗΣ ΒΛΑΣΤΗΡΗΣ / VEGETATION MAP

ΥΠΟΜΗΜΑ/LEGEND	
<b>ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ/ PROJECT DATA</b>	
1.	ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ/ PRELIMINARY TECHNICALLY FEASIBLE ROUTE
2.	ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ/ PROPOSED ROUTE ALT1a
5.	ΠΡΟΤΕΙΝΟΜΕΝΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ/ PROPOSED OFFSHORE ROUTE
7.	ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT1b
8.	ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT1
9.	ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT2
5.	ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT1
6.	ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT3
7.	ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT3
8.	ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT4
9.	ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT4
10.	ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT5
11.	ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT6
12.	ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT5
13.	ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT7
14.	ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT7
15.	ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΧΕΡΣΑΙΩΝ ΕΓΚΑΤΑΣΤΑΣΕΩΝ/ ALTERNATIVE ONSHORE FACILITIES SITE
16.	ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΠΡΟΖΑΓΓΙΩΣΗΣ/ ALTERNATIVE LANDFALL SITES
17.	ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ ΧΕΡΣΑΙΩΝ ΤΜΗΜΑΤΟΣ/ ONSHORE INVESTIGATED AREA

ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ/ ENVIRONMENTAL AND CULTURAL DATA	
18.	ΠΕΡΙΟΧΕΣ ΔΙΚΤΥΟΥ ΦΥΣΙΚΩΝ ΦΑΙΝΟΜΕΝΩΝ/ NATURAL SITES
19.	ΚΑΤΑΦΥΓΙΟ ΑΓΡΙΑΣ ΖΩΗΣ/ WILD LIFE RESERVES
20.	ΠΑΡΚΟ ΑΝΑΨΥΧΗΣ/ RECREATION PARK
21.	ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΩΡΟΙ/ ARCHAEOLOGICAL SITES

ΦΥΤΟΚΛΑΥΣΗ/ VEGETATION COVER	
22.	ΟΡΙΑ ΠΕΡΙΦΕΡΕΙΑΚΗΣ ΕΝΟΤΗΤΑΣ/ REGIONAL BOUNDARIES
23.	ΚΥΡΙΟ ΟΔΙΚΟ ΔΙΚΤΥΟ/ MAIN ROAD NETWORK
28.	ΔΟΜΗΜΕΝΗ ΠΕΡΙΟΧΗ/ STRUCTURED AREA
29.	ΒΡΑΧΩΔΕΙΣ ΕΚΤΑΞΕΙΣ/ ROCKY AREAS
30.	ΓΕΩΡΓΙΚΕΣ ΕΚΤΑΞΕΙΣ/ FARMLANDS
31.	ΧΟΡΤΟΒΑΔΙΚΕΣ ΕΚΤΑΞΕΙΣ/ GRASSLANDS
32.	ΔΑΣΙΚΕΣ (ΘΑΜΝΩΔΕΙΣ) ΕΚΤΑΞΕΙΣ/ SHRUBLANDS
33.	ΔΑΣΟΣ/ FOREST

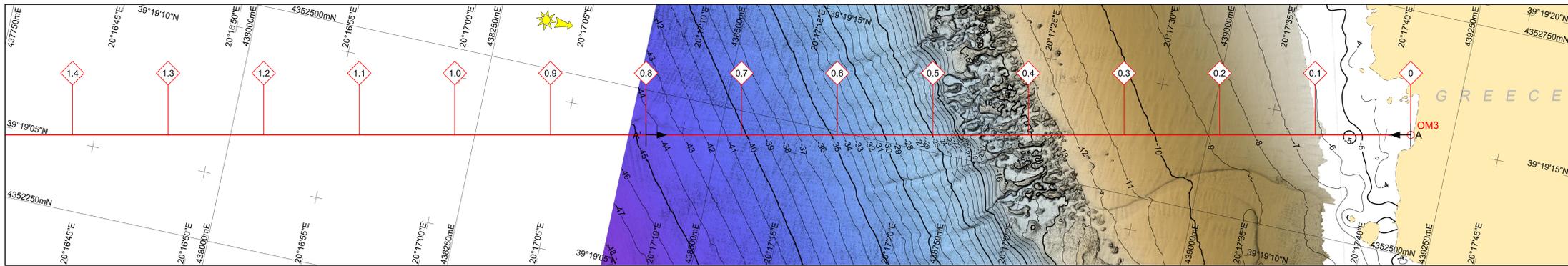
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REVISION	DATE	DESCRIPTION	PREPARED	DRAWN	CHECKED	APPROVED
2	28.05.12	ΕΣΧΗΜΑΤΩΣΗ ΣΧΕΔΙΟΥ/ COMMENTS INCORPORATION	DPH	DPH	EAP	PMS
1	30.03.12	ΑΜΑΧΗ ΧΑΡΑΞΗ/ MILEAGE MODIFICATION	DPH	DPH	EAP	PMS
0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/ FIRST ISSUE	DPH	DPH	EAP	PMS

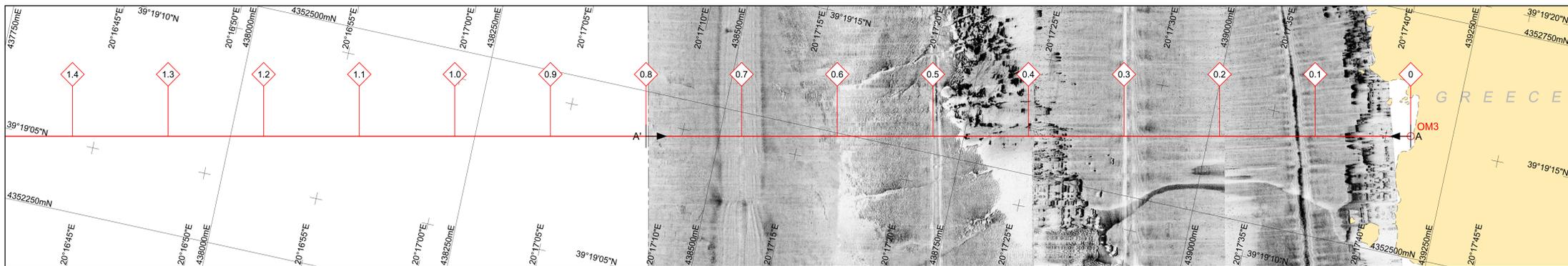
ΠΕΛΙΕΡΗΣ ΚΛΙΝΤ IGI Poseidon	IGI Poseidon s.a. ΟΙΚΟΝΟΜΟΣ PHILIPPOS SPANDIS
ΤΙΤΛΟΣ - ΤΙΤΛΟΣ ΥΠΟΘΑΛΑΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ "POSEIDON" OFFSHORE NATURAL GAS PIPELINE "POSEIDON" ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΠΛΟΚΩΝ ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT ΧΑΡΤΗΣ ΦΥΤΟΚΛΑΥΣΗΣ/ VEGETATION COVER MAP	ΑΝΤΙΚΑΤΑΣΤΗΡΙΟ ΑΠΟ SUBMITTED BY: ΑΝΤΙΚΑΤΑΣΤΗΡΙΟ SUPERSEDES THE:
ΚΑΙΜΑΚΑ SCALE 1:30.000	ΑΡ. ΣΧ. ΑΡ. AF. DWG No: 7240-AU-VM-01
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**BATHYMETRY**



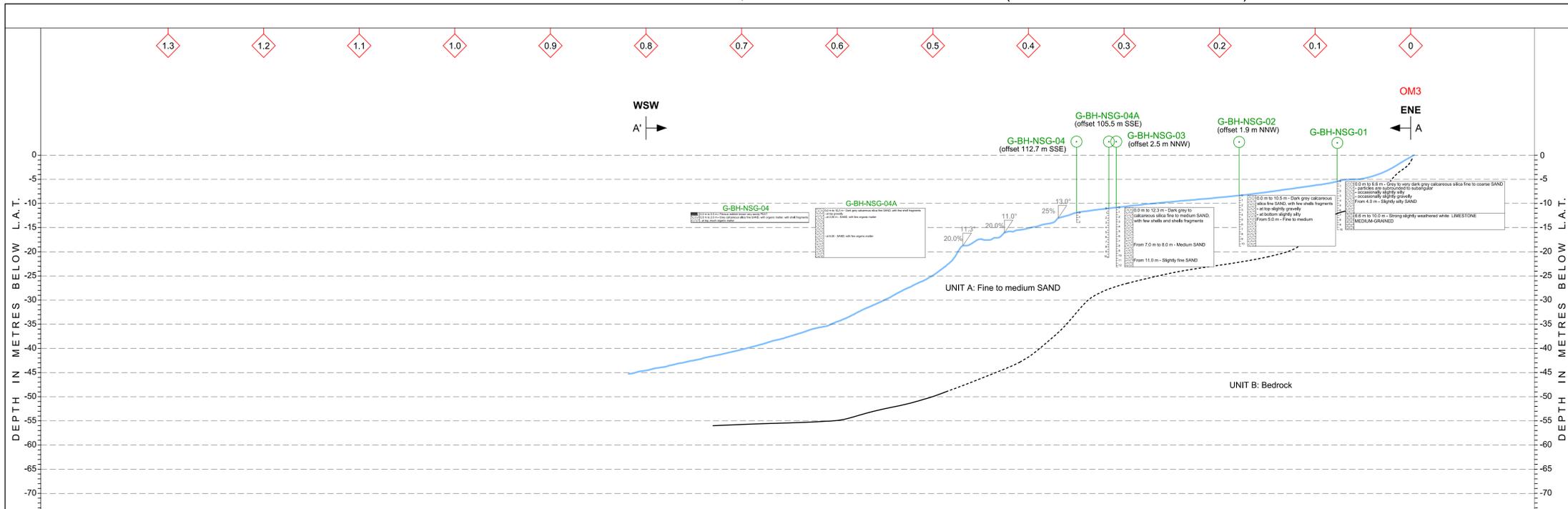
**SIDE SCAN SONAR MOSAIC**



**SEABED FEATURES**



**LONGITUDINAL PROFILE HORIZONTAL SCALE 1 : 2,500 VERTICAL SCALE 1 : 500 (x5 VERTICAL EXAGGERATION)**

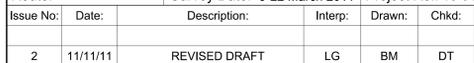
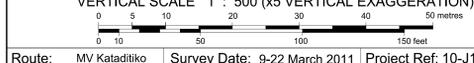
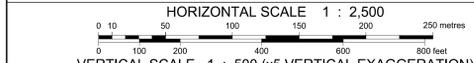
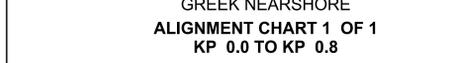
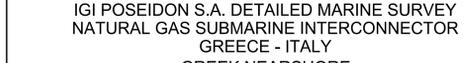
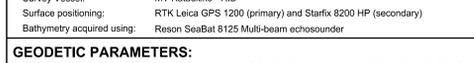
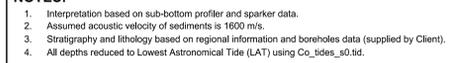
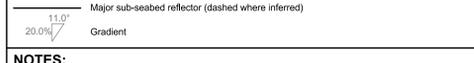
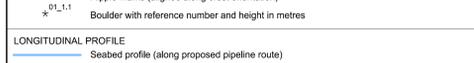
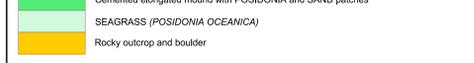
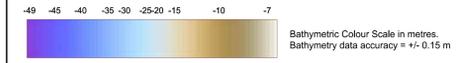


**LEGEND:**

Name	Easting (m)	Northing (m)	Latitude (N)	Longitude (E)
OM3	439206.89	4352623.52	39°19'15.18"	20°17'41.07"

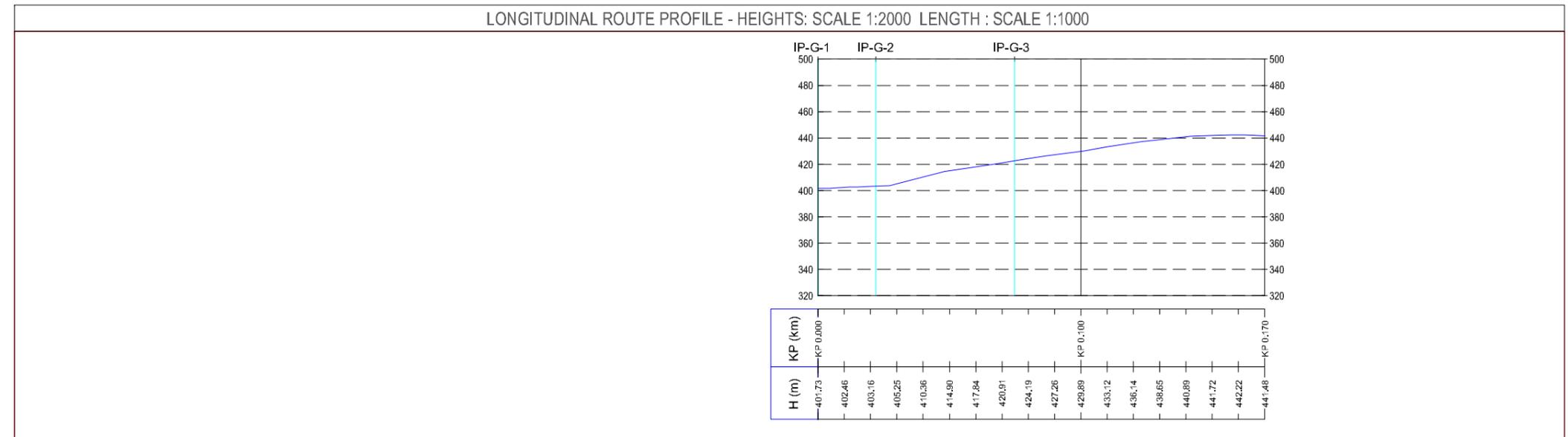
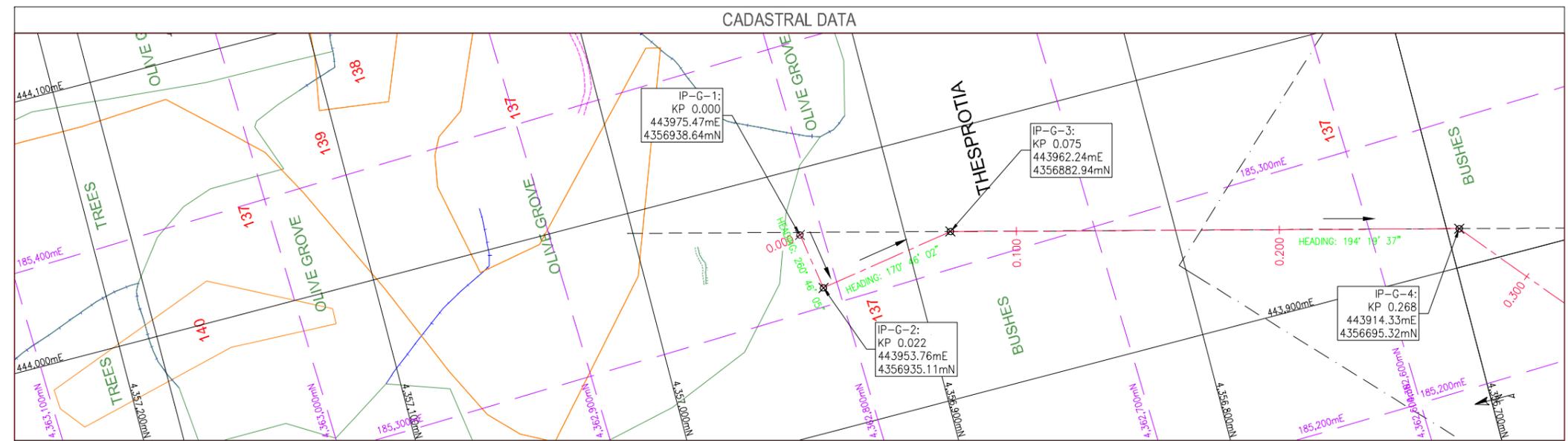
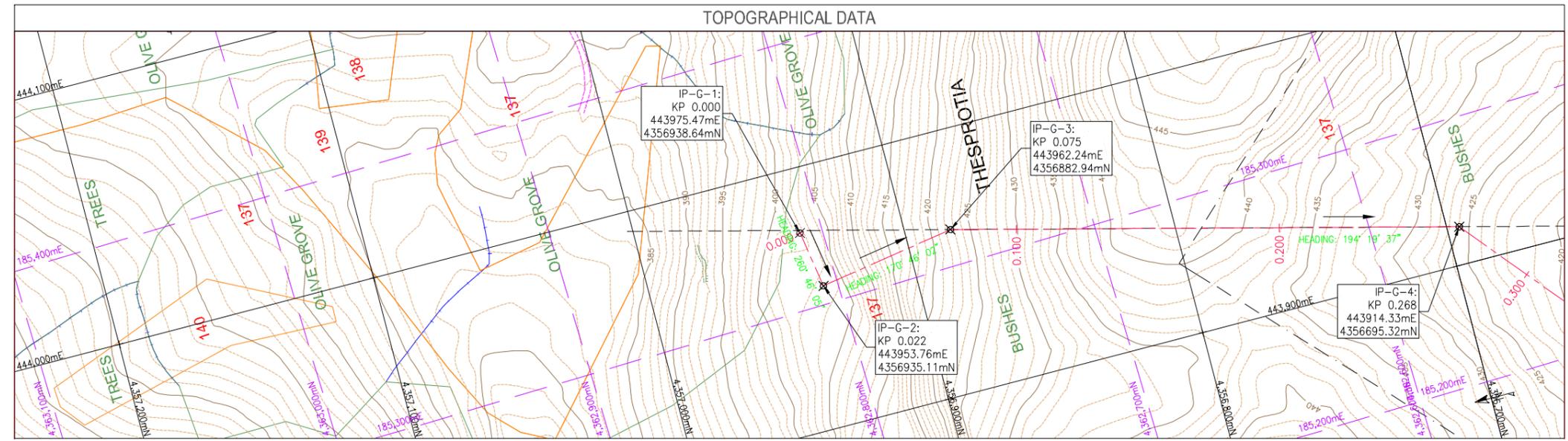
  

Borehole	Easting (m)	Northing (m)	Latitude (N)	Longitude (E)	Penetration depth (mbs)
G-BH-NSG-01	439131.72	4352607.36	39°19'14.64"	20°17'37.93"	10.00
G-BH-NSG-02	439030.98	4352587.38	39°19'13.97"	20°17'33.73"	10.50
G-BH-NSG-03	438905.14	4352560.76	39°19'13.07"	20°17'28.49"	12.30
G-BH-NSG-04	438888.93	4352439.55	39°19'09.13"	20°17'27.85"	2.00
G-BH-NSG-04A	438920.54	4352453.61	39°19'09.60"	20°17'29.17"	10.40



# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## ANNEX B: PLOT PLANS



### NOTES

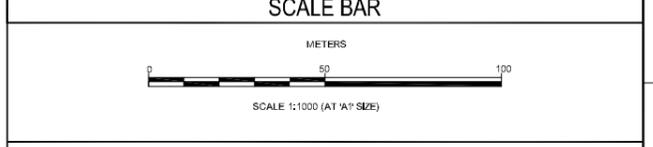
- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT - GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
- GEODETIC DATUM: WGS 84 - UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northng (m)	Easting (m)	Northng (m)	
IP-G-1	443,975.47	4,356,938.64	185,328.79	4,362,808.34	401.8
IP-G-2	443,953.76	4,356,935.12	185,306.95	4,362,805.54	403.2
IP-G-3	443,962.25	4,356,882.94	185,313.70	4,362,753.05	422.5
IP-G-4	443,914.33	4,356,695.32	185,259.51	4,362,566.90	426

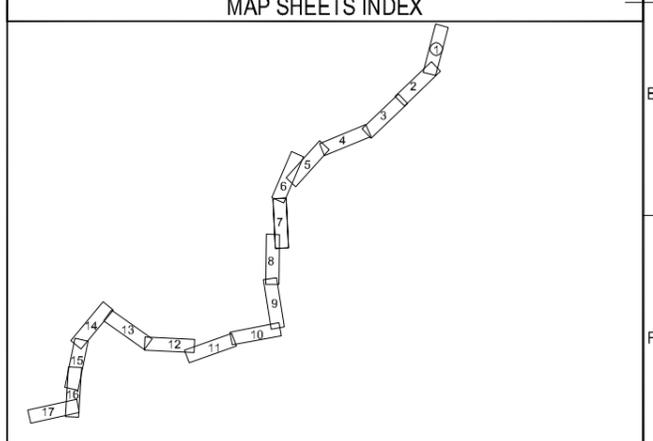
### LEGEND

Contour major	Fold	Prefecture Border
Contour minor	Dry (stone) wall	Power Line
Building	Hedge	Power Point
Ruined Building	Slope upper level	
Asphalt road	Slope lower level	
Dirt road	Pipeline route	
Path	Corridor Limit	Survey Center Line
Coast	Other Structures	Chart Out Line



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600



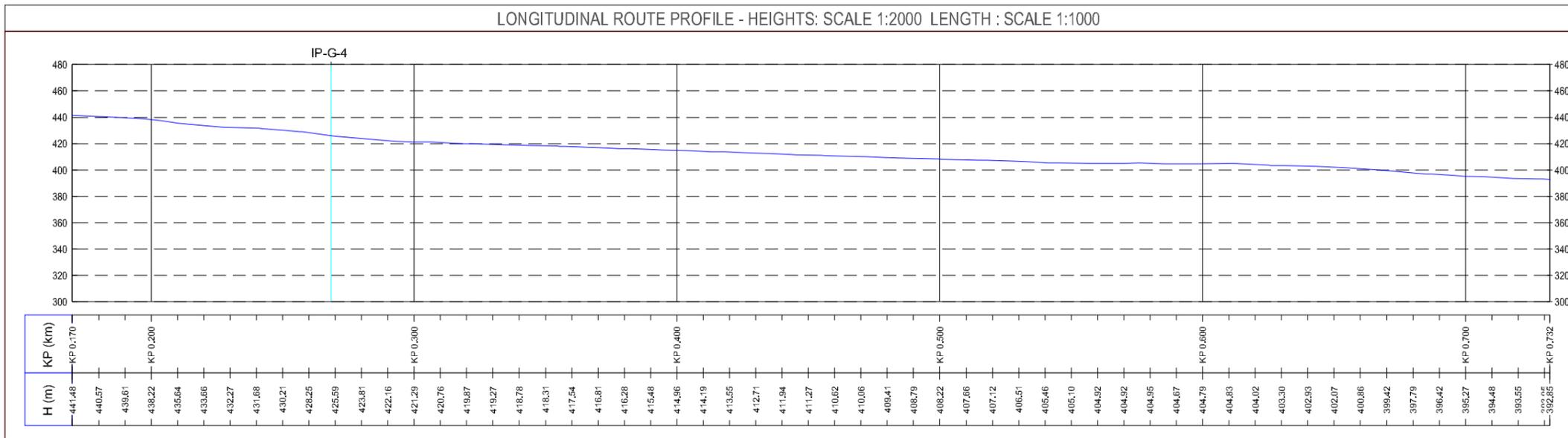
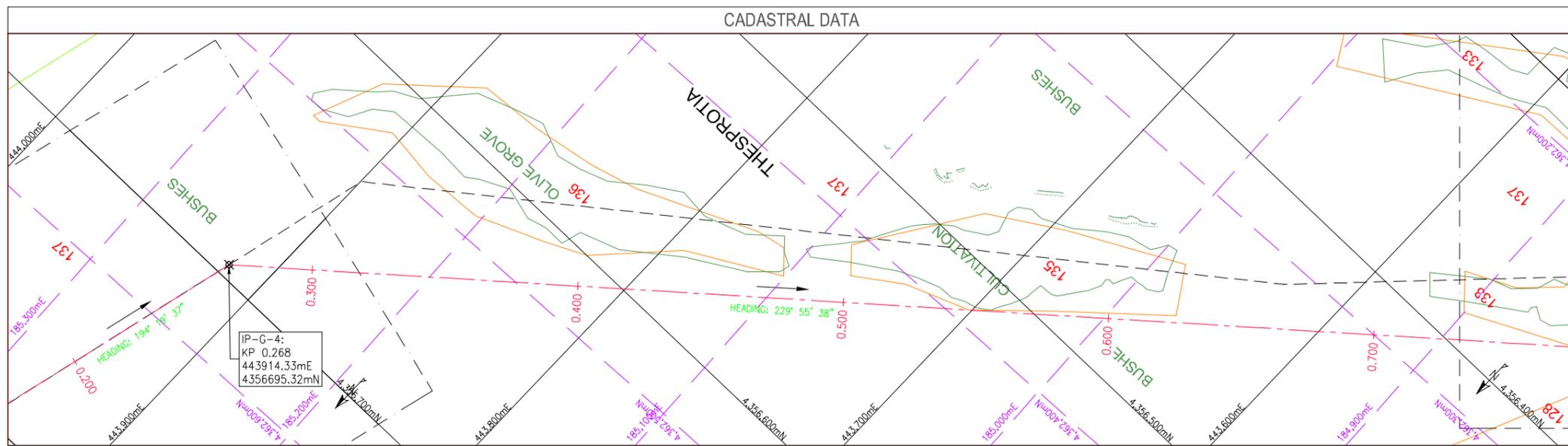
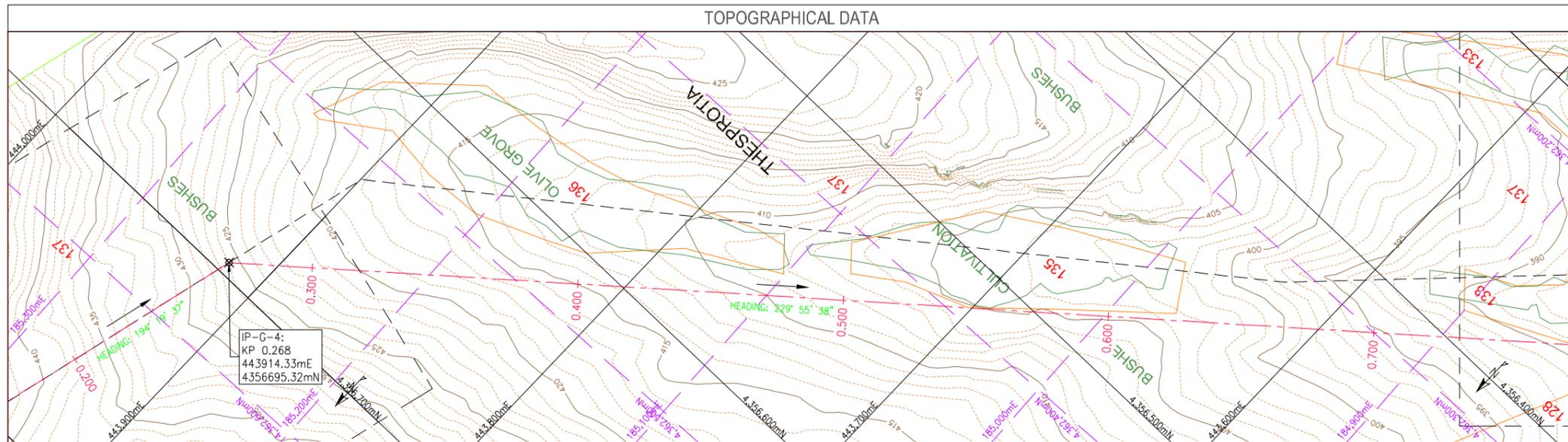
REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT	
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1	21/10/11	ISSUED FOR CLIENT APPROVAL			GEOM	SM/JB	MVD	JWT
0	27/07/11	ISSUED FOR CLIENT REVIEW			GEOM	SM/JB	MVD	JWT

	PROJECT:	Interconnector Greece - Italy	
	CLIENT:	IGI Poseidon S.A.	
	Project No.:	31049101 / OGPAD80197	
	WBS Code:	10.10.20 (FEED Deliverables)	
	EDISON Doc. No.:		
	DEPA Doc. No.:		

### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY:	DATE:	CHECKED BY:	DATE:	APPROVED BY:	DATE:	SHEET:
GEOM	08-07-2011	FAK/JB	14-12-2011	JWT	14-12-2011	1 OF 17

SCALE AT A1 SIZE	PROJECT	CTR	AREA	DISCIPLINE	TYPE	NUMBER	REVISION
1:1,000	IGI	402	20	PL	DWG	003	2



### NOTES

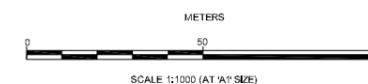
- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT – GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
- GEODETIC DATUM: WGS 84 – UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
IP-G-4	443,914.33	4,356,695.32	185,259.51	4,362,566.90	426

### LEGEND

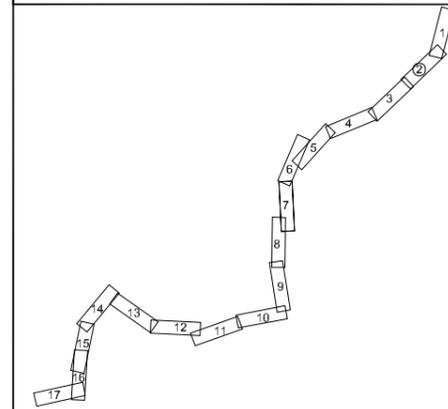

### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX

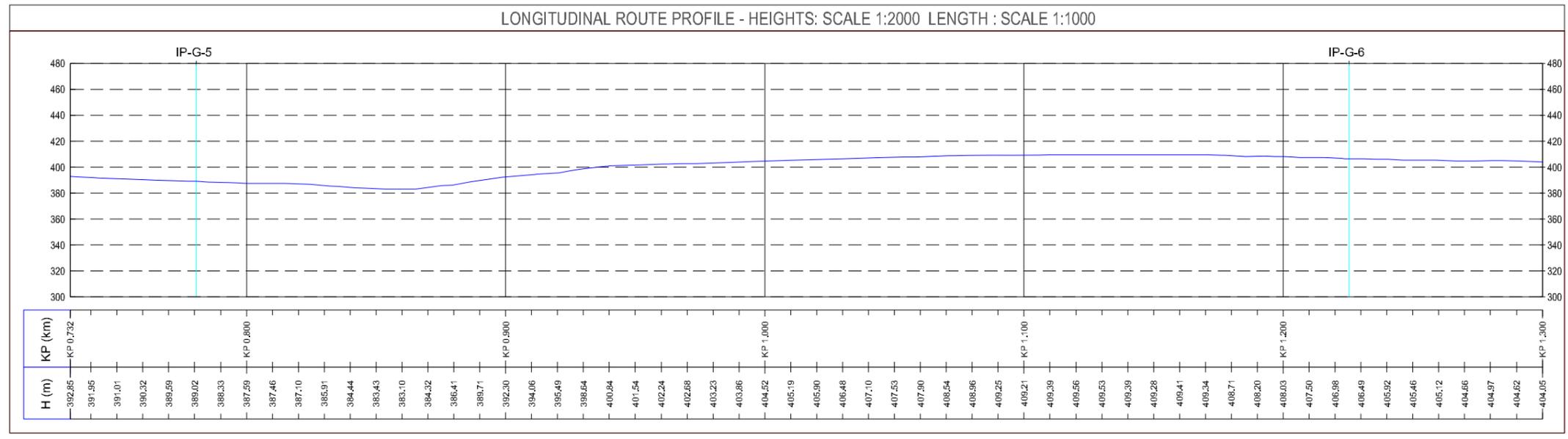
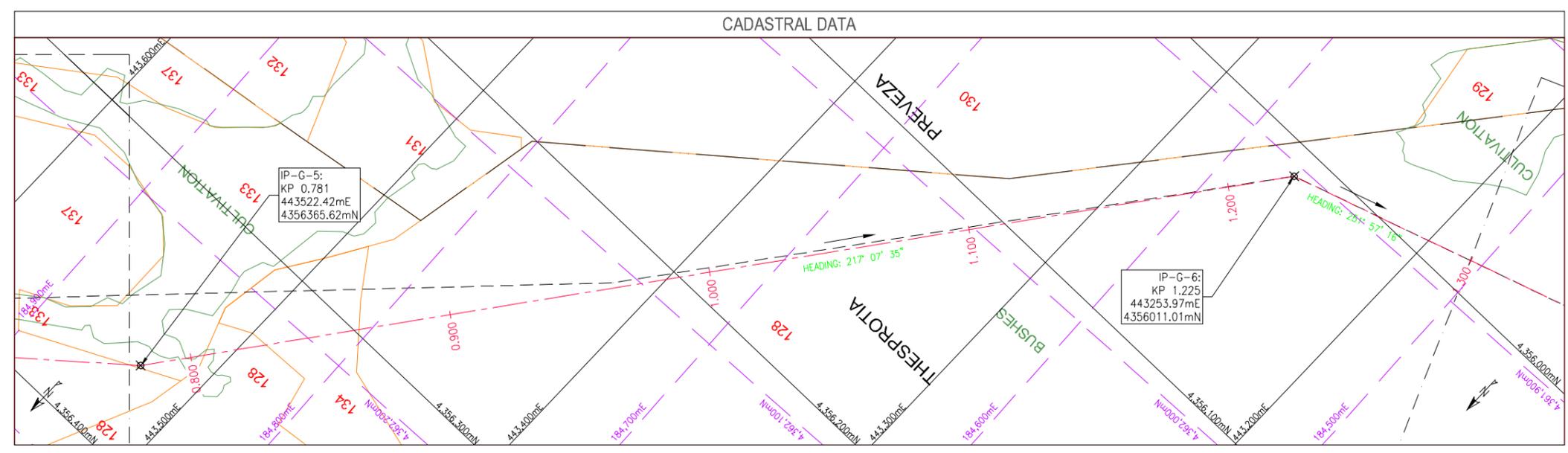
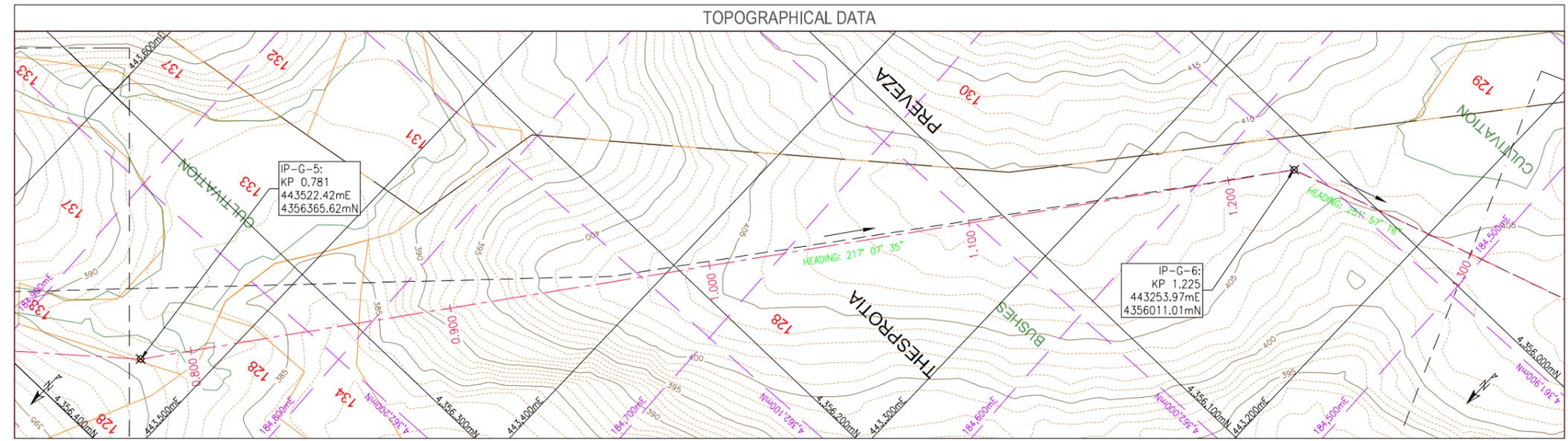


REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
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1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JB	MVD	JWT	

 CLIENT: IGI Poseidon S.A.	PROJECT: Interconnector Greece - Italy	
	Project No.: 31049101 / OGPAD80197 WBS Code: 10.10.20 (FEED Deliverables) EDISON Doc. No.: DEPA Doc. No.:	

### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/JB	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 2 OF 17
SCALE AT 'A' SIZE: 1:1000	PROJECT: IGI	CTR: 402	AREA: 20	DISCIPLINE: PL	TYPE: DWG	NUMBER: 003
						REVISION: 2



### NOTES

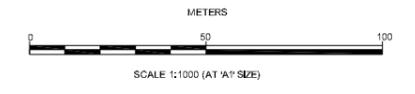
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- GEODETIC DATUM: WGS 84 – UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
IP-G-5	443,522.42	4,356,365.62	184,856.38	4,362,250.03	389
IP-G-6	443,253.97	4,356,011.01	184,575.97	4,361,904.13	407.7

### LEGEND

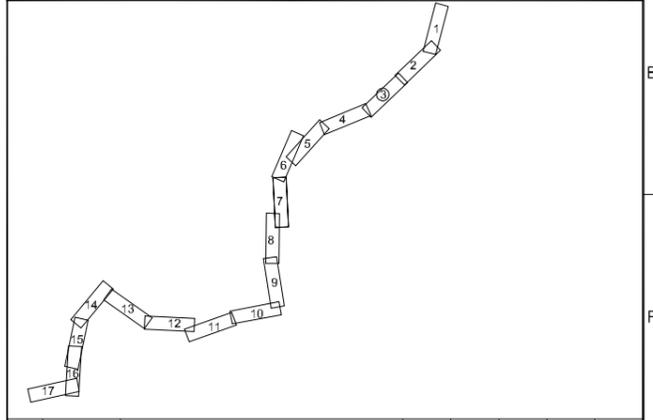

### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
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False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX



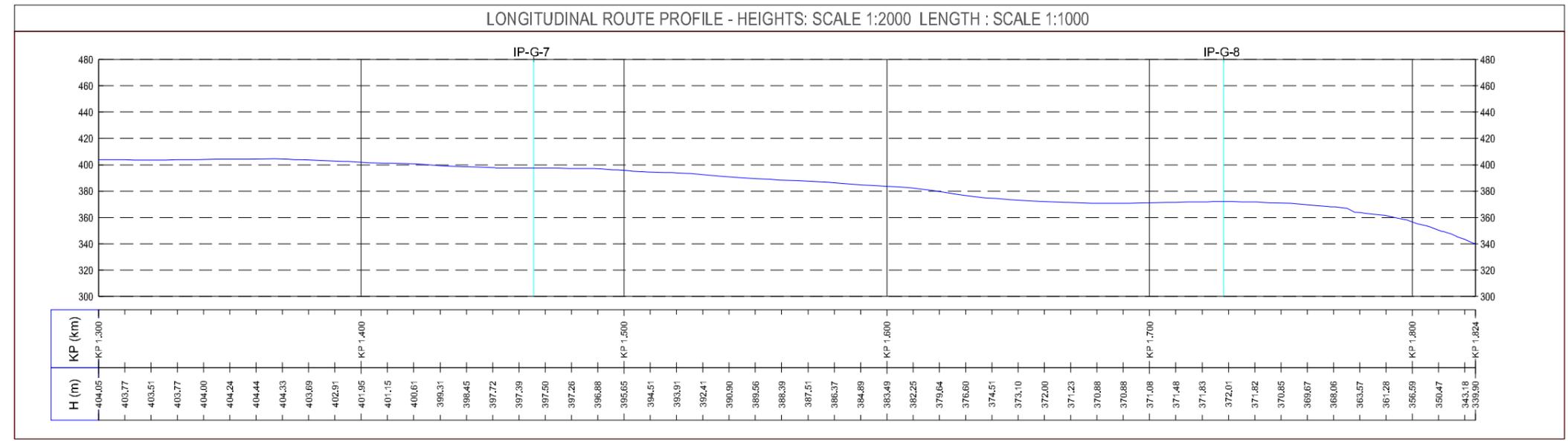
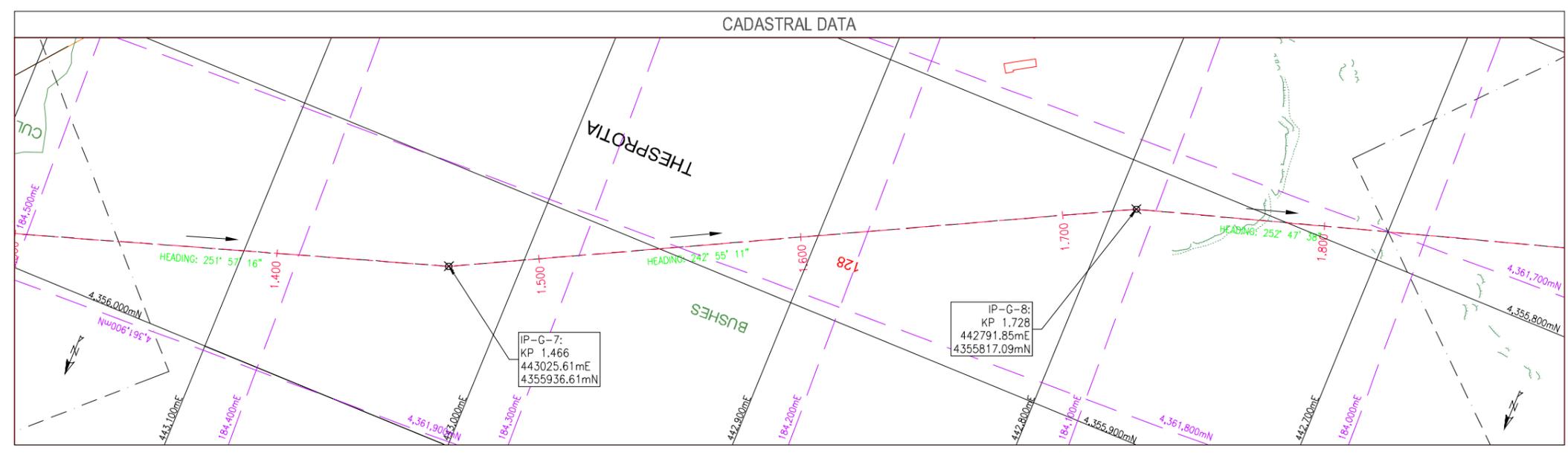
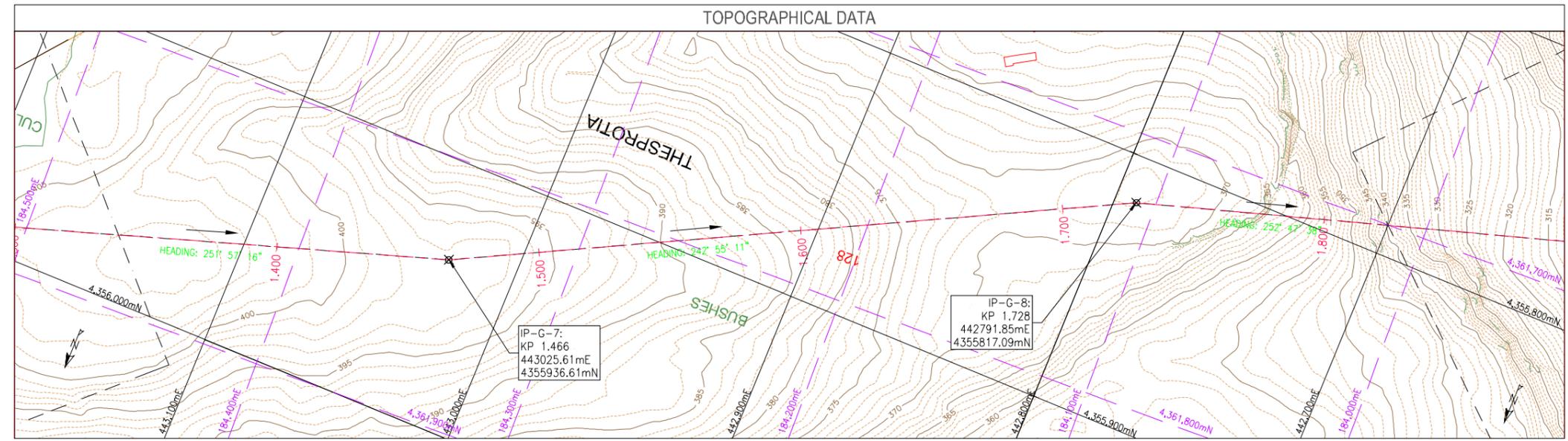
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1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/IB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/IB	MVD	JWT	

 CLIENT: IGI Poseidon S.A.	PROJECT: Interconnector Greece - Italy Project No.: 31049101 / OGPAD80197 WBS Code: 10.10.20 (FEED Deliverables) EDISON Doc. No.: DEPA Doc. No.:	 
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### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/IB	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 3 OF 17
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SCALE AT A1 SIZE: 1:1000	PROJECT: IGI	CTR: 402	AREA: 20	DISCIPLINE: PL	TYPE: DWG	NUMBER: 003	REVISION: 2
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### NOTES

- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT - GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
- GEODETIC DATUM: WGS 84 - UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

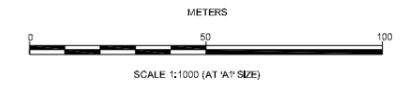
### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
IP-G-7	443,025.61	4,355,936.61	184,344.99	4,361,837.27	397.5
IP-G-8	442,791.85	4,355,817.09	184,107.10	4,361,725.45	372.1

### LEGEND

Contour major	Fold	Prefecture Border
Contour minor	Dry (stone) wall	Power Line
Building	Hedge	Power Point
Ruined Building	Slope upper level	
Asphalt road	Slope lower level	
Dirt road	Pipeline route	
Path	Corridor Limit	
Coast	Other Structures	

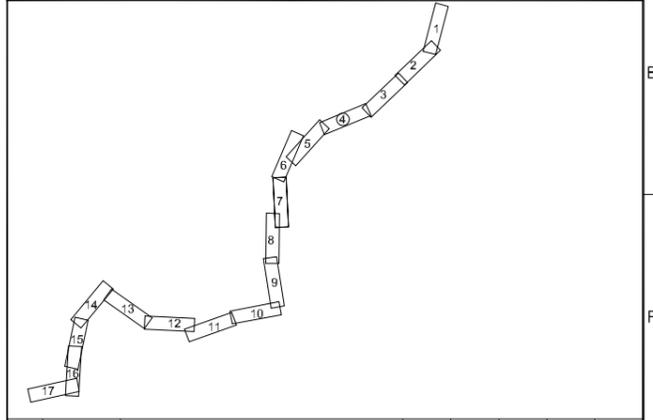
### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX



REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/JP	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JP	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JP	MVD	JWT	

**INTECSEA**  
WorleyParsons Group

PROJECT: Interconnector Greece - Italy

CLIENT: IGI Poseidon S.A.

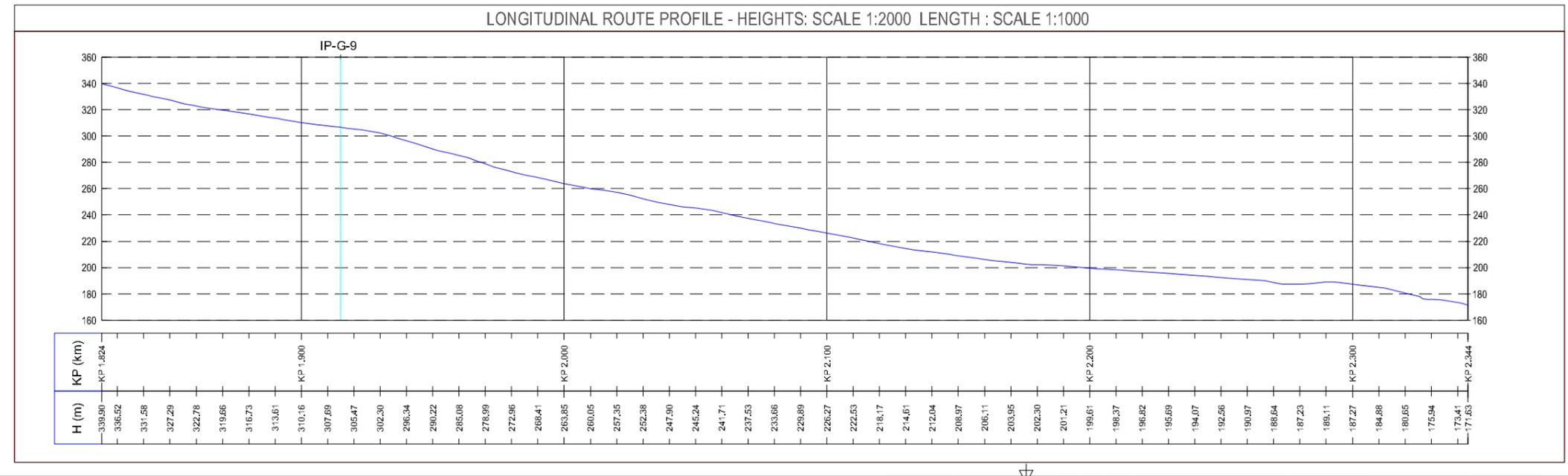
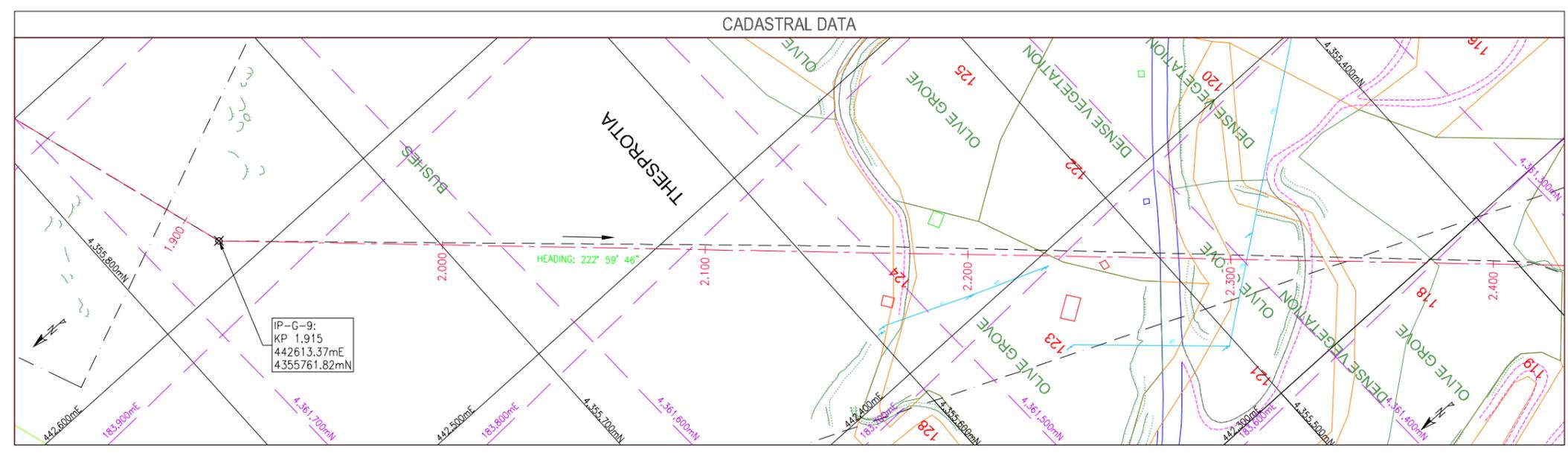
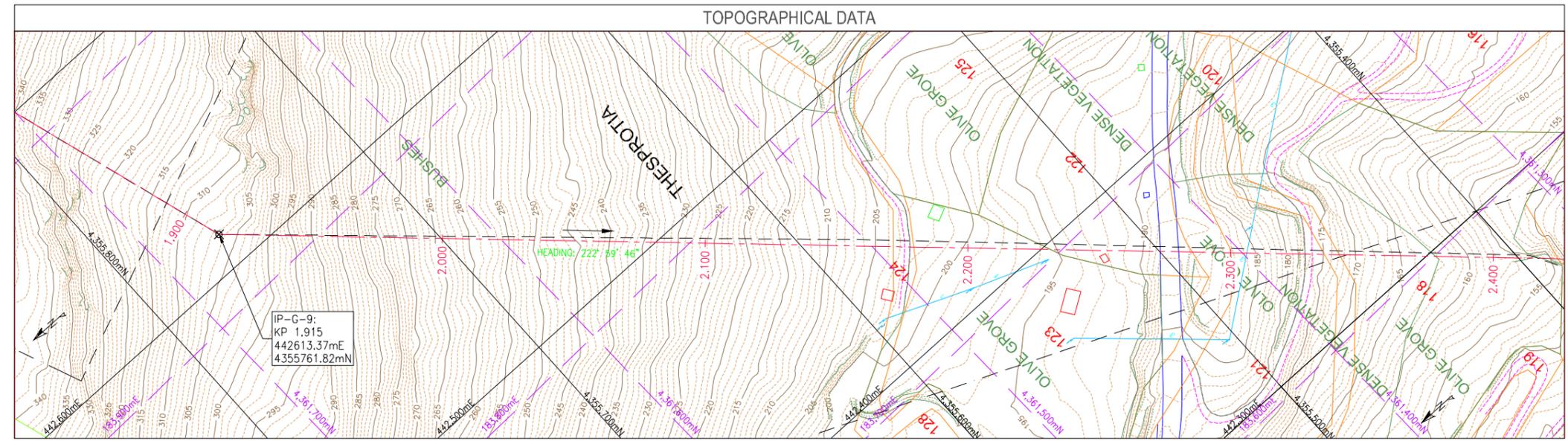
Project No.: 31049101 / OGPAD80197  
WBS Code: 10.10.20 (FEED Deliverables)  
EDISON Doc. No.:  
DEPA Doc. No.:

IGI Poseidon

### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/JP	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 4 OF 17
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SCALE AT 'A' SIZE: 1:1000	PROJECT: IGI	CTR: 402	AREA: 20	DISCIPLINE: PL	TYP: DWG	NUMBER: 003	REVISION: 2
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### NOTES

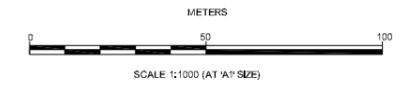
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- GEODETIC DATUM: WGS 84 – UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
IP-G-9	442,613.37	4,355,761.82	183,926.67	4,361,676.08	306.6

### LEGEND

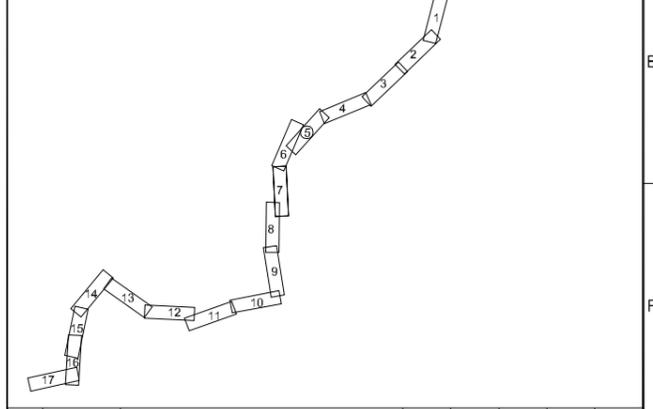

### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
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False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX

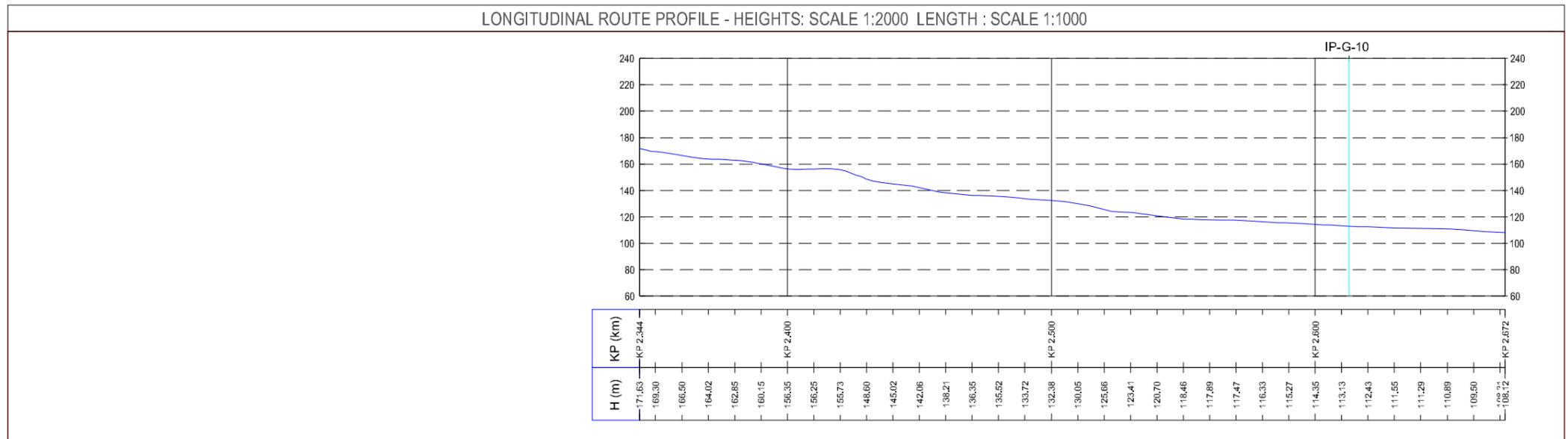
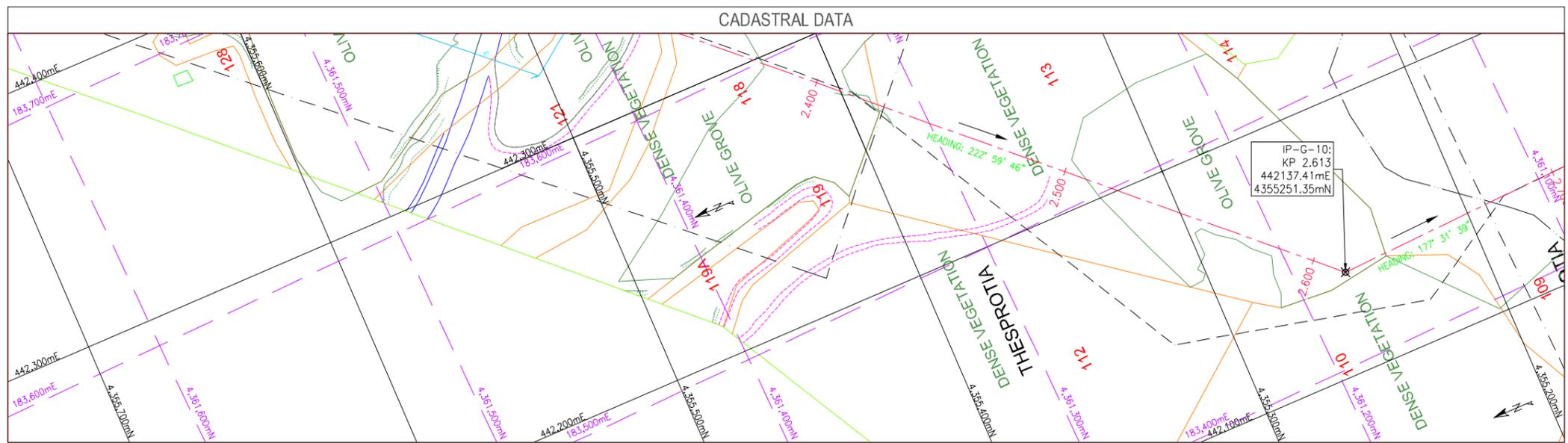
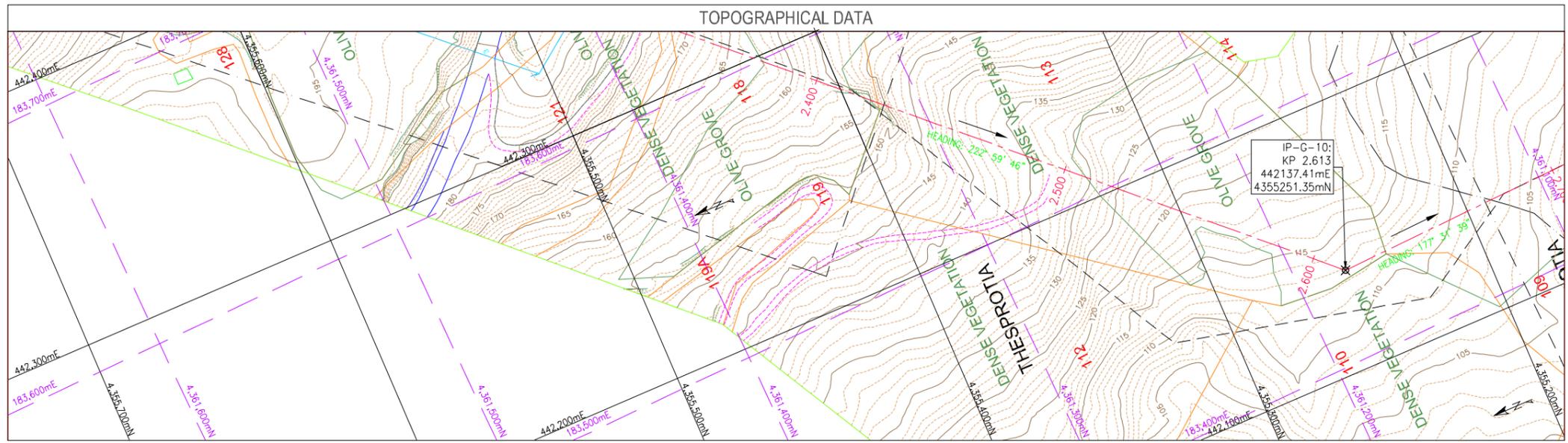


REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/JP	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JP	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JP	MVD	JWT	

 CLIENT: IGI Poseidon S.A.	PROJECT: Interconnector Greece - Italy Project No.: 31049101 / OGPAD80197 WBS Code: 10.10.20 (FEED Deliverables) EDISON Doc. No.: DEPA Doc. No.:	 
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### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/JP	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 5 OF 17
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						REVISION: 2



### NOTES

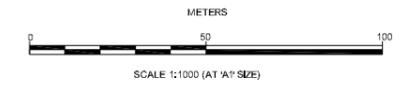
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- GEODETIC DATUM: WGS 84 - UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
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### LEGEND

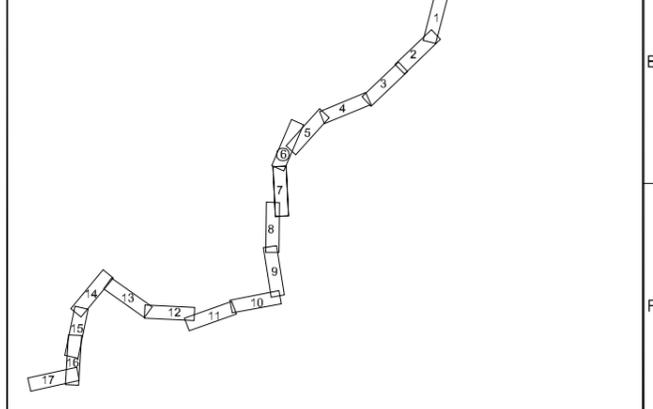

### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX



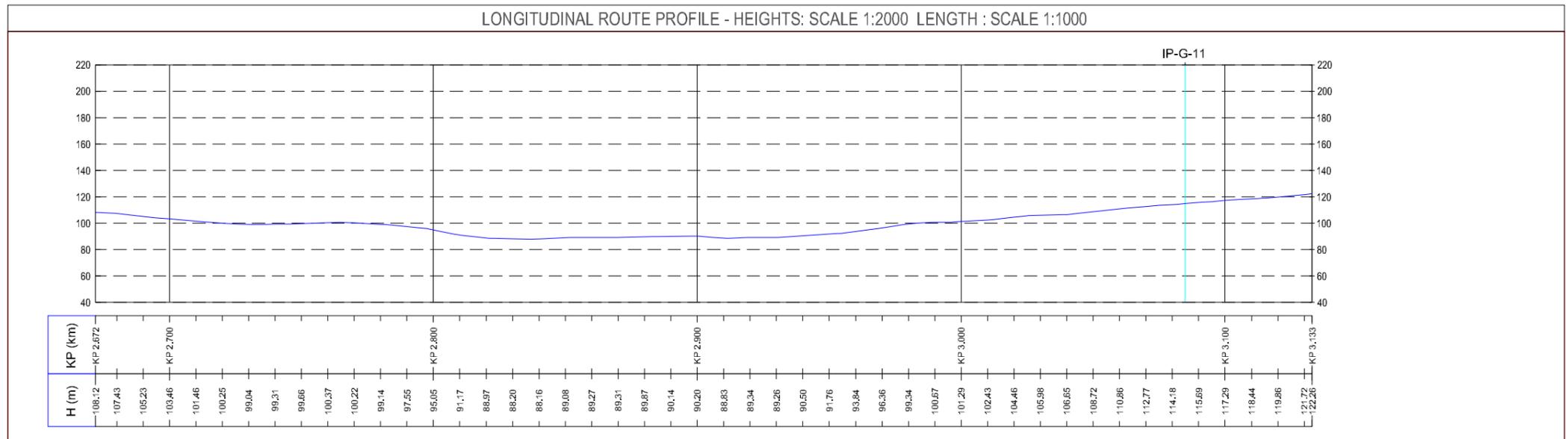
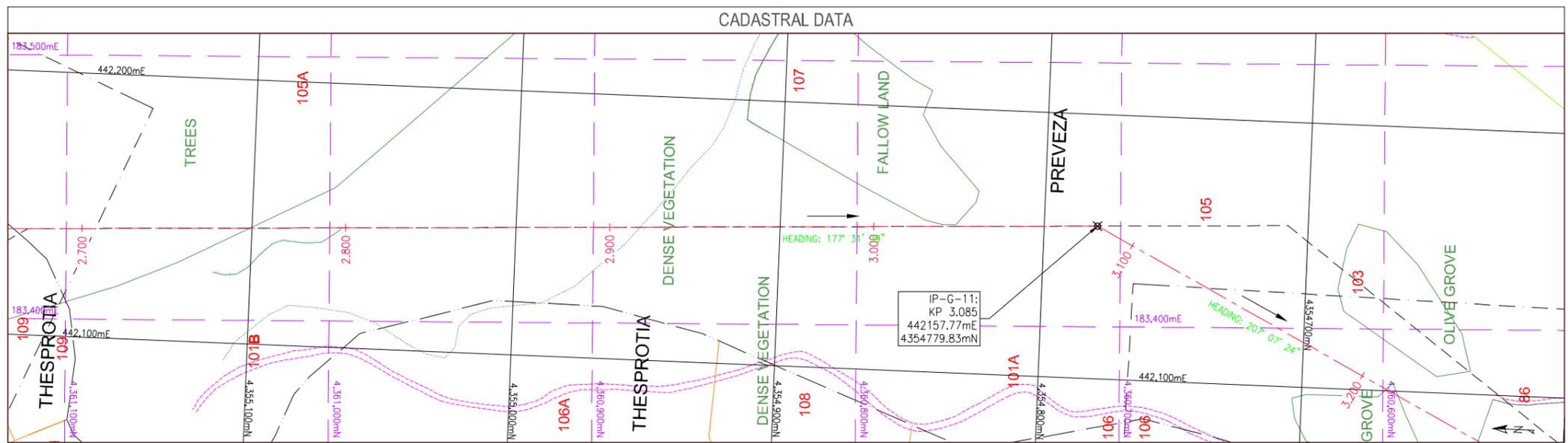
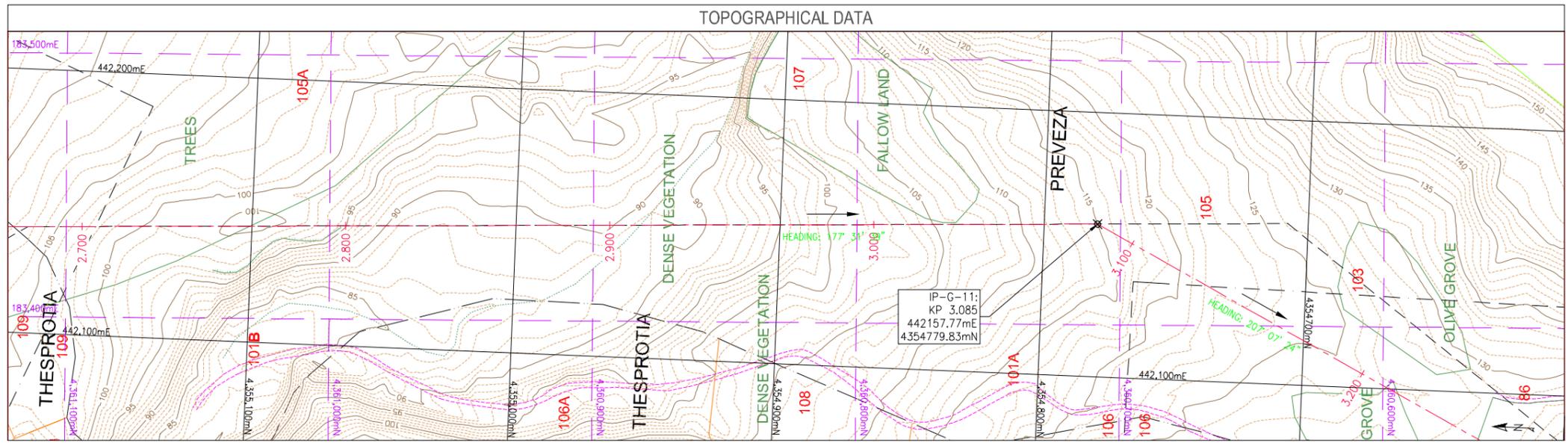
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1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/UB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/UB	MVD	JWT	

	PROJECT:	Interconnector Greece - Italy	
	CLIENT:	IGI Poseidon S.A.	
	Project No.:	31049101 / OGPAD80197	
	WBS Code:	10.10.20 (FEED Deliverables)	
	EDISON Doc. No.:		
	DEPA Doc. No.:		

## ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY:	DATE:	CHECKED BY:	DATE:	APPROVED BY:	DATE:	SHEET:	6 OF 17
GEOM	27-07-2011	FAK/UB	14-12-2011	JWT	14-12-2011		

SCALE AT A1 SIZE	PROJECT	CTR	AREA	DISCIPLINE	TYP	NUMBER	REVISION
1:1000	IGI	402	20	PL	DWG	003	2



### NOTES

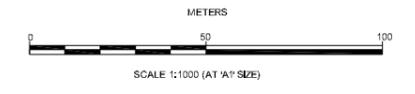
- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT – GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
- GEODETIC DATUM: WGS 84 – UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
IP-G-11	442,157.78	4,354,779.83	183,438.12	4,360,708.61	115

### LEGEND

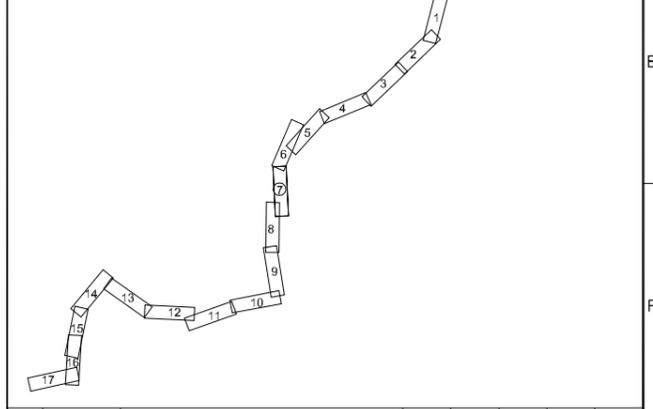

### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX



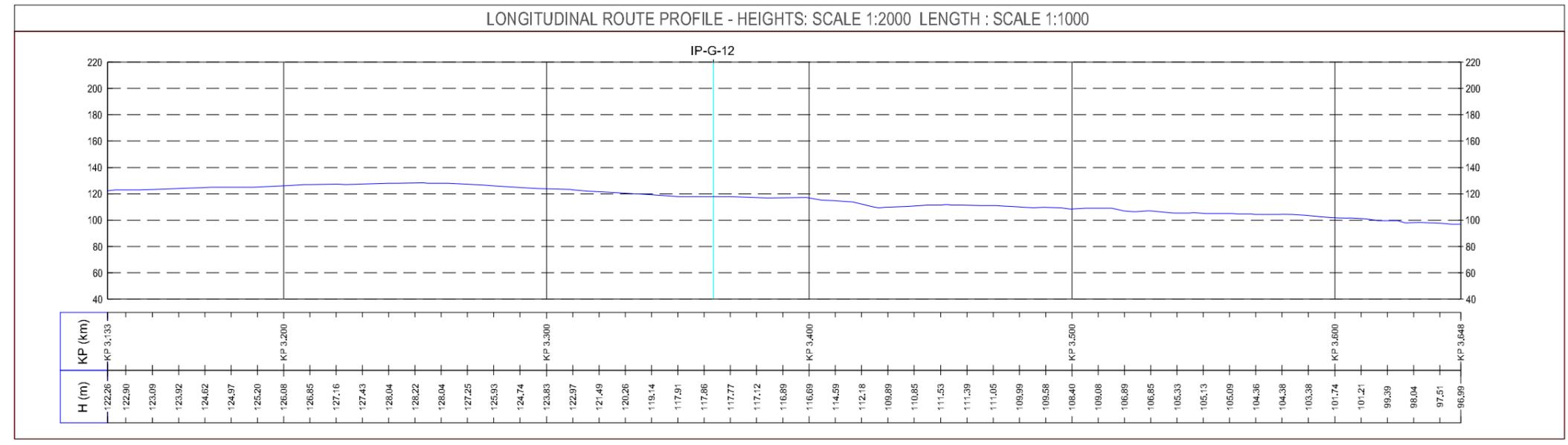
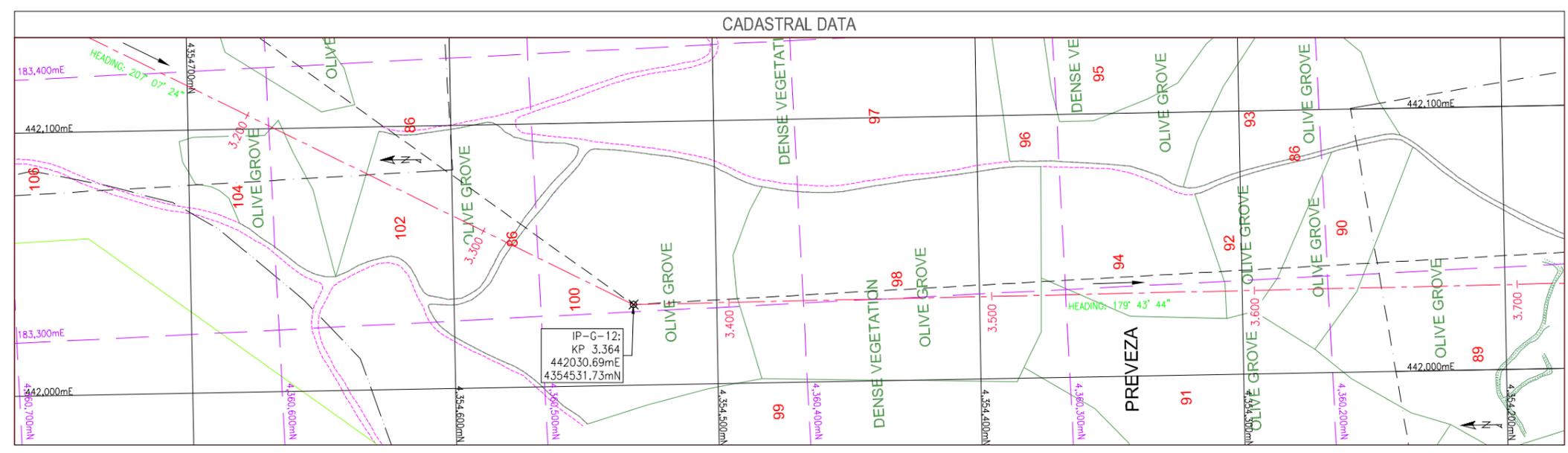
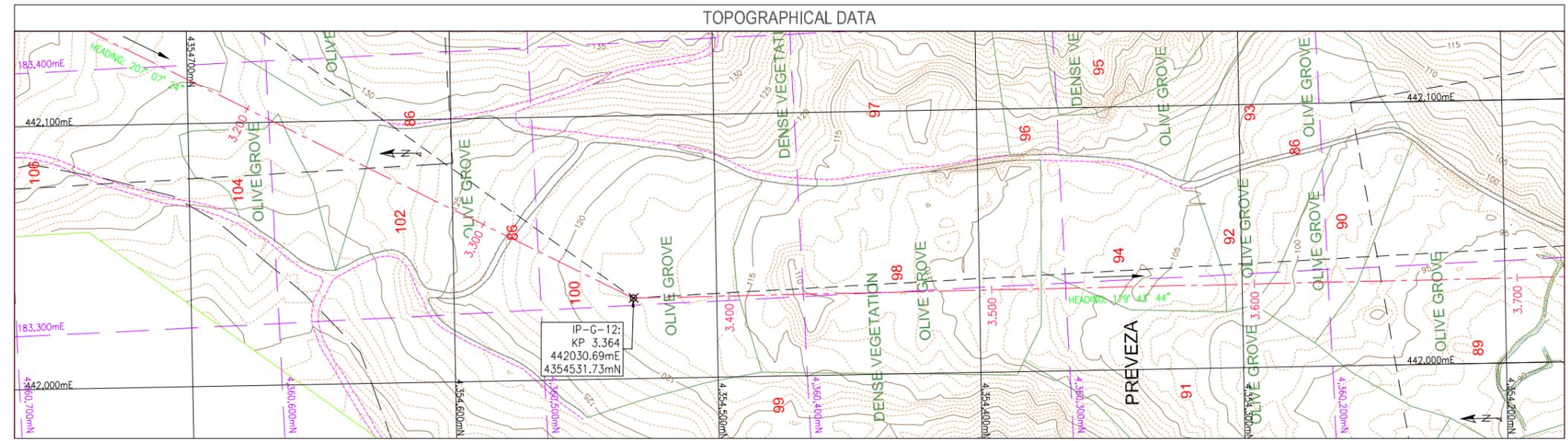
REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/IB	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/IB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/IB	MVD	JWT	

 <b>IGI Poseidon S.A.</b>	PROJECT: Interconnector Greece - Italy	
	Project No.: 31049101 / OGPAD80197 WBS Code: 10.10.20 (FEED Deliverables) EDISON Doc. No.: DEPA Doc. No.:	

## ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/IB	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 7 OF 17
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SCALE AT A1 SIZE 1:1000	PROJECT IGI	CTR 402	AREA 20	DISCIPLINE PL	TYPE DWG	NUMBER 003	REVISION 2
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### NOTES

- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT – GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
- GEODETIC DATUM: WGS 84 – UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

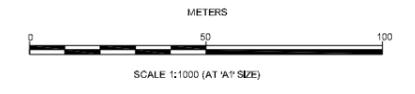
### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Eastng (m)	Northng (m)	Eastng (m)	Northng (m)	
IP-G-12	442,030.69	4,354,531.73	183,302.70	4,360,464.58	117.9

### LEGEND

- Contour major
- Contour minor
- Fold
- Dry (stone) wall
- Prefecture Border
- Building
- Hedge
- Power Line
- Ruined Building
- Slope upper level
- Power Point
- Asphalt road
- Slope lower level
- Dirt road
- Pipeline route
- Survey Center Line
- Path
- Corridor Limit
- Chart Out Line
- Coast
- Other Structures

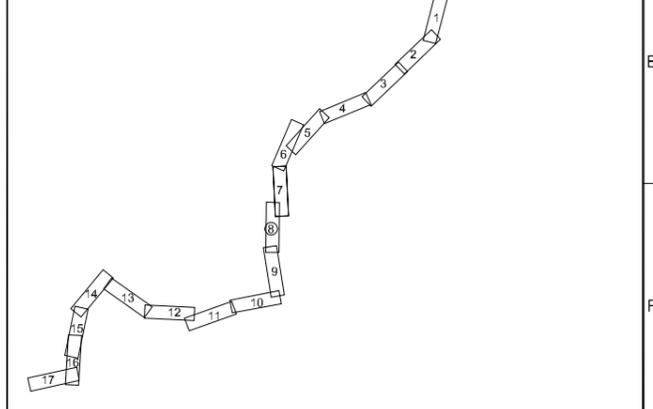
### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX



REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/JP	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JP	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JP	MVD	JWT	

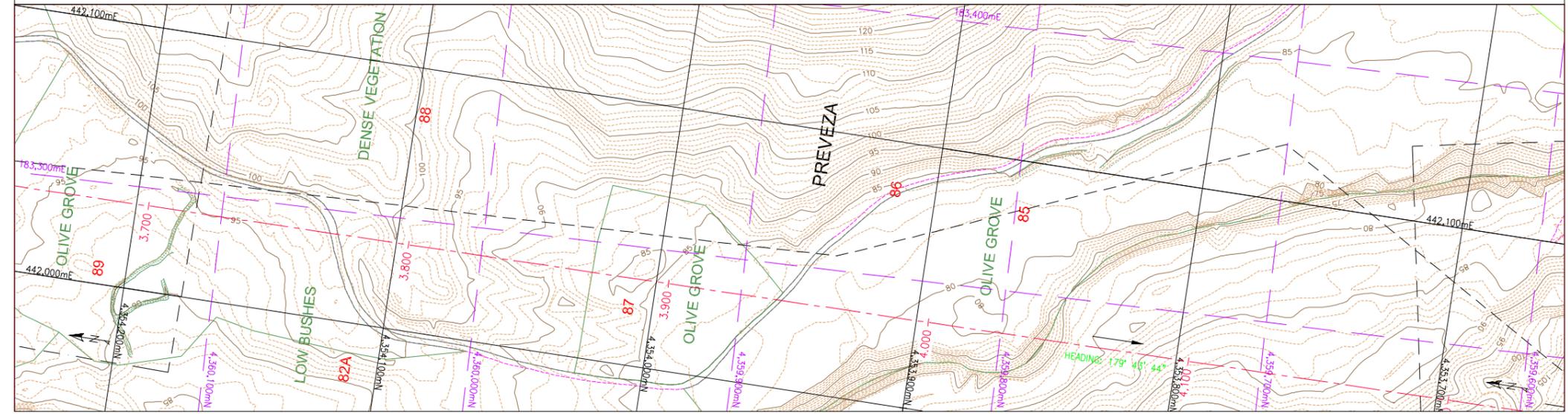
 CLIENT: IGI Poseidon S.A.	PROJECT:	Interconnector Greece - Italy	
	Project No.:	31049101 / OGPAD80197	
	WBS Code:	10.10.20 (FEED Deliverables)	
	EDISON Doc. No.:		

## ONSHORE GREECE SURVEY ALIGNMENT CHART

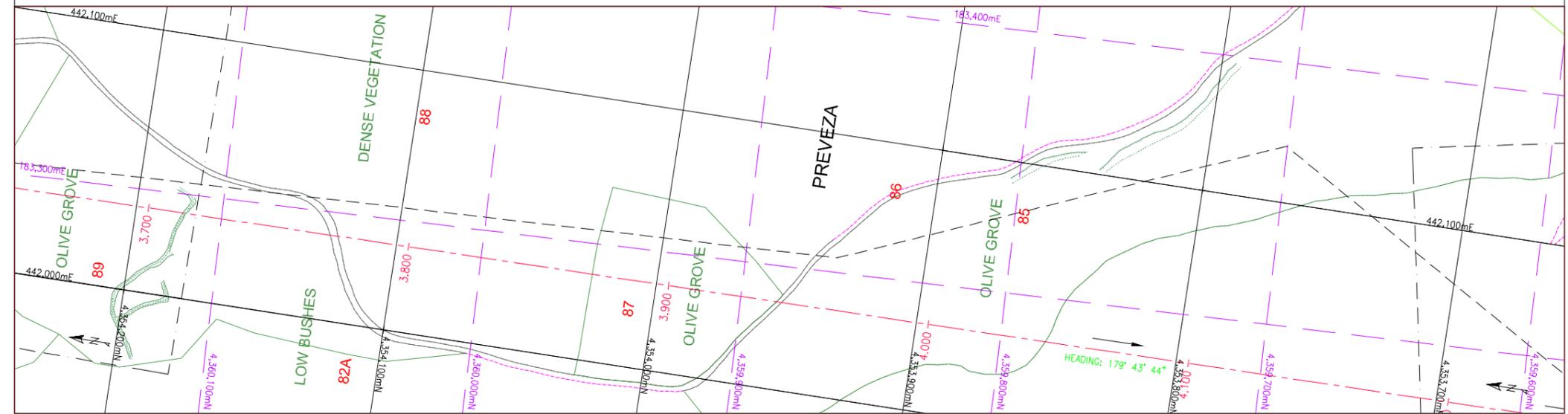
DRAWN BY:	DATE:	CHECKED BY:	DATE:	APPROVED BY:	DATE:	SHEET:	8 OF 17
GEOM	08-07-2011	FAK/JP	14-12-2011	JWT	14-12-2011		

SCALE AT A1 SIZE	PROJECT	CTR	AREA	DISCIPLINE	TYP	NUMBER	REVISION
1:1000	IGI	402	20	PL	DWG	003	2

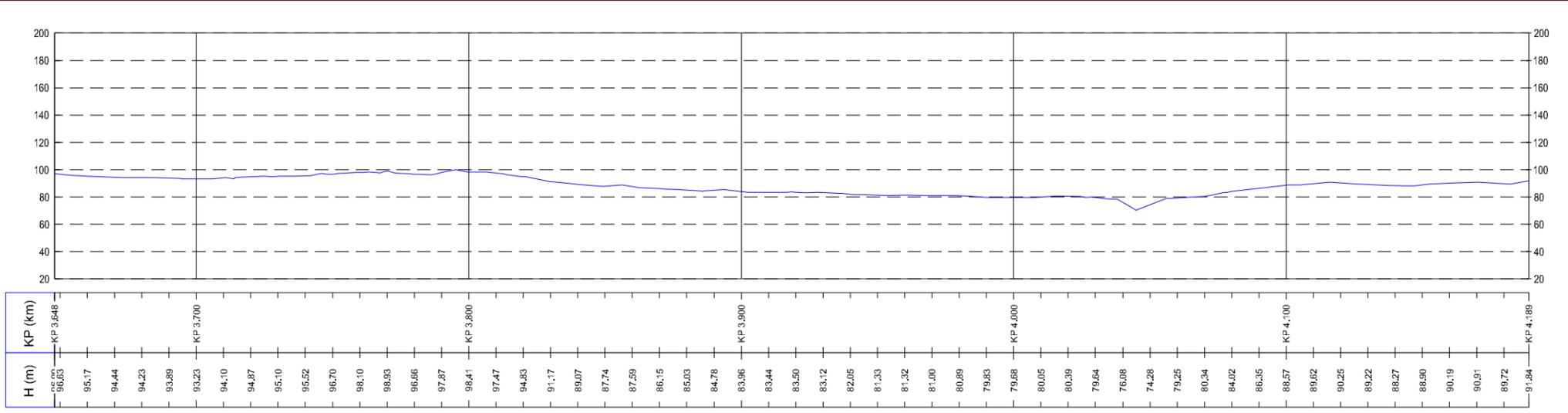
TOPOGRAPHICAL DATA



CADASTRAL DATA



LONGITUDINAL ROUTE PROFILE - HEIGHTS: SCALE 1:2000 LENGTH : SCALE 1:1000



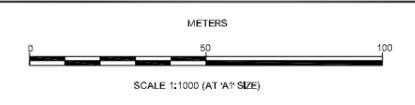
NOTES

- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT - GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
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LEGEND

Contour major	Fold	Prefecture Border
Contour minor	Dry (stone) wall	Power Line
Building	Hedge	Power Point
Ruined Building	Slope upper level	
Asphalt road	Slope lower level	
Dirt road	Pipeline route	
Path	Corridor Limit	Survey Center Line
Coast	Other Structures	Chart Out Line

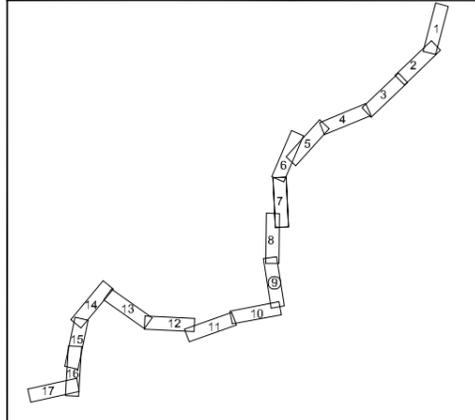
SCALE BAR



GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

MAP SHEETS INDEX



REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/JB	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JB	MVD	JWT	

**INTECSEA**  
WorleyParsons Group

PROJECT: Interconnector Greece - Italy

CLIENT: IGI Poseidon S.A.

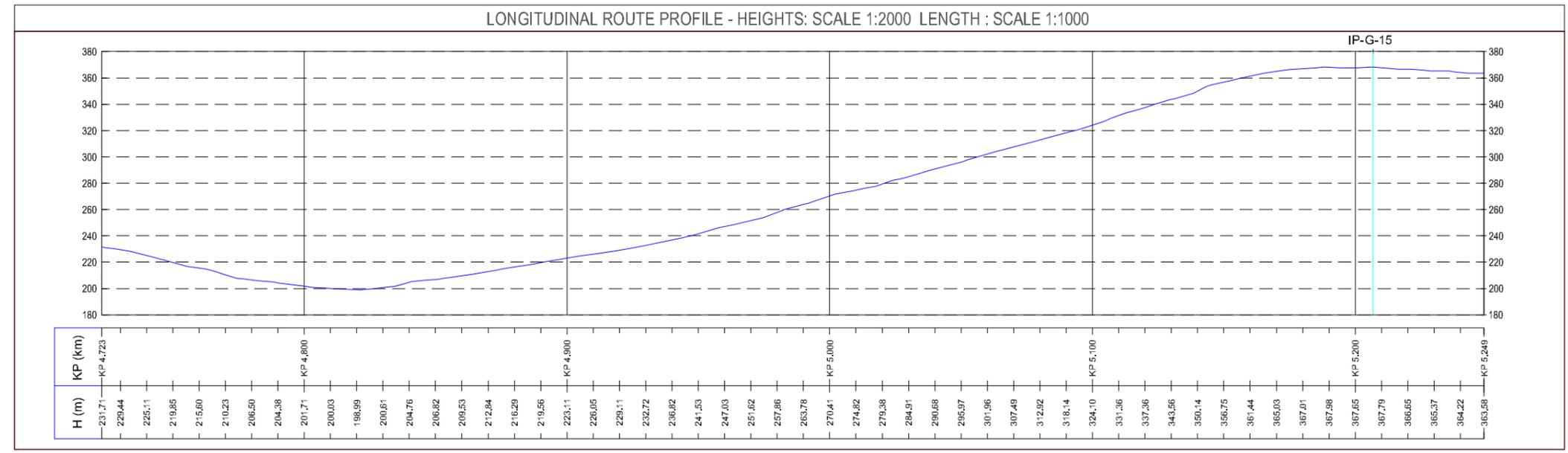
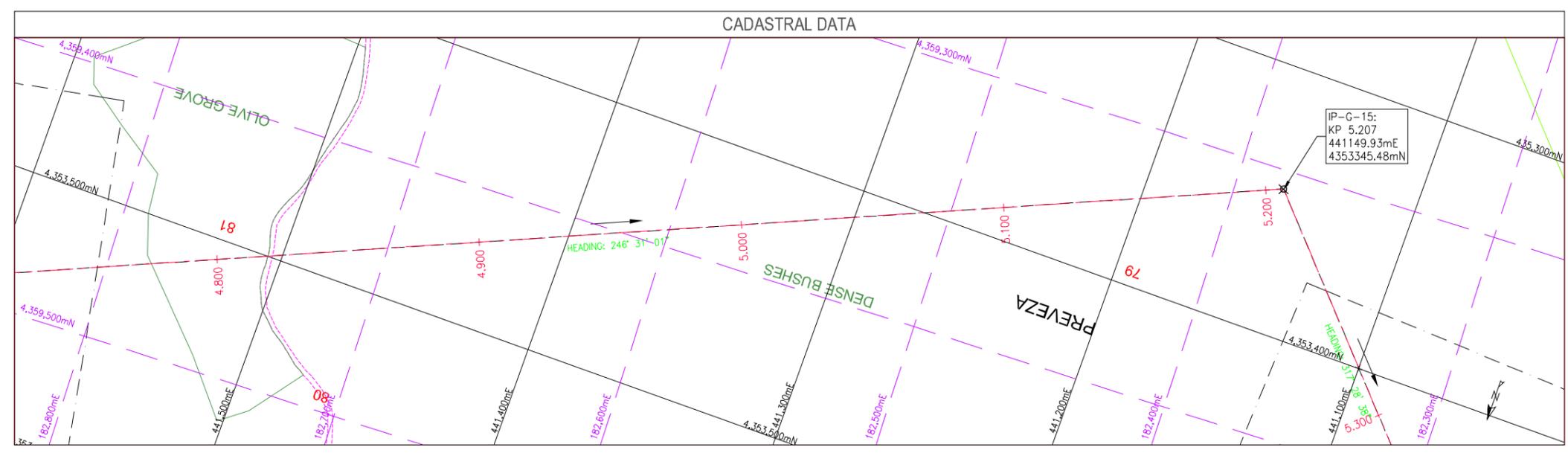
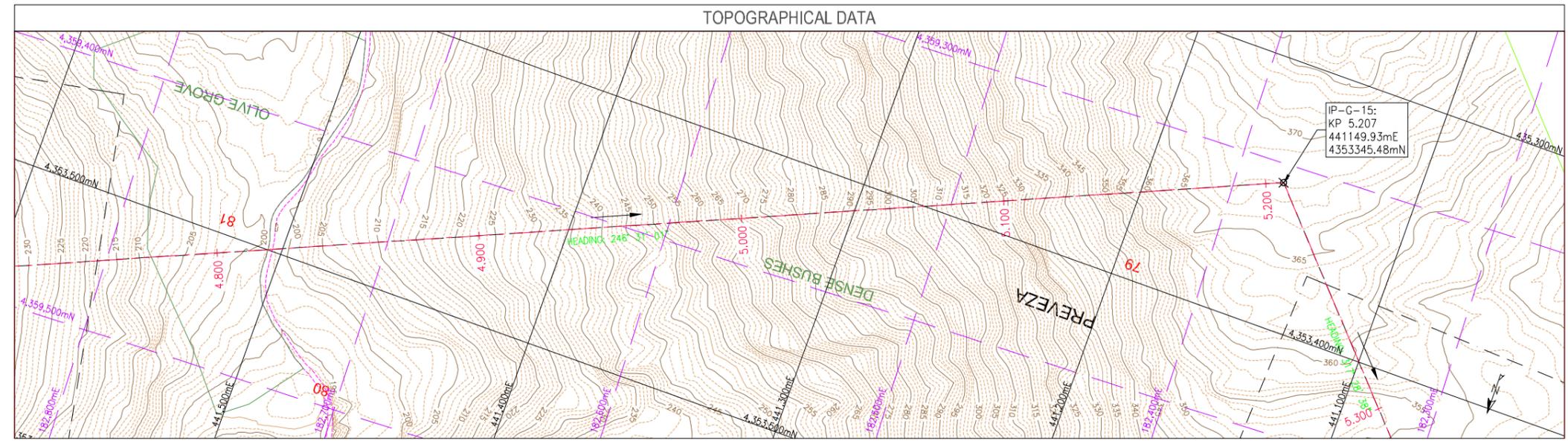
Project No.: 31049101 / OGPAD80197  
 WBS Code: 10.10.20 (FEED Deliverables)  
 EDISON Doc. No.:  
 DEPA Doc. No.:

IGI Poseidon

ONSHORE GREECE  
SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/JB	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 9 OF 17
SCALE AT 'A' SIZE: 1:1000	PROJECT: IGI	CTR: 402	AREA: 20	DISCIPLINE: PL	TYPE: DWG	NUMBER: 003
						REVISION: 2





### NOTES

- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT - GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
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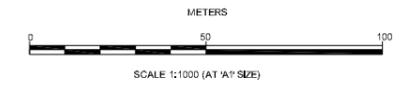
### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Eastng (m)	Northng (m)	Eastng (m)	Northng (m)	
IP-G-15	441,149.93	4,353,345.48	182,381.92	4,359,306.85	368.1

### LEGEND

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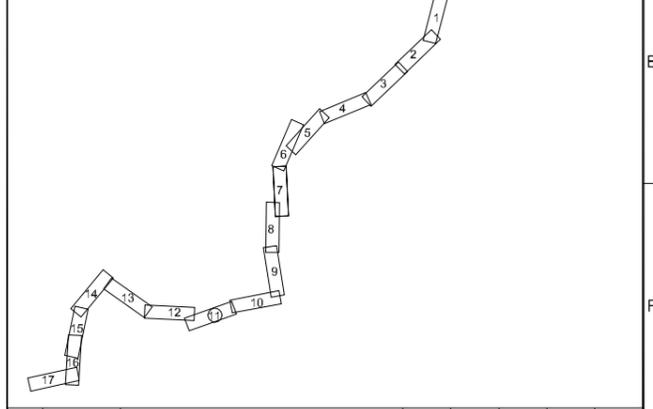
### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX

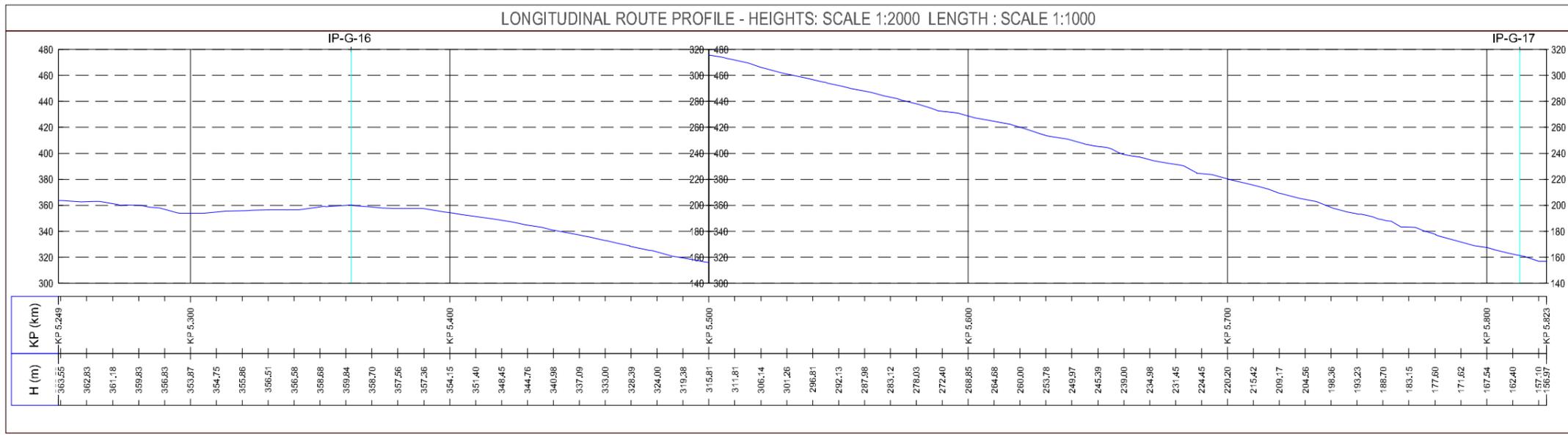
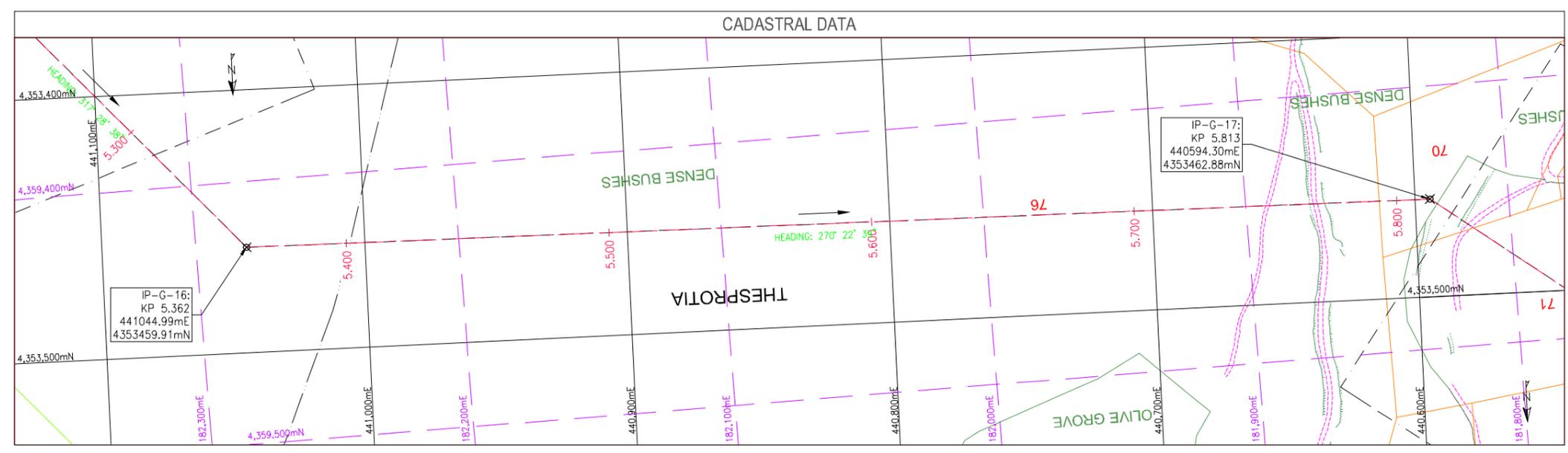
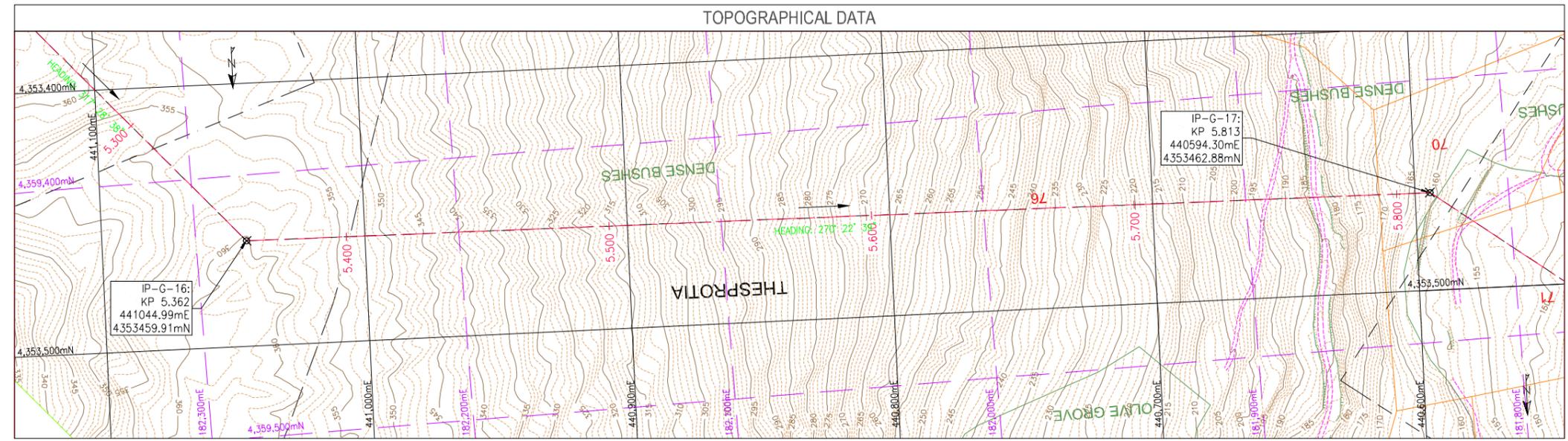


REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/UB	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/UB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/UB	MVD	JWT	

 CLIENT: IGI Poseidon S.A.	PROJECT: Interconnector Greece - Italy Project No.: 31049101 / OGPAD80197 WBS Code: 10.10.20 (FEED Deliverables) EDISON Doc. No.: DEPA Doc. No.:	 
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### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/UB	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 11 OF 17
SCALE AT 'A1' SIZE: 1:1000	PROJECT: IGI	CTR: 402	AREA: 20	DISCIPLINE: PL	TYPE: DWG	NUMBER: 003
						REVISION: 2



### NOTES

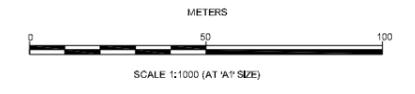
- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT - GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
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- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Eastings (m)	Northing (m)	Eastings (m)	Northing (m)	
IP-G-16	441,044.99	4,353,459.91	182,280.72	4,359,424.84	360.2
IP-G-17	440,594.30	4,353,462.88	181,829.83	4,359,442.80	161.1

### LEGEND

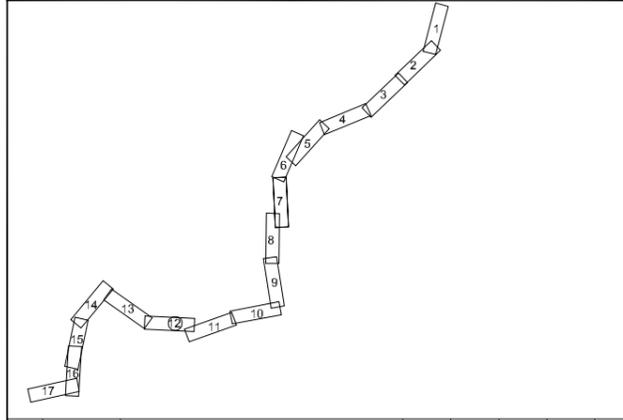

### SCALE BAR



### GEODETTIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.9999600

### MAP SHEETS INDEX



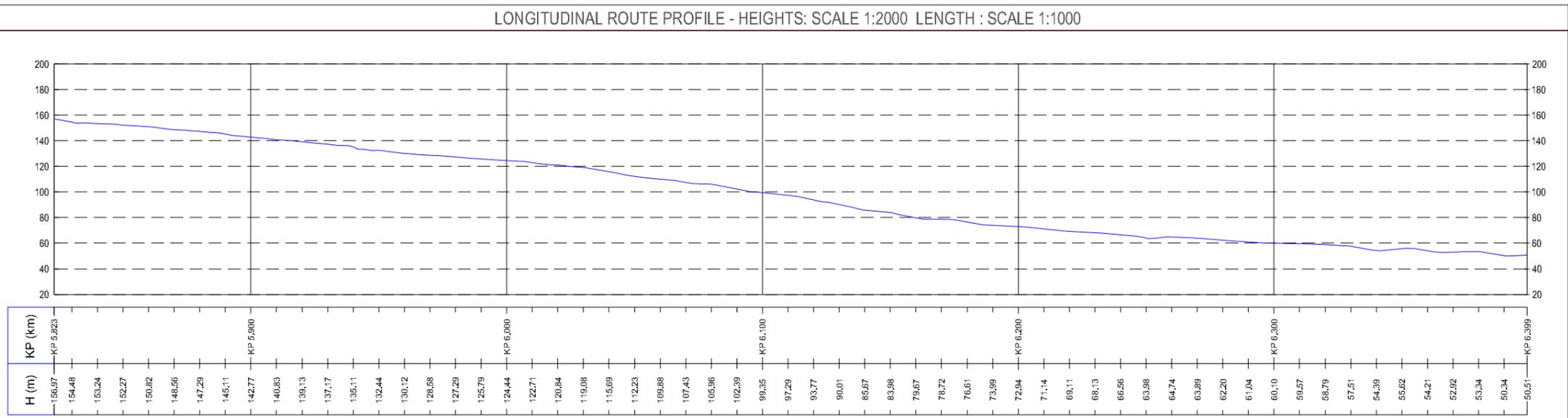
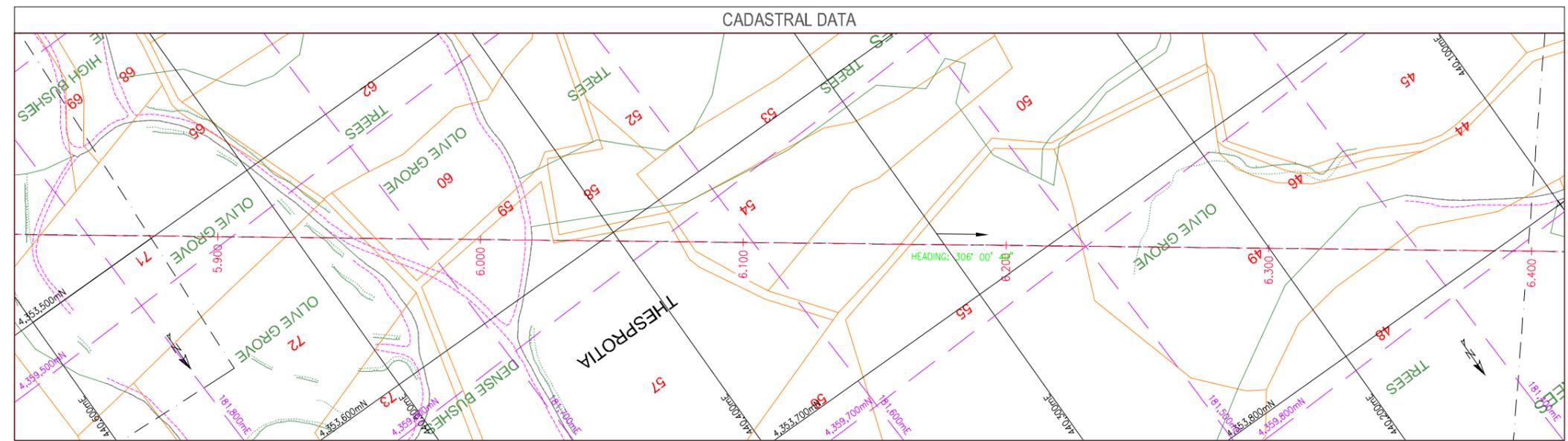
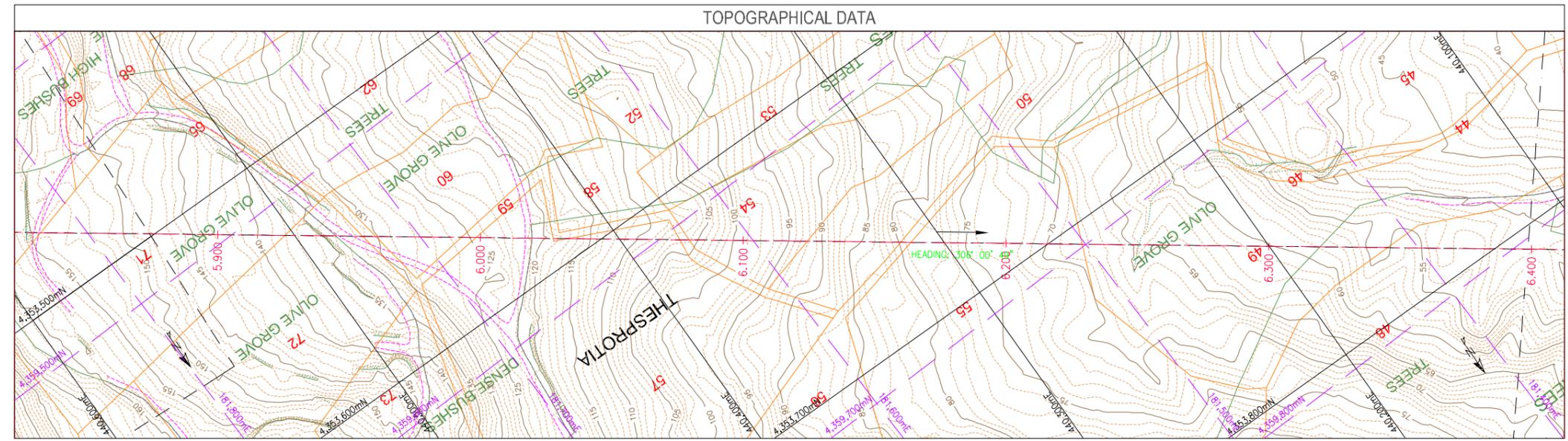
REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/JPB	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JPB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JPB	MVD	JWT	

 CLIENT: IGI Poseidon S.A.	PROJECT: Interconnector Greece - Italy Project No.: 31049101 / OGPAD80197 WBS Code: 10.10.20 (FEED Deliverables) EDISON Doc. No.: DEPA Doc. No.:	 
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### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/JPB	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 12 OF 17
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SCALE AT A1 SIZE: 1:1000	PROJECT: IGI	CTR: 402	AREA: 20	DISCIPLINE: PL	TYPE: DWG	NUMBER: 003	REVISION: 2
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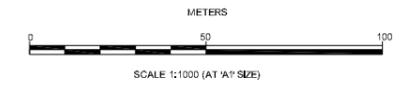
### NOTES

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- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### LEGEND

Contour major	Fold	Prefecture Border
Contour minor	Dry (stone) wall	Power Line
Building	Hedge	Power Point
Ruined Building	Slope upper level	
Asphalt road	Slope lower level	
Dirt road	Pipeline route	
Path	Corridor Limit	Survey Center Line
Coast	Other Structures	Chart Out Line

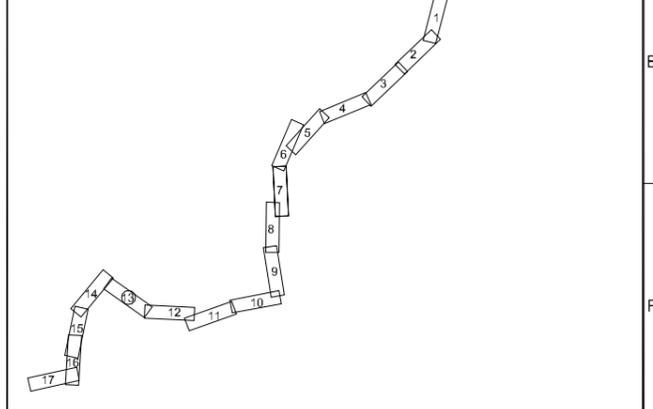
### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX

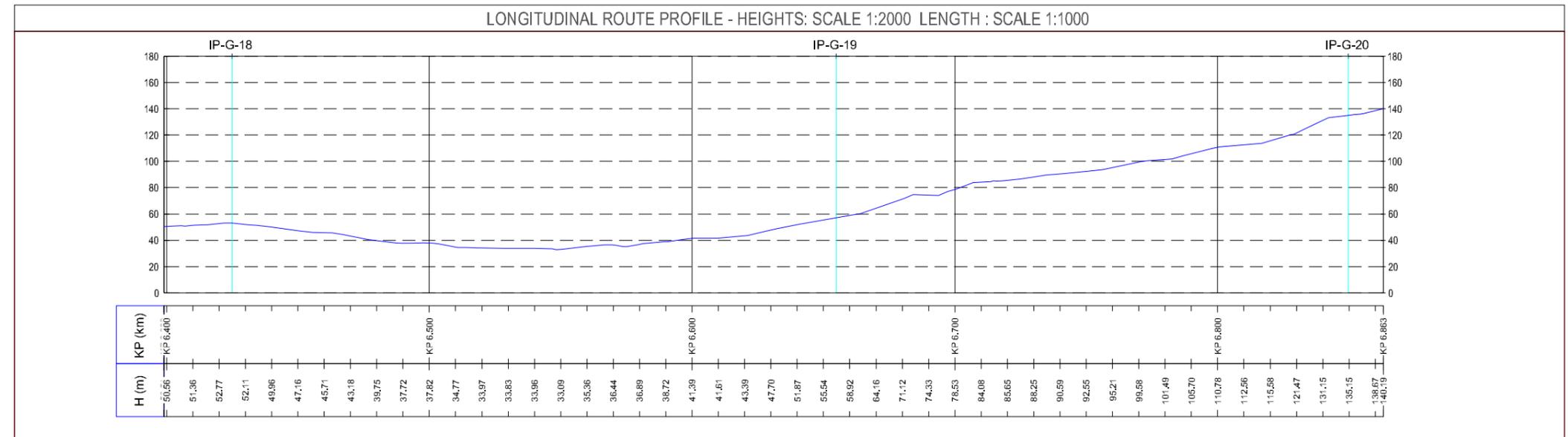
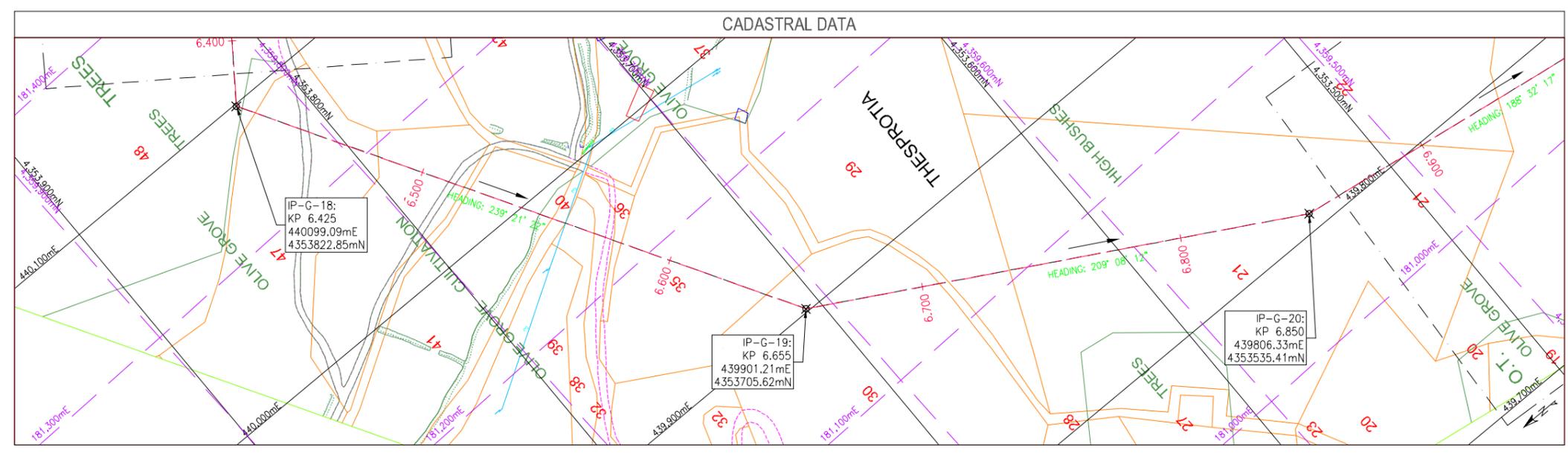
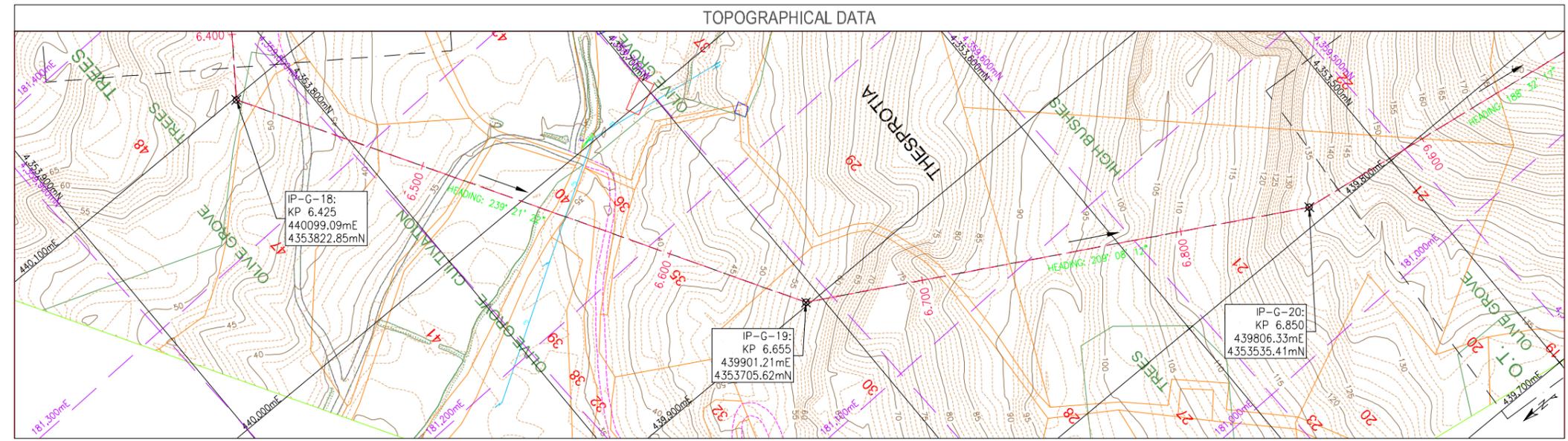


REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/JB	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JB	MVD	JWT	

	PROJECT:	Interconnector Greece - Italy	
	CLIENT:	IGI Poseidon S.A.	
	Project No.:	31049101 / OGPAD80197	
	WBS Code:	10.10.20 (FEED Deliverables)	
	EDISON Doc. No.:		
	DEPA Doc. No.:		

### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY:	DATE:	CHECKED BY:	DATE:	APPROVED BY:	DATE:	SHEET:	13	OF	17
GEOM	08-07-2011	FAK/JB	14-12-2011	JWT	14-12-2011				
SCALE AT A1 SIZE:	PROJECT:	CTR:	AREA:	DISCIPLINE:	TYPE:	NUMBER:	003	REVISION:	2
1:1000	IGI	402	20	PL	DWG				



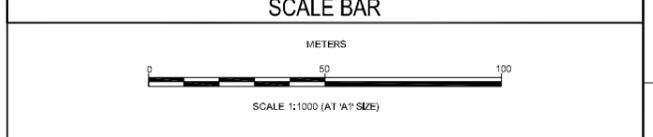
### NOTES

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### IP POINTS COORDINATES

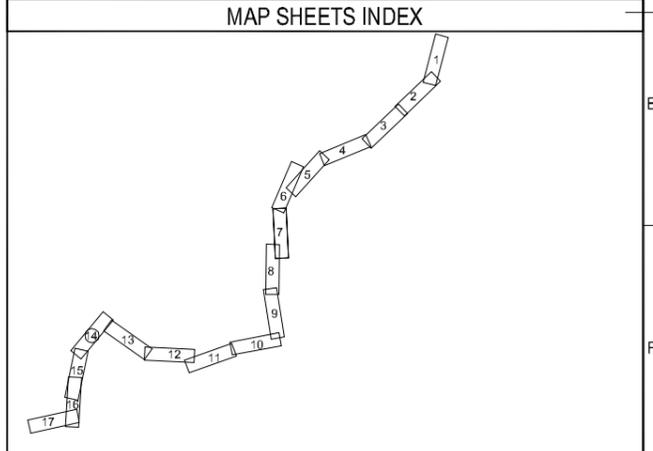
POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
IP-G-18	440,099.09	4,353,822.85	181,346.27	4,359,819.47	53
IP-G-19	439,901.21	4,353,705.62	181,144.36	4,359,708.74	57.3
IP-G-20	439,806.33	4,353,535.41	181,043.76	4,359,541.58	135.1

### LEGEND

### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

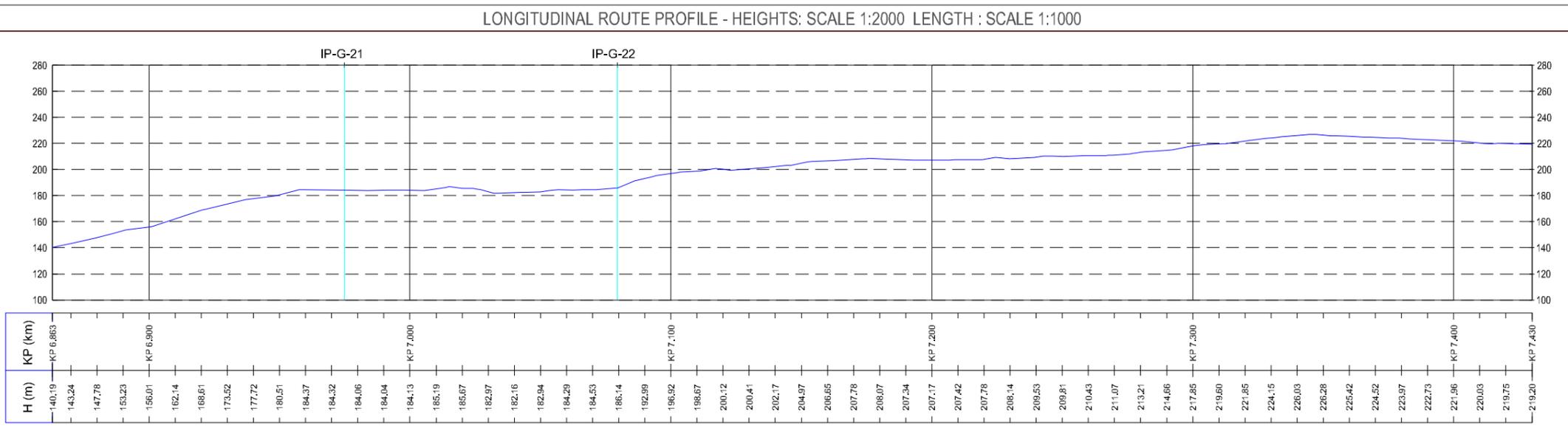
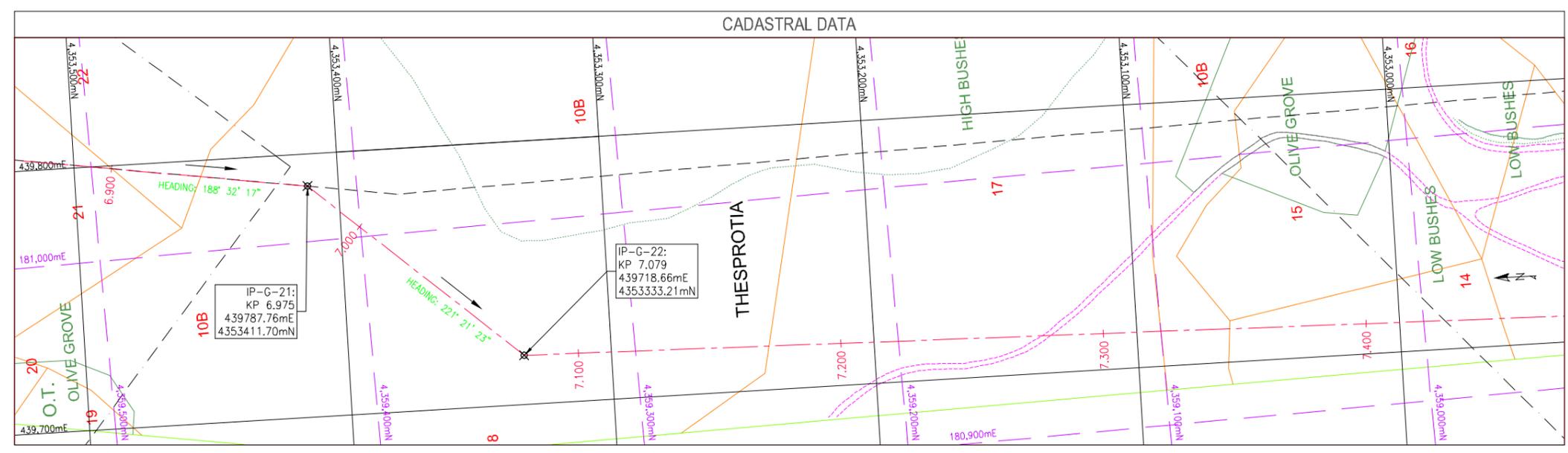
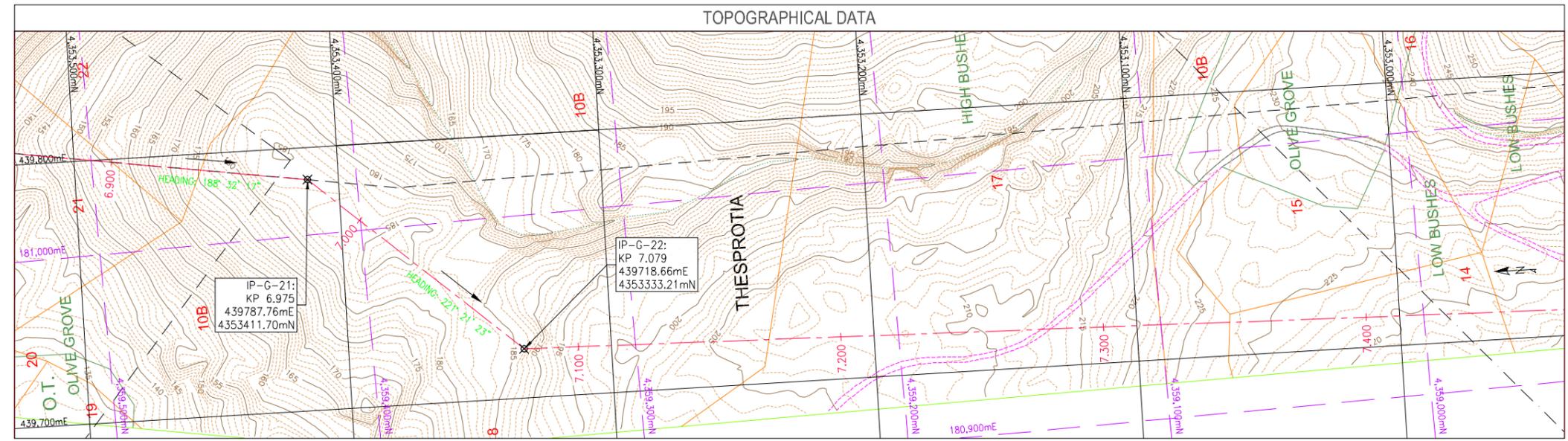


REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/JB	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JB	MVD	JWT	

 <b>IGI Poseidon S.A.</b>	PROJECT: <b>Interconnector Greece - Italy</b>	
	Project No.: 31049101 / OGPAD80197 WBS Code: 10.10.20 (FEED Deliverables) EDISON Doc. No.: DEPA Doc. No.:	

### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY: GEOM	DATE: 08-07-2011	CHECKED BY: FAK/JB	DATE: 14-12-2011	APPROVED BY: JWT	DATE: 14-12-2011	SHEET: 14 OF 17
SCALE AT A1 SIZE: 1:1000	PROJECT: IGI	CTR: 402	AREA: 20	DISCIPLINE: PL	TYPE: DWG	NUMBER: 003
						REVISION: 2



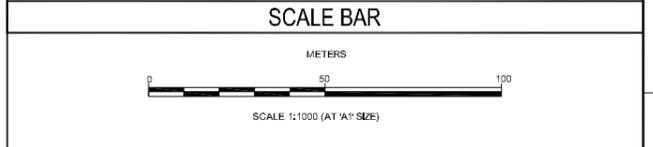
### NOTES

- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT – GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
- GEODETIC DATUM: WGS 84 – UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

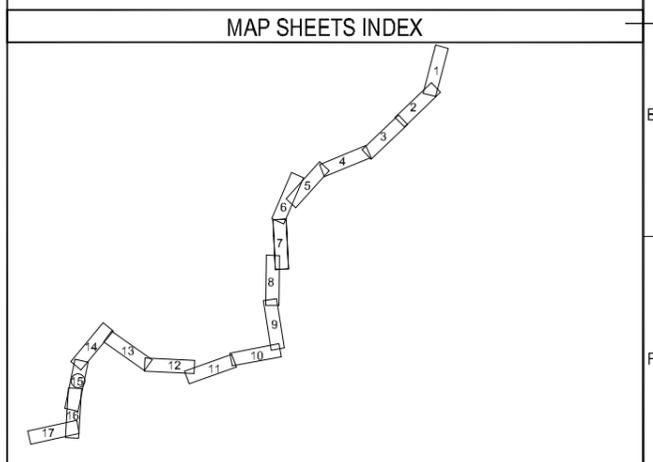
POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Eastings (m)	Northing (m)	Eastings (m)	Northing (m)	
IP-G-21	439,787.76	4,353,411.70	181,021.06	4,359,418.41	184.3
IP-G-22	439,718.66	4,353,333.21	180,949.31	4,359,342.16	185.9

### LEGEND

### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

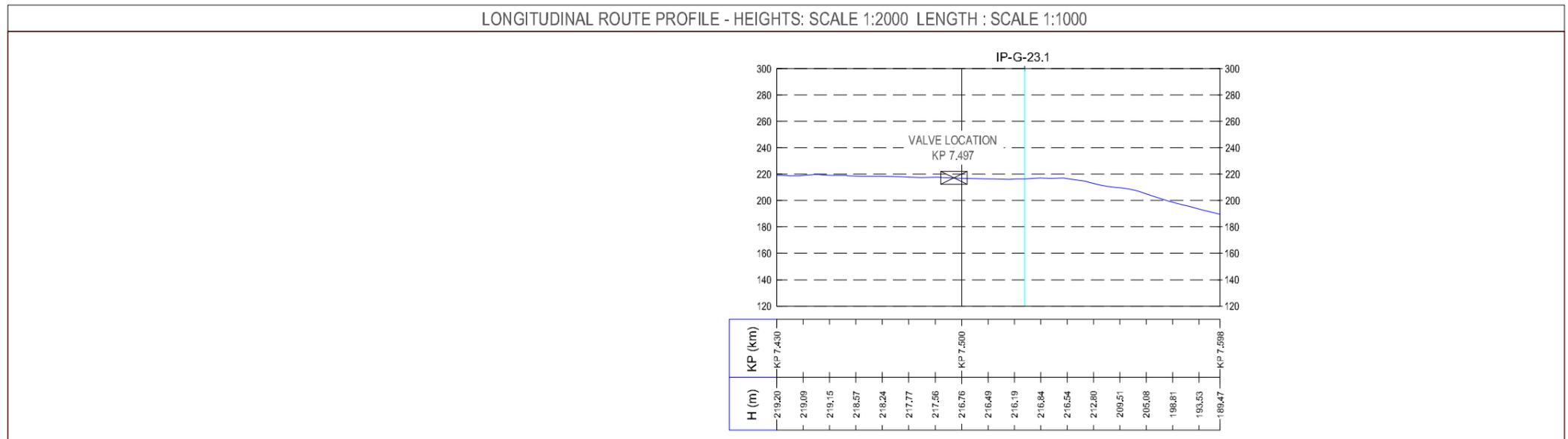
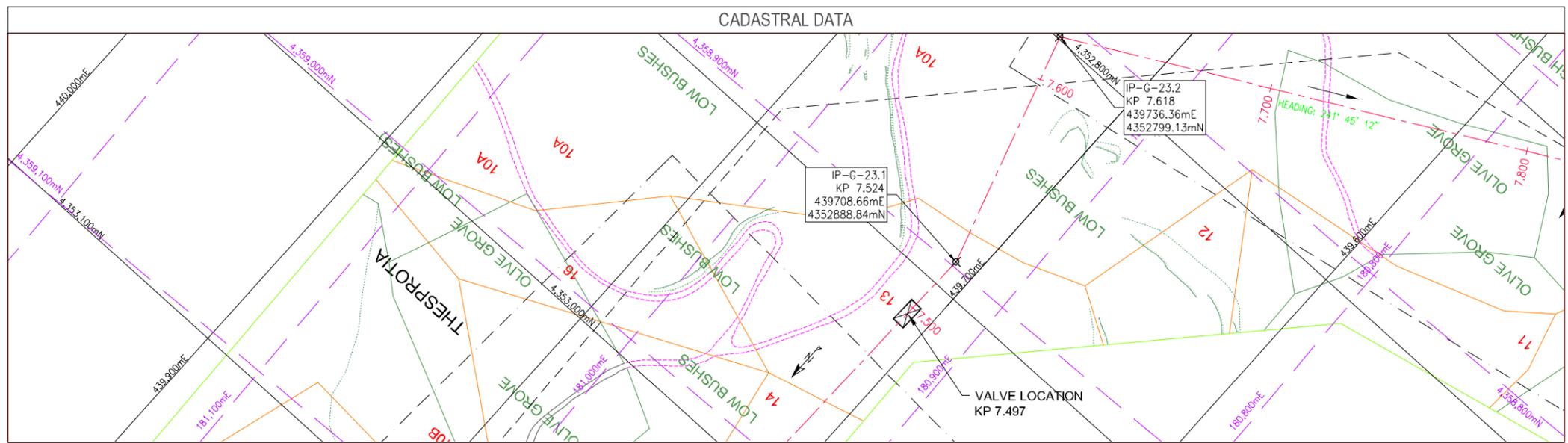
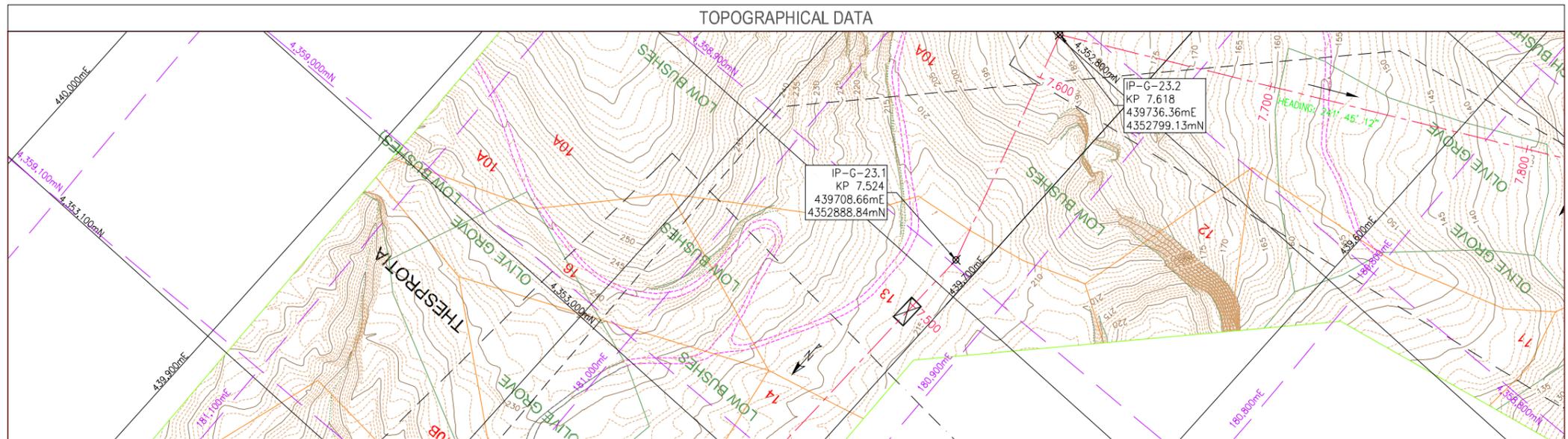


REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	14/12/11	APPROVED FOR USE	GEOM	FAK/JB	MVD	JWT	
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JB	MVD	JWT	

 CLIENT: IGI Poseidon S.A.	PROJECT:	Interconnector Greece - Italy	
	Project No.:	31049101 / OGPAD80197	
	WBS Code:	10.10.20 (FEED Deliverables)	
	EDISON Doc. No.:		

### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY:	DATE:	CHECKED BY:	DATE:	APPROVED BY:	DATE:	SHEET:	OF
GEOM	08-07-2011	FAK/JB	14-12-2011	JWT	14-12-2011	15	17
SCALE AT 'A1' SIZE:	PROJECT:	CTR:	AREA:	DISCIPLINE:	TYPE:	NUMBER:	REVISION:
1:1000	IGI	402	20	PL	DWG	003	2



### NOTES

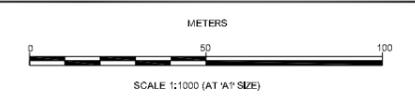
- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT – GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
- GEODETIC DATUM: WGS 84 – UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
IP-G-23.1	439,708.66	4,352,888.84	180,924.52	4,358,897.83	216.4
IP-G-23.2	439,736.36	4,352,799.13	180,949.26	4,358,807.14	184.5

### LEGEND

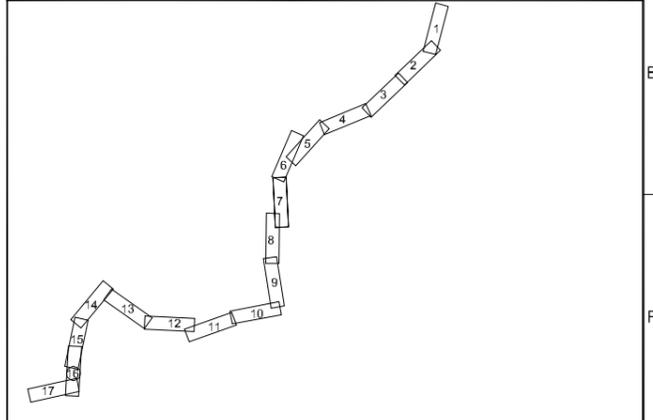

### SCALE BAR



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

### MAP SHEETS INDEX

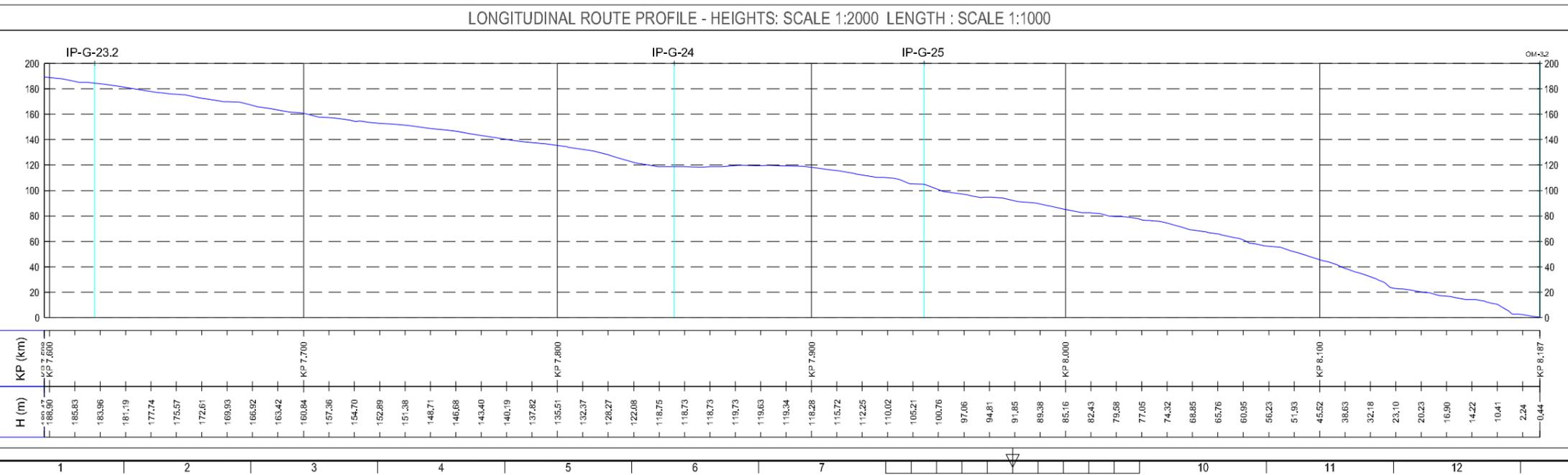
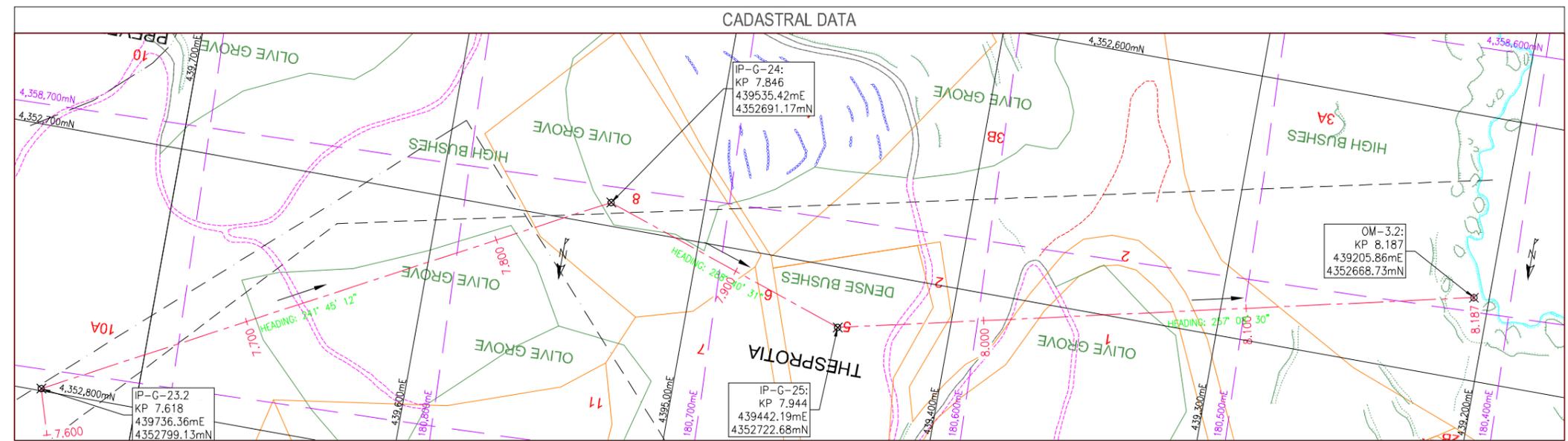
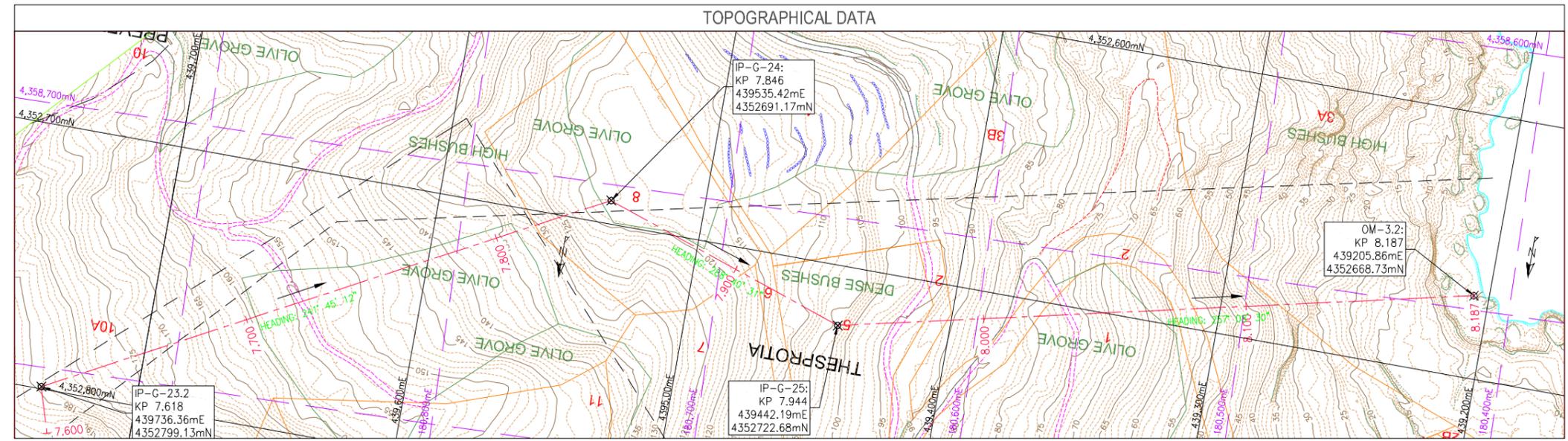


REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
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1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JB	MVD	JWT	
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JB	MVD	JWT	

 CLIENT: IGI Poseidon S.A.	PROJECT:	Interconnector Greece - Italy	
	Project No.:	31049101 / OGPAD80197	
	WBS Code:	10.10.20 (FEED Deliverables)	
	EDISON Doc. No.:		

## ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY:	DATE:	CHECKED BY:	DATE:	APPROVED BY:	DATE:	SHEET:	16	OF	17
GEOM	08-07-2011	FAK/JB	14-12-2011	JWT	14-12-2011				
SCALE AT A1 SIZE	PROJECT	CTR	AREA	DISCIPLINE	TYPE	NUMBER	REVISION		
1:1000	IGI	402	20	PL	DWG	003	2		



### NOTES

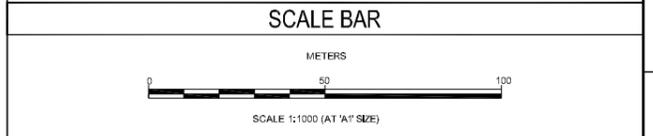
- SOURCE DATA: TOPOGRAPHICAL SURVEY PERFORMED BY GEOMATICS S.A. (MARCH 2011), ONSHORE TOPOGRAPHICAL SURVEY REPORT - GREECE, DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.
- GEODETIC DATUM: WGS 84 - UTM ZONE 34 NORTH (BLACK GRID LINES) AND GGRS'87 (PURPLE DASHED GRID LINES).
- FOR CADASTRAL DATA (PROPERTY OWNER DETAILS), REFERENCE IS MADE TO APPENDIX H OF DOCUMENT NUMBER: IGI-402-20-PL-RPT-001.

### IP POINTS COORDINATES

POINT ID	WGS84-UTM Zone 34N		GREEK GRID / GGRS'87		Elevation (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
IP-G-23.2	439,736.36	4,352,799.13	180,949.26	4,358,807.14	184.5
IP-G-24	439,535.42	4,352,691.17	180,744.60	4,358,705.79	119
IP-G-25	439,442.19	4,352,722.68	180,652.35	4,358,740.42	104.5
OM-3.2	439,205.86	4,352,668.73	180,414.07	4,358,694.29	0.5

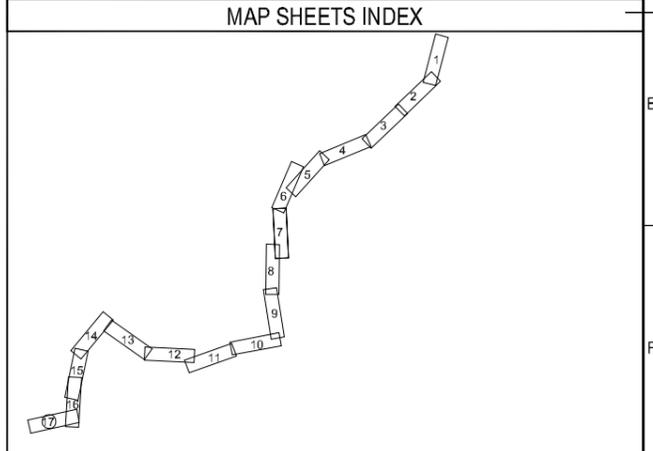
### LEGEND

Contour major	Fold	Prefecture Border
Contour minor	Dry (stone) wall	Power Line
Building	Hedge	Power Point
Ruined Building	Slope upper level	
Asphalt road	Slope lower level	
Dirt road	Pipeline route	
Path	Corridor Limit	Survey Center Line
Coast	Other Structures	Chart Out Line



### GEODETIC PARAMETERS

COORDINATE SYSTEM	:WGS 84
PROJECTION	:UTM Zone 34 North
Origin Latitude	:00° 00' 00"
Origin Longitude	:21° 00' 00"
False Easting	:500000m
False Northing	:0m
Scale factor at CM	:0.999600

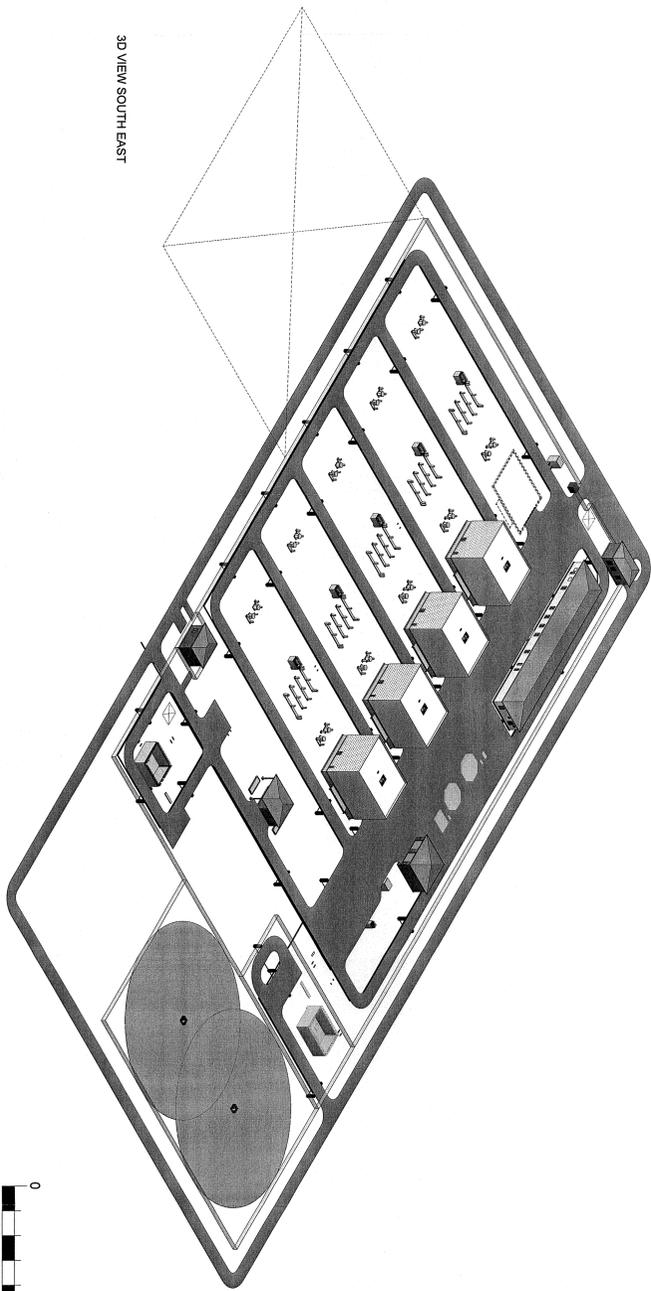
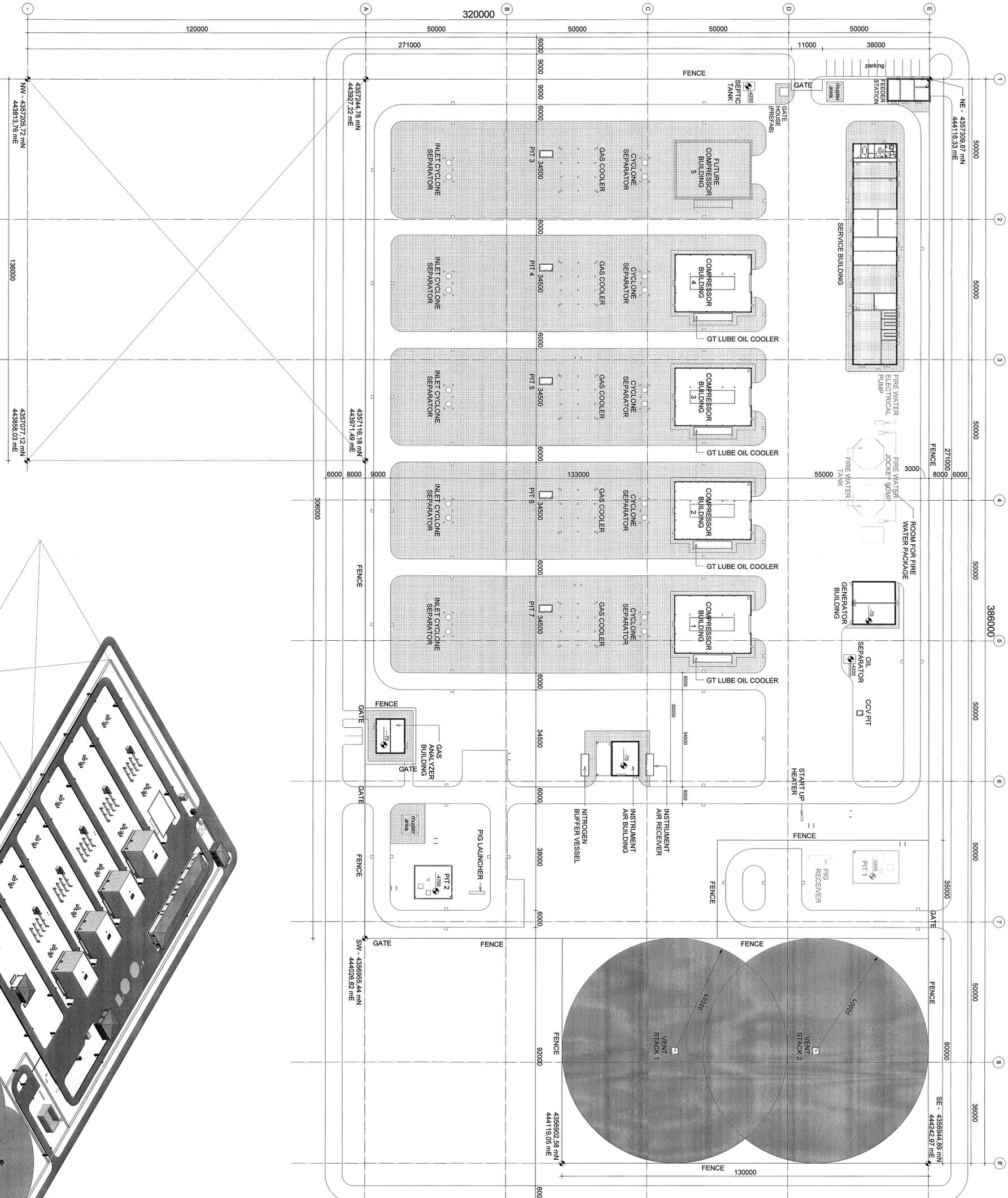


2	14/12/11	APPROVED FOR USE	GEOM	FAK/JP	MVD	JWT
1	21/10/11	ISSUED FOR CLIENT APPROVAL	GEOM	SM/JP	MVD	JWT
0	27/07/11	ISSUED FOR CLIENT REVIEW	GEOM	SM/JP	MVD	JWT

 <b>IGI Poseidon S.A.</b>	PROJECT:	Interconnector Greece - Italy	
	CLIENT:	IGI Poseidon S.A.	
	Project No.:	31049101 / OGPAD80197	
	WBS Code:	10.10.20 (FEED Deliverables)	
	EDISON Doc. No.:		
	DEPA Doc. No.:		

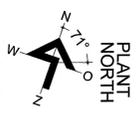
### ONSHORE GREECE SURVEY ALIGNMENT CHART

DRAWN BY:	DATE:	CHECKED BY:	DATE:	APPROVED BY:	DATE:	SHEET:	17	OF	17
GEOM	08-07-2011	FAK/JP	14-12-2011	JWT	14-12-2011				
SCALE AT 'A1' SIZE	PROJECT	CTR	AREA	DISCIPLINE	TYPE	NUMBER	REVISION		
1:1000	IGI	402	20	PL	DWG	003	2		



3D VIEW SOUTH EAST

- NOTES
- 1) PIT 1 + PIG RECEIVER IN DESFA SCOPE



REV	DATE	DESCRIPTION	BY	CHKD
4	27/04/2021	REVU	IGI	IGI
3	06/03/2021	REVU	IGI	IGI
2	02/10/2021	REVU	IGI	IGI
1	11/11/2021	REVU	IGI	IGI
0	06/05/2021	REVU	IGI	IGI

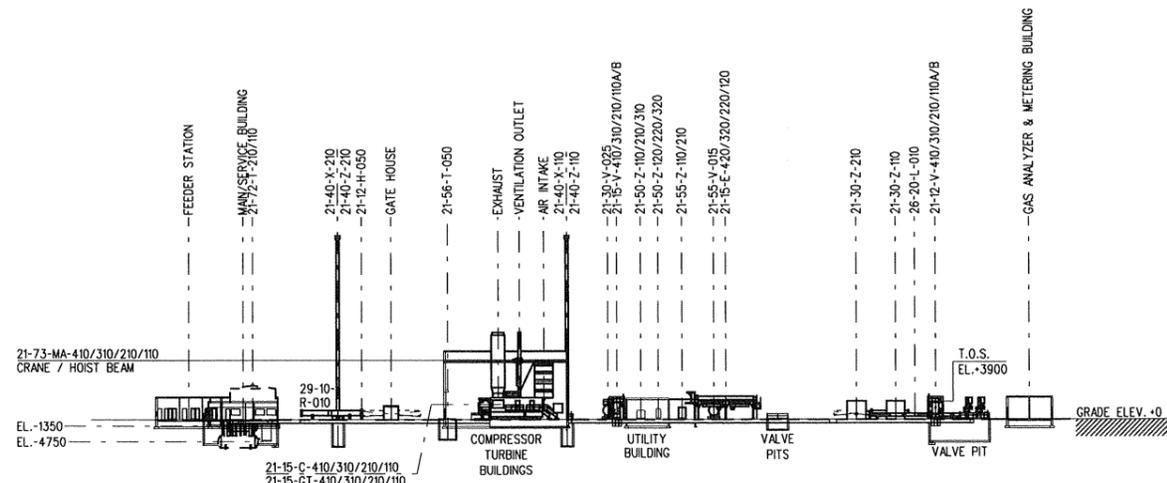
<b>INTECSEA</b> WorleyParsons Group PROJECT: Interconnector Greece - Italy TITLE: COMPRESSOR AND METERING STATION LOC. FLOPOVOUNI (GREECE) LAYOUT & 3D VIEW	PROJECT No.: 143324 (REVISED CONTRACT) IGI Poseidon IGI Poseidon	IGI & Co. PROJECT No.: 143324 (REVISED CONTRACT) IGI Poseidon IGI Poseidon
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DRAWN BY: [Signature] CHECKED BY: [Signature] SCALE: AT SIZE A0 PROJECT: IGI 505 SHEET: 1 OF 1 NUMBER: 001 REGION: 4 DATE: 13/09/2020	PROJECT No.: 143324 (REVISED CONTRACT) IGI Poseidon IGI Poseidon
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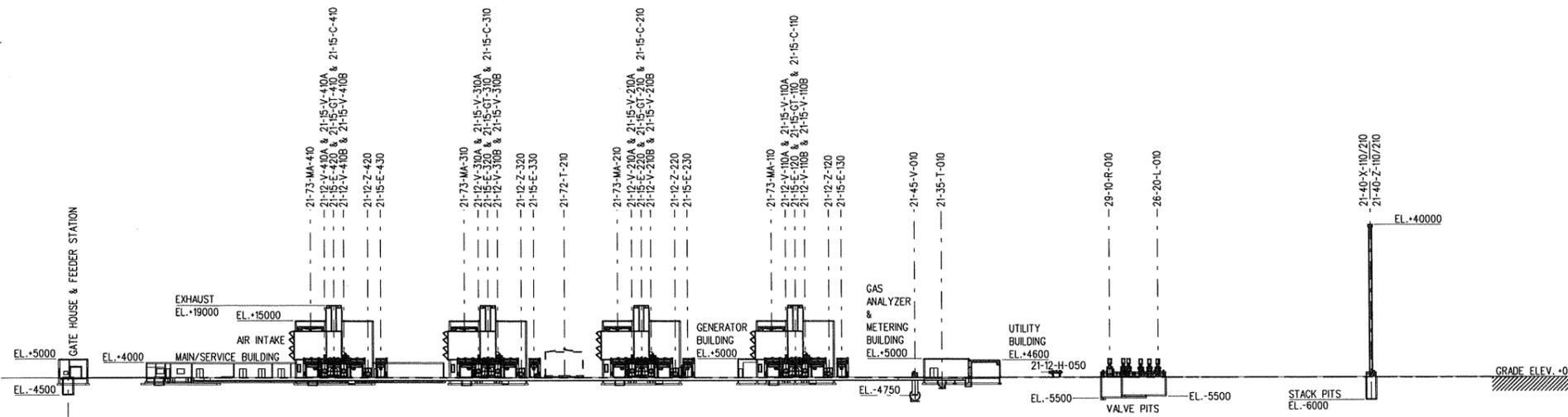
NOTES

FOR GENERAL NOTES AND HOLDS SEE GENERAL PLOTPLAN IGI-508-21-PI-DPP-001



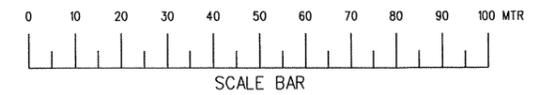
SECTION B-B "LOOKING EAST"

FOR LOCATION SEE GENERAL PLOTPLAN



SECTION A-A "LOOKING NORTH"

FOR LOCATION SEE GENERAL PLOTPLAN



REFERENCE DRAWINGS

DRAWING NUMBER	DESCRIPTION
IGI-508-21-PI-DPP-001	GENERAL PLOTPLAN
IGI-508-21-PI-DAL-001	OVERALL PIPING LAYOUT

REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	26-10-2011	AFU LOCAL GEODETIC SYSTEM UPDATED	RGB	JDK	RRR		
1	11-07-2011	ISSUE FOR USE	RGB	JDK	RRR		
0	05-05-2011	FOR CLIENT REVIEW	RGB	JDK	RRR		

**INTECSEA**  
WorleyParsons Group

PROJECT: Interconnector Greece - Italy

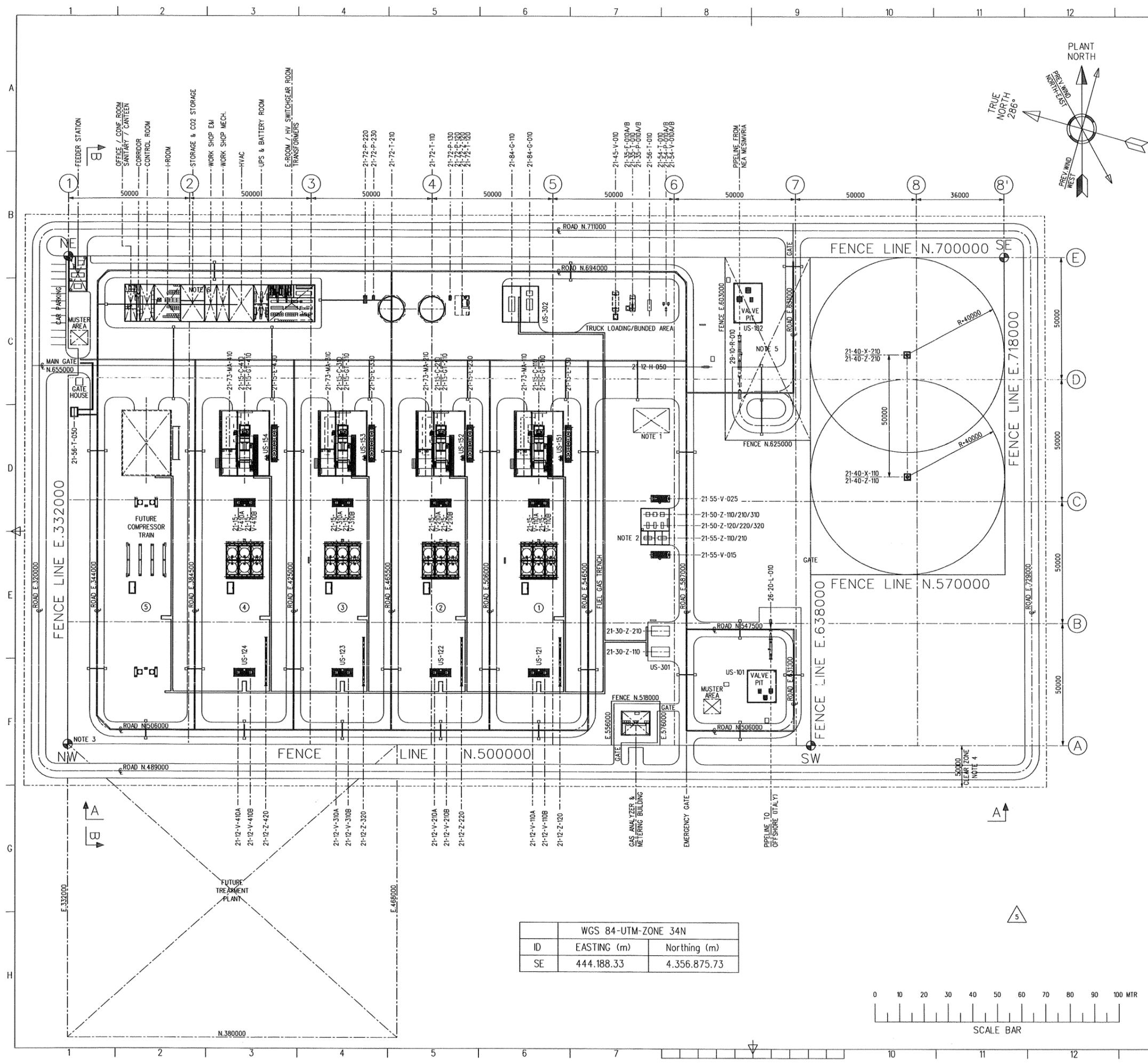
CLIENT: IGI Poseidon

Project No.: 31049101 / OGPA080197  
WBS Code: 10.10.20(FEED Deliverables)  
EDISON Doc. No.:  
DEPA Doc. No.:

iv-oil & Gas  
IGI Poseidon

TITLE:  
PLOTPLAN SECTION A-A AND B-B  
COMPRESSOR AND METERING STATION  
LOCATION FLOROVOUNI GREECE

DRAWN BY: R.Baldinger	DATE: 29-04-2011	CHECKED BY: E.Jansen	DATE: 29-04-2011	APPROVED BY: J.de Klerk	DATE: 29-04-2011	SHEET: 1 OF 1
SCALE AT 'A1' SIZE: 1:750	PROJECT: IGI	CTR: 508	AREA: 21	DISCIPLINE: PI	TYPE: DPP	NUMBER: 002
						REVISION: 2



**NOTES**

- AREA FOR TEMPORARY SKIDS
- NITROGEN GENERATOR LOCATED IN CANOPY.
- DELETED
- CLEAR ZONE DISTANCE
- RECEIVER PLOTSPACE BY DESFA
- WATER TANKS UNDER MAIN SERVICE BUILDING
- PREVAILING WIND DIRECTION (DATA AT PALASCIA) TO BE CONFIRMED

**EQUIPMENT DESCRIPTION**

21-12-H-050	START-UP HEATER
21-12-V-110/210/310/410A/B	INLET CYCLONE SEPARATOR
21-12-Z-120/220/320/420	FLOW METERING RUN
21-15-C-110/210/310/410	GAS COMPRESSOR
21-15-E-120/220/320/420	GAS COOLER
21-15-G-110/210/310/410	GT LUBE OIL COOLER
21-15-V-110/210/310/410A/B	GAS TURBINE
21-15-V-110/210/310/410A/B	CYCLONE SEPARATOR
21-30-Z-110/210	FUEL GAS SKID PACKAGE
21-35-F-010A/B	DIESEL OIL FILTER
21-35-P-010A/B	DIESEL OIL TRANSFER PUMP
21-35-T-010	DIESEL OIL STORAGE TANK
21-40-X-110/210	SONIC VENT TIP
21-40-Z-110/210	VENT STACK PACKAGE
21-45-V-010	CONDENSATE COLLECTION VESSEL
21-50-V-025	INSTRUMENT AIR RECEIVER
21-50-Z-110/210/310	AIR COMPRESSOR PACKAGE
21-50-Z-120/220/320	AIR DRYER PACKAGE
21-53-P-010A/B	POTABLE WATER PUMPS (NOTE 6)
21-53-T-010A/B	POTABLE WATER TANKS (NOTE 6)
21-54-P-010A/B	UTILITY WATER PUMP
21-54-T-010	UTILITY WATER BREAK TANK
21-54-V-010A/B	UTILITY WATER EXPANSION VESSEL
21-55-V-015	NITROGEN BUFFER VESSEL
21-55-Z-110/210	NITROGEN PACKAGE
21-56-T-010	SKIMMER TANK
21-56-T-050	SANITARY WASTE FLUIDS TANK
21-72-P-130/230	FIRE WATER JOCKEY PUMP
21-72-P-120	FIRE WATER DIESEL PUMP
21-72-P-220	FIRE WATER ELECTRICAL PUMP
21-72-T-120	FIRE WATER DIESEL DAY TANK
21-72-T-110/210	FIRE WATER TANK
21-72-Z-120	FIRE WATER PACKAGE
21-72-Z-010	FIRE EXTINGUISHING CO2 SYSTEM (MAIN SERVICE BUILDING)
21-72-Z-020	FIRE EXTINGUISHING CO2 SYSTEM (20kV FEEDER BUILDING)
21-72-Z-030	FIRE EXTINGUISHING CO2 SYSTEM (ANALYZER/METERING BUILDING)
21-73-MA-110/210/310/410	CRANE COMPR./TURB. BUILDING
21-84-G-010	DIESEL GENERATOR
21-84-G-110	GAS GENERATOR
26-20-L-010	PIG LAUNCHER
29-10-R-010	PIG RECEIVER

**REFERENCE DRAWINGS**

DRAWING NUMBER	DESCRIPTION
IGI-508-21-PI-DPP-002	PLOTPLAN SECTION A-A AND B-B
IGI-508-21-PI-DAL-001	OVERALL PIPING LAYOUT

**LOCATION PLAN**

**WGS 84-UTM-ZONE 34N**

ID	EASTING (m)	Northing (m)
SE	444.188.33	4.356.875.73

**SCALE BAR**

0 10 20 30 40 50 60 70 80 90 100 MTR

**INTECSEA**  
WorleyParsons Group

**IGI Poseidon**

**Interconnector Greece - Italy**

**Project:** 31049101 / OCPAD080197  
WBS Code: 10.10.20/FEED Deliverables

**IGI Poseidon**

**GENERAL PLOTPLAN**  
**COMPRESSOR AND METERING STATION**  
**LOCATION FLOROVOUNI-GREECE**

**REVISIONS**

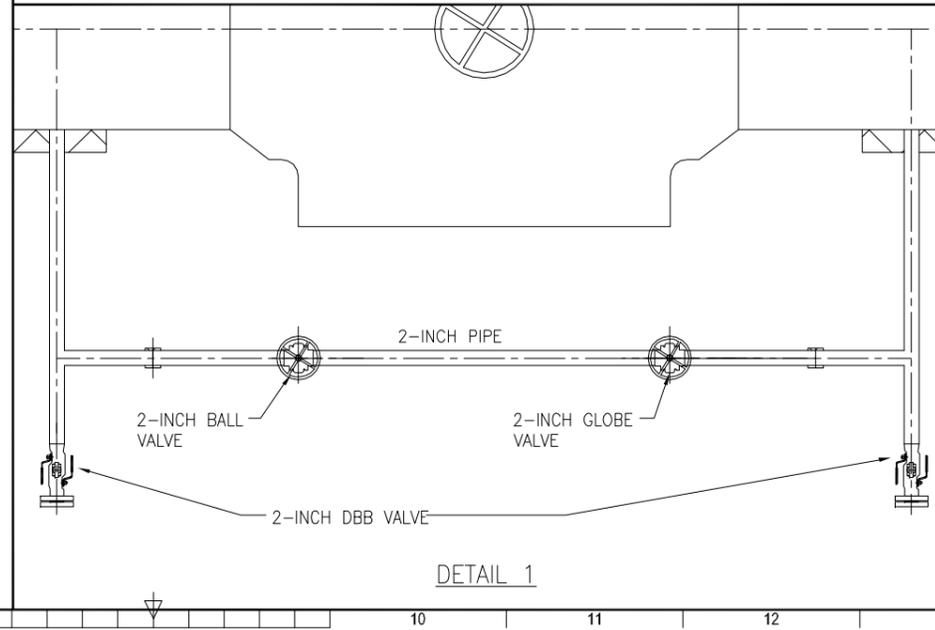
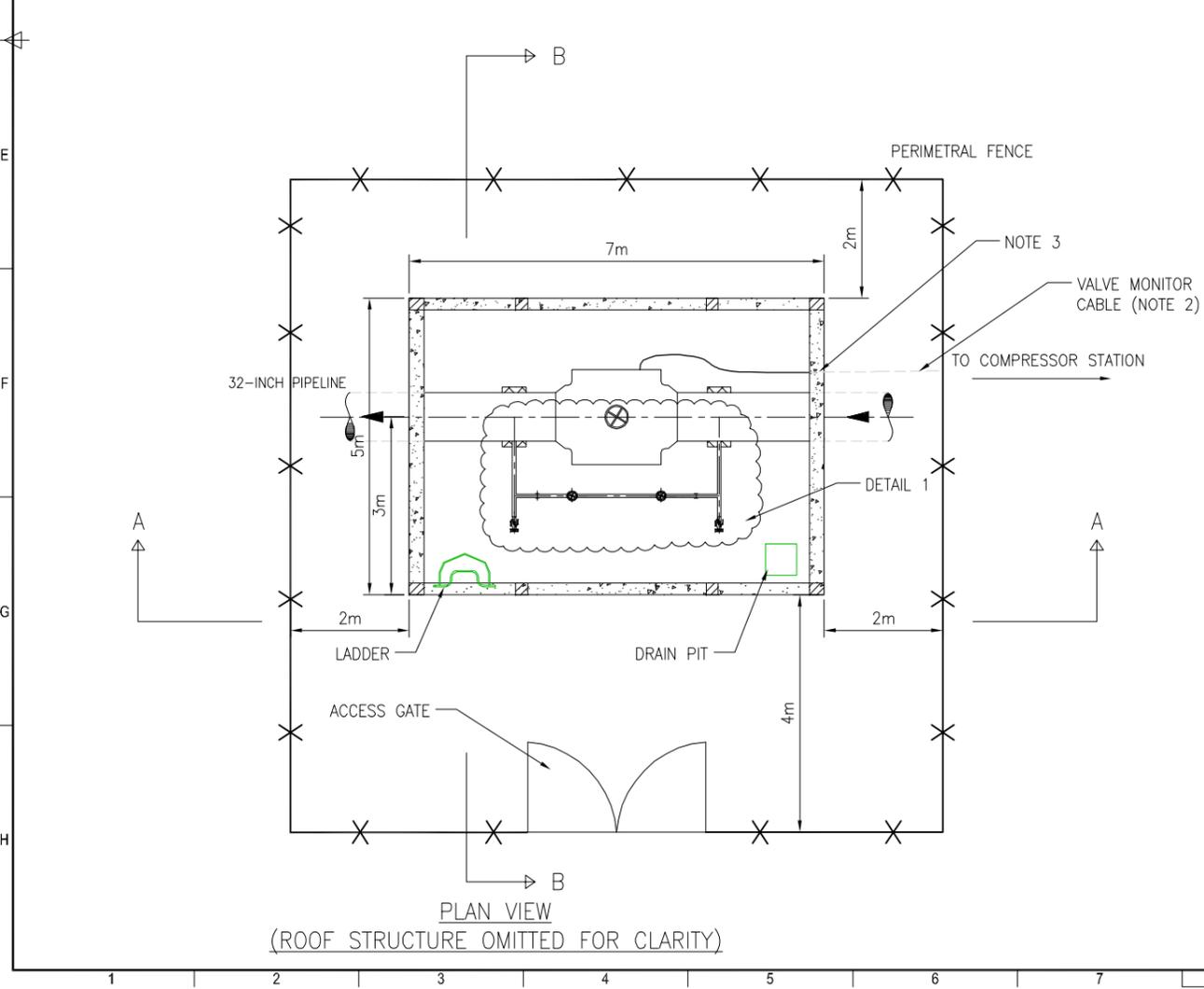
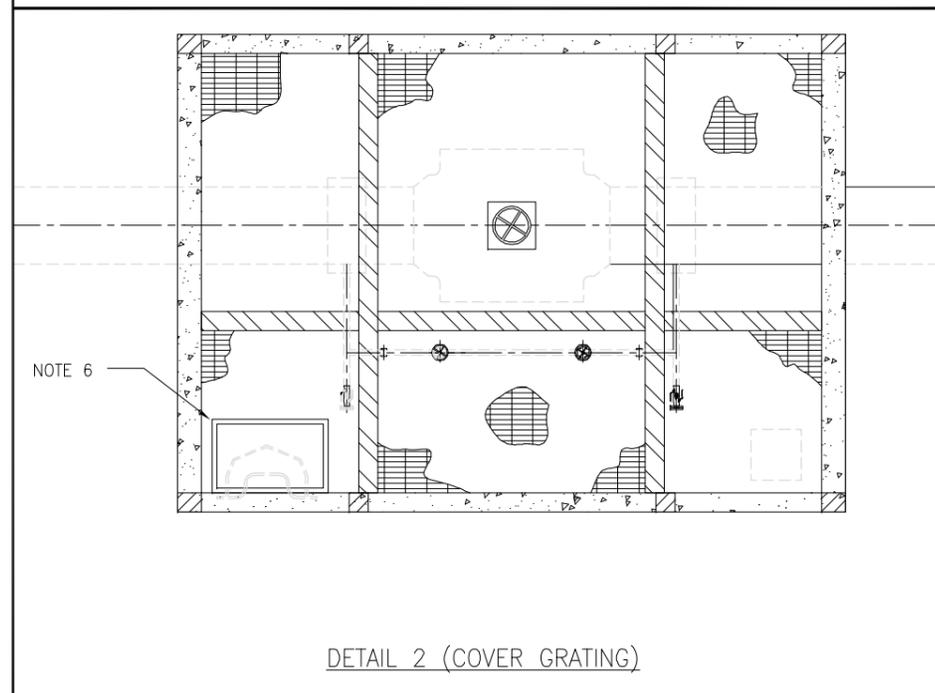
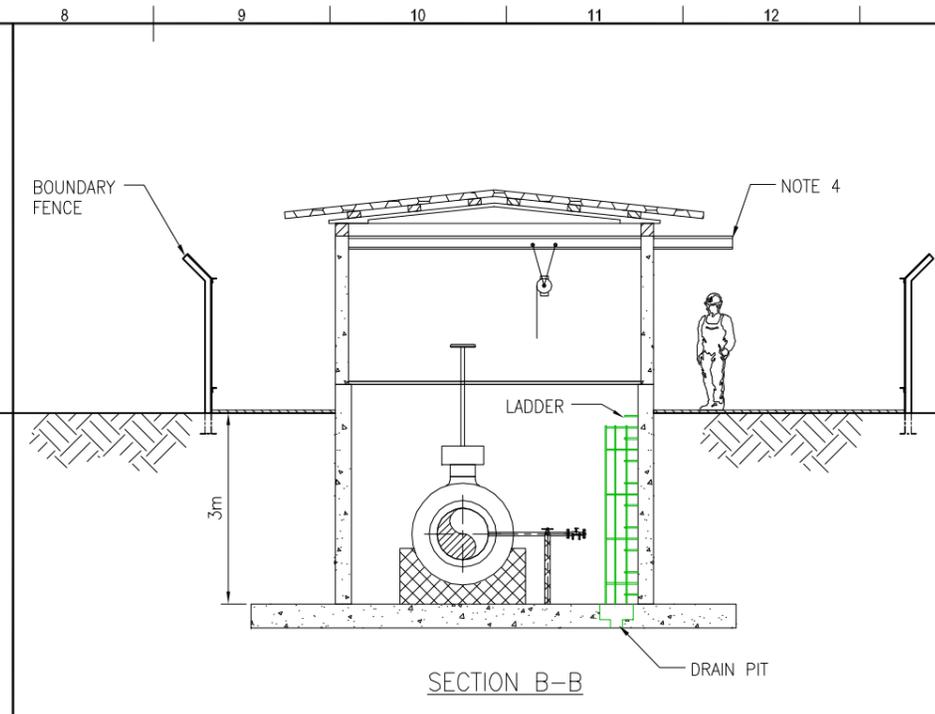
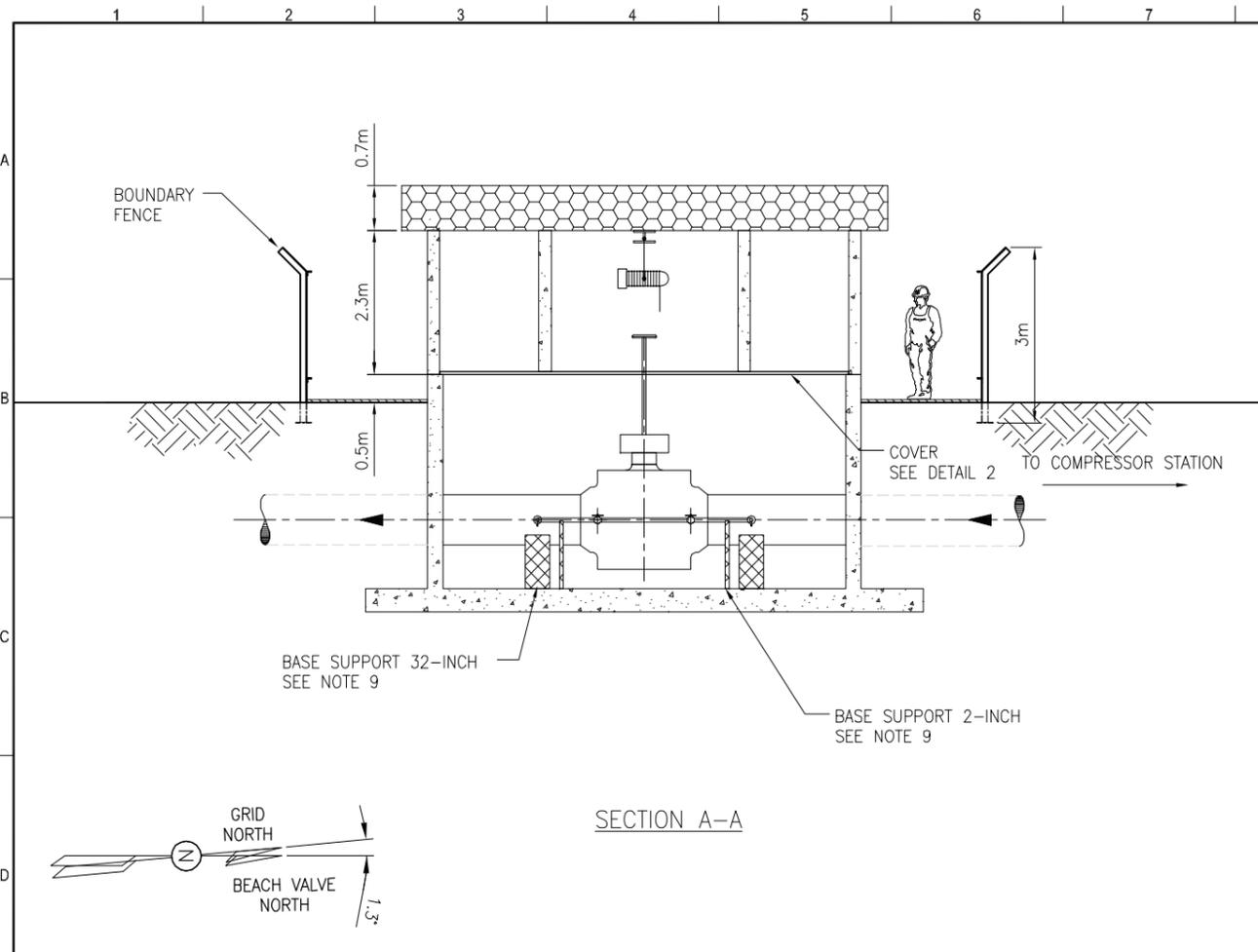
REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
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3	26-10-2011	AFU LOCAL GEODETIC SYSTEM UPDATED	RGB	JDK	RRR		
2	11-07-2011	ISSUE FOR USE	RGB	JDK	RRR		
1	05-05-2011	FOR CLIENT APPROVAL	RGB	JDK	RRR		
5	13-01-2012	ISSUE FOR USE, HOLDS REMOVED	RGB	JDK	RRR		

**APPROVED BY:** J. de Klerk  
**DATE:** 08-12-2010

**SHEET:** 1 OF 1

**SCALE AT 'A' SIZE:** 1:750

PROJECT	CTR	AREA	DISCIPLINE	TYPE	NUMBER	REVISION
IGI	508	21	PI	DPP	001	5



- ### NOTES
1. THE DIMENSIONS SHOWN ARE INDICATIVE. FINAL SIZING OF VALVE STATION STRUCTURES SHALL BE CARRIED OUT DURING THE DETAILED DESIGN STAGE. THIS IS ALSO VALID FOR THE CONCRETE STRUCTURE SIZING.
  2. OPTIMAL POSITION AND EXIT ROUTE OF THE SIGNAL CABLE IN/OUT OF VALVE PIT SHALL BE DETERMINED IN THE DETAILED DESIGN STAGE. THE SIGNAL CABLE SHALL HOWEVER SHARE THE PIPELINE TRENCH OUTSIDE THE VALVE STATION.
  3. PIPELINE AND SIGNAL CABLE PASSAGE THROUGH THE VALVE PIT WALL IS NOT HERE SPECIFIED. THE SOLUTION ADOPTED SHALL PREVENT WATER INGRESS IN THE VALVE PIT ALONG THE PIPELINE OR THE SIGNAL CABLE. IN ADDITION, THE PIPELINE SECTION SHALL BE ALLOWED SOME LONGITUDINAL (RELATIVE TO PIPELINE AXIS) MOVEMENT, PREVENTING EXCHANGE OF LOADS BETWEEN THE STRUCTURE AND THE PIPELINE.
  4. ROOF STRUCTURE TO INCLUDE LIFTING BEAM TO ALLOW MOVEMENT OF EQUIPMENT IN/OUT OF THE VALVE PIT. THE SUPPORT STRUCTURE FOR SUCH MECHANISM SHALL BE DESIGNED ACCORDINGLY TO ENSURE SAFE WORKING LOADS.
  5. PANELS OF THE COVER GRATING SYSTEM SHALL BE REMOVABLE, ALLOWING MOVEMENT OF EQUIPMENT IN AND OUT OF THE VALVE PIT.
  6. HINGED PANEL FOR LADDER ACCESS.
  7. PID COVERING VALVE STATION ARRANGEMENT IS PROVIDED IN DOC NO. IGI-502-26-PR-PID-001 SH2.
  8. PROVISIONS SHALL BE MADE TO PREVENT BIRD NESTING AND ACCESS OF ANIMALS TO THE INTERIOR OF THE BEACH VALVE STATION. SPIKES ON THE ROOF AND A FINE GRATING MESH ARE POSSIBLE OPTIONS, OTHERS MAY BE ADOPTED.
  9. THE UPPER PART OF THE BASE SUPPORT SHALL COMPRISE OF A PIPE SADDLE OR CLAMP. THIS SUPPORT SHALL HAVE A LINER (E.G. NEOPRENE OR SIMILAR MATERIAL) TO ENSURE A GOOD FIT AND PROVIDE ELECTRICAL ISOLATION.
  10. PROVISIONS SHALL BE MADE REGARDING PROTECTION AGAINST LIGHTNING.

### REFERENCE DRAWINGS

DRAWING NUMBER	DESCRIPTION

REV	DATE	DESCRIPTION	DRWN	CHKD	PROJ	APPR	CLIENT
2	19/03/12	APPROVED FOR USE	FAK	RPR	JWT	JWT	
1	21/12/11	ISSUED FOR CLIENT APPROVAL	SM	RPR	JWT	JWT	
0	18/11/11	ISSUED FOR CLIENT REVIEW	SM	RPR	JWT	JWT	
A	02/11/11	ISSUED FOR INTERNAL REVIEW	SM	RPR			

		<b>PROJECT:</b> Interconnector Greece - Italy			
<b>CLIENT:</b> IGI Poseidon		Project No.: 31048101 / OGPA00197 WBS Code: 10.10.20 (FEED Deliverables) EDISON Doc. No.: DEPA Doc. No.:			
<b>TITLE:</b> BEACH VALVE STATION GENERAL ARRANGEMENT					
DRAWN BY: SM DATE:	CHECKED BY: JB DATE: 19-03-2012	APPROVED BY: JWT DATE: 19-03-2012	SHEET: 1 OF 1		
SCALE AT 'A1' SIZE		PROJECT: IGI	CTR: 407	AREA: 10	DISCIPLINE: PL TYPE: DWG NUMBER: 001 REVISION: 2

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX C:**

**PHOTOGRAPHIC DOCUMENTATION  
OF NEAR SHORE DMS**

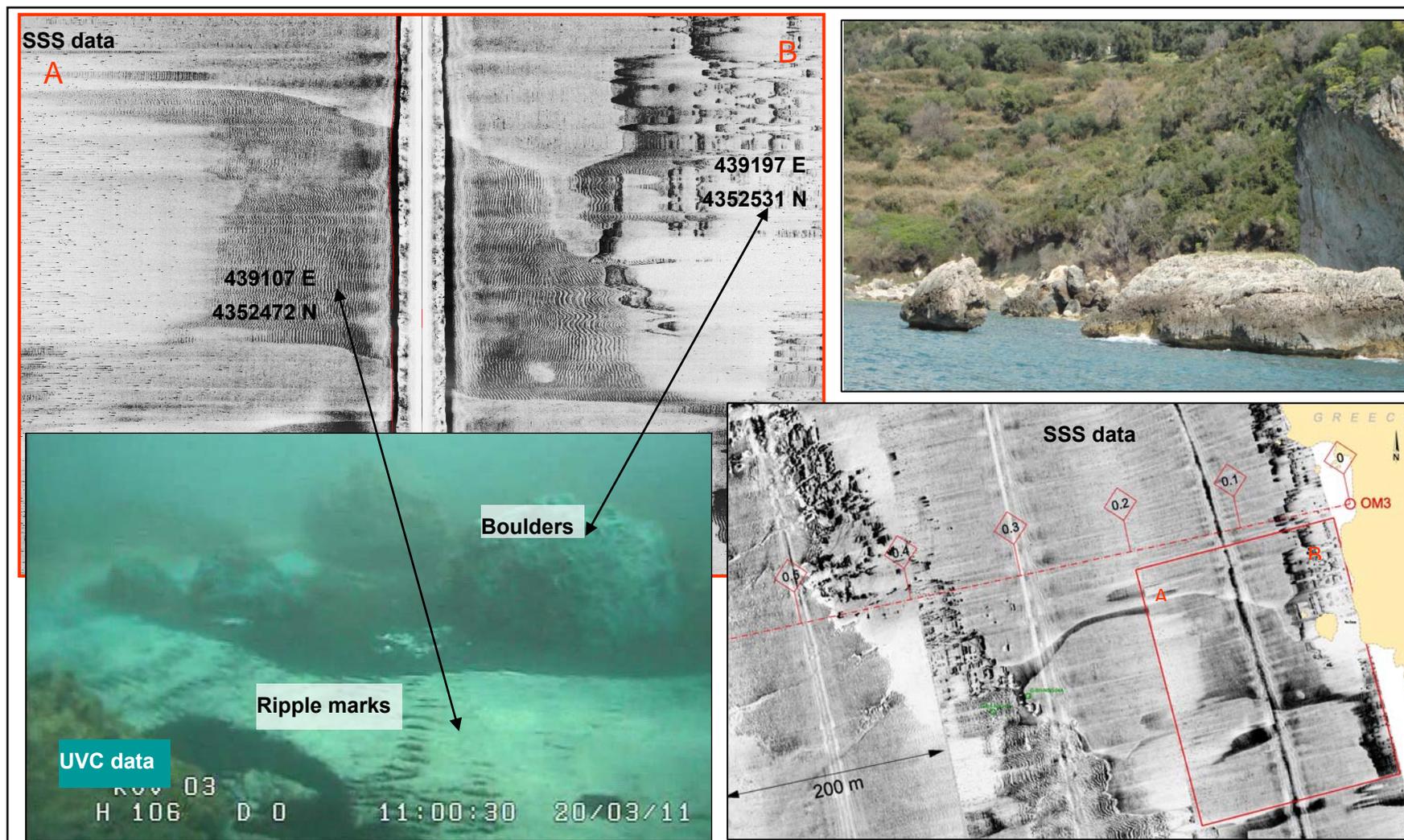
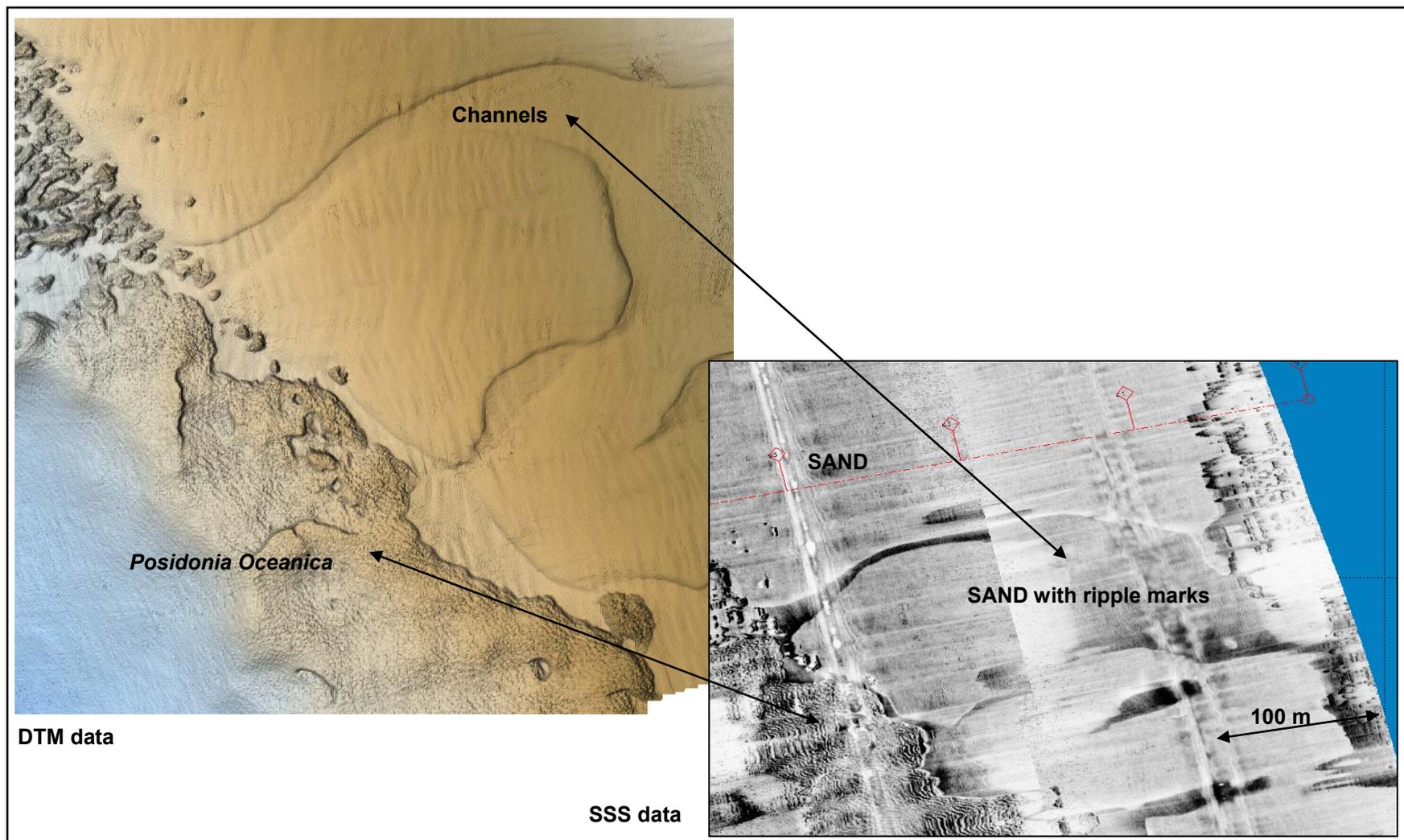


Figure B.1: Correlation between SSS data (Line TIE01SSS), UVC data (Point 03) and picture of the coast – Rocky outcrop and boulders

Σχήμα Β.1: Συσχέτιση μεταξύ δεδομένων SSS (Γραμμή TIE01SSS), δεδομένων UVC (Σημείο 03) και φωτογραφία της ακτής - Βραχώδης εξάρσεις και ογκόλιθοι.



**Figure B.2: SSS data (Line TIE01SSS), DTM and picture of the coast – Channelling within SAND and incised valley on land**

Σχήμα Β.2: Δεδομένα SSS (Γραμμή TIE01SSS), DTM και εικόνα της ακτής - Κανάλια στην ΆΜΜΟ και διασταύρωση θαλάσσιας κοιλάδας με ηπειρωτική πλατφόρμα

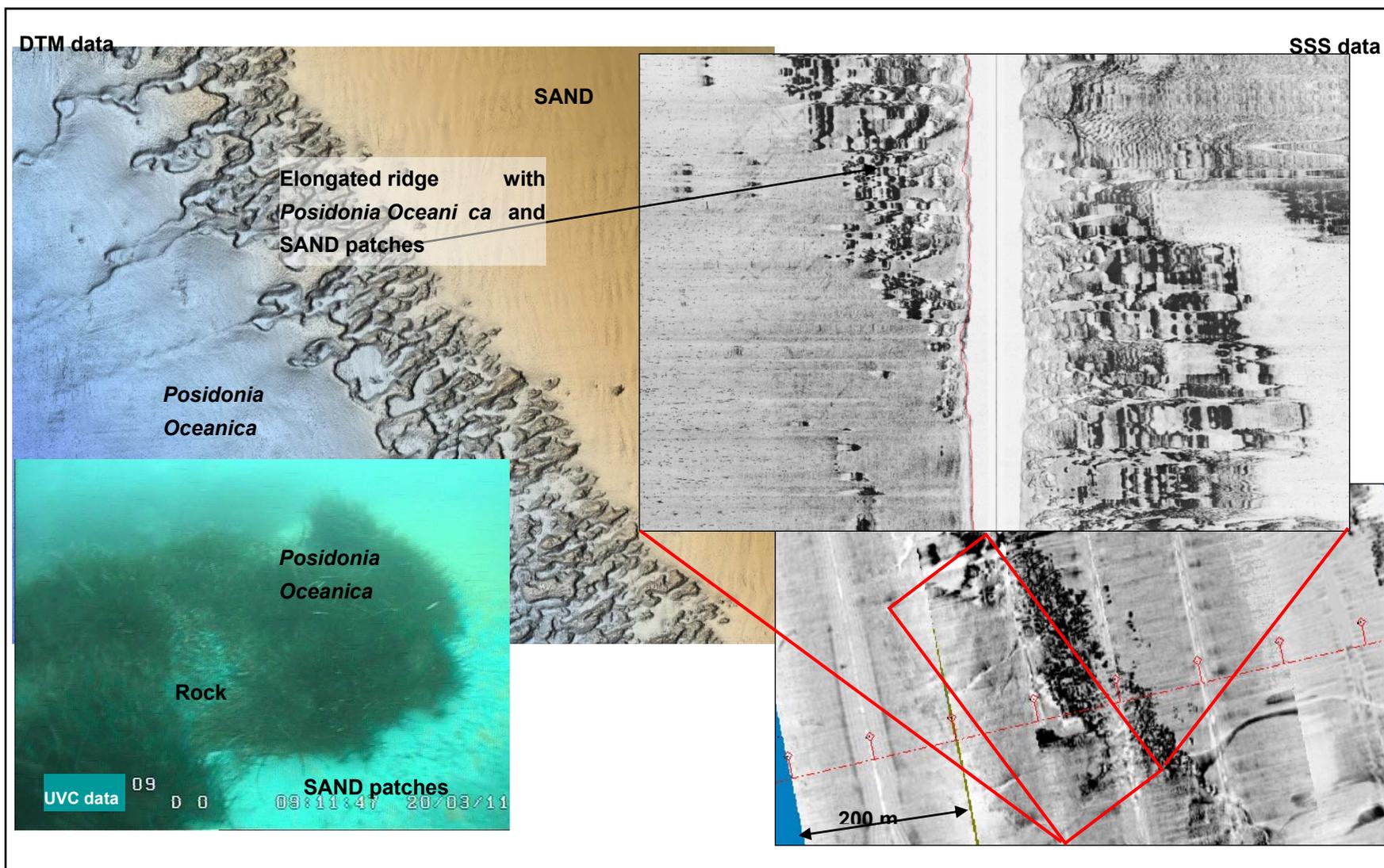
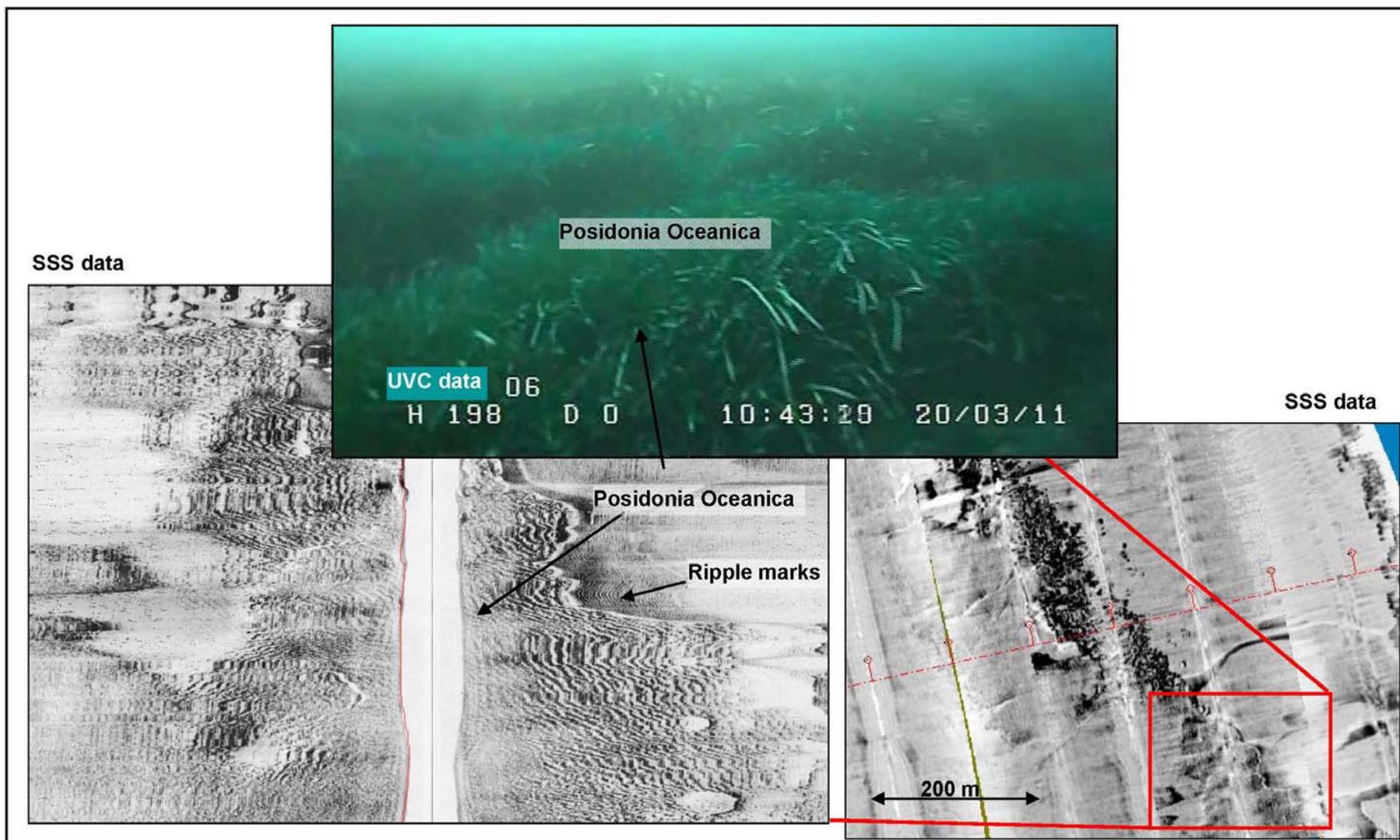


Figure B.3: SSS data (Line TIE04SSS), DTM and UVC data (Point 09) – Rocky ridge with *Posidonia Oceanica* and SAND patches  
Σχήμα Β.3: Δεδομένα SSS (Γραμμή TIE04SSS), DTM και UVC δεδομένα (Σημείο 09) - Βραχώδης έξαρση με άτομα *Posidonia Oceanica* και θέσεις με ΑΜΜΟ.



**Figure B.4: SSS data (Line TIE03SSS) and UVC data (point 06) – *Posidonia Oceanica***  
Σχήμα Β.4: Δεδομένα SSS (Γραμμή TIE03SSS) και UVC δεδομένα (Σημείο 06) - *Posidonia Oceanica*.

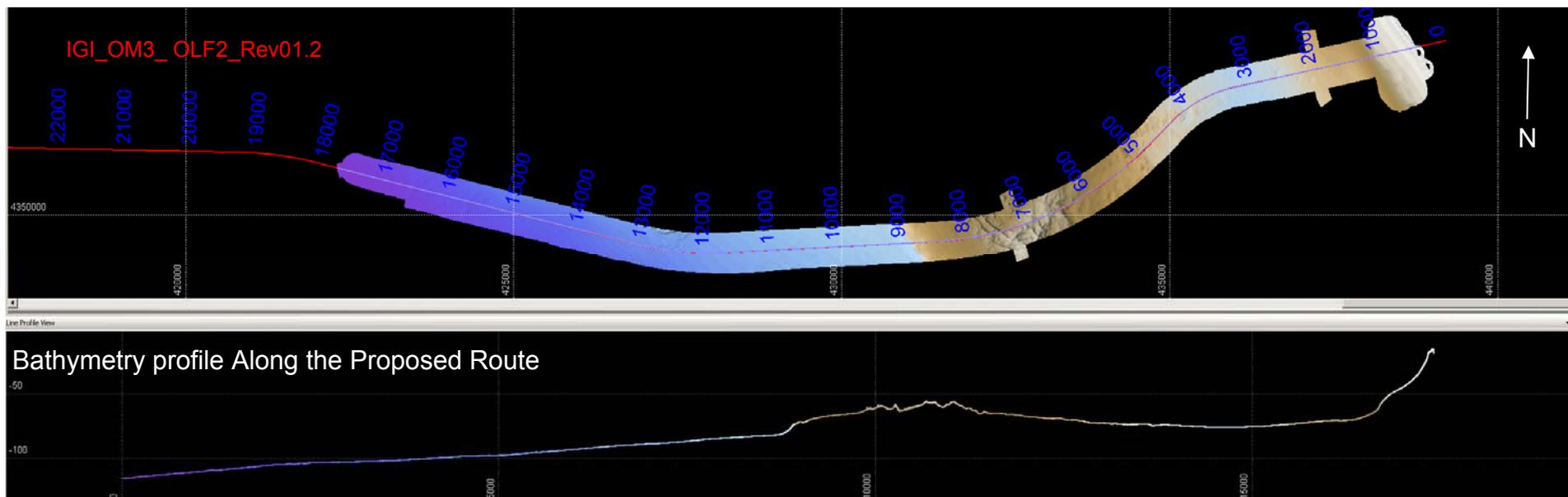


**Figure B.5: UVC data (Point 08) – Sparse and dead *Posidonia Oceanica***  
Σχήμα Β.5: UVC δεδομένα (Σημείο 08) - Αραιά και νεκρά άτομα *Posidonia Oceanica*.

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

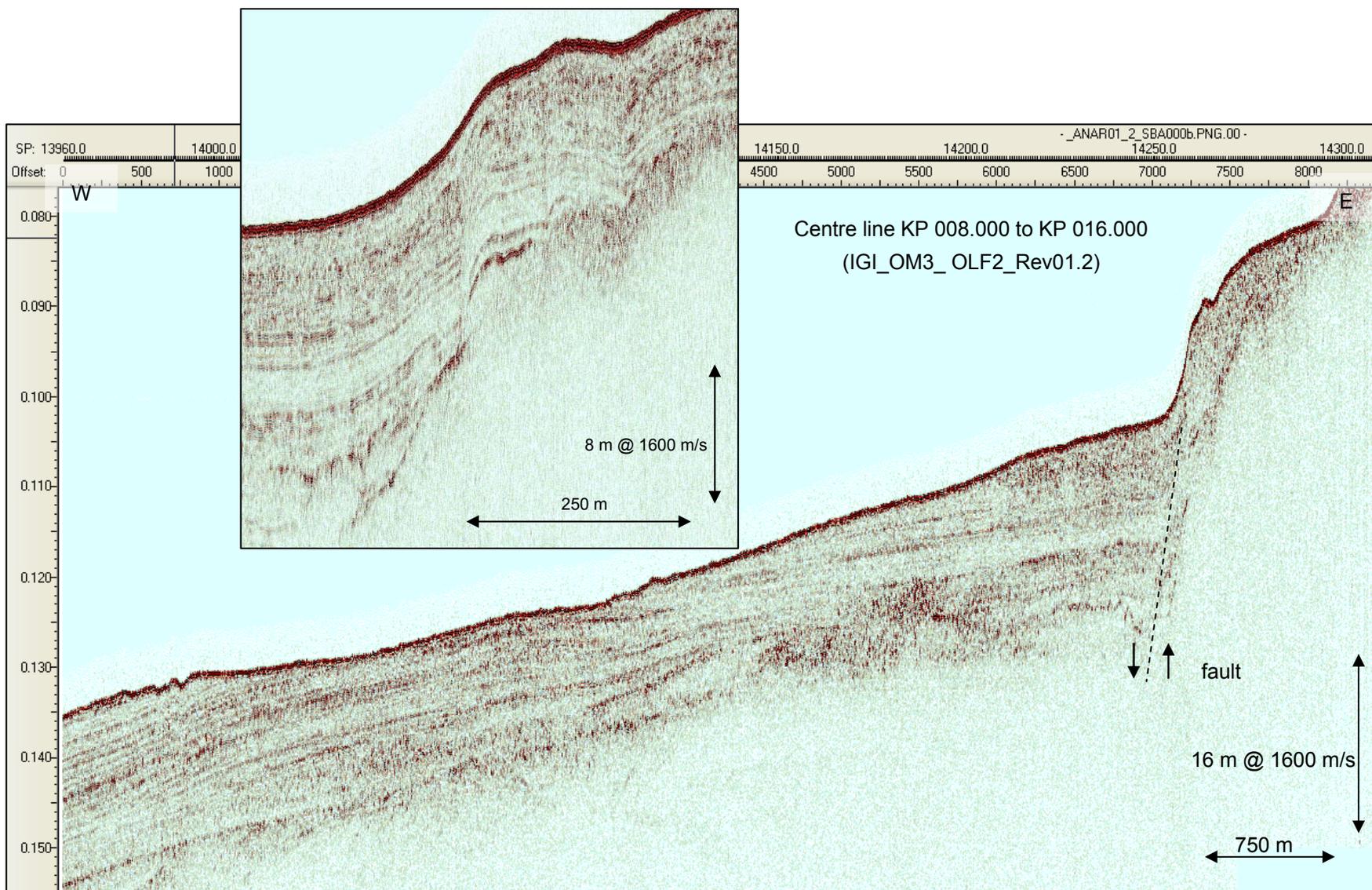
## ANNEX D:

### PHOTOGRAPHIC DOCUMENTATION OF OFFSHORE DMS



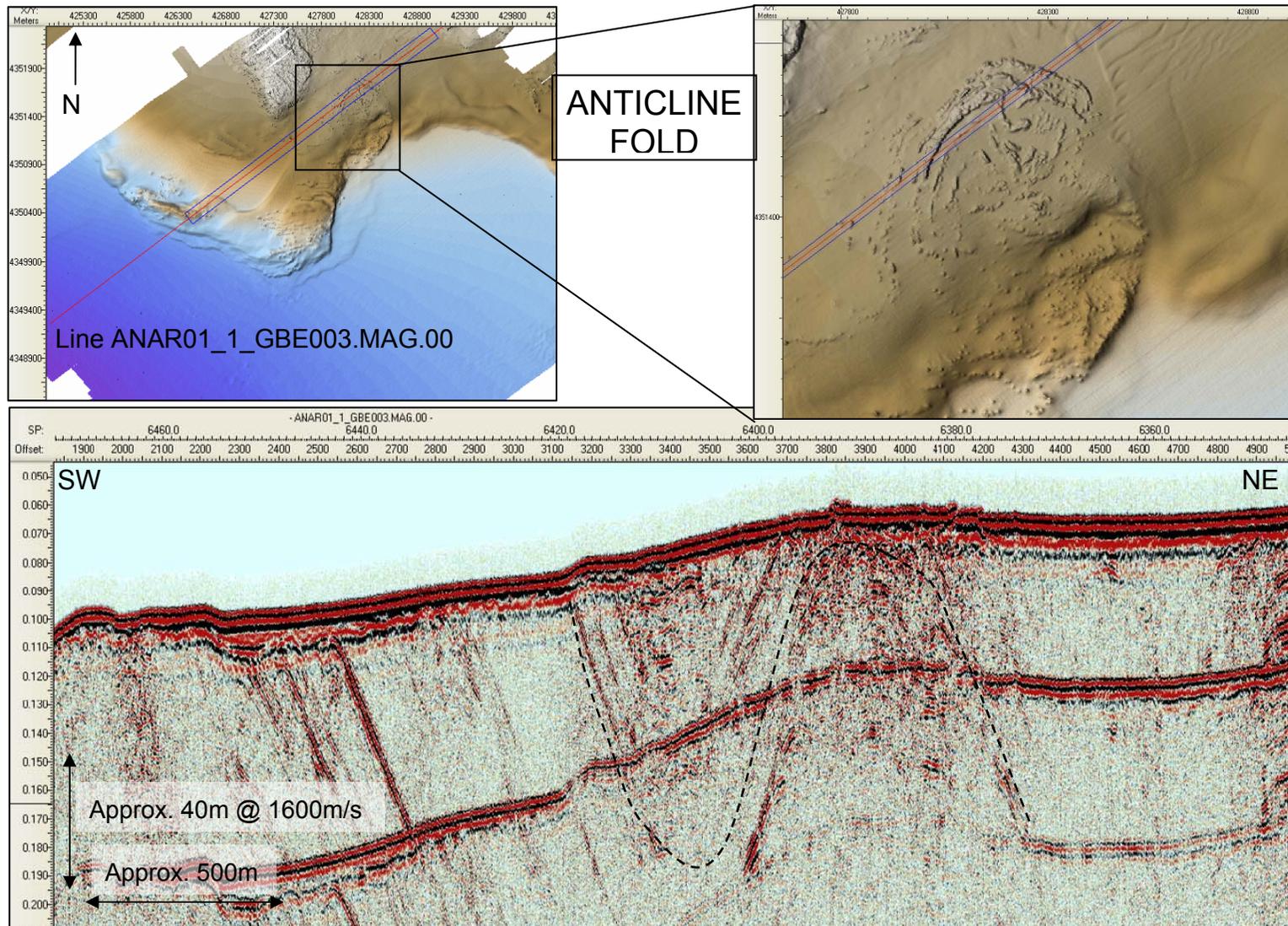
**Figure 2.3: Multibeam echo sounder bathymetry along Route Survey Block A and bathymetry profile along the Proposed Route**

Σχήμα 2.3: Ηχοβολιστική βυθομέτρηση κατά μήκος του τμήματος Α της χάραξης και βυθομετρικό προφίλ κατά μήκος της Προτεινόμενης Χάραξης

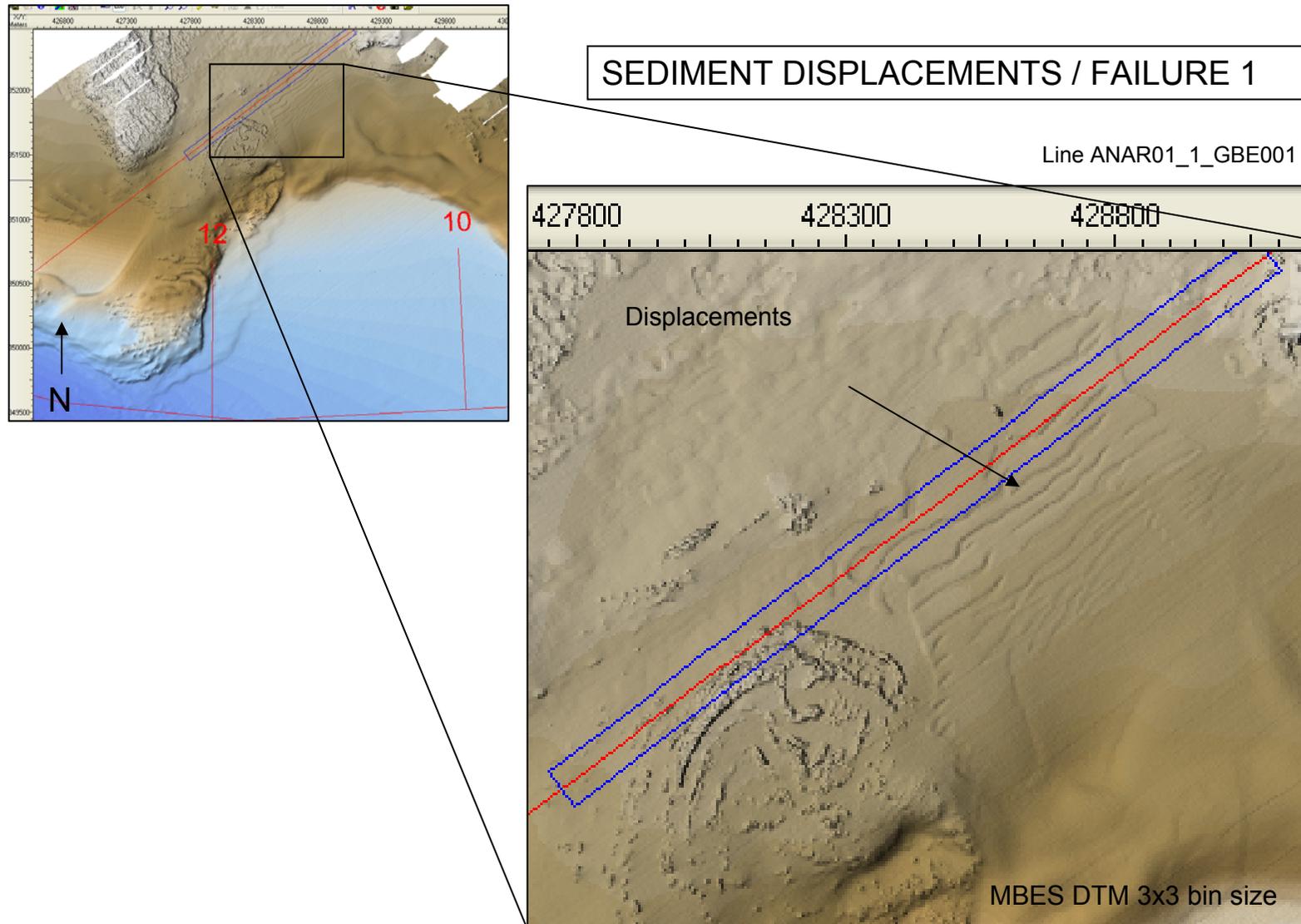


**Figure 2.14: HMP Sub-bottom profile - Fault identified at KP 008.913 along the Proposed Route**

Σχήμα 2.14: HMP Υπεδάφιο προφίλ πυθμένα - Ρήγμα στη θέση KP 008.913 κατά μήκος της Προτεινόμενης Χάραξης.



**Figure 3.10: Mini sleeve gun sub-bottom profile and multibeam bathymetry data – Anticline fold**  
 Σχήμα 3.10: Υπεδάφιο προφίλ πυθμένα και δεδομένα ηχοβολιστικής βαθυμέτρησης - Αντικλινική πτυχή



**Figure 3.12: Multibeam echo sounder bathymetry data example of sediment displacements (Type 1)**  
Σχήμα 3.12: Παράδειγμα δεδομένων ηχοβολιστικής βυθομέτρησης μετατόπισης ιζημάτων (Τύπος 1)

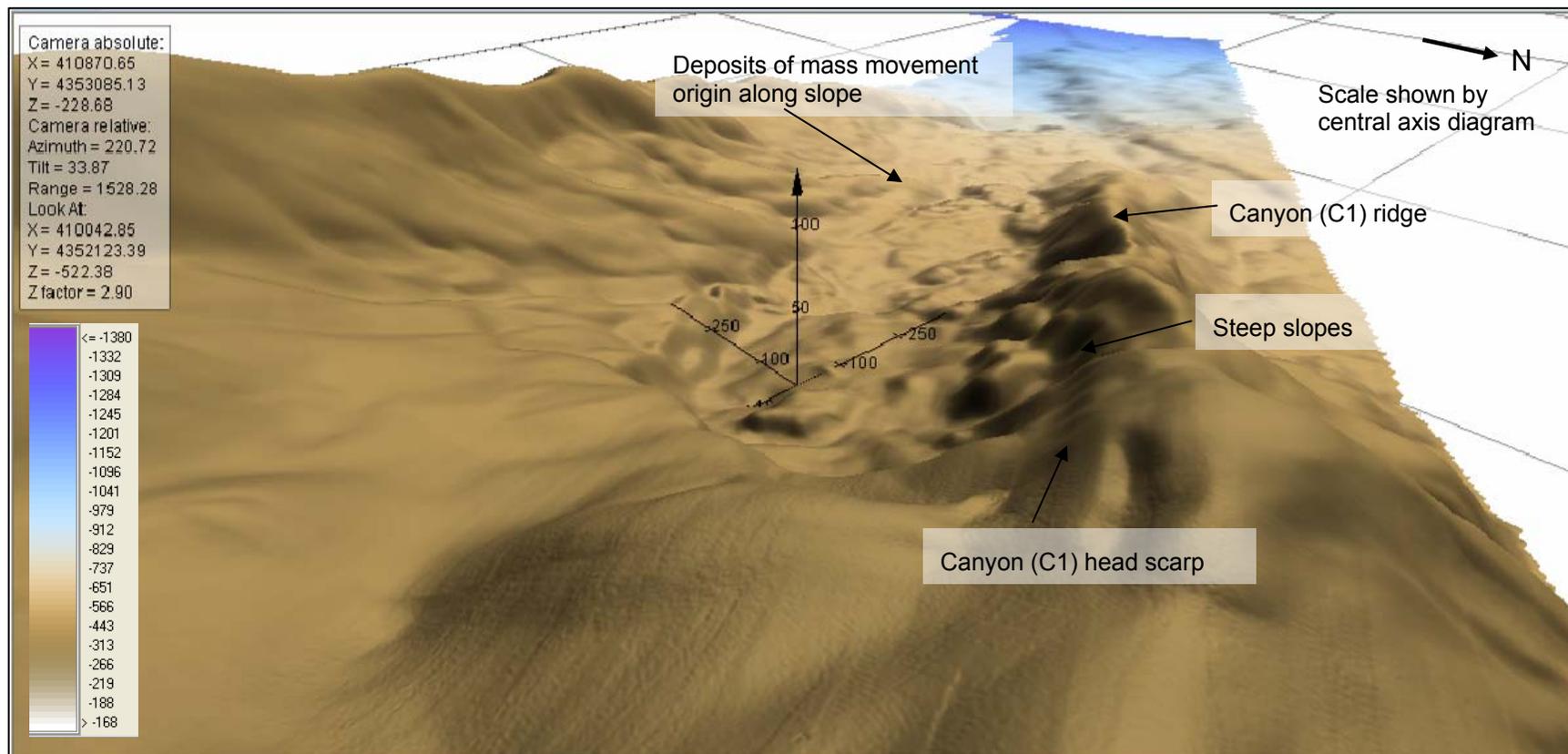


Figure 5.17: Multibeam echo sounder bathymetry 3D image showing upper section of Northern Canyon C1

Σχήμα 5.17: Τρισδιάστατη απεικόνιση της ηχοβολιστικής βυθομέτρησης με ένδειξη του ανώτερου τμήματος του Βόρειου Φαραγγιού C1

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX E:**

### **PHOTOGRAPHIC DOCUMENTATION OF ONSHORE SECTION**

#### **Aerial Images of the proposed**

- E.1 Project's Elements**
- E.2 Geological and Tectonic Documentation**
- E.3 On-site Visit**

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

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### IGI GEOM\_IMAGES\_104\_0

Images of the survey are with a successive order from landfall to the facility area

Οι φωτογραφίες της περιοχής ξεκινάνε από το σημείο προσαιγιάλωσης και καταλήγουν στις Εγκαταστάσεις Μέτρησης και Συμπύεσης

Σημείο Φωτογραφίας/ Point of Picture	Ενδεικτικές συντεταγμένες σε ΕΓΣΑ 87/ Indicative Coordinates in GGRS87	
	X	Y
OM2	180413.60	4358649.01
IP25S	180846.86	4359728.82
IP24S	181012.31	4358895.88
IP21	181144.35	4359708.75
IP18	182280.72	4359424.84
IP17	182381.93	4359306.85
IP14	183276.84	4359556.98
IP13	183368.22	4359700.33
IP04F	181263.70	4359774.18
IP03F	181256.97	4359771.15
IP12F	185481.17	4362909.64

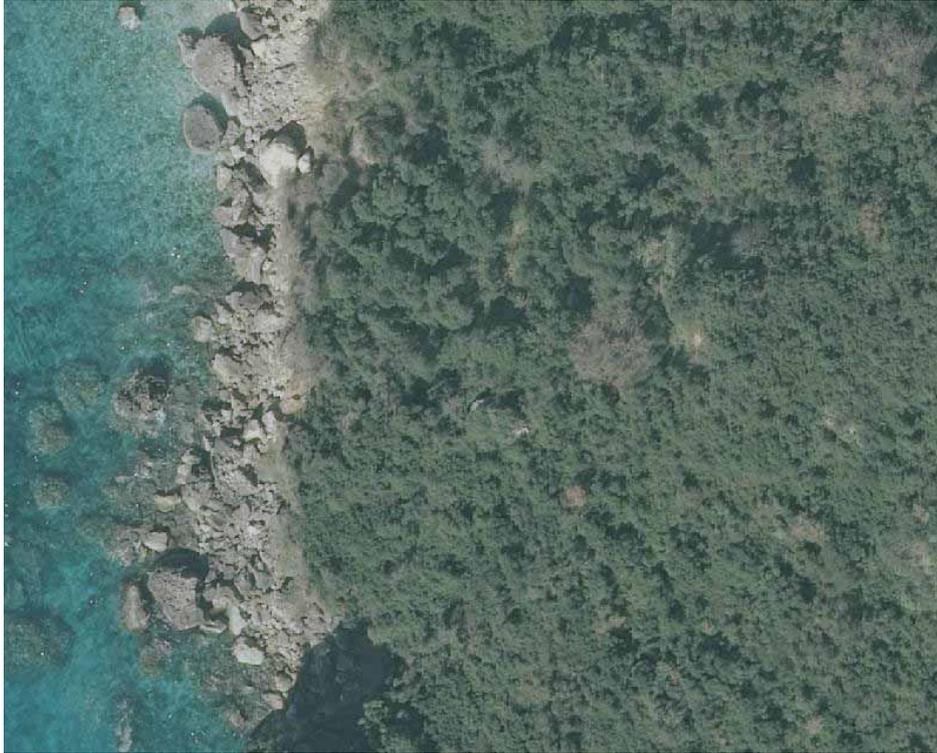


Image 1 : OM2 Landfall  
Εικόνα 1: Σημείο Προσאיγιάλωσης OM2

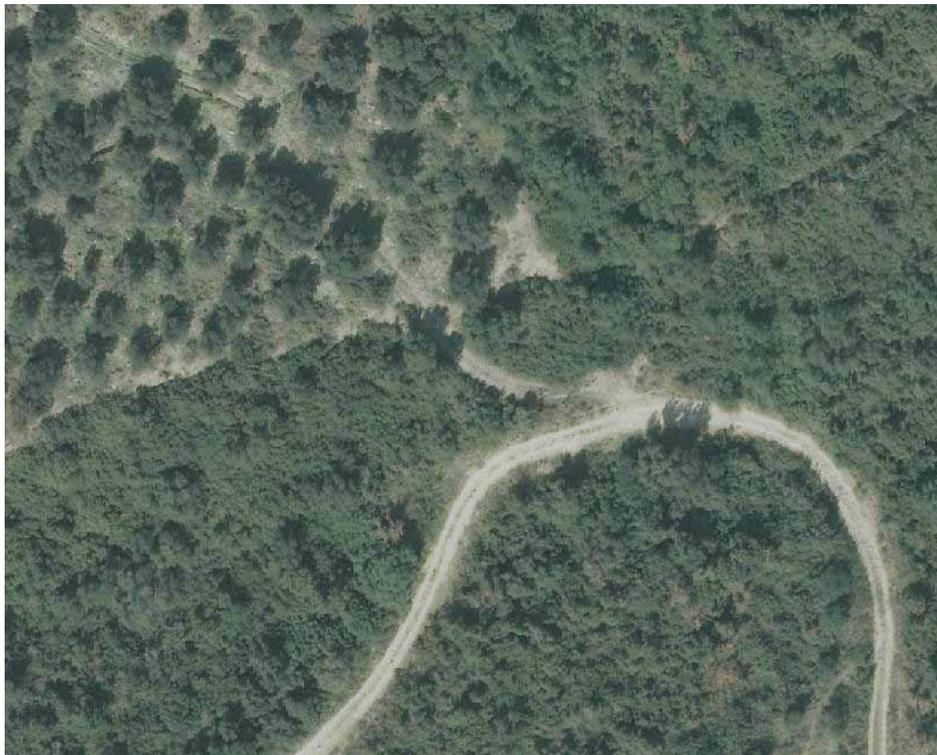


Image 2 :IP25S Dense vegetation and olive grove  
Εικόνα 2: IP25S Πυκνή βλάστηση και ελαιώνες

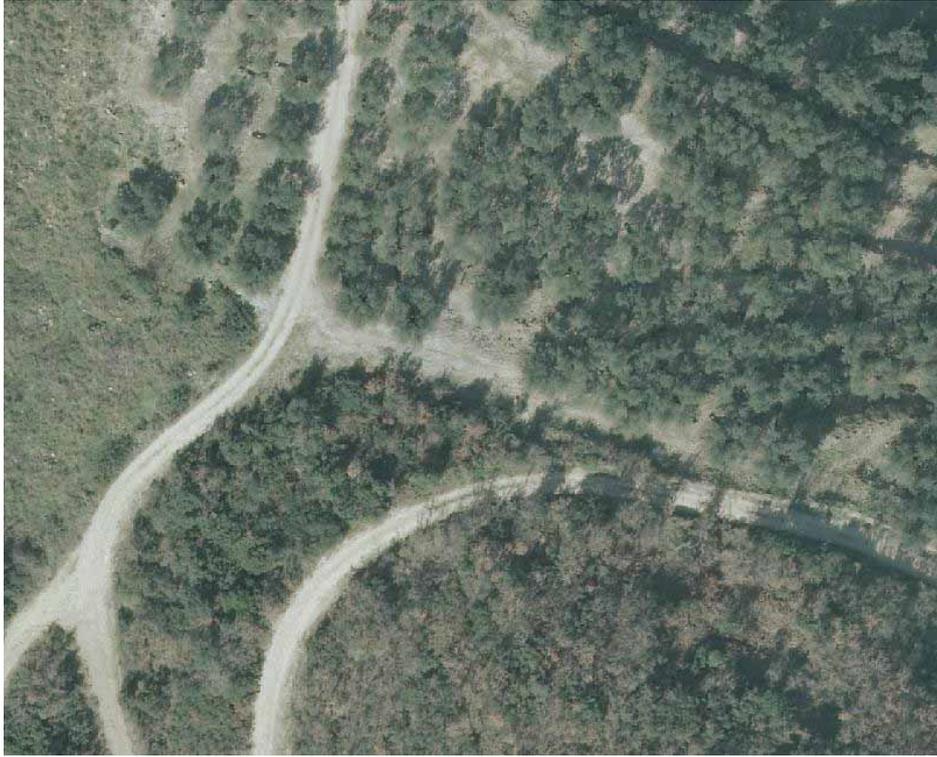


Image 3 : IP24S Olive Grove  
Εικόνα 3: IP24S Ελαιώνες

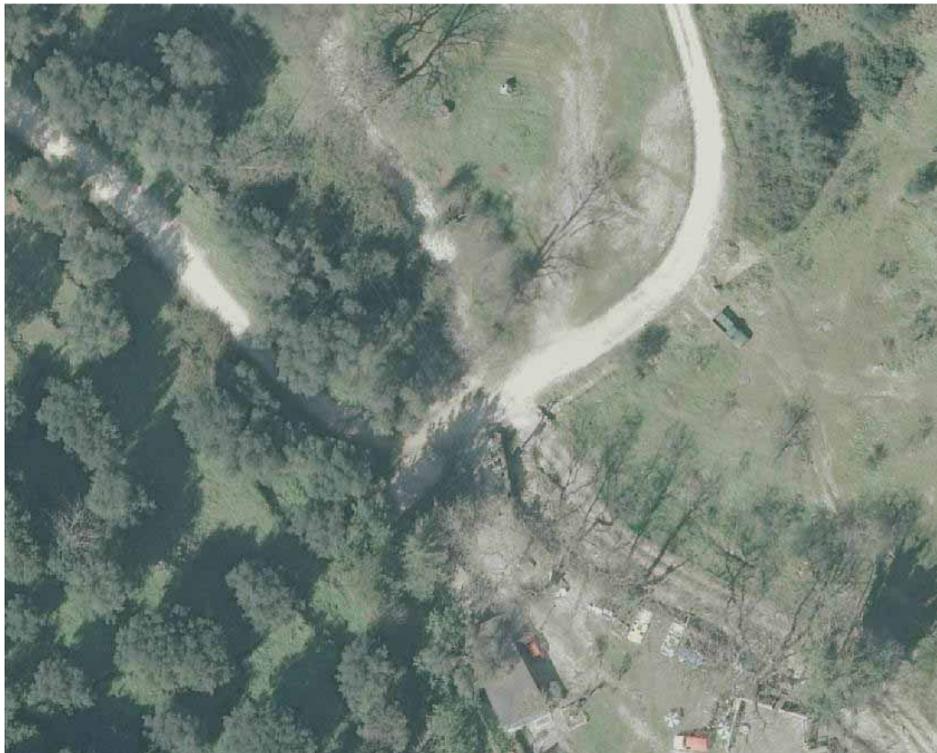


Image 4 : IP21 Buildings and power line  
Εικόνα 4: IP21 Κτίρια και γραμμή ηλεκτρικού ρεύματος



Image 5 : IP18, IP17 Dense vegetation  
Εικόνα 5: IP18, IP17 Πυκνή βλάστηση

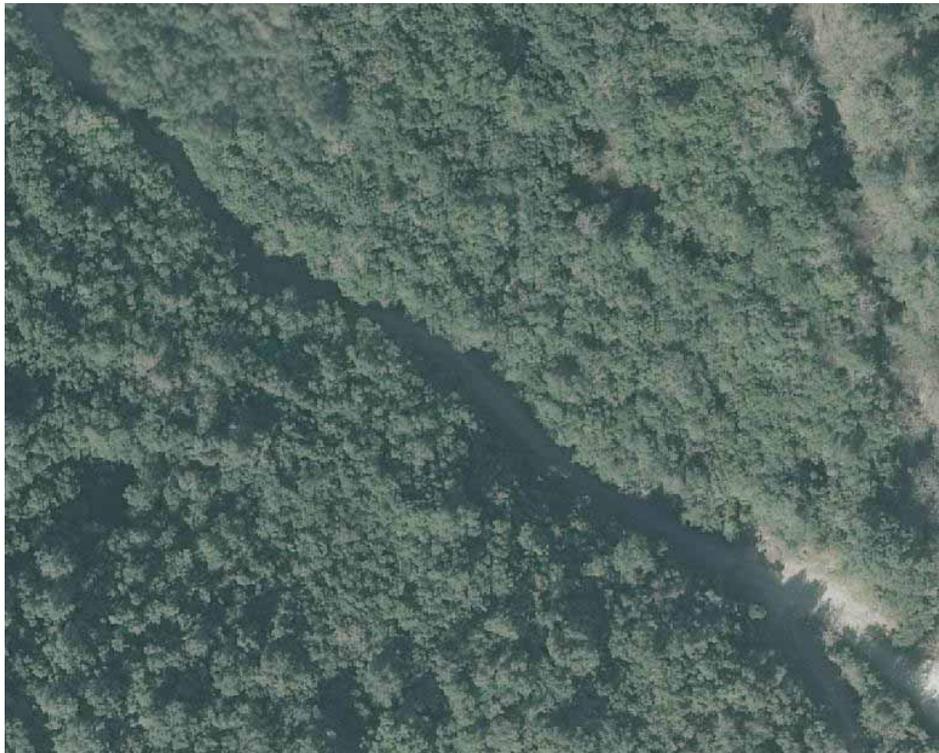


Image 6 : IP14, IP13 Dense vegetation  
Εικόνα 6: IP14, IP13 Πυκνή βλάστηση



Image 7: IP13 Dense vegetation (start of a hill) field and olives  
Εικόνα 7: IP13 Πυκνή βλάστηση (αρχή λόφου), αγρός και ελαιόδεντρα



Image 8 : IP03F IP04F. Asphalt road , building  
Εικόνα 8: IP03F, IP04F. Ασφαλτόδρομος, κτίριο



Image 9 : IP12F. Facility area, olives

Εικόνα 9: IP12F. Περιοχή Εγκαταστάσεων Μέτρησης και Συμπύεσης, ελιές

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX E:**

### **PHOTOGRAPHIC DOCUMENTATION OF ONSHORE SECTION**

#### **Aerial Images of the proposed**

- E.1 Project's Elements**
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Photo 1: General view of the low mountainous landscape of the region under investigation. Optical direction to NE from site  $x/y:180706/4359366$ , Greek Grid.

Εικόνα 1: Γενική άποψη στο τοπίο με χαμηλό ορεινό ανάγλυφο της ευρύτερης περιοχής μελέτης. Οπτική διεύθυνση προς ΒΑ από το σημείο  $x/y:180.706/4.359.366$ , ΕΓΣΑ87.



Photo 2: Field view of the exposed along the coastline Upper Senonian limestones. Optical direction to south from site  $x/y:180.431/4.358.821$ , Greek Grid.

Εικόνα 2: Άποψη των ασβεστόλιθων του Αν. Σενωνίου στην ακτή. Οπτική διεύθυνση προς Νότο από το σημείο  $x/y:180.706/4.359.366$ , ΕΓΣΑ87.



Photo 3: Field view of the Pliocene clay-marl sediments in the pipeline section A (site x/y: 180.492/4.358.881, Greek Grid)

Εικόνα 3: Άποψη των Πλειοκαινικών αργιλομαργαϊκών ιζημάτων σε τομή του αγωγού (σημείο χ/γ:180.492/4.358.881, ΕΓΣΑ87).



Photo 4: Field view of a crack formed in the marl sediments due to surficial creep in the section A as shown by Spyros Pavlides (site x/y:180.604/4.358.642, Greek Grid).  
Εικόνα 4: Άποψη της θραύσης που παρατηρείται στα μαργαίκα ιζήματα λόγω της δράσης επιφανειακού ερπυσμού στην τομή Α, όπως δείχνει ο Σπύρος Παυλίδης (σημείο χ/γ:180.604/4.358.64 ΕΓΣΑ87).



Photo 5: Detailed view of the previous crack (same site) (site x/y:180.604/4.358.642 Greek Grid).

Εικόνα 5: Λεπτομερής άποψη της προηγούμενης θραύσης (ίδιο σημείο) (σημείο: χ/γ:180.604/4.358.642 ΕΓΣΑ87).



Photo 6: Field view of the gypsum that interbeds the Pliocene sediments (site x/y:180.262/4.359.296, Greek Grid).

Εικόνα 6: Άποψη των αποθέσεων γύψου που παρεμβάλλονται στα Πλειοκαινικά ιζήματα (σημείο χ/γ:180.262/4.359.296, ΕΓΣΑ87).



Photo 7: Detail view of the map unit sc1 (L) that covers the map unit (Pl.m) on the western slopes of the mountain chain of the pipeline section A (site x/y:180.882/4.358.735, Greek Grid).  
Εικόνα 7: Λεπτομερής άποψη των κορημάτων που καλύπτουν τα μαργαϊκά ιζήματα.



Photo 8: The exposed Pantokrator Limestones (J1.k) as shown from the road (site x/y:181.004/4.358.716, Greek Grid) cutting across the western slopes of the mountain chain in pipeline section A. Although, its bedding is not so easily observed, it dips to the NE at gentle angles.

Εικόνα 8: Γενική άποψη των ασβεστόλιθων του Παντοκράτορα, όπως φαίνονται από το δρόμο (σημείο x/y:181.004/4.358.716, ΕΓΣΑ87). Αν και η στρώση των ασβεστόλιθων δεν είναι ευδιάκριτη, αυτή έχει βύθιση προς τα ΒΑ σε μικρές γωνίες.



Photo 9: The surficial scree-debris deposits (sc2) of thickness less than 2m that conceal the underlying J1.k. They both included in the map unit J1.k (Sc2) (site x/y:181.079/4.358.976, Greek Grid).

Εικόνα 9: Η επιφανειακή απόθεση κορημάτων, πάχους μικρότερου των 2m που καλύπτει τους υποκείμενους ασβεστόλιθους (σημείο x/y:181.079/4.358.976, ΕΣΓΑ87).



Photo 10: Field view of the Vigla Limestones (Js-K8.k) at the site x/y:181.812/4.360.226, Greek Grid.

Εικόνα 10: Άποψη των ασβεστόλιθων της Βίγλας στο σημείο x/y:181.812/4.360.226, ΕΓΣΑ87.



Photo 11: Field view of an array of WNW-ESE striking faults that dip towards SSW in the Triassic breccias (tb) close to the road that join the village of Perdika with Parga town (site x/y:182.960/4.362.253, Greek Grid).

Εικόνα 11: Άποψη οικογένειας ρηγμάτων γενικής διεύθυνσης ΔΒΔ-ΑΒΑ με βύθιση στα ΝΝΔ στα Τριαδικά λατυποπαγή κοντά στον δρόμο που συνδέει την Πέρδικα με την Πάργα (σημείο x/y:182.960/4.362.253, ΕΣΓΑ87).



Photo 12: Field view of the Triassic breccias (tb) and the badland terrain they form because of their very bad mechanical features (site x/y:184.487/4.360.805, Greek Grid).

Εικόνα 12: Άποψη των Τριαδικών λατυποπαγών και του ανώμαλου αναγλύφου που δημιουργούν λόγω των δυσμενών γεωτεχνικών χαρακτηριστικών τους (σημείο x/y:184.487/4.360.805, ΕΣΓΑ87).



Photo 13: Detailed view of the Triassic breccias (tb) in the same site as previous photo (site x/y:184.487/4.360.805, Greek Grid).

Εικόνα 13: Λεπτομερής άποψη των Τριαδικών λατυποπαγών, στο ίδιο σημείο με την προηγούμενη φωτογραφία (σημείο x/y:184.487/4.360.805, ΕΣΓΑ87).



Photo 14: Field view of the fault affecting the Pantokrator Limestones (Ji.k) (labeled Fp\_19). The fault surface is very steep and intensely eroded (site x/y:185.013/4.362.330, Greek Grid).

Εικόνα 14: Άποψη του ρήγματος που επέδρασε στους ασβεστόλιθους του Παντοκράτωρα. Η κατοπτρική επιφάνεια είναι απότομη και έντονα διαβρωμένη (σημείο x/y:185.013/4.362.330, ΕΣΓΑ87).

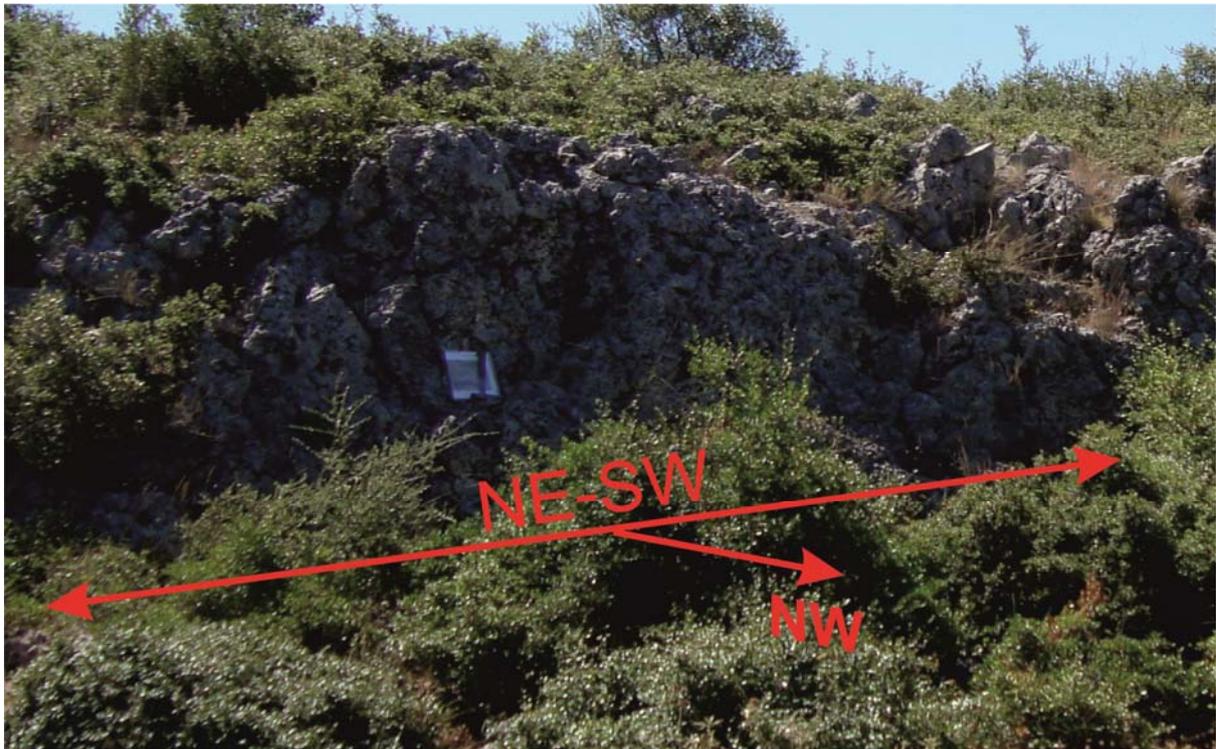


Photo 15: Detailed view of the fault surface of the previous fault (labeled Fp\_19) (site x/y:185.013/4.362.330, Greek Grid).

Εικόνα 15: Λεπτομερής άποψη της κατοπτρικής επιφάνειας του προηγούμενου ρήγματος (Fp\_19) (σημείο x/y:185.013/4.362.330, ΕΣΓΑ87).

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX E:**

### **PHOTOGRAPHIC DOCUMENTATION OF ONSHORE SECTION**

#### **Aerial Images of the proposed**

- E.1 Project's Elements**
- E.2 Geological and Tectonic Documentation**
- E.3 On-site Visit**

## Περιγραφή Εγκαταστάσεων Μέτρησης και Συμπίεσης

### Description of Compressor and Metering Station

**Εικόνα 1 Περιοχή Εγκαταστάσεων Μέτρησης και Συμπίεσης - Κεντροειδές (Λεπτομέρεια).**  
**Picture 1 Area of Compressor and Metering Station - Centroid (Detail).**



**Εικόνα 2 Περιοχή Εγκαταστάσεων Μέτρησης και Συμπίεσης - Πανοραμική Κεντροειδούς (από Ανατολή).**  
**Picture 2 Area of Compressor and Metering Station - Panoramic of Centroid (from the East).**



**Εικόνα 3 Περιοχή Εγκαταστάσεων Μέτρησης και Συμπύεσης - Πανοραμική Κεντροειδούς (από Βόρεια).**  
**Picture 3 Area of Compressor and Metering Station - Panoramic of Centroid (from the North).**



## Γεωλογική Περιγραφή

### Geological Description

Εικόνα 4 Βραχώδεις ασβεστολιθικοί σχηματισμοί στην τομή του δρόμου στην περιοχή του Σταθμού.

Picture 4 Rocky limestone formations at the road section near the facilities site.



Εικόνα 5 Βραχώδεις ασβεστολιθικοί σχηματισμοί στην τομή του δρόμου στην περιοχή του Σταθμού.

Picture 5 Rocky limestone formations at the road section near the facilities site.



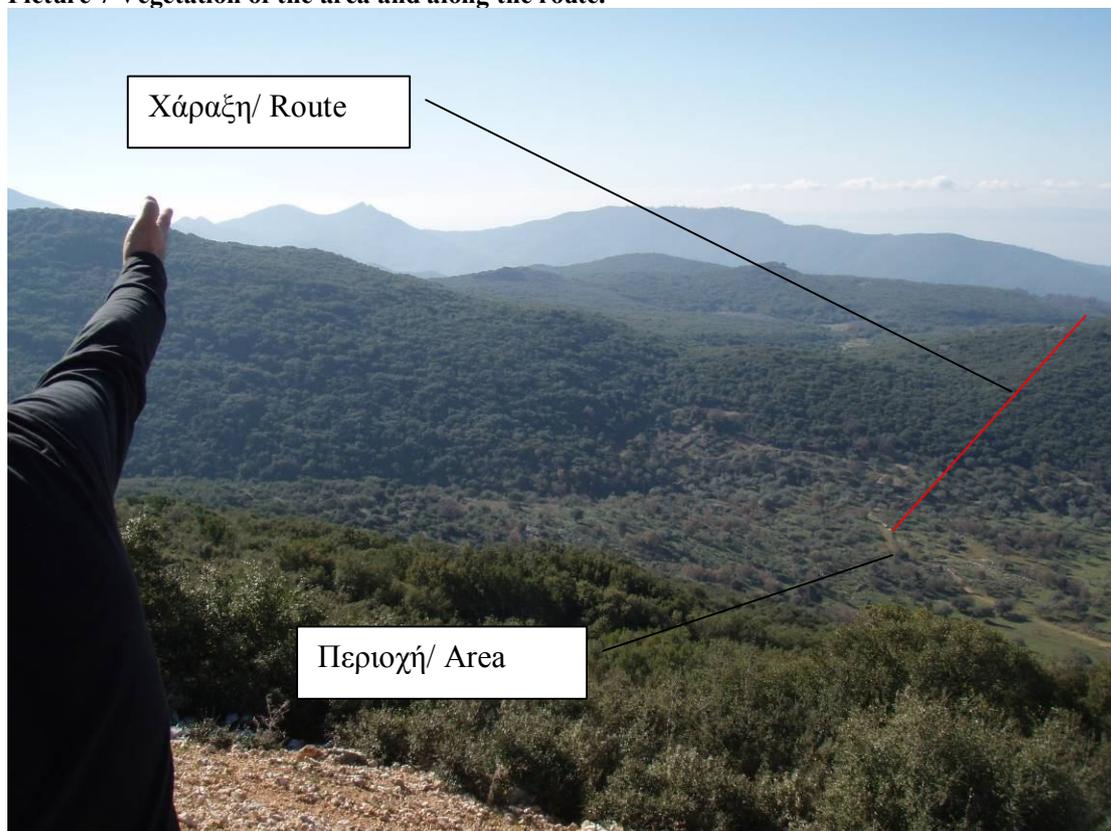
## Περιγραφή Περιβάλλοντος

### Description of the Environment

Εικόνα 6 Βλάστηση στην περιοχή.  
Picture 6 Vegetation of the area.



Εικόνα 7 Βλάστηση στην περιοχή και κατά μήκος της χάραξης.  
Picture 7 Vegetation of the area and along the route.



# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## ANNEX F: REPRESENTATIVE SHORE CROSSING PHOTOS



**Εικόνα 1 Κατασκευή προσαιγιάλωσης του αγωγού Blue Stream – Έλξη αγωγού**

**Picture 1: Actual Blue Stream Landfall Construction – Pipe Pull**



**Backhoe Excavators/ Εκσκαφείς με δαγκάνα**

**Εικόνα 2 Επισκόπηση εξοπλισμού ορύγματος και βυθοκόρησης (για τον αγωγό Blue Stream).**

**Picture 2: Overview of Trenching and Dredging Equipment (Blue Stream)**



Open Trench Dry Excavations/ Χωματουργικά Ανοικτού Ορύγματος



Causeway View/ Όψη Ζώνης Εργασίας Έργου



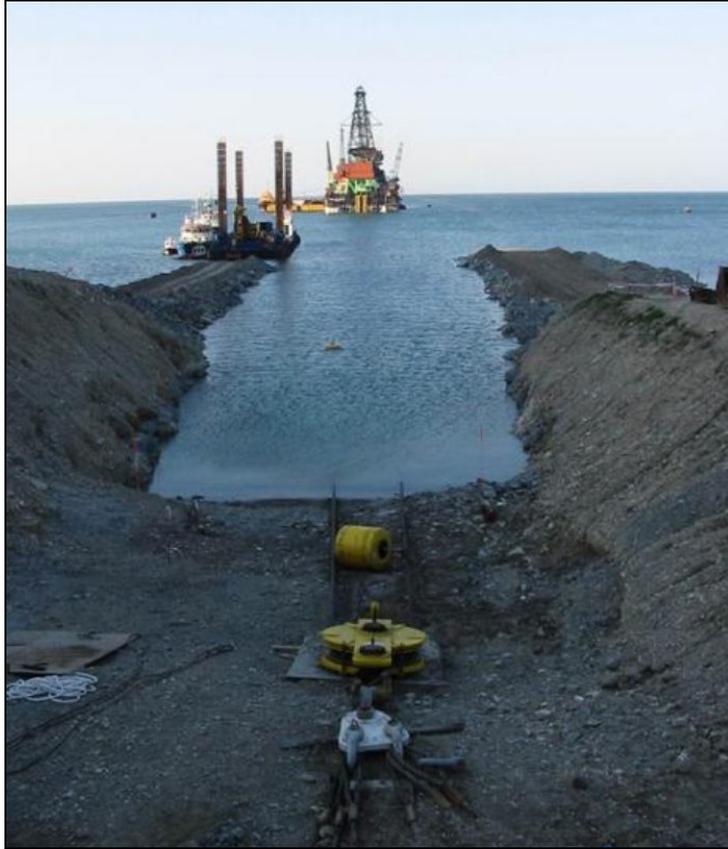
2nd Pipe Pull/ Έλξη αγωγού



Pipe Pull Completion/ Ολοκλήρωση έλξης αγωγού

**Εικόνα 3 Συνθήκες κατασκευής αγωγού Blue Stream.**

**Picture 3: Blue Stream Construction Conditions**



**Εικόνα 4 Παράδειγμα διάταξης βαρούλκου επιστροφής (εγκατάσταση αγωγού Blues Stream από Castoro 8).**

**Picture 4: Example of Return Sheave Arrangement (Castoro 8 installing Blue Stream)**

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## ANNEX G:

### PHOTOREALISTICS OF ONSHORE FACILITIES













# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## ANNEX H:

### AIR EMISSIONS MODEL



Environmental Research Laboratory  
INTR-P / NCSR "Demokritos"



GREEK MINISTRY OF  
NATIONAL EDUCATION AND  
RELIGIOUS AFFAIRS

**STUDY OF THE ATMOSPHERIC DISPERSION  
OF AIR POLLUTANTS FROM  
INTERCONNECTOR GREECE-ITALY (IGI) POSEIDON**

**FINAL REPORT**

**March 2012**

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## SUMMARY

The *Environmental Research Laboratory (EREL)* of the National Centre for Scientific Research “Demokritos” performed the present modelling study of the atmospheric dispersion of NO<sub>x</sub>, HC, CO and PMs assumed to be emitted from the future installation of the Compression of Natural Gas Station (IGI POSEIDON), part of the construction project “Greek-Italian Pipeline of Natural Gas”, at the location of Florovouni in the region of Thesprotia (Greece).

The study was carried out for ASPROFOS Engineering S.A. by the following EREL personnel:

*Vlachogianni D, M.Sc., Ph.D*

*Sfetsos A., Ph.D*

*Gounaris N., M.Sc.*

# 1. INTRODUCTION

## AIM OF THE REPORT

The aim of this work was to study the impact of the dispersion of Nitrogen Oxides (NO<sub>x</sub>), Non-Methane Hydrocarbons (HC), Carbon Monoxide (CO) and Particular Matter (PM) on the atmosphere from the Compression Station IGI POSEIDON (Interconnector Greece-Italy) of natural gas, located at Florovouni (region of Thesprotia, Greece), using appropriate 3-dimensional computer modelling tools of the Environmental Research Laboratory of the NCSR “Demokritos”. The study included the modelling of CH<sub>4</sub> gas from the vents of the dry seal leakage from the compressors and the gas analyser.

The position and geometry of the IGI POSEIDON as well as the necessary data on stacks, emission rates of NO<sub>x</sub>, HC, CO, PM and CH<sub>4</sub> were provided to EREL by Asprofos S.A. based on construction information.

The meteorological data were retrieved by EREL. The topography of the area was extracted from the Geographic Information System (ARC GIS) available at EREL. The basic computational steps followed are listed below:

- (i) Processing of the available data – preparation of the input files for the dispersion model.
- (ii) Modelling calculations of the dispersion of the concentrations of NO<sub>x</sub>, HC, CO, PM and CH<sub>4</sub> from the compression station.
- (iii) Analysis and evaluation of the model results on the distribution of the NO<sub>x</sub>, HC, CO, PM and CH<sub>4</sub> concentrations.
- (iv) Comparison of the calculated concentrations NO<sub>x</sub>, HC, CO and PM with the current EU Directives of air quality standards. Emphasis was placed on the investigation of the values of the concentration of the air pollutants over nearby urban areas.

## 2. PREPARATION OF THE INPUT DATA

This part involves the preparation of the input data files to the atmospheric dispersion model. For the specific study, the necessary data includes the topography and meteorological fields.

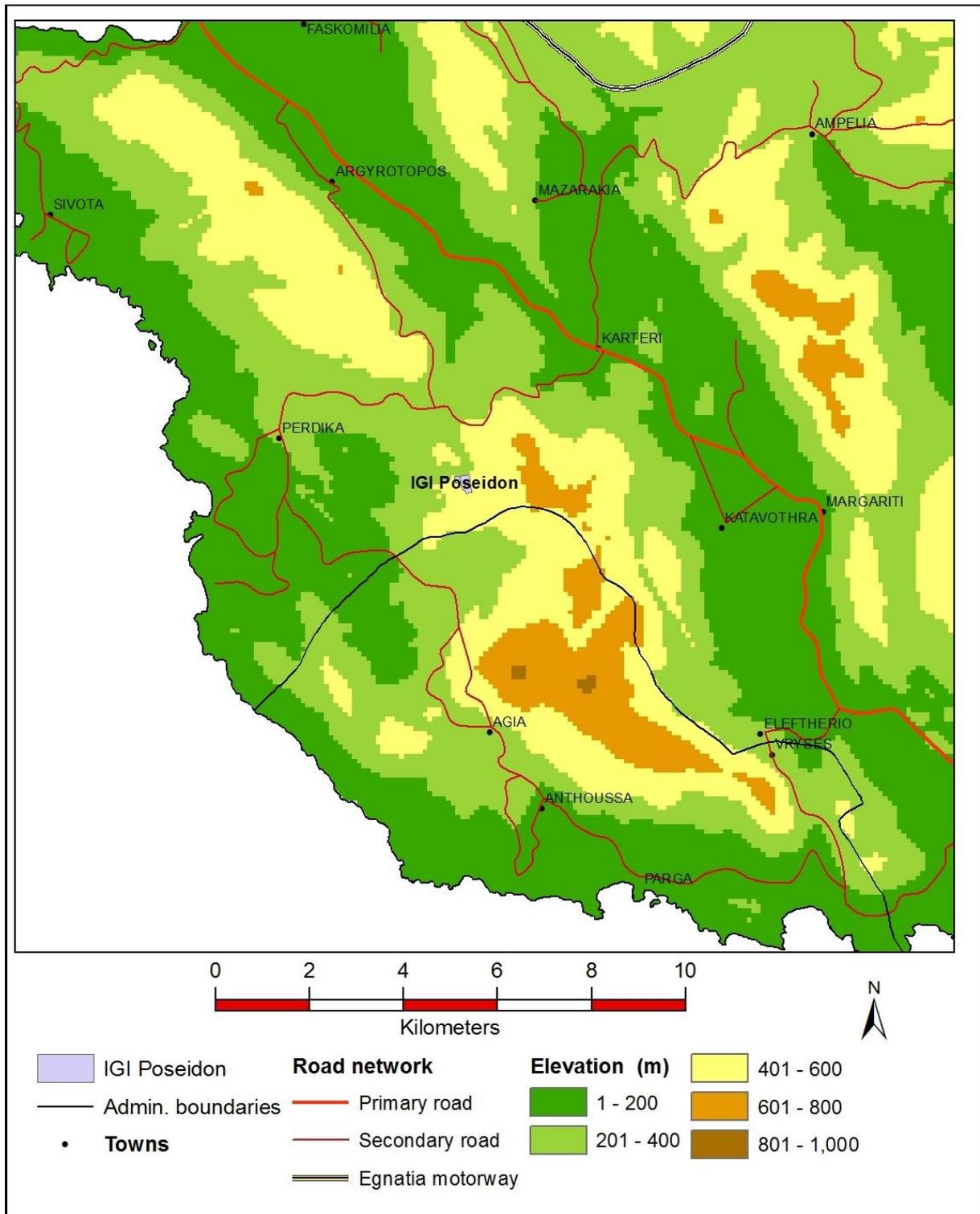
### 2.1. TOPOGRAPHY AND MODELLING DOMAIN

The geographical coordinates of the emission sources of the compression station of natural gas at the location of Florovouni (region of Thesprotia) were provided by the construction company on Greek Geodetic Reference System (GGRS87) (X,Ψ) (Table 1):

**Table 1. Geographic coordinates of the location of the emission sources of IGI POSEIDON (GGRD87).**

<b>Emission Source</b>	<b>X (m)</b>	<b>Ψ (m)</b>
Back-up Generator (1)	185500.841	4362921.2257
Compressors (4)	185444.5788	4362955.4938
	185433.9557	4363037.8119
	185444.5788	4362955.4938
	185433.9557	4363037.8119
Compressors' leakages (vents)	185439.4014	4362918.5325
	185434.4541	4362957.2570
	185428.7783	4362997.4890
	185423.1645	4363039.5750
Gas Analyser (Bleed)	185330.2151	4362864.2808

The computational domain for the atmospheric modelling calculations was constructed in a way so as to include at its centre the IGI POSEIDON. The domain extent was set to 20 km × 20 km to include all the neighbouring urban areas (see Figure 1). The original topographical data used were of 100 m resolution. The topography of the area revealed a non uniform terrain with ridges (up to a height of 1000 m) alternating with valleys running in a northwest to southeast direction.



**Figure 1. Topography map of the computational domain of size 20 ×20 km<sup>2</sup> (contour interval 200 m). The IGI POSEIDON is located in the centre of the domain.**

## **2.2. METEOROLOGY AND CHARACTERISTIC WEATHER TYPES**

The atmospheric dispersion models use as input data meteorological variables such as wind speed and direction, temperature, category of atmospheric stability, mixing layer height etc. The more complex models (like the one used in this study named HYSPLIT) use 3-dimensional meteorological fields as input. The discretised meteorological fields are calculated by prognostic and/or diagnostic models.

The sources of meteorological data are usually the following:

1. Prognostic meteorological weather models of large scale, which use coarser grid than the dispersion models.
2. Observational stations in random locations in the computational domain.

For the current study, meteorological data (vertical distribution of wind speed and direction, temperature, mixing layer height, humidity, precipitation, cloud cover etc) were extracted from the National Centres for Environmental Prediction (NCEP / USA) Global Forecasting System (GFS) available on a 6-hour temporal resolution from a planetary model of 1 degree horizontal resolution.

The prognostic meteorological model MM5 (Mesoscale Model 5 / Pennsylvania State University, National Centre for Atmospheric Research, USA) was used for the calculation of the 3-dimensional meteorological fields.

### **2.2.1. Typical Meteorological Conditions over the study area**

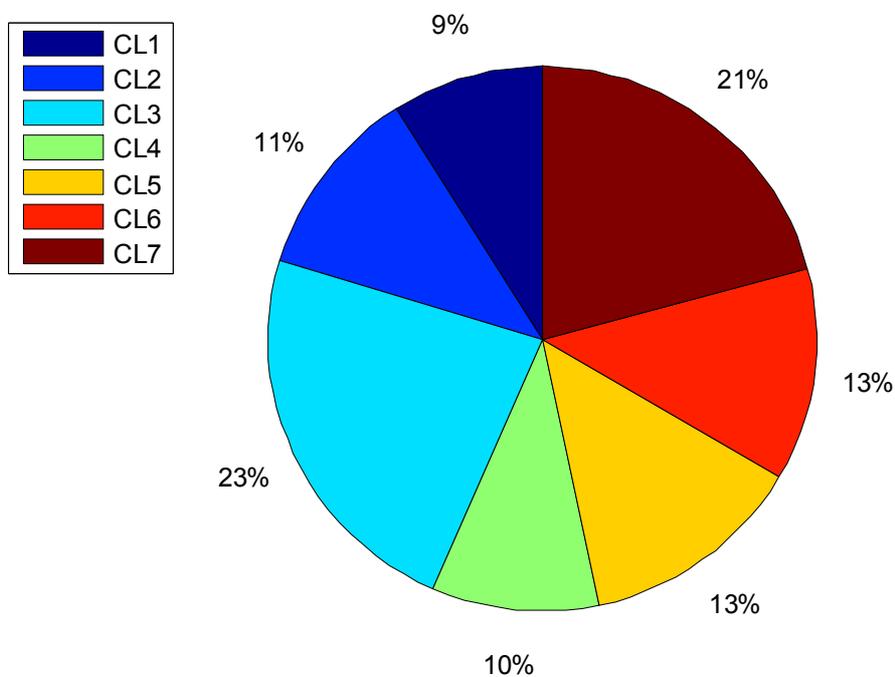
To calculate the average levels and the maximum values of the pollutant concentrations in the atmosphere on an annual, daily and hourly basis, the procedure of identifying the characteristic weather types of the area of interest was followed. The prevailing meteorological conditions or in other words characteristic weather types were obtained by applying the methodology of Sfetsos et al. (2005). The specific methodology was applied on the GFS meteorological data of large scale, as referenced above, covering a five year period (2006-2010). The analysis revealed the prevailing weather conditions in the defined computational domain and the corresponding frequency of occurrence (in percentage) per year. Each weather condition was assigned a characteristic or else typical day (24-hour).

The results showed that the area of study is characterised by seven (7) in total weather types (see Table 2). Table 3, summarises the meteorological conditions from the planetary scale model, which characterise each typical weather day of the region.

The data from the planetary model for the characteristic weather days (see Table 3) were used as initial and boundary conditions to the meteorological model (MM5).

**Table 2. Characteristic weather types and percentage of their frequency of occurrence within a year in the area of Florovouni (region of Thesprotia).**

<b>FLOROVOUNI</b>		
Typical weather type	Frequency Percentage of occurrence in a year (%)	Number of days in a year
1	9	32.85
2	11	40.15
3	23	83.95
4	10	36.5
5	13	47.45
6	13	47.45
7	21	76.65



**Figure 2. Pie chart depicting the frequency of occurrence of the returned clusters.**

**Table 3. Prevailing meteorological conditions during the characteristic weather types in the area of Florovouni: WS wind speed (m/s), WD wind direction (deg.) (at 850 mbar and 10 meter above ground level), T Temperature (K) (at 2 meters above ground level), MLH Mixing Layer Height (m above ground level): Results for 00:00, 12:00 and 24:00.**

**FLOROVOUNI**

**(00:00)**

Typical Day	WS (m/s) (850 mb)	WD (deg.) (850 mb)	T (K) (2 m)	WS (m/s) (10 m)	WD (deg.) (10 m)
1	16.72039	327.2563	286.0021	4.358148	42.0414
2	12.98684	299.8682	293.6903	1.890325	51.40858
3	13.63688	276.259	294.1424	2.697208	93.61414
4	19.22419	250.7224	291.6515	2.921589	141.6712
5	25.822	233.2245	287.779	6.112002	141.1524
6	11.70431	258.5672	284.2415	7.03101	99.83644
7	15.94701	266.57	286.0023	2.009948	114.4267

**(12:00)**

Typical Day	WS (m/s) (850 mb)	WD (deg.) (850 mb)	T (K) (2 m)	MLH (m)	WS (m/s) (10 m)	WD (deg.) (10 m)
1	17.77653	15.254	286.0511	790.3441	9.746546	16.65174
2	12.36237	28.25053	293.3918	1199.438	10.22959	7.142796
3	7.064888	16.18699	293.8235	1223.496	7.889754	18.88497
4	2.157312	278.7621	291.4452	1090.954	4.904919	19.34661
5	9.192361	218.6249	287.7477	884.8964	4.322308	60.41888
6	4.06865	26.30287	284.3701	696.6619	10.16672	43.70327
7	4.782067	356.4973	286.0512	790.3529	6.125416	15.5691

**(24:00)**

Typical Day	WS (m/s) (850 mb)	WD (deg.) (850 mb)	T (K) (2 m)	WS (m/s) (10 m)	WD (deg.) (10 m)
1	37.58229	2.52802	286.3861	3.966157	22.03148
2	34.57086	5.014112	294.2793	4.646049	358.633
3	32.43524	357.3735	294.7434	1.901408	40.55732
4	29.85818	347.9185	292.1861	1.954004	172.35
5	27.52485	337.7174	288.2104	5.510508	152.9836
6	30.88972	356.8826	284.5785	6.077649	77.57907
7	31.67091	352.5386	286.3862	0.504761	146.2745

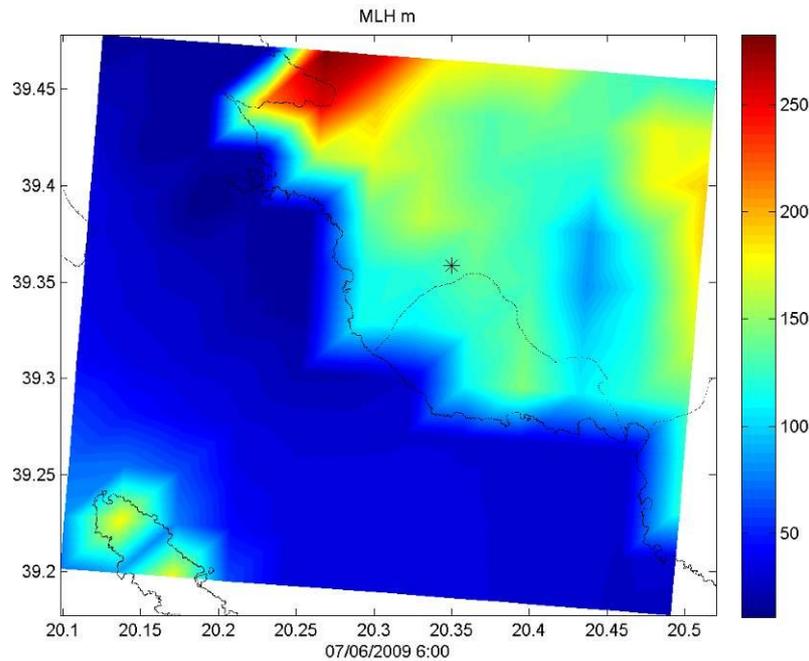
### 2.2.2. MM5 model results

The MM5 model is a limited-area, nonhydrostatic, terrain-following sigma-coordinate model designed to simulate or predict mesoscale atmospheric circulation. The model is supported by several pre- and post-processing programs, which are referred to collectively as the MM5 modelling system.

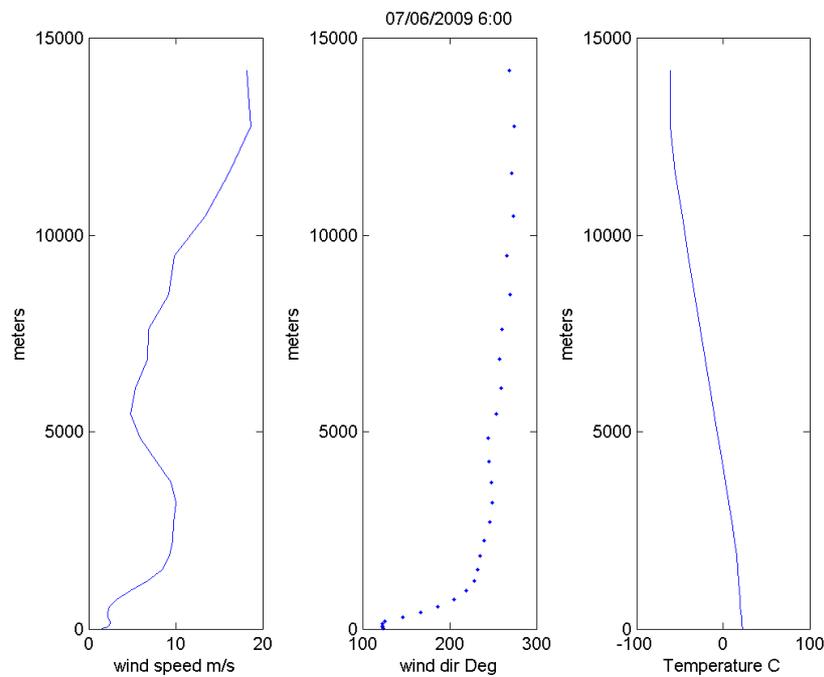
The MM5 model runs were performed with the Grell option (simple cloud scheme), the Rapid Radiative Transfer Model (RRTM) longwave scheme and the Five-Layer Soil model option. Since MM5 is a regional model, it requires initial conditions as well as lateral boundary conditions to run. To produce lateral boundary condition for a model run, one needs gridded data to cover the entire time period that the model is integrated. In this study, the GFS data were used as initial and boundary conditions to the model for the characteristic weather days calculated.

The MM5 model calculated the 3-dimensional meteorological fields of the region of interest, in a horizontal and temporal resolution of 3 km × 3 km and 1-hour, respectively. Subsequently, the

meteorological data files were input to the dispersion model. The meteorological calculations showed that the weather types 4 and 6 exhibited rather low values of the Mixing Layer Height (MLH) during early morning hours compared to the rest of the characteristic types (see Figures 3 and 5). Moreover, those days were characterised by calm conditions with very low winds between the ground surface and 50 meters (see Figures 4 and 6). Such stagnant atmospheric conditions favour the formulation of air pollution events, as pollutants are trapped.



**Figure 3. MM5 calculated Mixing Layer Height above sea level (m) at 6:00 hours, during WT 4.**



**Figure 4. Vertical profiles of wind speed, wind direction and temperature during WT 4 at 6:00 hours, calculated by MM5 at a location close to IGI.**

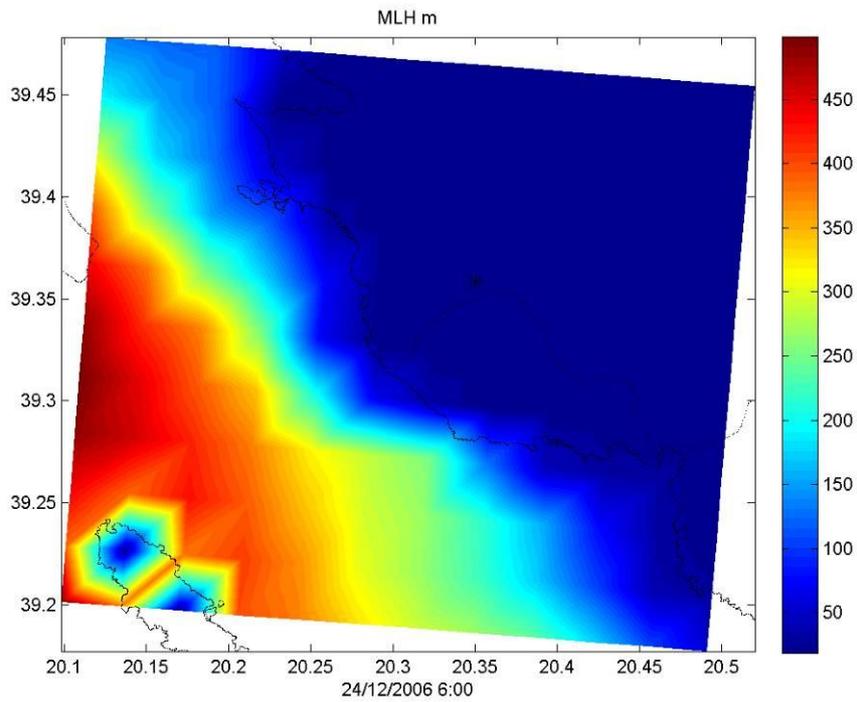


Figure 5. MM5 calculated Mixing Layer Height above sea level (m) at 6:00 hours, during WT 6.

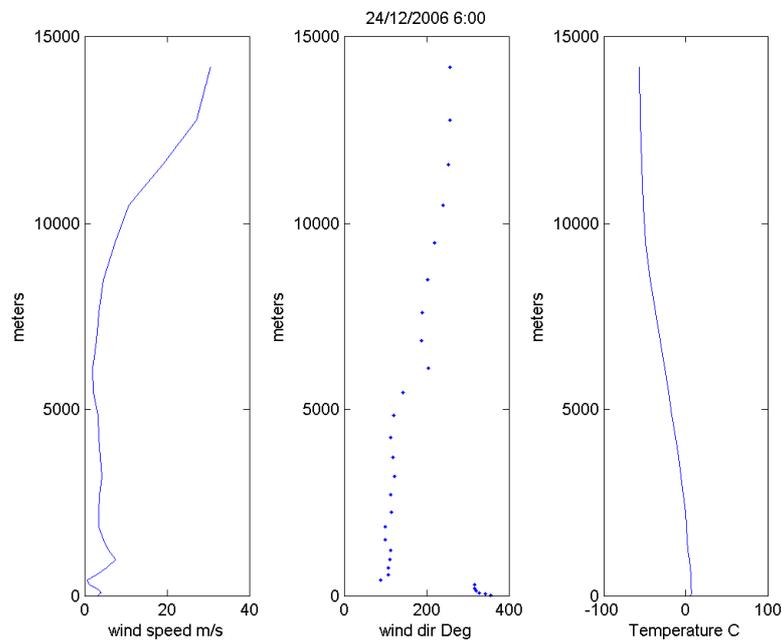


Figure 6. Vertical profiles of wind speed, wind direction and temperature during WT 6 at 6:00 hours, calculated by MM5 at a location close to IGI.

#### REFERENCES

- A. Sfetsos, D. Vlachogiannis, N. Gounaris, and A. K. Stubos, (2005). On the identification of representative samples from large data sets with application to synoptic climatology, *Theor. Appl. Climatol.* 82, 177–182.

### **3. SIMULATION OF THE DISPERSION OF THE POLLUTANTS**

This chapter presents the preparation of the input data for the dispersion model **HYSPLIT** (Hybrid Single Particle Lagrangian Integrated Trajectory Model) used in this study, for each characteristic weather type. The HYSPLIT model is the newest version of a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. As a result of a joint effort between NOAA and Australia's Bureau of Meteorology, the model has recently been upgraded and used for several applications ([http://www.arl.noaa.gov/HYSPLIT\\_info.php](http://www.arl.noaa.gov/HYSPLIT_info.php)).

The computational domain has already been described in paragraph 2.1

#### **3.1. The Dispersion Model**

The Air Resources Laboratory's HYbrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model is a complete system for computing both simple air parcel trajectories and complex dispersion and deposition simulations. The model calculation method is a hybrid between the Lagrangian approach, which uses a moving frame of reference as the air parcels move from their initial location, and the Eulerian approach, which uses a fixed three-dimensional grid as a frame of reference. In the model, advection and diffusion calculations are made in a Lagrangian framework following the transport of the air parcel, while pollutant concentrations are calculated on a fixed grid.

The model is designed to support a wide range of simulations related to the atmospheric transport and dispersion of pollutants and hazardous materials, as well as the deposition of these materials to the Earth's surface.

#### **3.2. Data of the pollutant emissions**

The data of the emission levels of NO<sub>x</sub>, CO, HC and PMs from IGI POSEIDON were provided to EREL by the constructor.

The station is designed to comprise four Compressors of 30MW each, in full annual operation (24 hours x 365 days) and one Back-up Generator (Gas turbine exhaust) of 3.5 MW, operating 350 days per year. The computational study investigated the effect of varying the height of the stacks of the compressors (19 m or 25 m) on the concentration fields of the pollutants. In addition, simulation of the leakage of CH<sub>4</sub> gas was performed from the 2 vents on each compressor and from the gas analyser.

Table 4 shows data on the geometric characteristics of the stacks and the gas flow properties while Table 5 provides the estimated values of the pollutants provided for input to the dispersion model. Table 6 summarises the data on the leakages of CH<sub>4</sub> from the compressors and the gas analyser.

**Table 4. Data on emission sources from IGI Poseidon.**

Name of emission source	Number of stacks	Stack Geometric characteristics		Exit gas Temperature (°C)	Exhaust gas flow rate (kg/h)	Exhaust gas flow volume rate (Nm <sup>3</sup> /h)	Exit gas velocity (m/s)
		Height (m)	Diameter (m)				
Compressor (4 compressors)	4	19 or 25	3.5	528	338400	254492	21.7
Back-up generator	1	19 or 25	5	445	68365	51274	
Compressors' leakages (Emergency and Maintenance Depressurization)	2 vents on each compr.	15	-	-	0.7 – 4.264		
Gas analyzer (Bleed)	1	8	-	-	0.07	0.1	

**Table 5: Data of HC, CO, PM and NO<sub>x</sub>, from each Compressor of IGI.**

Pollutant	Pollutant concentration in exhaust mg/Nm <sup>3</sup>	Pollutant rate gr/h
HC	5	1272.46
CO	5	1272.46
PM	5	1272.46
Pollutant	Pollutant concentration in exhaust mg/Am <sup>3</sup>	Pollutant rate gr/h
NO <sub>x</sub>	10.5	8032.5 (assuming 212.5 Am <sup>3</sup> /sec)

**Table 6: Emission data of CH<sub>4</sub>.**

<b>Name of emission source</b>	<b>CH<sub>4</sub> kg/h</b>	<b>Total CH<sub>4</sub> load kg/year</b>
Compressors' leakages (Emergency and Maintenance Depressurization) 2 vents on each compressor	Range of: 0.7 – 4.264	Range of: 49804 - 298826
Gas analyzer (Bleed)	Average value: 0.07	Range of: 613 - 774

## 4. RESULTS - CONCLUSIONS

### 4.1. NO<sub>x</sub>, CO, PM & HC concentrations

This section focuses on the analysis of the HYSPLIT model results about the concentration values of NO<sub>x</sub>, CO, PM and HC from the compression station IGI Poseidon.

The concentrations of NO<sub>x</sub> were calculated on an hourly and annual basis to compare the modelled results with the respective air quality limits as set by the legislation in force (MD 14122/549/E.103/2011 “Measures to improve air quality in compliance with the provisions of Directive 2008/50/EC "on the air quality and cleaner air for Europe" the European Parliament and Council of the European Union of 21 May 2008”). According to the current directive, the air quality limit for NO<sub>2</sub> for averaging period of 1 hour is set at 200 µg/m<sup>3</sup> not to be exceeded more than 18 times a calendar. On an annual average basis, the respective limit is 40 µg/m<sup>3</sup>. The CO values were calculated as maximum daily 8 hour running mean concentrations for comparison with the respective air quality limit of 10 mg/m<sup>3</sup> (Directive 2008/50/EC). It must be emphasized that there is no current EU Directive establishing air quality standards on HC. Yet, the EU Directive 2008/50/EC relating to limit values for Benzene in ambient air (annual average limit concentration of 5 µg/m<sup>3</sup>) could be adopted in the case when the percentage concentration of benzene in total emitted HC is known. The air quality limits for PM<sub>10</sub>/PM<sub>2.5</sub> are set by the Directive 2008/50/EC, as 50 µg/m<sup>3</sup> (not to be exceeded more than 35 times a calendar year) for the average daily concentration and 40 µg/m<sup>3</sup> for the average annual concentration.

The modelling approach was performed without the inclusion of the photochemical reactions which could reduce the concentrations of NO<sub>x</sub>, CO and PM in the atmosphere for the reason of obtaining the maximum possible values in the domain. Moreover, detailed data on the HC compounds would be needed for a photochemical model. It should be noted that the background air quality concentrations of the region have not been included in this study; therefore, the concentration values of the pollutants refer only to those from the compression station.

As far as background concentrations concern, reliable information on the air quality of the region of interest can be extracted from the database of EMEP, *European Monitoring and Evaluation Programme*, which is a scientifically based and policy driven programme under the Convention on Long-range Transboundary Air Pollution for international co-operation to solve transboundary air pollution problems (<http://www.ceip.at/emission-data-webdab/gridded-emissions-in-google-maps/>). According to the EMEP data, the background of NO<sub>x</sub> emissions of the 50×50 km<sup>2</sup> area (where IGI Poseidon is placed) centred at the town of Paramithia is estimated at 2963.71 Mg/year (EMEP, reference year 2009). These emissions result from the existing anthropogenic activities in the area (e.g. traffic, agriculture, combustion industry, waste disposal, fossil fuel extraction and distribution). In comparison with the anthropogenic emission levels of NO<sub>x</sub> from the adjacent cell of 50×50 km<sup>2</sup> centred at Arta, estimated at 4353.66 Mg/year (EMEP, reference year 2009), where greater population and anthropogenic activities can be found, it can be concluded that the NO<sub>x</sub> background levels in the area of interest are low. In addition, the NO<sub>x</sub> emission rate from IGI of approximately 104 Mg/year is also found to be comparatively at low levels.

Similarly, the EMEP 2009 data for the CO background anthropogenic emissions show a total value of 6996.3 Mg/year in the area of the 50×50 km<sup>2</sup> centred at Paramithia. Hence, the CO contribution of approximately 13.0 Mg/year of IGI to the total emissions of the area is small. The same area emits 1634.2 Mg/yr of HC (Non Methane VOC) from anthropogenic activities while HC emissions from

IGI are estimated at much lower values of approximately 12.5 Mg/yr. The PM10 (PM coarse) EMEP emission data of the same referenced area and year are 238.86 Mg/yr while from IGI the estimated emission contribution is approximately 13.2 Mg/yr.

The distribution of the calculated NO<sub>x</sub> maximum hourly and annual average concentrations is shown in contours in Figures 7 to 10 (Annex A), where the centre is placed at the IGI Poseidon. The results are shown for both height stack scenarios of 19 m and 25 m and for all characteristic weather types (see Table 2). Special attention was given to the populated areas of more than 50 inhabitants and at a distance of 15 km around the compression station.

The results show that the maximum hourly average values of NO<sub>x</sub> concentrations from IGI Poseidon do not to exceed the air quality limit of 200 mg/m<sup>3</sup> for any assumed height of the stacks and during any weather type in the region even during those (WT 4 and 6) characterised by high stability in atmospheric masses and low wind speeds (see also Table 7). The maximum hourly average NO<sub>x</sub> concentrations remain low and well below the air quality limit even in the vicinity of the stacks. In fact, the highest maximum hourly NO<sub>x</sub> concentrations values were found to be equal to 106 µg/m<sup>3</sup> and 104 µg/m<sup>3</sup> for stack height 19m and 25m, respectively during WT 4 (Table 8). Additionally, the annual average values of NO<sub>x</sub> do not exceed the respective air quality limit (40 µg/m<sup>3</sup>) as very low values have been calculated for the two stack heights and weather types (Figures 9 and 10).

Figures 11 and 12 depict the model results of the CO maximum 8-hour mean concentrations for the 7 WTs. The maximum 8-hour value of CO concentration was calculated to be equal to 4.2 µg/m<sup>3</sup> and 4.0 µg/m<sup>3</sup> during WT 4 (see Table 8). The CO values were found to remain very low compared to the legislative limit everywhere in the domain and no exceedances occurred.

Similarly, no exceedances in the PM hourly maximum and annual concentrations of the respective air quality limits were calculated for both stack heights and weather types (Figures 17 to 19). The PM calculated concentrations were found to be very low everywhere in the area of study (see also Table 8).

Tables 9 and 10 summarise the average NO<sub>x</sub> maximum hourly and annual concentrations, the CO maximum 8-hour mean values and the PM daily and annual average concentrations, calculated by the dispersion model for the two assumed stack heights (19 m and 25 m), at the location of the compression station and over the residential areas of the domain. **It can be deduced, that no exceedances of the air quality limits of the pollutants occur over the populated regions.**

Figures 13 to 16 depict the distribution of HC concentrations calculated as maximum hourly and annual averages for the two stack heights (19 m and 25 m) and weather types (see also Tables 11-12). An inspection of the values yields that overall the HC concentrations are low. Even in the case of the average annual total HC concentrations, the values remain well below the level of 5 µg/m<sup>3</sup>, which is the air quality limit of Benzene. Hence, it is safe to conclude that the total HC concentrations from IGI Poseidon are very low on annual basis and do not in any case of assumed stack height exceed the only existing relevant limit that of benzene.

**Table 7. Maximum calculated values of hourly average NO<sub>x</sub> concentrations in the domain per weather type (height of stacks at 19 m and 25 m).**

IGI POSEIDON		
Typical weather type	19 m Stack	25m Stack
	Height Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Height Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )
1	31	32
2	61	55
3	37	32
4	106	104
5	28	22
6	46	45
7	65	38

**Table 8. Maximum calculated average concentration values of NO<sub>x</sub>, CO and PM10 in the domain.**

Stack Height (m)	Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Annual average NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Maximum 8-h mean CO concentration (µg/m <sup>3</sup> )	Maximum average daily PM10 concentration (µg/m <sup>3</sup> )	Maximum annual average PM10 concentration (µg/m <sup>3</sup> )
	(Air quality limit 200 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )	(Air quality limit 10000 µg/m <sup>3</sup> )	(Air quality limit 50 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )
19	106	3.4	4.2	1.9	0.5
25	104	2.8	4.0	1.5	0.4

**Table 9. Calculated maximum concentration values of NO<sub>x</sub>, CO and PM10 for 19 m stack height over the residential areas in the domain.**

IGI POSEIDON						
19 m stack height						
		Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Annual average NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Maximum 8-h mean CO concentration (µg/m <sup>3</sup> )	Maximum average daily PM10 concentration (µg/m <sup>3</sup> )	Annual average PM10 concentration (µg/m <sup>3</sup> )
Nu.	Place of residence	(Air quality limit 200 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )	(Air quality limit 10000 µg/m <sup>3</sup> )	(Air quality limit 50 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )
1	IGI POSEIDON	80.2	1.5	2.9	1.6	0.3
2	KARTERI	9.4	0.1	0.3	0.1	0.0
3	MARGARITI	3.6	0.1	0.1	0.1	0.0
4	PERDIKA	24.9	0.8	1.3	1.2	0.2
5	SIVOTA	0.5	0.0	0.0	0.0	0.0

**Table 10. Calculated maximum concentration values of NO<sub>x</sub>, CO and PM10 for 25 m stack height over the residential areas in the domain.**

IGI POSEIDON						
25 m stack height						
		Maximum hourly (mean) NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Annual average NO <sub>x</sub> concentration (µg/m <sup>3</sup> )	Maximum 8-h mean CO concentration (µg/m <sup>3</sup> )	Maximum average daily PM10 concentration (µg/m <sup>3</sup> )	Annual average PM10 concentration (µg/m <sup>3</sup> )
Nu.	Place of residence	(Air quality limit 200 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )	(Air quality limit 10000 µg/m <sup>3</sup> )	(Air quality limit 50 µg/m <sup>3</sup> )	(Air quality limit 40 µg/m <sup>3</sup> )
1	IGI POSEIDON	99.3	1.3	3.1	1.2	0.2
2	KARTERI	4.5	0.1	0.2	0.1	0.0
3	MARGARITI	1.9	0.1	0.2	0.1	0.0
4	PERDIKA	11.5	0.4	0.5	0.5	0.1
5	SIVOTA	0.4	0.0	0.0	0.0	0.0

**Table 11. Calculated maximum average HC concentration per weather type for 19 m stack height.**

<b>Weather Type</b>	<b>Maximum hourly average HC concentration <math>\mu\text{g}/\text{m}^3</math></b>	<b>Maximum hourly HC concentration <math>\mu\text{g}/\text{m}^3</math></b>
1	0.8	4.9
2	1.3	9.7
3	0.4	5.9
4	1.8	16.8
5	1.0	4.5
6	0.9	7.3
7	0.5	10.3

**Table 12. Calculated maximum average HC concentration per weather type for 25 m stack height.**

<b>Weather type</b>	<b>Maximum hourly average HC concentration <math>\mu\text{g}/\text{m}^3</math></b>	<b>Maximum hourly HC concentration <math>\mu\text{g}/\text{m}^3</math></b>
1	0.8	5.1
2	1.0	8.7
3	0.4	5.0
4	1.6	16.5
5	0.6	3.4
6	0.4	7.1
7	0.4	6.1

## 4.2. CH<sub>4</sub> concentrations

Methane (CH<sub>4</sub>) is a greenhouse gas and therefore, it is not related to air quality legislative limits. The dispersion calculations yielded the maximum hourly average concentrations and the maximum hourly value detected in the domain for each weather type (see Table 13). In addition, the distribution of the maximum hourly averages per weather type and the annual average CH<sub>4</sub> concentrations in the area of study can be found in Figures 21 and 22.

**Table 13. Calculated maximum hourly average and maximum hourly CH<sub>4</sub> concentrations per weather type.**

<b>Weather type</b>	<b>Maximum hourly average CH<sub>4</sub> concentration μg/m<sup>3</sup></b>	<b>Maximum hourly CH<sub>4</sub> concentration μg/m<sup>3</sup></b>
1	33.6	91.3
2	42.3	115.8
3	45.7	133.4
4	60.5	146.7
5	37.6	94.3
6	63.0	207.9
7	70.9	255.6

**Figures**

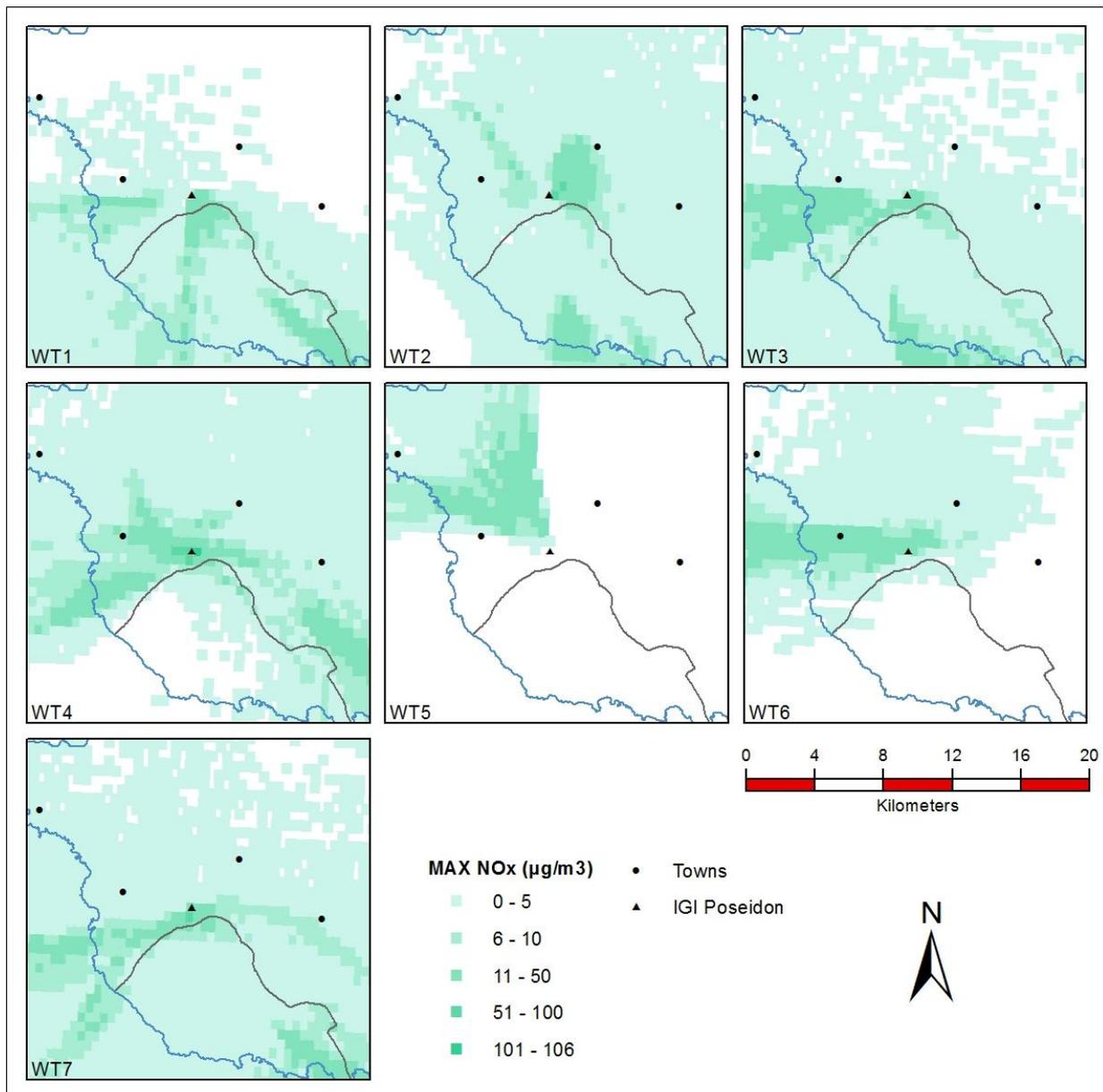
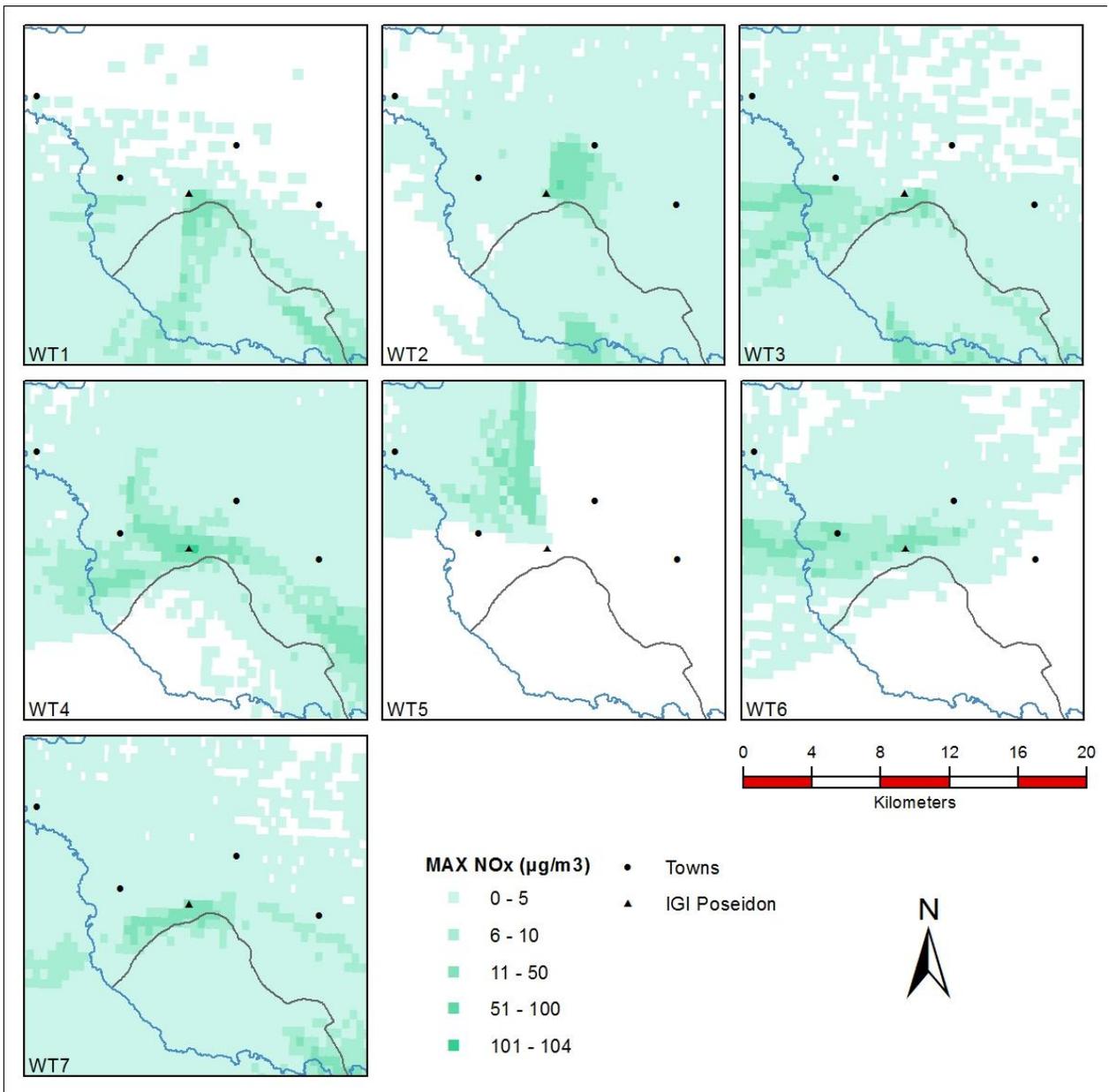


Figure 7. . Maximum average hourly concentrations of NO<sub>x</sub> near the ground for the 7 weather types (WT) from 19m stack height. Black dots indicate residential areas. (Air quality limit values for hourly concentration of NO<sub>2</sub>: 200 (µg/m<sup>3</sup>)).



**Figure 8. . Maximum average hourly concentrations of NO<sub>x</sub> near the ground for the 7 weather types (WT) from 25m stack height. Black dots indicate residential areas. (Air quality limit values for hourly concentration of NO<sub>2</sub>: 200 (µg/m<sup>3</sup>)).**

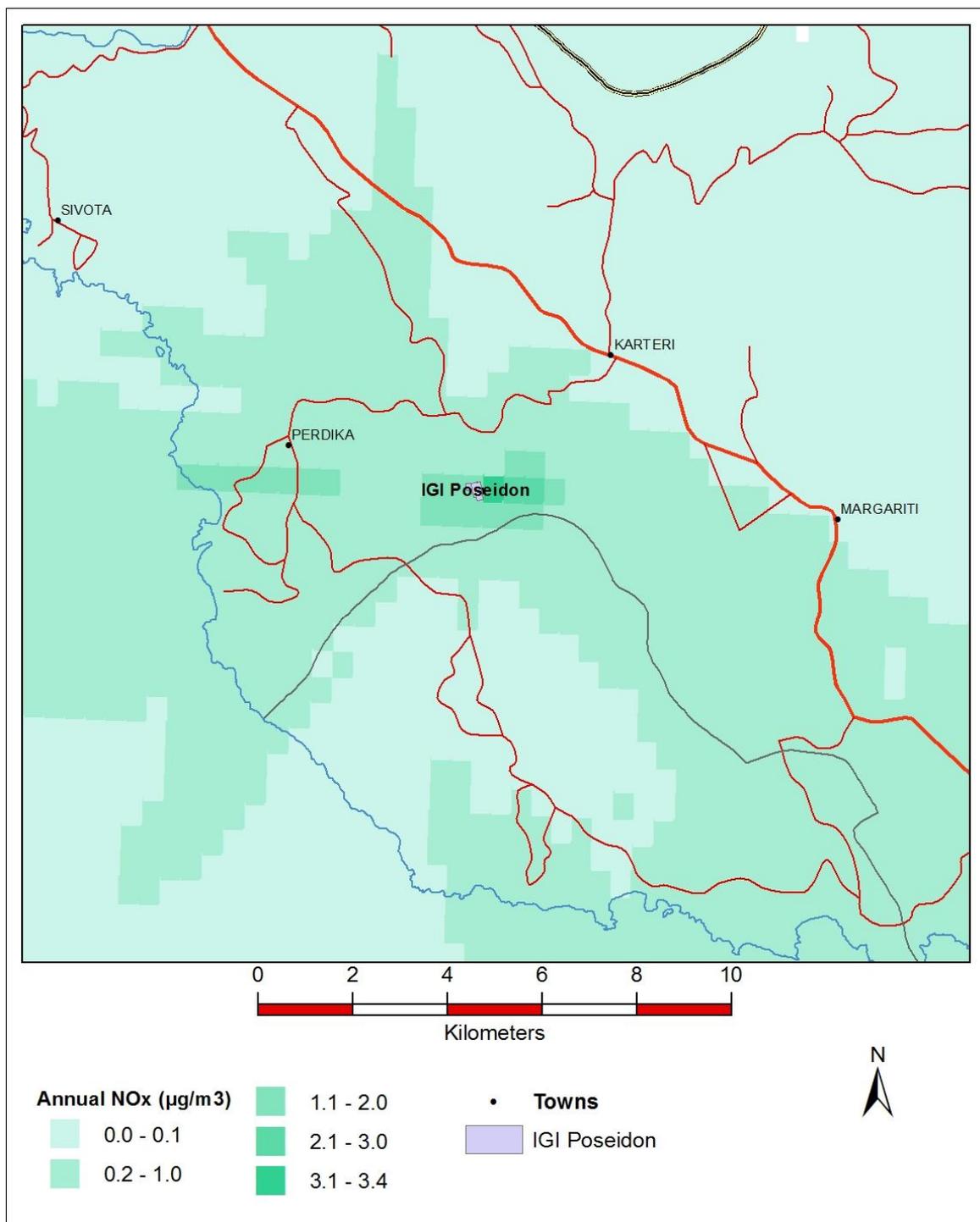


Figure 9. Total average annual NO<sub>x</sub> concentration contours (in µg/m<sup>3</sup>) for 19m stack height. (Annual Air Quality Limit for NO<sub>2</sub>: 40 (µg/m<sup>3</sup>)).

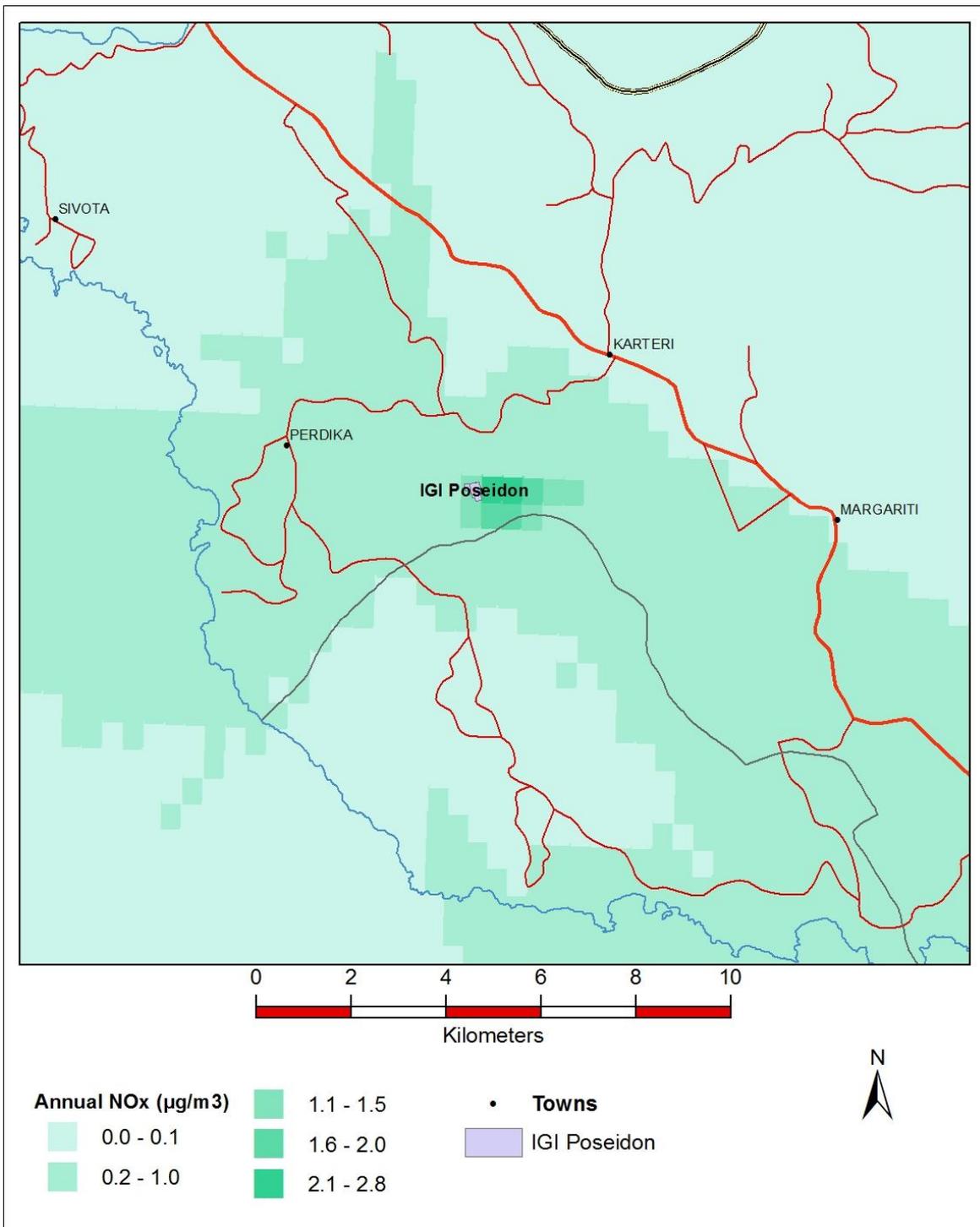


Figure 10. Total average annual NO<sub>x</sub> concentration contours (in µg/m<sup>3</sup>) for 25m stack height. (Annual Air Quality Limit for NO<sub>2</sub>: 40 (µg/m<sup>3</sup>)).

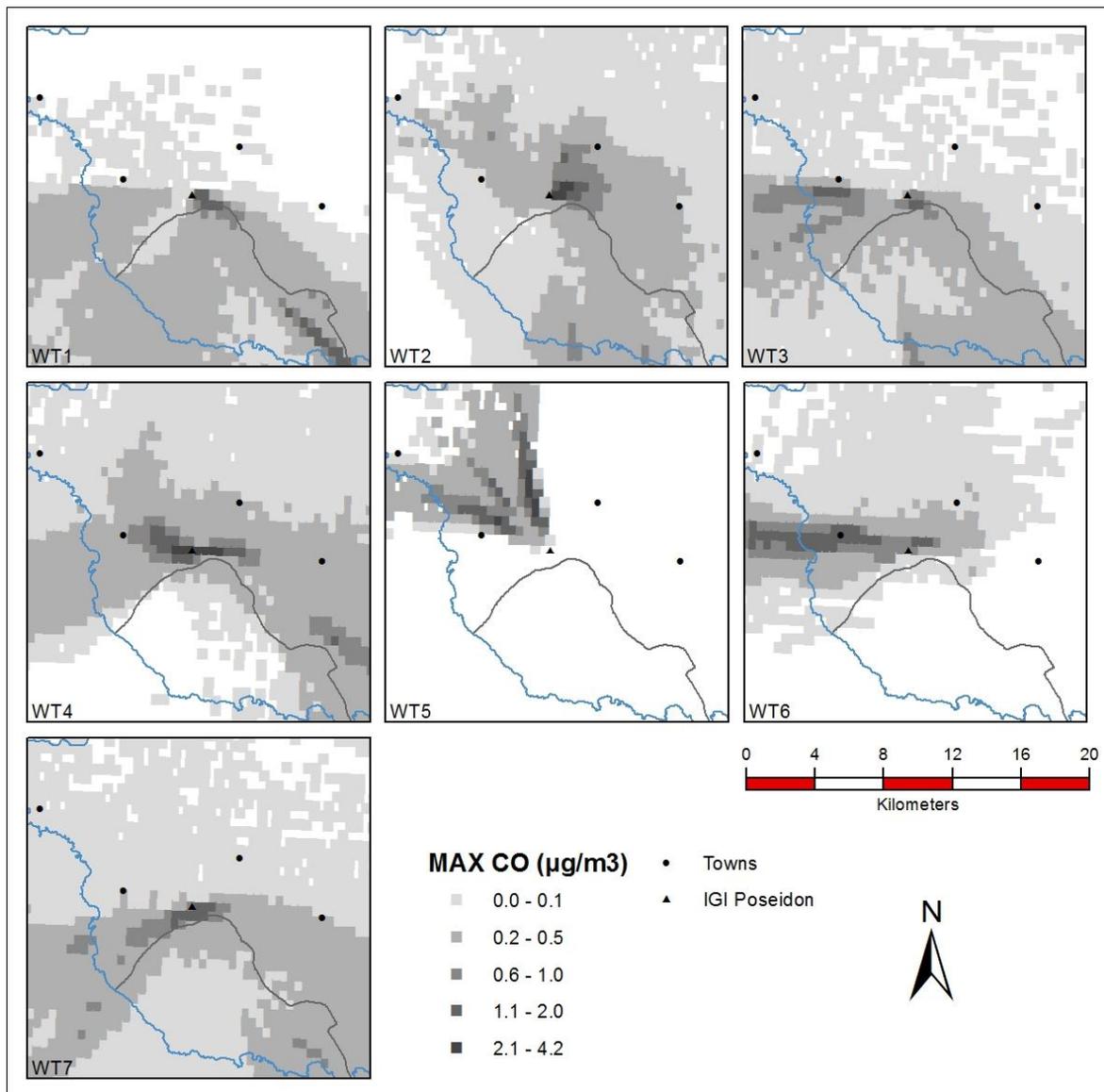


Figure 11. Calculated 8-hour running mean concentration values of CO ( $\mu\text{g}/\text{m}^3$ ) for the 7 weather types (WT) for 19m stack height. (Air quality limit value for 8-hour concentration: 10 ( $\text{mg}/\text{m}^3$ )).

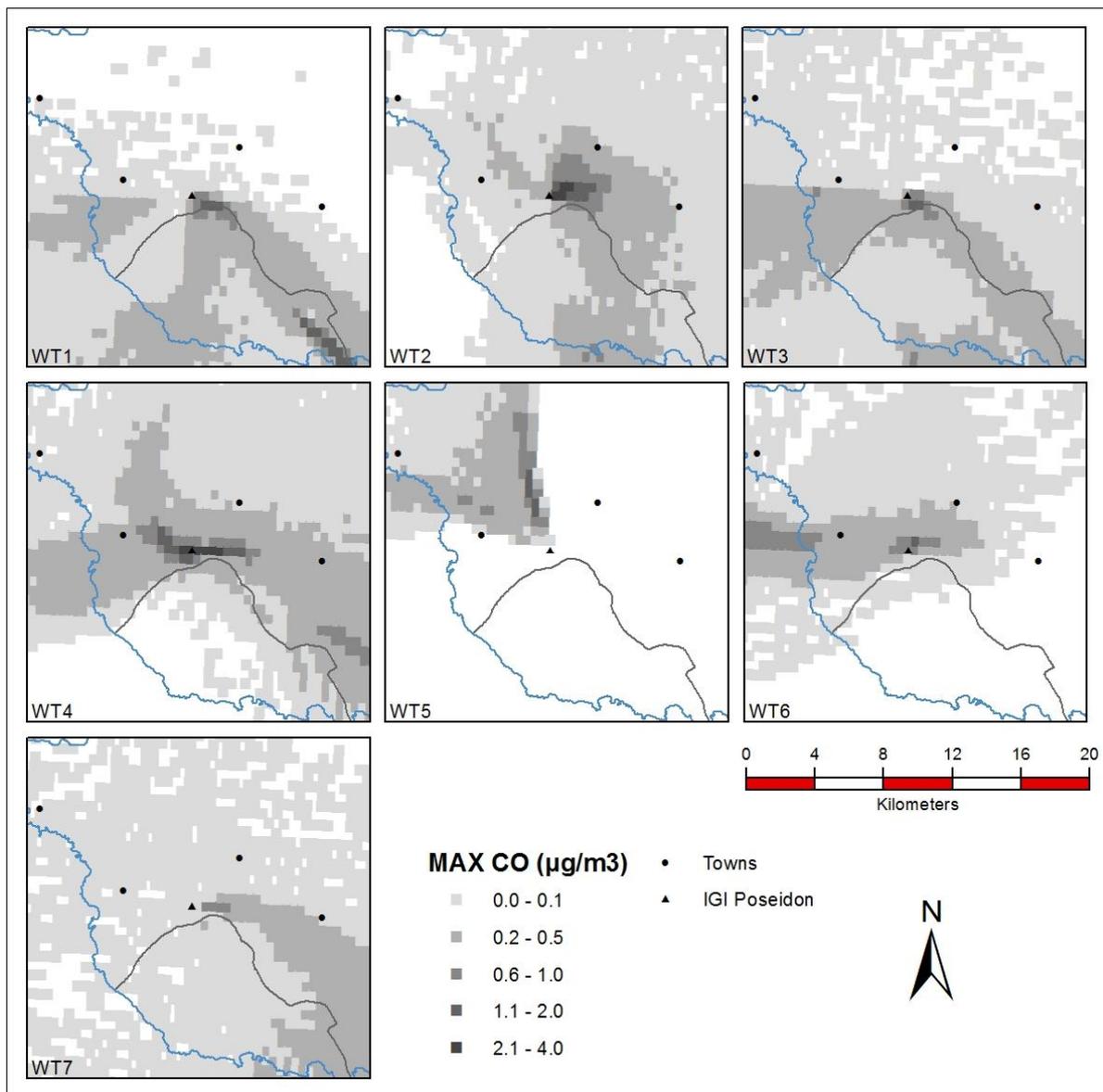


Figure 12. Calculated 8-hour running mean concentration values of CO ( $\mu\text{g}/\text{m}^3$ ) for the 7 weather types (WT) for 25m stack height. (Air quality limit value for 8-hour concentration: 10 ( $\text{mg}/\text{m}^3$ )).

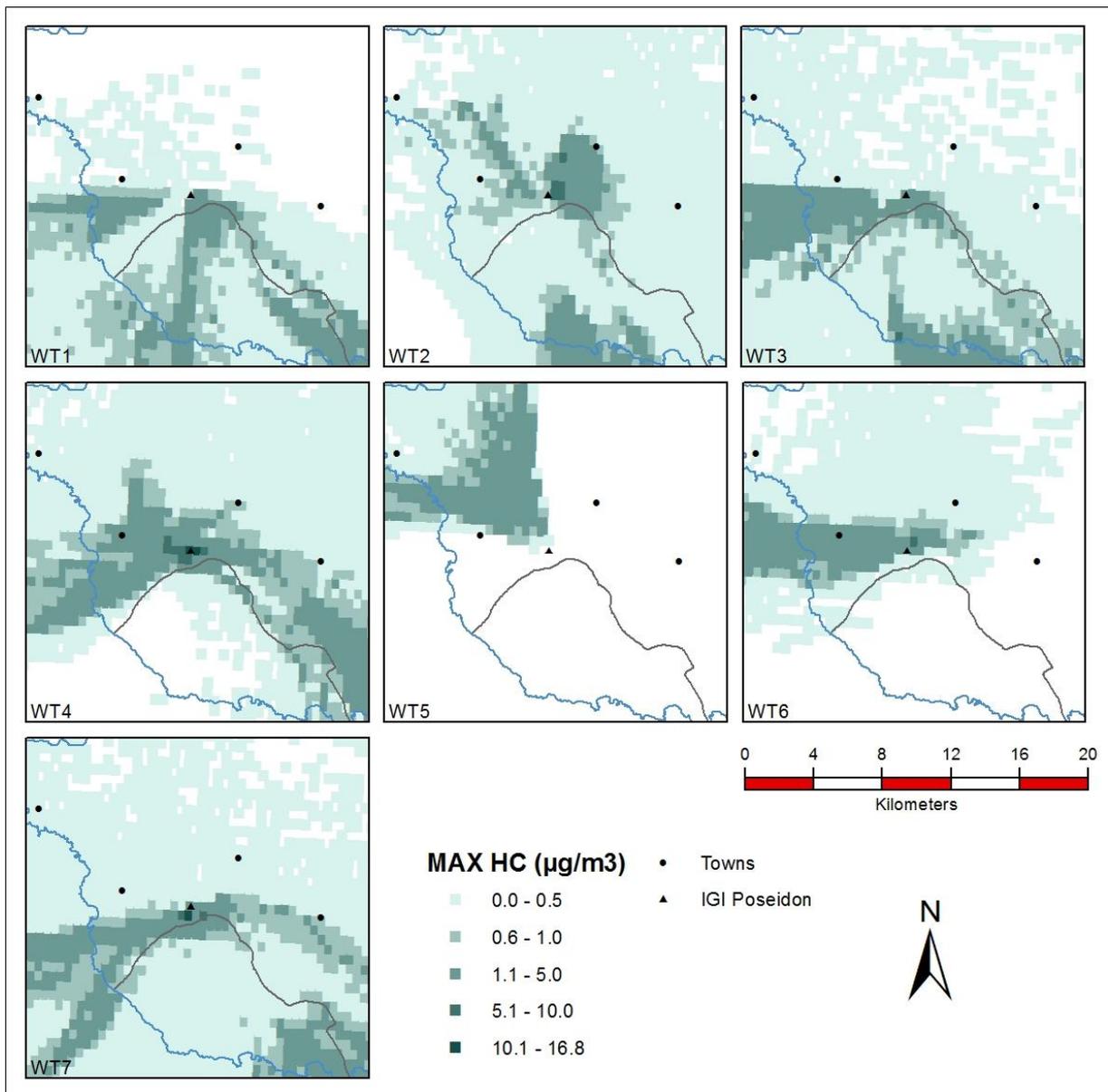
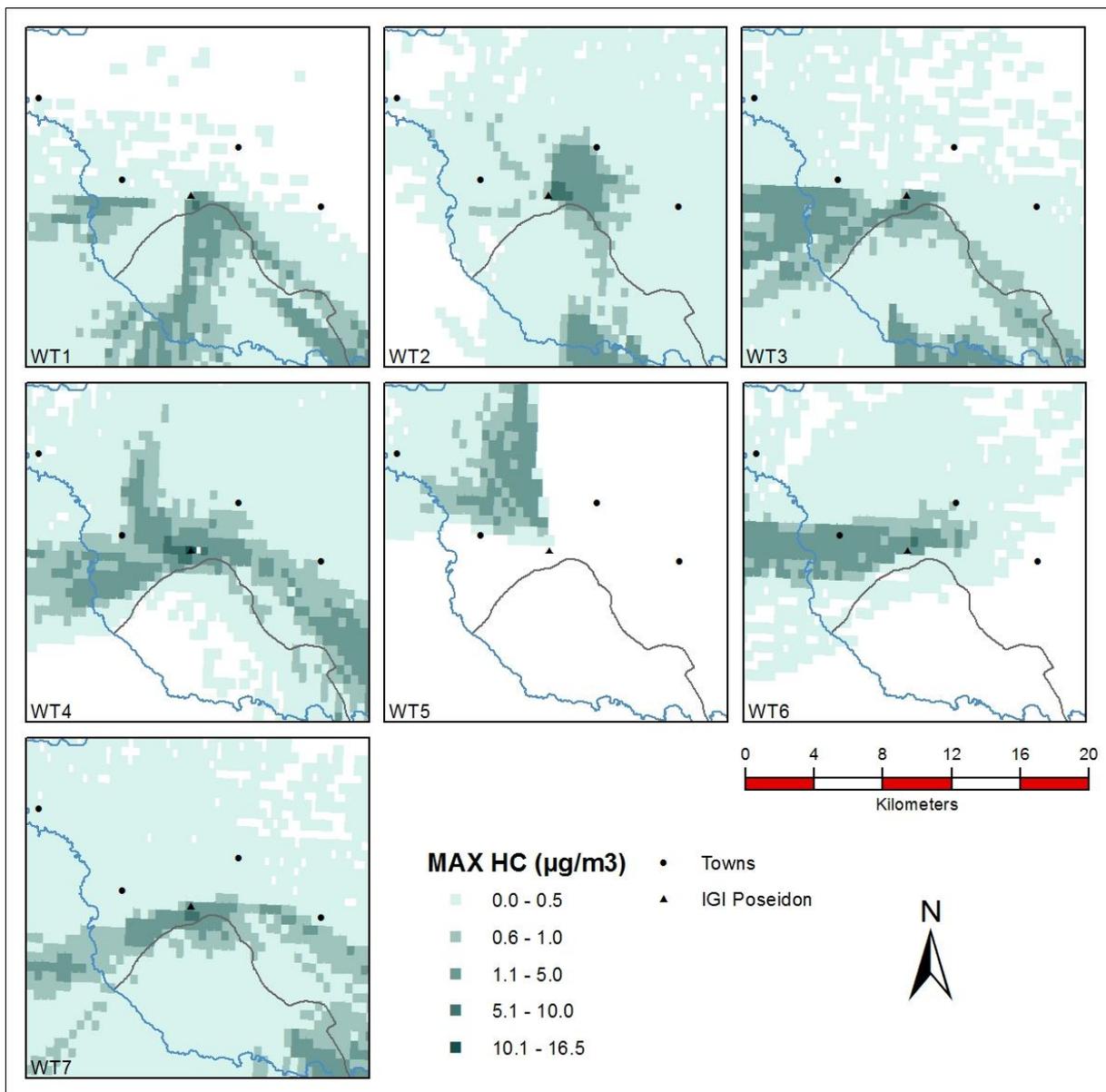


Figure 13. Maximum average hourly concentrations of HC near the ground for the 7 weather types (WT) from 19m stack height. Black dots indicate residential areas.



**Figure 14. Maximum average hourly concentrations of HC near the ground for the 7 weather types (WT) from 25m stack height. Black dots indicate residential areas.**

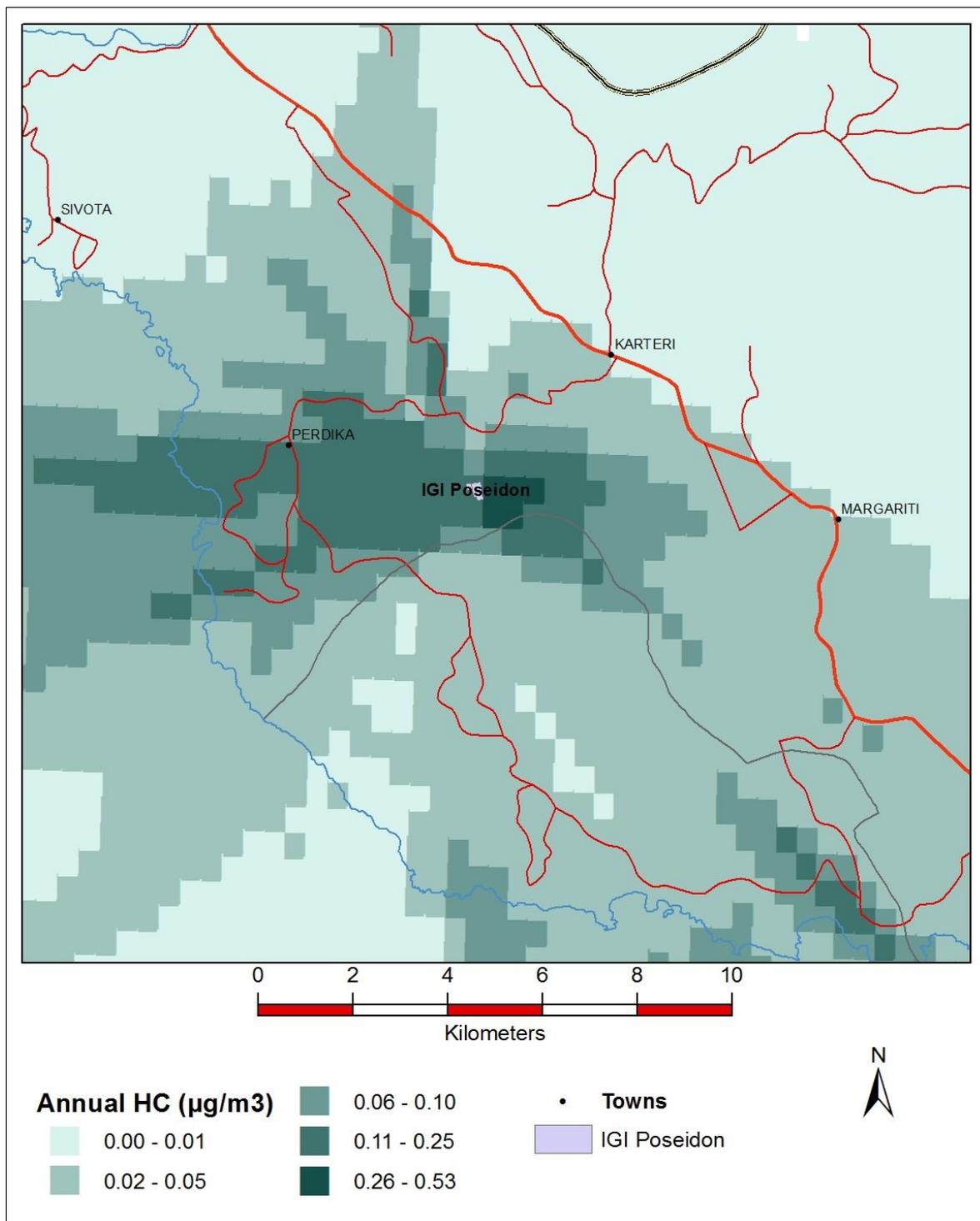


Figure 15. Total average annual HC concentration contours (in  $\mu\text{g}/\text{m}^3$ ) for 19m stack height.

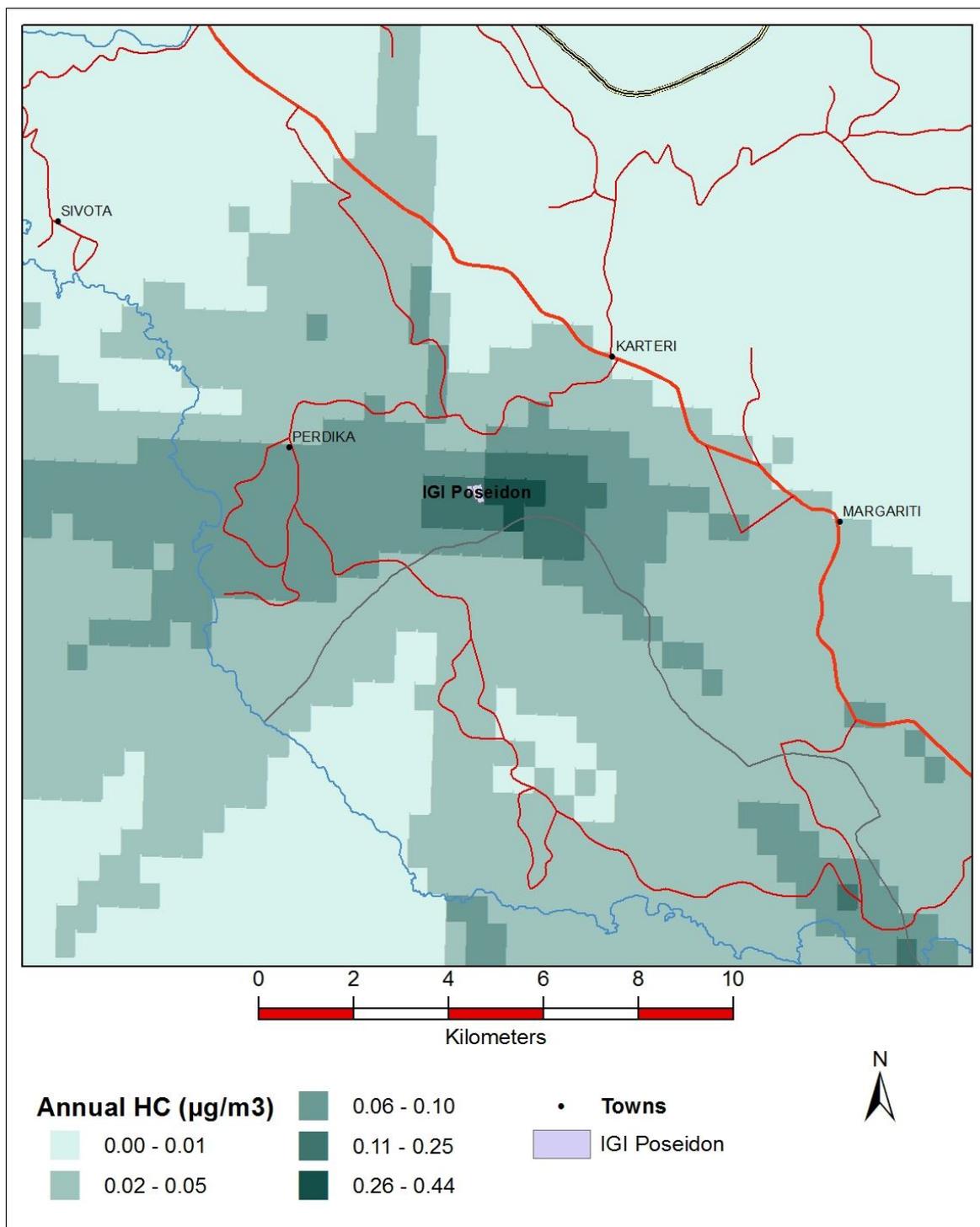
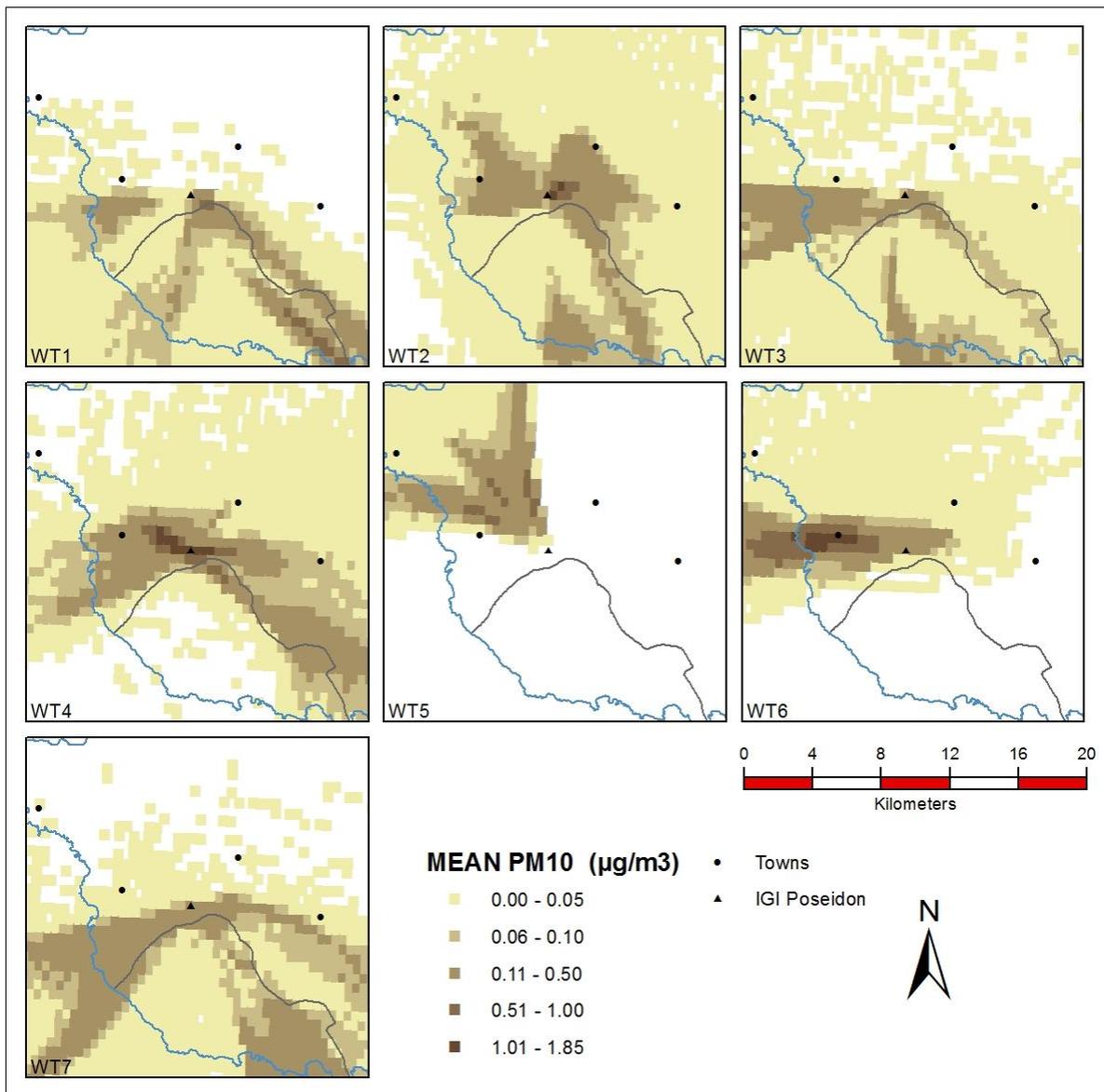


Figure 16. Total average annual HC concentration contours (in  $\mu\text{g}/\text{m}^3$ ) for 25m stack height.



**Figure 17. Maximum daily average PM10 concentrations near the ground for the 7 weather types (WT) from 19m stack height. Air Quality limit:  $50 \mu\text{g}/\text{m}^3$ .**

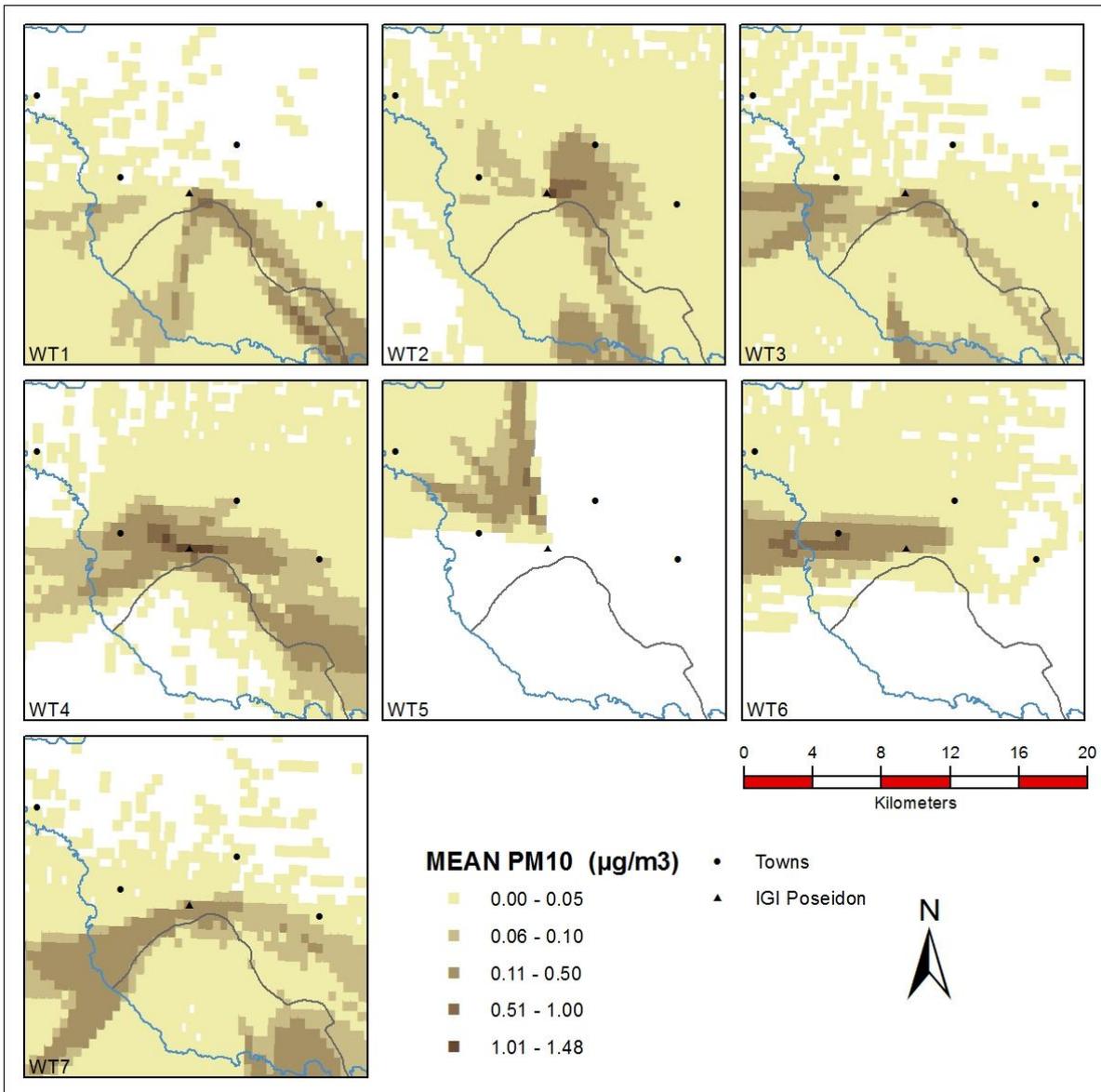


Figure 18. Maximum daily average PM10 concentrations near the ground for the 7 weather types (WT) from 25m stack height. Air Quality limit:  $50 \mu\text{g}/\text{m}^3$ .

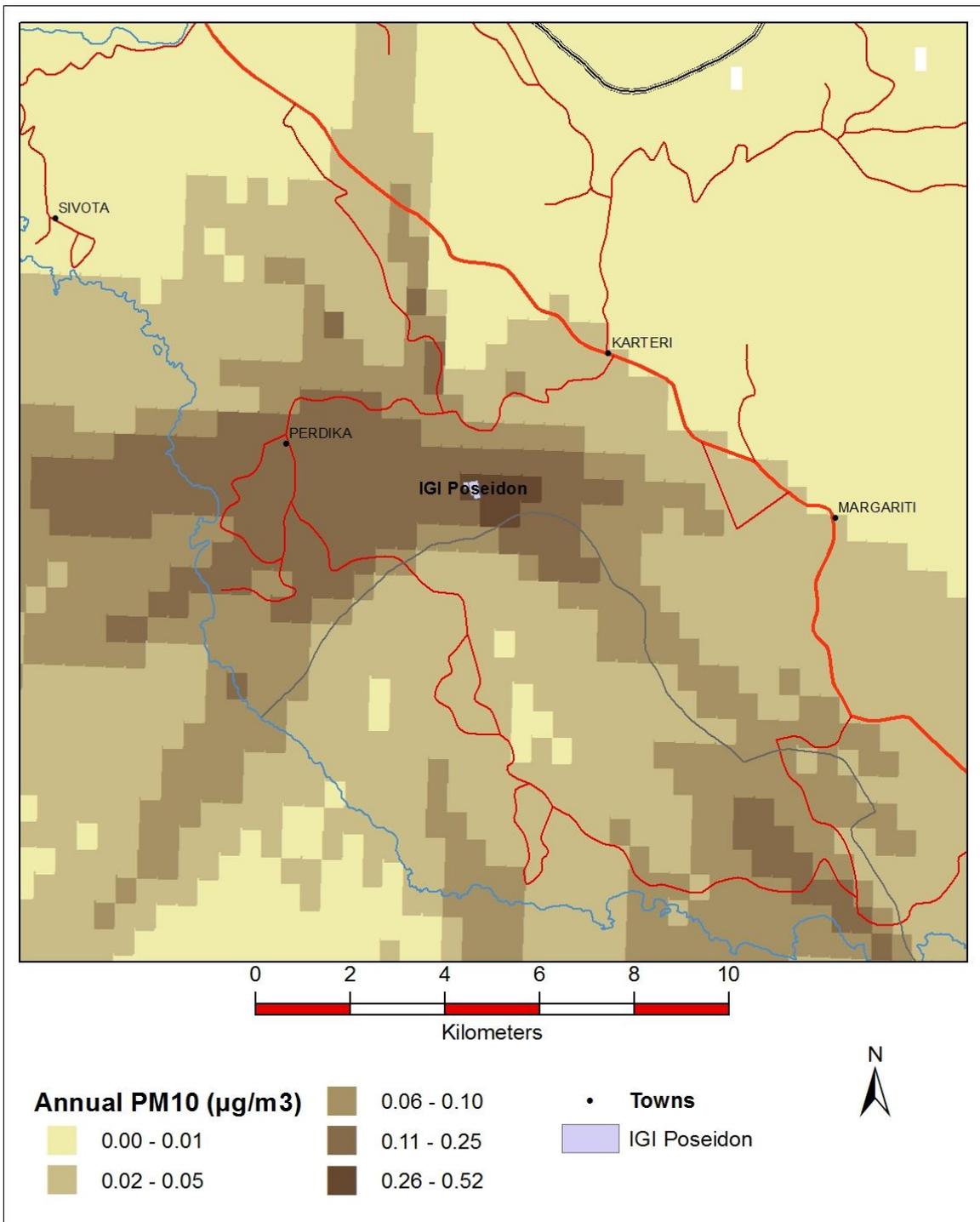


Figure 19. Average annual PM10 concentration contours (in  $\mu\text{g}/\text{m}^3$ ) for 19m stack height. (Annual Air Quality Limit for PM10:  $40 \mu\text{g}/\text{m}^3$ ).

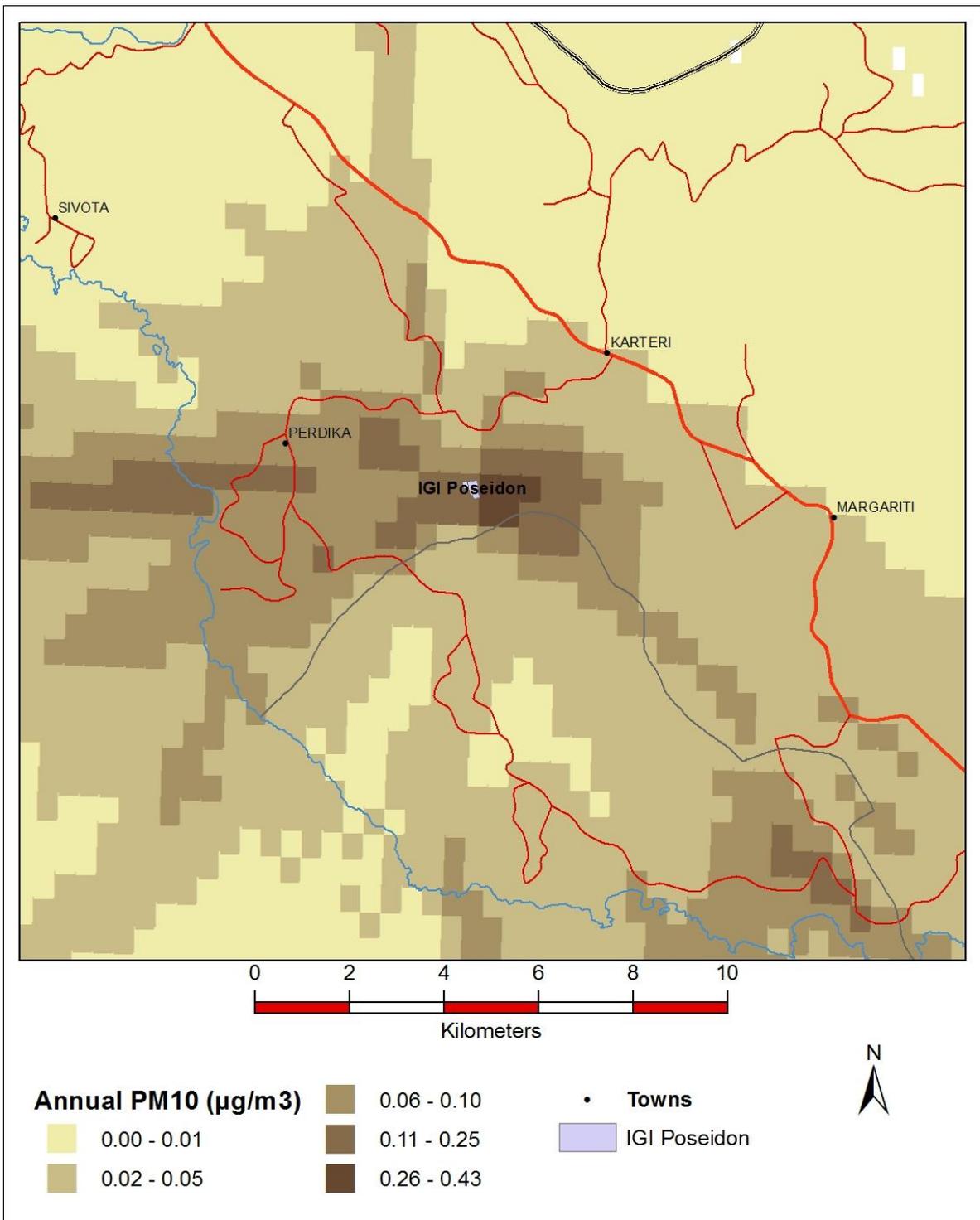


Figure 20. Average annual PM10 concentration contours (in  $\mu\text{g}/\text{m}^3$ ) for 25 m stack height. (Annual Air Quality Limit for PM10:  $40 \mu\text{g}/\text{m}^3$ ).

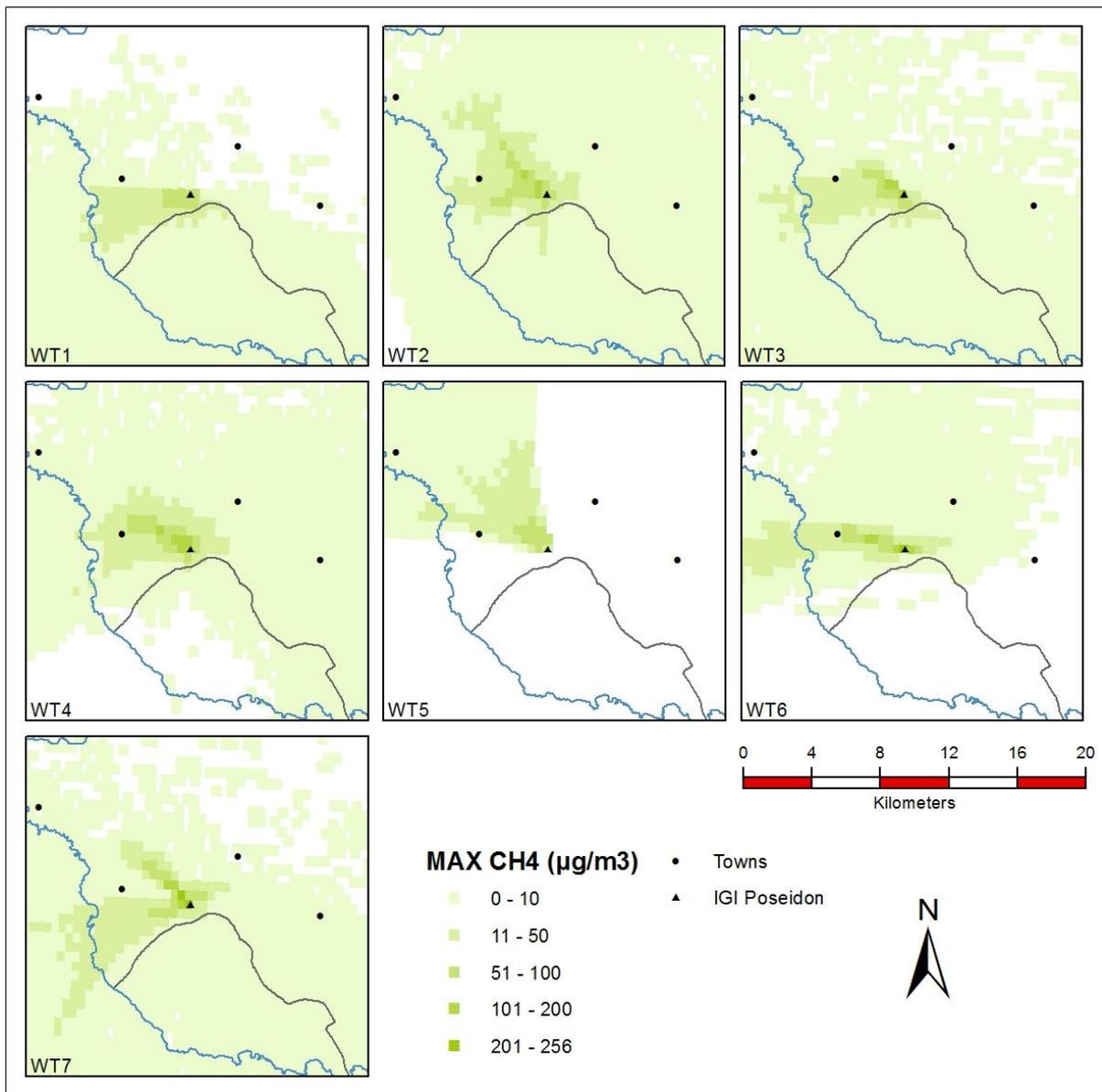


Figure 21. Maximum average hourly concentrations of CH<sub>4</sub> near the ground for the 7 weather types (WT).

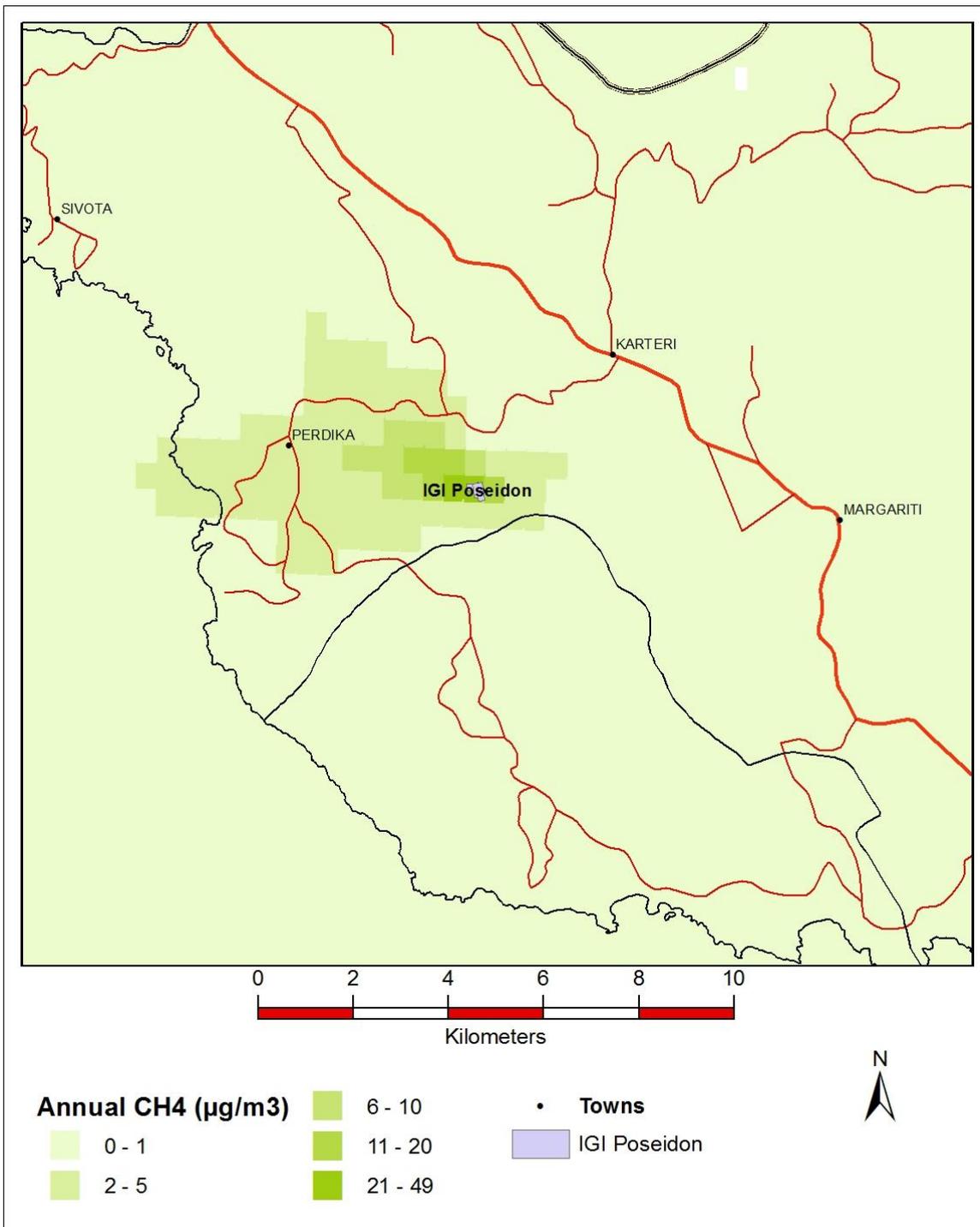


Figure 22. Average annual CH<sub>4</sub> concentration contours (in µg/m<sup>3</sup>).

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

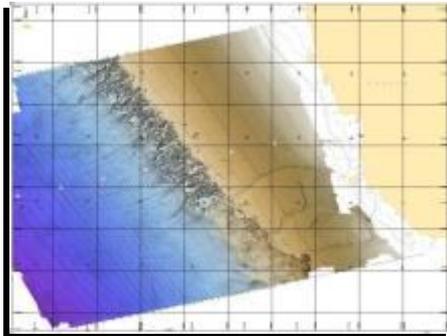
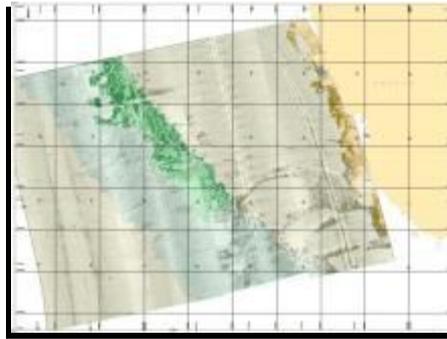
**ANNEX I:**

**HCMR STUDY**



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**ENVIRONMENTAL IMPACTS AND RESPONSE MEASURES OF  
INSTALLATION AND OPERATION OF NATURAL GAS PIPELINE -  
SOLUTION FOR THE DISPOSAL OF WATER HYDRAULIC TEST**



**AUTHORS: DR. PANAGIOTIDIS PANAGIOTIS  
GERAKARIS VASILEIOS (MSc)  
DR. TSIAMIS KONSTANTINOS**

**ATHENS, MARCH 2012**

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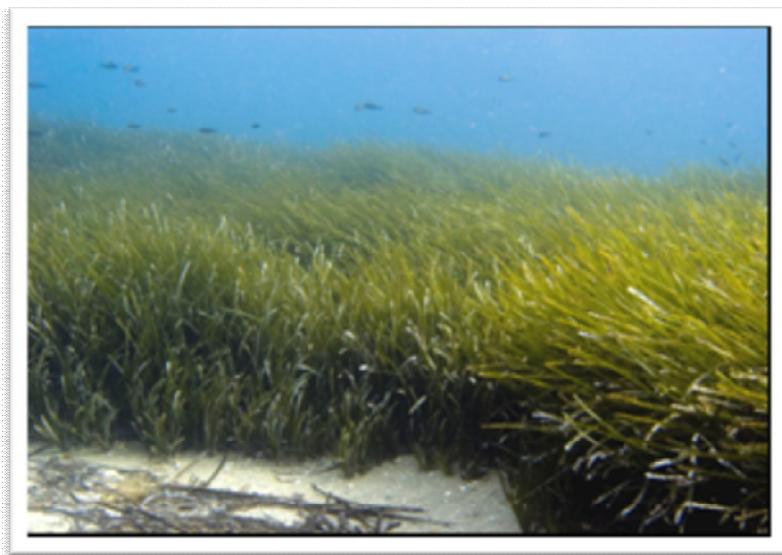
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## 1. INTRODUCTION

The underwater deployment of a natural gas pipeline requires dredging of the near shore part of the seabed. Dredging is an excavation activity or operation usually carried out underwater with the purpose of gathering up bottom sediments and disposing of them at a different location. It is also used as a way to replenish sand on some public beaches, where too much sand has been lost because of coastal erosion. The process of dredging creates spoils (excess material), which usually are carried away from the dredged area. Dredging can create disturbance in aquatic ecosystems, often with adverse impacts.

## 2. SEAGRASSES

Seagrasses are marine angiosperms that are flowering plants with terrestrial ancestors which returned to the sea around 100 millions of years ago and gradually adapted to the marine realm. Today, seagrasses occur widely in the coastal zones throughout the world. The most common seagrass species around the Mediterranean coasts is *Posidonia oceanica* (L.) Delile. *P. oceanica* is endemic, long-lived and slow-growing species (a few centimetres per year). It forms extensive meadows usually between 1 and 40 m depth (Peres and Picard 1964), which on total cover 25.000 - 50.000 km<sup>2</sup> representing 1-2% of Mediterranean Sea surface (Pasqualini et al. 1998).



View of a dense *Posidonia oceanica* meadow at -10m depth.

*P. oceanica* meadows are identified as a priority habitat type for conservation in the Habitats Directive (Dir92/43/CEE) and *P. oceanica* is protected at the European level, as a priority habitat (Dir. 92/42 CEE 21/05/92 and 97/62/CE 27/10/1997) and as a species (Bern Convention, Annex 1) because they rank amongst the most valuable ecosystems along the Mediterranean coastline. *P. oceanica* meadows are hot spots for biodiversity, proving habitat and refuge for hundreds of algae and animals, some of which are rare species important for conservation (e.g. fun mussel *Pinna nobilis*). *P. oceanica* meadows are also nursery ground for many commercial fish and invertebrates, supporting local fisheries.



***P. oceanica* meadows are hot spots for biodiversity, proving habitat and refuge for hundreds of algae and animals**

Moreover, *P. oceanica* meadows stabilize the sediments protecting shoreline from erosion, produce oxygen oxygenating the water column and trap suspended particles improving water quality. Therefore, *P. oceanica* meadows should be protected and conserved, in order to fulfil their key role in the Mediterranean coasts.

However, in the last few decades, *P. oceanica* meadows have continued to decline, due to both natural and anthropogenic causes (Short and Wyllie-Echeverria 1996; Ruiz *et al.* 2001; Duarte 2002). Fish trawling, industrial and sewage outfalls, fish farms, boat anchoring and the deployment of gas pipes are all sources of disturbance that can impact seagrasses and cause their decline (Ruiz and Romero 2003; Diaz-Almela *et al.* 2008a; Montefalcone *et al.* 2008).

Although these events lead to local seagrass loss, they do not generally affect seawater properties over the long term. Therefore, once the impact is removed, *P. oceanica* may recover, as long as substrate and sediment conditions are favorable. When a disturbance affects a large area, clonal growth becomes insufficient, and a supply of propagules is required to fill the gap. For *P. oceanica*, a slow growing species with low sexual recruitment success (Diaz-Almela *et al.* 2008b; Balestrieri *et al.* 2009), meadow natural recovery is expected to be an extremely slow and difficult process (Duarte *et al.* 2006).

### **3. ENVIRONMENTAL IMPACTS ON MARINE FLORA AND FAUNA**

The deployment of a gas pipeline in the proposed area required dredging of a pristine seagrass bed. As a consequence, a great portion of the meadow should be destroyed or severely damaged by direct removal or sediment burial (Badalamenti *et al.* 2011).

When dredging and filling operations will be completed, the impacted area will contain a mosaic of substrates, ranging from calcarenitic boulders, coming from the excavation of the original substrate on which the meadow grew, to residual material such as dead matte, sand, gravel, and exogenous calcareous rubbles, used as back-fill material. As a result of the dumping activities, consolidated calcareous rocks will form rubble mounds (Di Carlo *et al.* 2005).

Besides mechanical removal and the burial of vegetation, dredging entails a number of potential “side-effects” to seagrasses, including increased turbidity and sedimentation, current alteration, the release of organic matter and the introduction of contaminants (Erftemeijer and Lewis 2006). For example, if a first step in seagrass mortality occurs (due either to increased turbidity or to burial process), the meadow becomes sparser. This facilitates sediment resuspension (Gacia *et al.* 1999; Koch 1999), which in turn decreases water transparency and causes further seagrass mortality (due to minimized light availability).

With regard to mortality, plants closer to the excavation site seem to be the most affected (Badalamenti *et al.* 2006). At 5m distance in shallow water, *P. oceanica* shoots showed the highest mortality rate, which may also be linked to low shoot density and patch size. Further from the construction site, seagrass shoots experienced a lower mortality

suggesting a lower sedimentation rate hence a lower level of disturbance. The combination of increased mortality and low recruitment rates reflects an overall decline of the meadow if present conditions are maintained.

In addition, increased suspended material is expected to stress suspension-feeders marine organisms which are fed by filtering the seawater, such as sponges and hydrozoa. However, after the completion of deploying the pipe on the sea bottom, the suspended material will gradually deposit on the bottom and the ecosystem will return to its original status.

In conclusion, we state that there will be some negative consequences for the marine environment, but these will be the result of the phase during which the pipe deployment on the sea bottom. When this phase completes, the ecosystem is expected to obtain gradually its original form. During the operation of the pipe there are no negative consequences for the marine environment to be expected.

#### **4. RESTORATION AND COMPENSATION INTERVENTIONS**

As mentioned the potential impact of the project identified in the construction phase. After completion of the project is proposed to make the following interventions aimed at restoring the natural environment and offer compensatory benefits

##### **4.1. RESTORATION**

There is a large degree of bias between studies identifying losses of seagrasses and those reporting recovery, due also to a lack of long-term monitoring programs (Erftemeijer and Robin Lewis 2006). To our knowledge, few records have documented instances of natural recovery of *P. oceanica* meadows after disturbance events, commonly reporting vegetative growth from the surrounding, well-established patches still present in the damaged area (González-Correa *et al.* 2005, 2008; Diaz-Almela *et al.* 2008b).

Data on recovery from wide, totally un-vegetated areas, involving propagule supply, are more scarce (Meinesz and Lefèvre 1984; Balestrieri *et al.* 1998; Balestri and Lardicci 2008). However, full recovery has never been observed and is thought to require centuries (Meinesz and Lefèvre, 1984; Duarte 2002; González-Correa *et al.* 2005), especially

considering the slow horizontal elongation rate of *P. oceanica* rhizomes, which is estimated, on average, at 2–4 cm/yr (Duarte 1991; Marbà and Duarte 1998).

Previous studies on post-dredging recovery and transplantations showed how species able to recover on sandy or muddy substrates (Williams 1990; Gallegos *et al.* 1994; Kenworthy *et al.* 2002; Di Carlo and Kenworthy 2008) failed to recruit on debris mounds due to sediment instability (Brown- Peterson *et al.* 1993; Kaldy *et al.* 2004; Sheridan 2004), suggesting that this feature prevents seagrass re-colonization beyond the habitat requirements of the species. *P. oceanica* propagules have been observed on different substrates (Meinesz and Lefèvre, 1984; Piazzini *et al.*, 1999; Balestrieri and Lardicci, 2008), but only those that settled on consolidated substrates survived and established successfully (Meinesz and Lefèvre, 1984; Balestrieri *et al.*, 1998; Piazzini *et al.*, 1999). Meinesz and Lefèvre (1984) observed *P. oceanica* recovery on dead matte through vegetative fragments, suggesting that dead rhizomes emerging from matte facilitated the entanglement and establishment of propagules. Balestrieri *et al.* (1998) and Piazzini *et al.* (1999) reported seedling survival on dead matte and rock but not on gravel or pebbles, probably due to substrate instability and the abrasive action of particles on unconsolidated substrates.

If we assume that bottom morphology and substrate distributions fully stabilized in the studied area site within the observation period, the differences observed in *P. oceanica* recovery between substrates must reflect the substrate preference of this species. Calcareous rubbles are made of a consolidated and stable material, which is motionless even in harsh hydrodynamic conditions and does not erode over time. Moreover, crevices between adjacent rubbles create a pattern of substrate complexity on the same scale as the propagules (centimeters, tens of centimeters). Our interpretation is that these features made the rubble mounds a suitable environment for *P. oceanica* recovery from vegetative fragments, unlike the other substrates, which lack sufficient complexity (dead matte, *C. nodosa*) and/or stability (calcareous boulder, sand).

Until now, *P. oceanica* transplantations have been developed mostly on sand or dead matte and make use of artificial supports, such as grids, nets or even bioengineering materials, to secure propagules to the substrate (Molenaar and Meinesz 1995; Gobert *et al.* 2005). Current trends in seagrass restoration ecology aim to develop cost- and labor-effective technologies, taking advantage of species' natural recovery abilities and of the presence of former populations that may act as sources of propagules, accelerating the

overall recovery of these systems (Orthet *al.* 2006a,b; Lee and Park 2008). In this scenario, artificial rubble-like materials, which proved to provide a suitable substrate for *P. oceanica* recovery, could be employed in developed coastal areas to support restoration of damaged meadows, allowing natural recovery to occur if there is a sufficient propagule supply from adjacent meadows, or to enhance the success of transplantation initiatives.

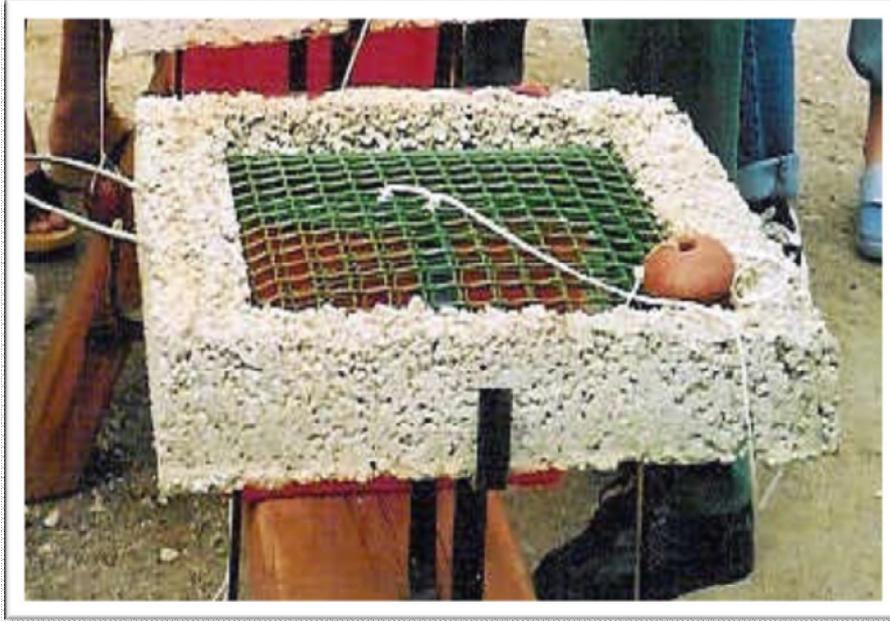
#### **4.1.1. CASE STUDY 1 - TRANSPLANTATION OF POSIDONIA OCEANICA PLANTS**

Drastic decline of *Posidonia oceanica* meadows in the Mediterranean Sea has been observed already since the 1960s. This fact triggered George Cooper, a pioneer researcher in *P. oceanica* study, to try applying translocation of *P. oceanica* plants. After 13 years of several failing attempts using various methods (use of pins, wooden boxes, etc.) he concluded in an initiative technique of transplantation *P. oceanica* plants, leading to the development of a non-profit Association, known as “**Les Jardiniers de la Mer**” ([www.posidonies.fr](http://www.posidonies.fr)). As a result, more than 5.000m<sup>2</sup> of *P. oceanica* plants have been transplanted in various Mediterranean coasts so far, such as Cannes, Nice, Monaco and Marseille, with 60 to 95% success rate. At the same time, transplantation of *P. oceanica* in these areas has led to an increase of marine biodiversity; decline of coastline erosion and to limitation of bottom currents speed. His proposed methods have been accredited by the ‘Ministry of Ecology, Energy, Sustainable Development and of the Sea’ of France, as part of the International Year of Biodiversity 2010.

The transplantation technique includes 2 major approaches:

##### **A) Transplantation through asexual development (known also as the ‘Cooper Technique’)**

This approach uses numerous **concrete boxes** covered by double fence, consisting of non-polluting material. With a total weight of 10kg, each box is heavy enough to resist underwater current forces once placed on the sea bottom. Mainly orthotropic *Posidonia* stalks are collected from the field, in order to avoid choosing stalks that have the greatest potential for recovery (plagiotropic). The orthotropic stalks are placed inside the concrete boxes. The fence protects young developing *Posidonia* leaves from herbivorous invertebrates.



**Concrete box**

On the sea bottom, by ordinating the concrete boxes each one next to the other in a **'beehive-like formation'**, a larger 'reef' is formed, thus protecting from strong hydrodynamism. In addition, the beehive-like formation acts as a wave barrier, protecting the nearby shore from erosion. At the same time, the reef itself attracts numerous fauna and flora marine species, including several fishes which seek protection in the open sea.



**Beehive-like formation in 1973**



**Beehive-like formation in 1987. Growth of seagrasses is rather obvious.**



**Beehive-like formation in 1997: the fish have found shelter, a place of nourishment and reproduction.**

### **DETAILS OF COOPER TECHNIQUE**

The Cooper Technique includes several simple steps, described briefly below:

- 1. Stalks of *Posidonia* are collected and placed inside a special net, in seawater.**



**Posidonia stalk**

- 2. *Posidonia* stalks are treated by hand in order to calibrate them. Stalks with suitable size will be selected for further treatment.**



**Choosing the suitable stalks**

- 3. Insertion of *Posidonia* stalks inside the fenced concrete boxes.**



**Placing *Posidonia* stalks inside the boxes**

- 4. Conservation of *Posidonia* stalks while they are inside the boxes**

in seawater before being transported on the ship.



rvation in the seawater

Conse



Transportation into the ship

**5. Installation of boxes in the boat.**



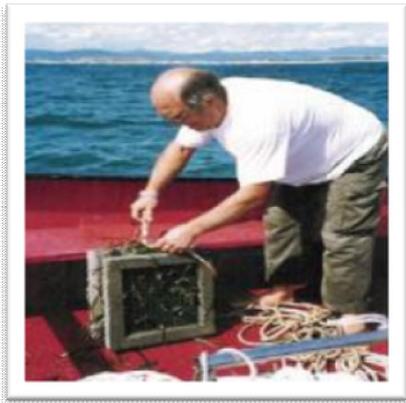
tallation of boxes

Ins



Securing boxes in the ship

**6. Concrete boxes are released into the water by rope. Then, scuba-divers will retrieve them and place them on the chosen sea bottom site, which has been previously marked.**



**Realizing boxes through a rope**



**Divers place them in the correct place**

- 7.** Marking the selected area: selected sea bottom is marked, which ranges usually between 2 and 12 m deep. The concrete boxes are not placed randomly but in an ordinary way. Each box is labeled.

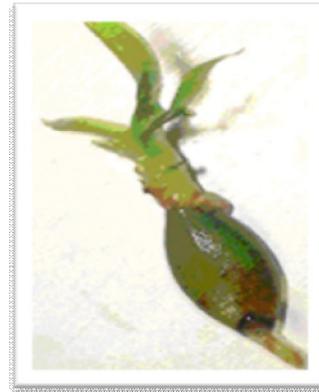


**Divers mark the specific spot**

## **B) Transplantation through sexual reproduction.**

In general, *Posidonia* seeds group a floating mass during April, May and June, and can be washed in the shore through waves and currents. The cast ashore seeds can be collected from a beach. These seeds are rinsed and sorted through a careful treatment. Checking if the

seeds contain any tiny grubs or hair is essential. Afterwards, these seeds are placed either in a seawater aquarium or in a controlled sea-bottom area of a coast. Choosing the aquarium is usually preferred since it is easier to observe the development of the seeds and young *Posidonia* plants. Germination of seeds comes after a few months, and young plants arise. These are transferred and installed inside the concrete boxes, as described in the Cooper Technique, following the exact same procedure as described above.



*Seeds of Posidonia Small plant germinating from the seed*



*Development of young Posidonia plants from seeds, in a seawater aquarium.*

#### **4.2. COMPENSATION INTERVENTIONS OF ENVIRONMENTAL INTEREST**

After completion of the project (deployment of the gas pipeline), it is proposed to consider the possibility of creating artificial reefs in selected positions of the pipeline route. This will be done by placing special concrete blocks, widely known as "anti-trawling blocks" or other methods, and results in inhibition of fishing using drift nets (trawls) in the region. In this way will protect the fish fauna of the area by trawlers and promote coastal and recreational

fisheries. Successful examples can be found along the Mediterranean coasts. For example, an anti-trawling artificial reef was installed in the Marine Reserve of Tabarca (Spanish SE) in 1989, which has eliminated illegal trawling, and thus has produced a slight recovery of the *Posidonia* meadow (Guillen *et al.* 1994).

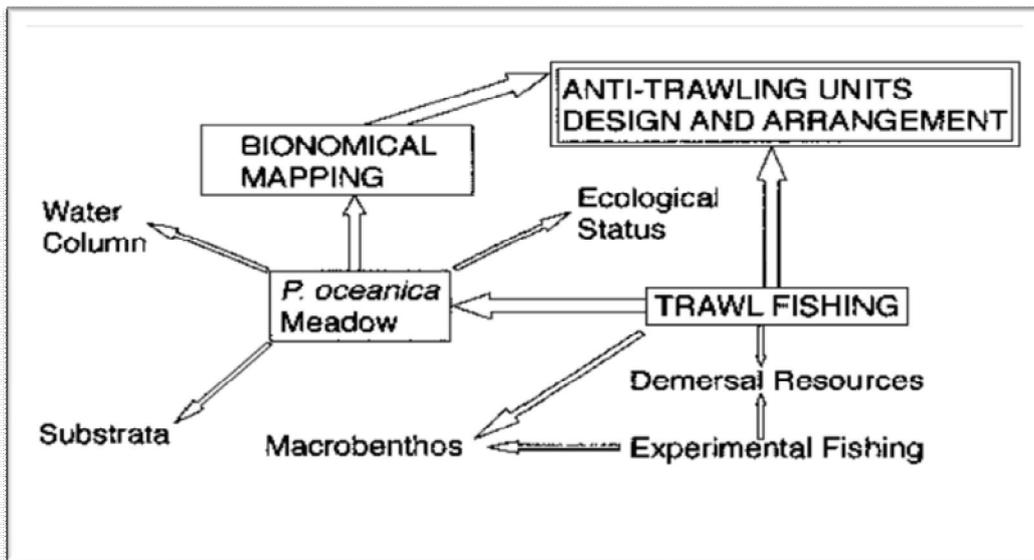
#### **4.2. 1. CASE STUDY 2 – ARTIFICIAL REEFS / ANTI-TRAWLING BLOCKS**

We propose the methodology developed by Guillen *et al.* (1994): The anti-trawling reef consists of several concrete cubic modules, 2 m in length and 20 cm thick. This fact facilitates its building, and assures its effectivity even if the modules are overturned. The modules are arranged in several quadrates, depending on the area size. The reef orientation points towards the direction from which the illegal trawling is detected, the distance between the modules barriers being less than the cable length used by the trawling fishing boats at that depth. This avoids the possibility of dodging the blocks.

The modules are opened on their upper face, and have two openings of 50 cm diameter on either side, favoring the circulation of water inside the reef. In steel, elements pass through the upper openings and protrude 1 m on either side. Inside each module, small, diverse blocks of concrete are installed (i.e., small vaults, tubes, etc.) so as to increase their heterogeneity and to favor their colonization. In this way, each module weights 7.900 kg, transmitting  $0.11 \text{ kg}\cdot\text{cm}^{-2}$  pressure on its base; the stability on the bottom depends on the sediment. In general, the modules can resist the traction of trawling fishing boats having more than 800 HP.

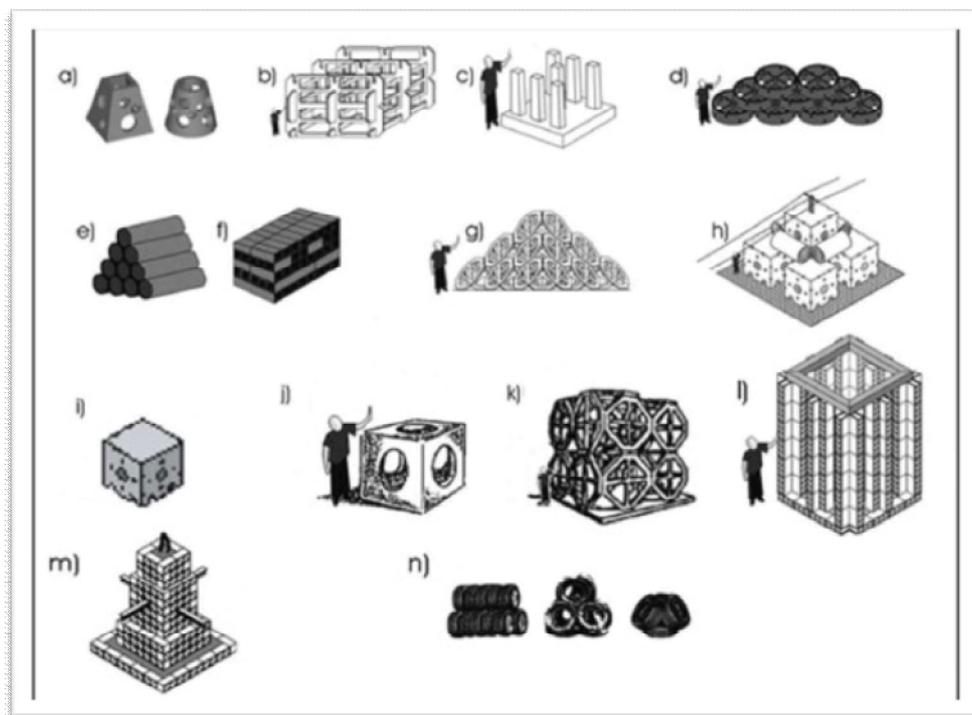
However, it should be noted that each area and *Posidonia* meadow can differ. This is why preliminary studies should be take place prior of the blocks installation. These studies should include:

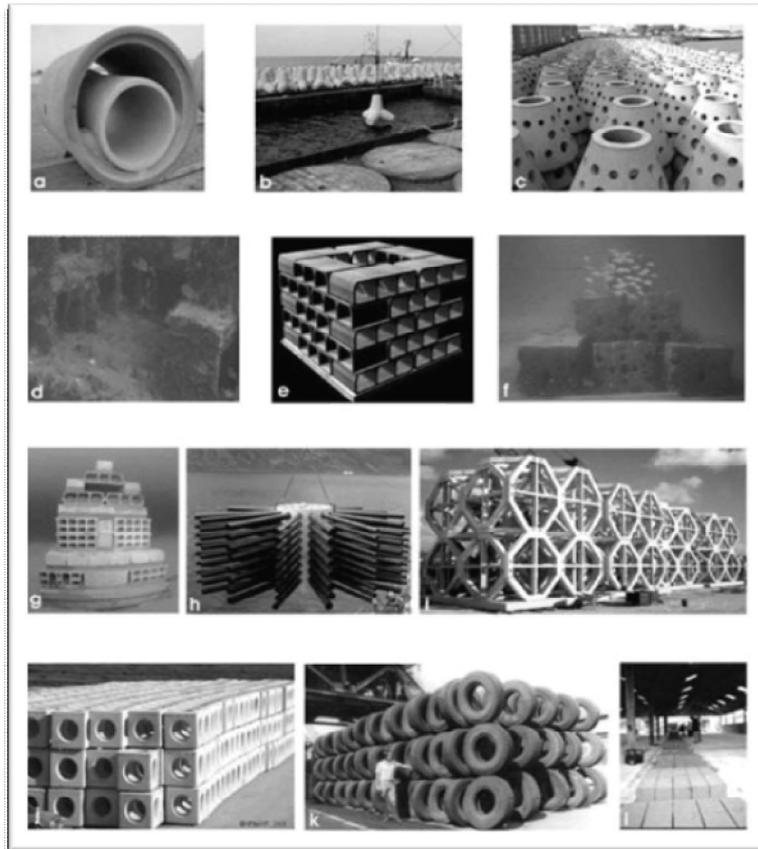
- Measurement of Physical Parameters (currents, waves, general hydrodynamism, temperature, salinity)
- Measurement of Chemical Parameters (oxygen, nutrients, PH, type of substrate)
- Measurement of Biological Parameters (benthic communities, *Posidonia* meadows density and size, etc)
- Local fisheries (number of fishing boats, size, frequency, type of equipment)



Plan of studies prior of anti-trawling blocks installation

These parameters play a crucial role on choosing the characteristics of each module and generally the reef (size, shape, weight, orientation, arrangement, type of material).





Examples of various reef module and reefs types

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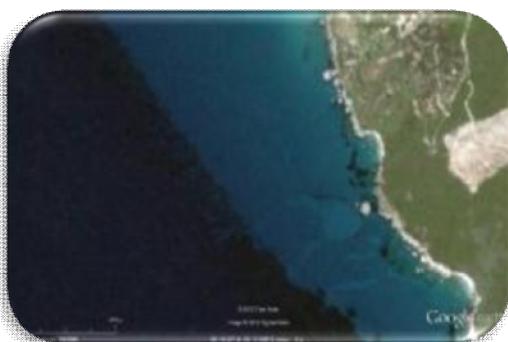
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## **UNDERWATER SURVEY TO DETERMINE LOCATION OF HYDRAULIC TEST WATER PIPELINE**



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ISSARIS YIANNIS**

**ATHENS, APRIL 2012**

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## **1. INTRODUCTION**

The present study was carried out as a continuation of hydrographic and geophysical study conducted by the GIPOSEIDONS.A. (report: "NEARSHORE HYDROGRAPHIC AND GEOPHYSICAL SURVEY" / Survey Period: 9 – 22 March 2011 / Fugro Document No.: J35002-RES4a-GR(2) / FOSPAR Report No.: 10-J110/479). This approach aims to locate and map possible natural cuttings of *Posidonia oceanica* meadows. These natural cuttings will allow us to define a natural passage for a secondary pipeline discharging offshore the waste waters, produced during the hydraulic tests of the main pipeline, without damaging the *Posidonia* meadow.

## **2. METHODOLOGY**

Data collection was carried out by SCUBA diving along three (3) selected underwater transects. For the efficient coverage of the large study area, underwater scooters (X-Scooter SIERRA) were used, which allowed the easier transition of the divers at great distances. During the dives were recorded ecological - biological observations along the 3 referred transects from the depth of -5m to -35m. Also, during the underwater survey, an adequate number of underwater photos were taken in order to estimate the biological value of each transect.

For underwater photography a digital camera NIKON D200 in Subal waterproof housing and 2 underwater flashes INON Z-240 were used. Positioning records were carried out by portable GPS (GARMIN eTrex-C), while the depth was recorded by a depth gauge (UWATEC Bottom Timer 330m).

During processing of field data, all underwater photos were georeferenced using the GPS's track log file, ecological - biological observations along the 3 underwater transects were analyzed and finally all the gathered data were entered in a single Geographic Information System, the ArcGIS 9.3 by ESRI.

## **3. RESULTS**

Recordings and observations were focused, as discussed in the methodology, along the 3 underwater transects. The 3 transects were established to cover 4 main areas of interest which are identified according to the findings of the previous hydrographic and geophysical

survey of the referred coastline (Table 1). The specific boundaries of these areas and transects are shown in Image 1 and 2, mounted on a satellite image of Google Earth.

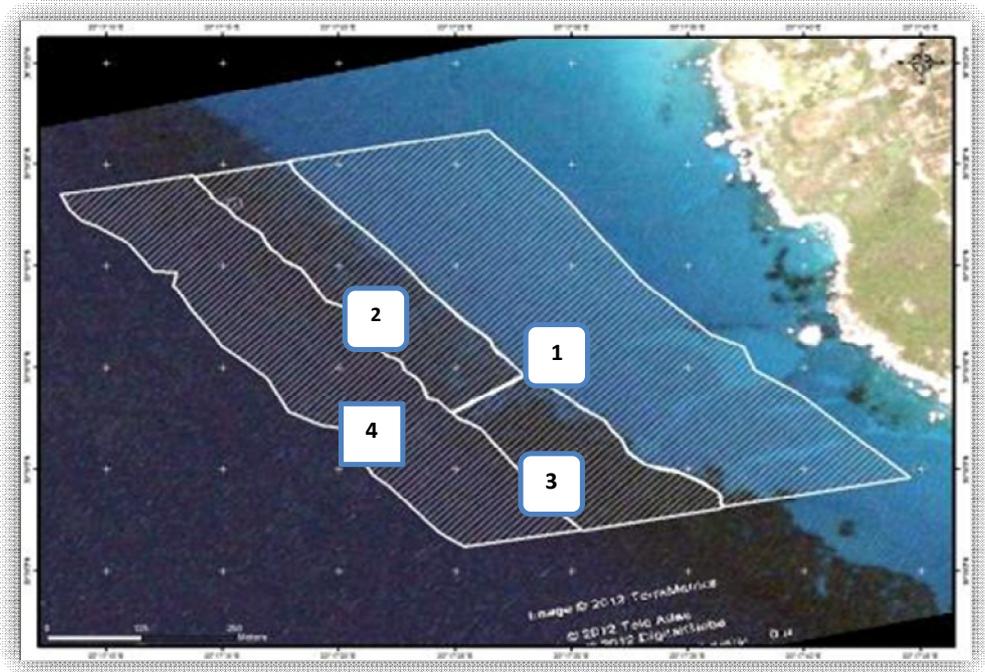


Image 1. The 4 areas of interest and their boundaries.

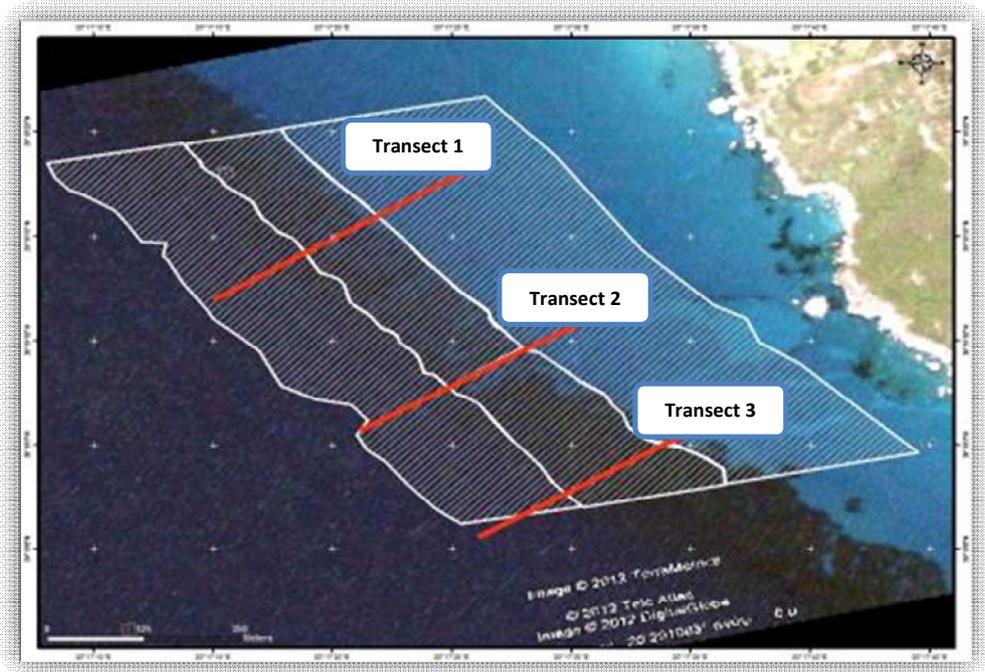


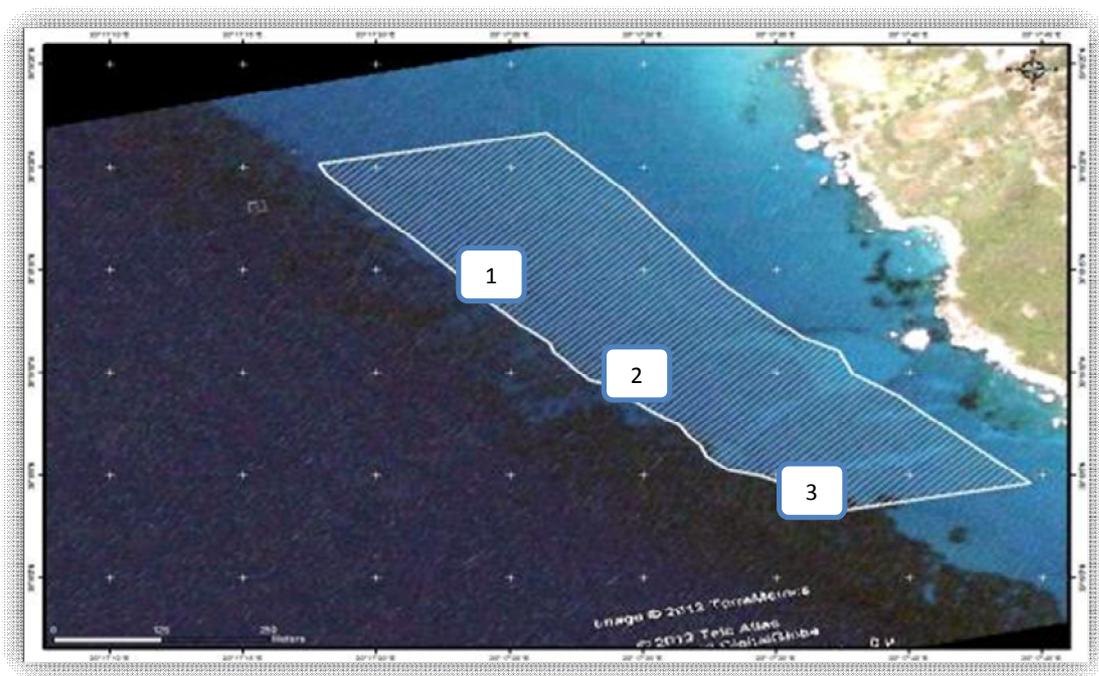
Image 2. The 3 underwater transects.

Table 1. Summary of the 4 areas of interest.

Area	Description	Depth
1	Sandy bottom, low slope, no vegetation. At -13m the upper limit of <i>Posidonia oceanica</i> meadow.	5-13 m
2	<i>Posidonia</i> meadow forms "barrier reefs", natural cuttings of <i>Posidonia</i> meadows	13-20 m
3	<i>Posidonia oceanica</i> forms compact and extensive meadow. <i>Posidonia</i> "barrier reefs" on the upper limit	13-20 m
4	<i>Posidonia</i> forms compact and extensive meadow. Bottom with moderate slope	20-35m

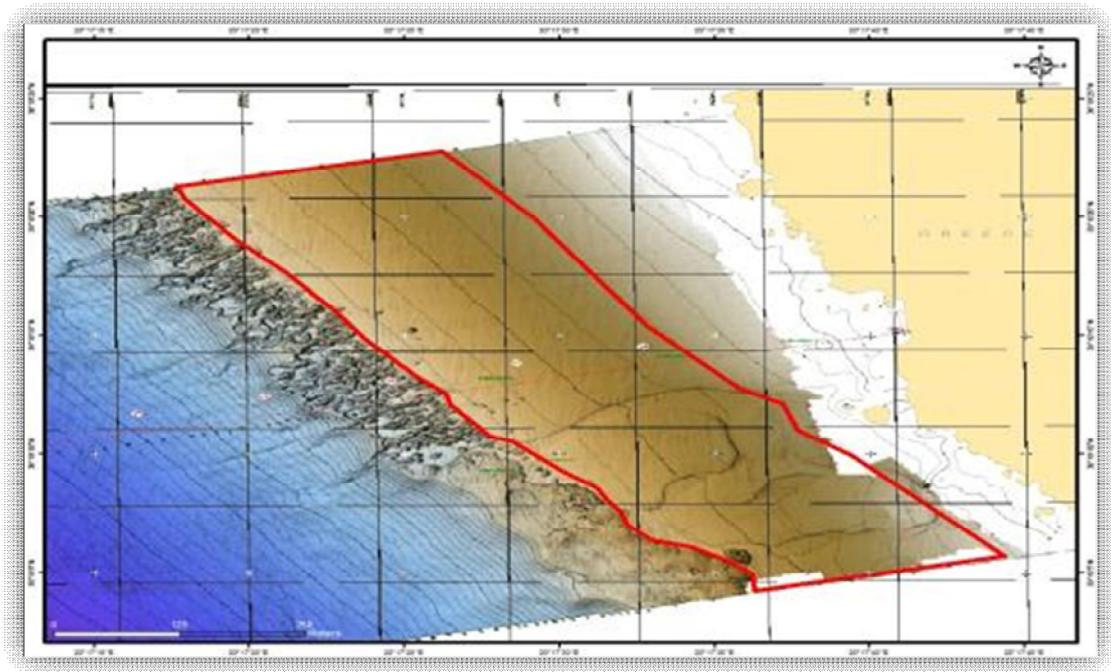
## AREA 1

Area 1 concerns the part of study area between depths of 5-13m. In this area there is a low slope bottom, where occur soft mobile sediments with no vegetation (sandbanks)(Image 3). In this area 3 sites of interest were chosen for further examination (Image 4, Table 2).



Image

3. Sites of interest in the Area 1.



**Image 4.**Area 1 as mounted on the provided geomorphological map of the area.

Site 1, there are sandbanks (soft mobile sediments) with no vegetation (Img. 5). Bottom is sandy and there are intense ripple marks (high hydrodynamic conditions) (Img. 11, 12). Interesting part is the morphology - type of the upper limit of Posidonia meadow distribution which forms an extensive area with “barrier reefs” (Img. 6-10).

Site 2, the interest is located on the natural Posidonia meadow cutting. That natural cutting occurs where there is located an alteration of Posidonia meadow morphology from “barrier reefs” to compact and extensive meadow (Img. 10).

Site 3, the interest is located on the upper limit of Posidonia meadow which presents a plane form (Img. 11, 12).

**Table 2.**Sites of interest in the Area 1.

Site	Description	Depth
1	Upper limit of Posidonia meadow which forms «barrier reefs» on transect 1	13m
2	Upper limit of Posidonia meadow with intense ripple marks on transect 2	13 m
3	Upper limit of Posidonia meadow with intense ripple marks on transect 3.	11 m



Image 5



Image 6



Image 7

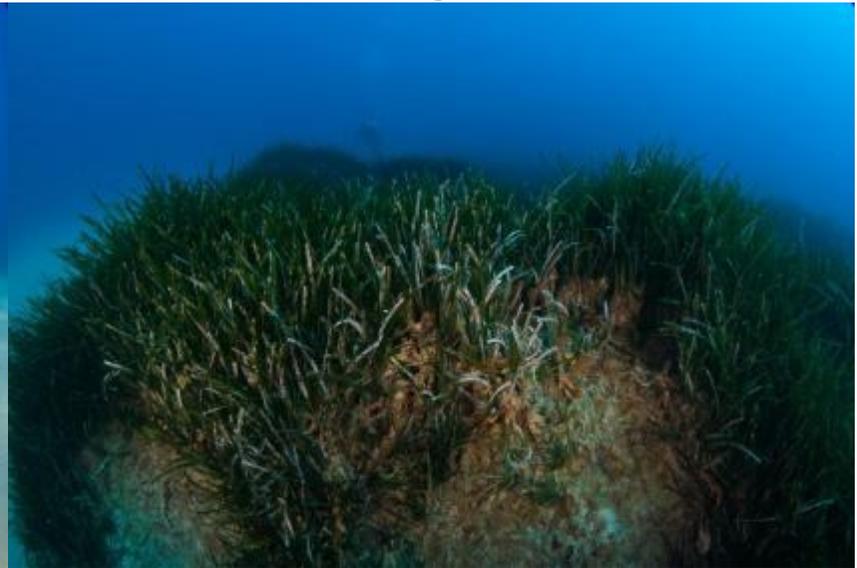


Image 8



Image 9



Image 10



Image 11



Image 12

## AREA 2

Area 2 concerns the part of study area between depths of 13-20m (Img. 13a, b). In this area there is Posidonia meadow with a “barrier reef” formation which creates a particularly intense geological terrain (Image 13-17). In this area 2 sites of interest were chosen to be further analyzed (Image 13a, Table 3).

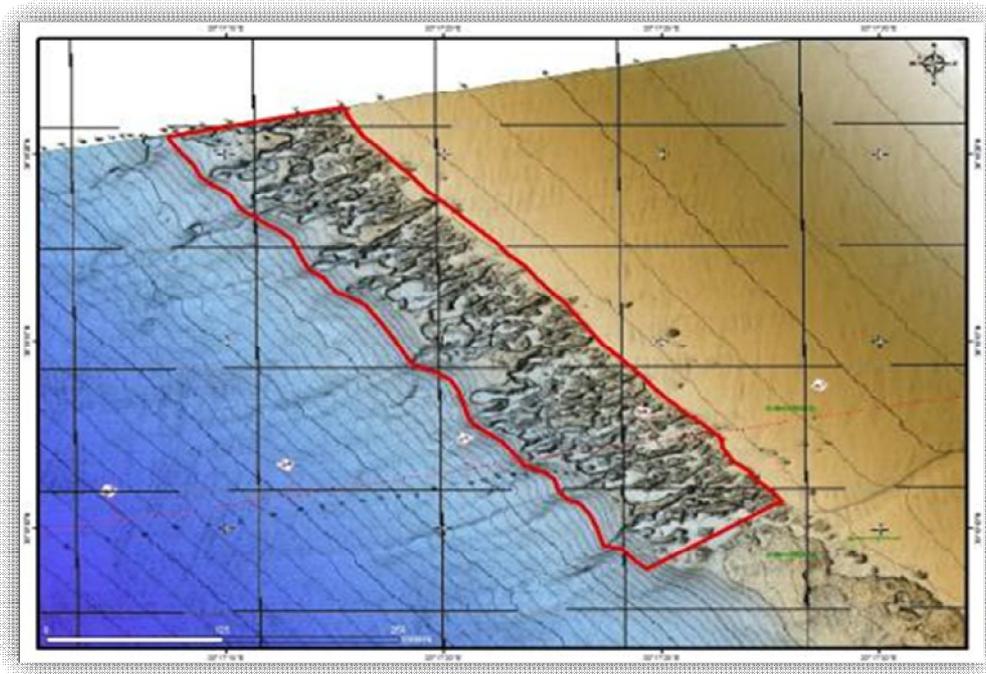
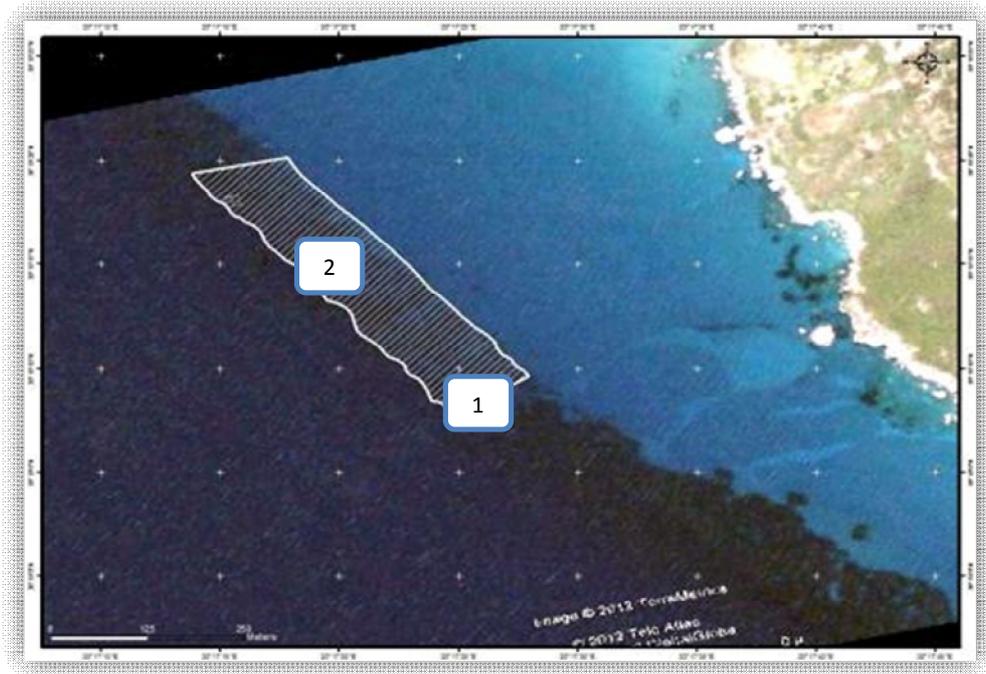


Image 13.a) Sites of interest in the Area 2.b) Area 2 as mounted on the provided geomorphological map of the area.

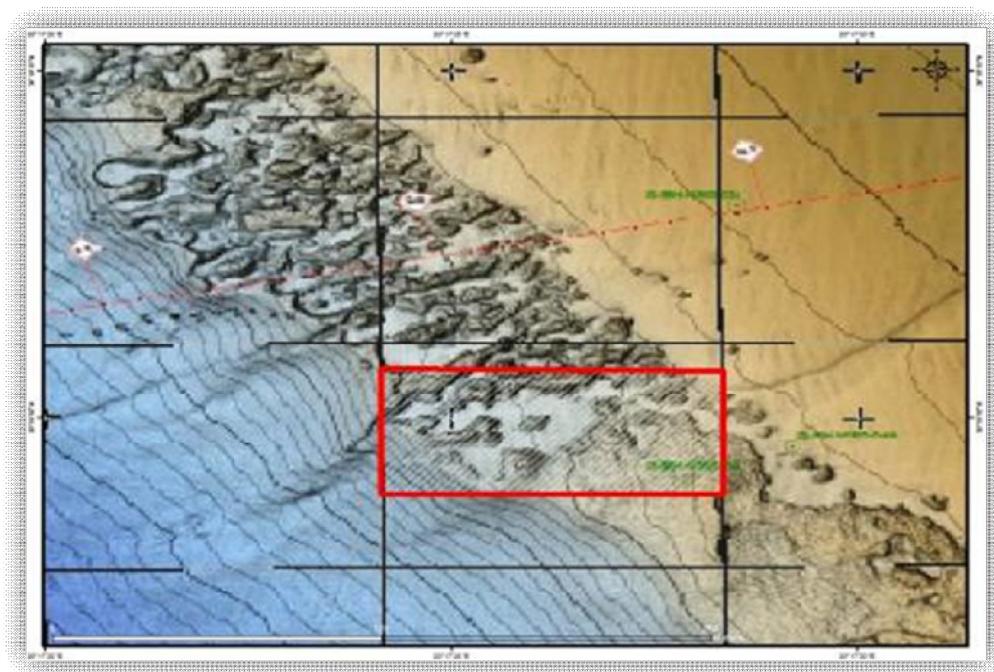
Site 1, the interest is located on the natural Posidonia meadow cutting. That natural cutting occurs where there is located an alteration of Posidonia meadow morphology from “barrier reefs” to compact and extensive meadow (Img. 14, 15).

Site 2, there are several Posidonia meadow reefs (“barrier reefs”) and numerous natural cuttings – passages through them. This type of Posidonia meadow creates the intense geological terrain of sea bottom (Img. 16-20). At the depth of -15m the meadow’s density was measured to be ~580 shoots/m<sup>2</sup>.

**Table 3. Sites of interest in the Area 2.**

Site	Description	Depth
1	Natural passage through Posidonia meadow on transect 2.	15 m
2	<i>Posidonia</i> meadow forms “barrier reefs” on transect 1	13 m

Along transect 2, and at depths between 13-17m a wide natural passage was recorded as referred previously (Img. 12). This natural passage is wide for about 100m, but beyond 17m depth there is an extensive Posidonia meadow.



**Image 14. The natural passage is placed where an alteration of Posidonia meadow morphology was recorded (from “barrier reefs” to compact and extensive meadow).**



Image 15



Image 16



Image 17



Image 18



Image 19



Image 20

### **AREA 3**

Area 3 concerns the part of study area between depths of 12-20m (Img. 21a, b). In this area there is a compact and extensive Posidonia meadow (Img 21b). In this area 1 site of interest was chosen to be further analyzed (Img 21a, Table 4).

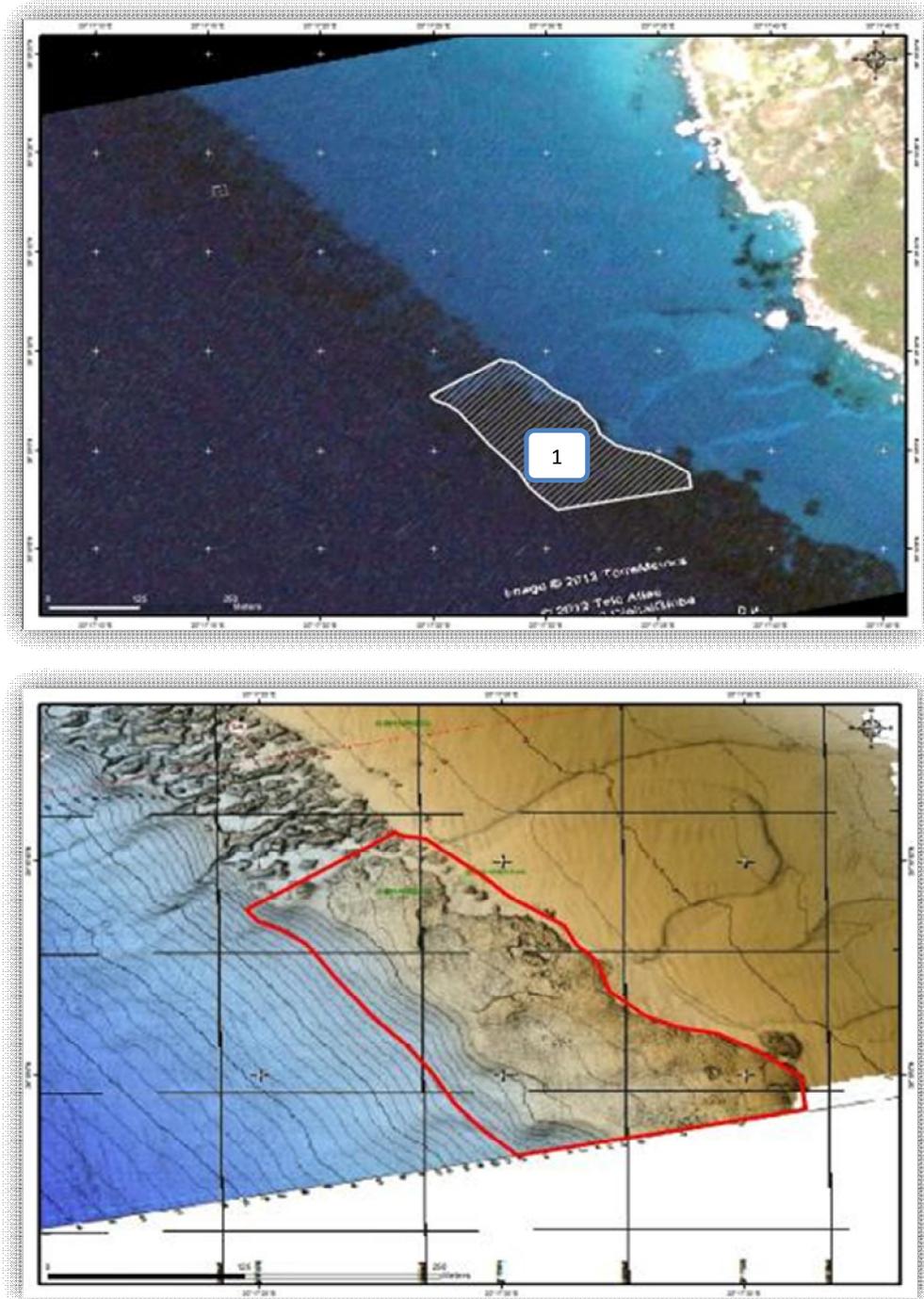


Image 21.a) Sites of interest of Area 3. b) Area 3 as mounted on the provided geomorphological map of the area.

Site 1, there is a typical, plane, compact, extensive Posidonia meadow (Img. 22, 23). At the depth of -15m the meadow's density was measured to be  $\sim 475$  shoots/m<sup>2</sup>. At  $\sim 13$ m depth, several flowers and fruits of Posidonia were recorded (Img. 25).

**Table 4. Sites of interest in the Area 3.**

<b>Site</b>	<b>Description</b>	<b>Depth</b>
<b>1</b>	Typical Posidonia meadow with a plane and extensive form	15 m



Image 22



Image 23



Image 24



Image 25

## AREA 4

Area 4 concerns the part of study area between depths of 20-35m (Img. 26a, b). In this area there is plane and compact Posidonia meadow (Img. 31-34). In this area 3 sites of interest were chosen to be further analyzed (Img. 26a, Table 5).

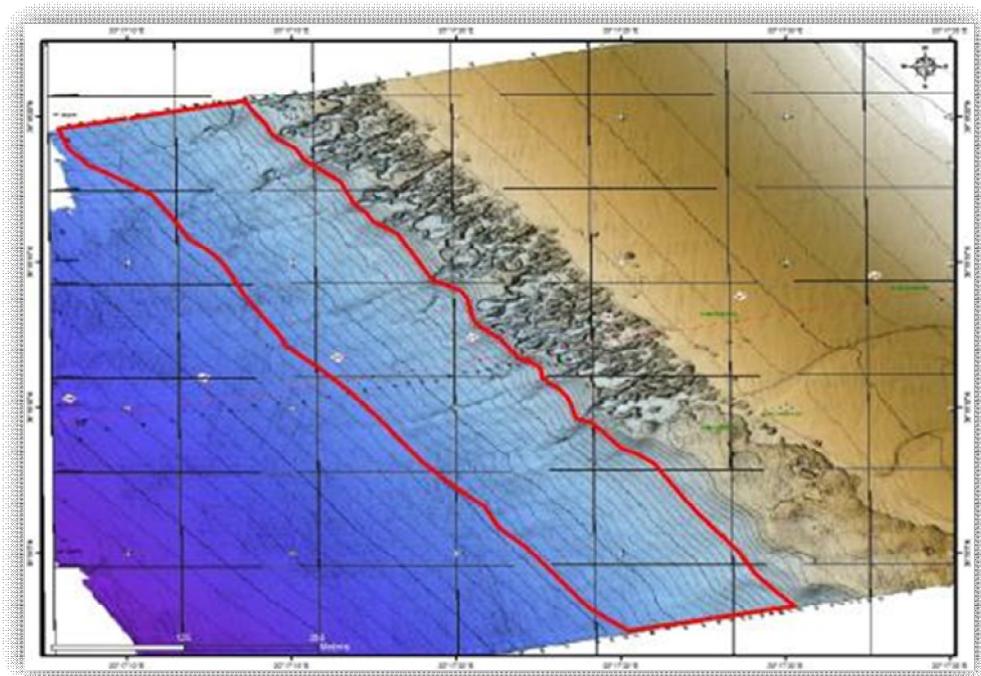
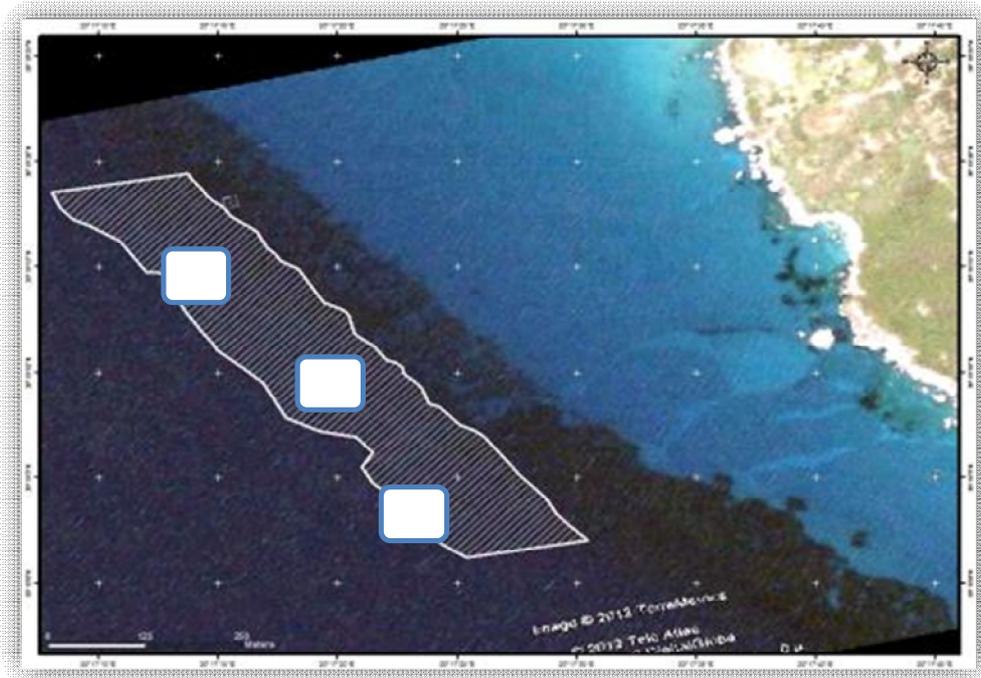


Image 26.a) Sites of interest in the Area 4. b) Area 4 as mounted on the provided geomorphological map of the area.

In Sites 1 and 2, the lower (deeper) limit of Posidonia meadow distribution was recorded (Img. 27, 28). The depth of the lower limit measured approximately -35m and its type is characterized as «natural shaded limit» as light availability is the limiting growth factor for seagrasses (Img. 29, 30).

At Site 3 and depths between 20-30m Posidonia forms a compact and extensive meadow (Img. 31-34).

**Table 5. Sites of interest in the Area 4.**

<b>Site</b>	<b>Description</b>	<b>Depth</b>
<b>1</b>	Lower limit of Posidonia meadow distribution	35 m
<b>2</b>	Lower limit of Posidonia meadow distribution	35 m
<b>3</b>	Compact and extensive Posidonia meadow.	25 m



Image 27



Image 28



Image 29



Image 30



Image 31



Image 32



Image 33



Image 34

#### 4. SUMMARY OF FAUNA AND FLORA

In summary, in the study area were recorded several organisms as Anthozoans (*Cerianthus sp.*) (Img. 36), Polychaetes (e.g. *Spirographis pallanzani*) (Img. 38), Echinoderms (e.g. *Echinaster sepositus*) (Img. 39), Ascidians (e.g. *Halocynthia papillosa*) (Img. 43), Sponges (e.g. *Aplysina aerophoba*), Bryozoans (e.g. *Adeonella calveti*, *Reteporella grimaldii*). Inside the Posidonia meadow were located individuals of the protected bivalve species (Annex IV of Habitat Directive 92/43/2000 and Annex II of Barcelona Convention) *Pinna nobilis* (Img. 37, 44). It should be mentioned that where Posidonia barrier reefs occur, macrofauna estimated to be comparatively higher. Moreover, the presence of macroalgae as epiphytes on Posidonia leaves and rhizomes was noticed (e.g. encrusted red algae) (Img. 35, 41).



Image 35



Image 36



Image 37



Image 38



Image 39



Image 40



Image 41



Image 42



Image 43



Image 44

## 5. DISCUSSION –CONCLUSIONS

From the above mentioned, it is clear that the ecological status of the seagrass meadow (angiosperm *Posidonia oceanica*) in the study area is characterized as good - high, both in terms of its characteristics such as structure, morphology, shoot density, and the supported biocoenosis which is characterized by great variety.

With regard to exploring and identifying of natural passages through the meadow, we could say that the only natural passage on existing meadow that could be considered satisfactory is that of transect 2 (as described in Area 2). However, that passage is limited to a depth of -17m, where there is an alteration of *Posidonia* meadow's type in a more compact form and therefore, we must take into consideration a different approach to the crossing of the secondary discharging pipeline of hydraulic test water.

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX J:**

**SAMPLE LOCATIONS OF OFFSHORE  
GEOTECHNICAL INVESTIGATION**

### 3. RESULTS / ΑΠΟΤΕΛΕΣΜΑΤΑ

#### 3.1 Geotechnical Locations/ Θέσεις Γεωτεχνικών Δοκιμών.

The following tables give details of the sample and in-situ test locations and water depths at the time of geotechnical data acquisition.

Οι παρακάτω πίνακες δίνουν λεπτομερώς τις θέσεις δειγματοληψίας, επί τόπου αναλύσεων και το βάθος νερού αυτών.

**Table/ Πίνακας 3.1: Piston Gravity Core Coordinates/ Συντεταγμένες δειγματολήπτη Piston**

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Easting [m]	Northing [m]	Latitude North [deg]	Longitude East [deg]
019-GT-PGC	424 967	4 350 037	39° 17' 47.26"	20° 07' 47.46"
019A-GT-PGC	424 941	4 350 045	39° 17' 47.51"	20° 07' 46.37"
021-GT-PGC	421 631	4 350 902	39° 18' 14.26"	20° 05' 27.82"
023-GT-PGC	418 924	4 351 047	39° 18' 18.07"	20° 03' 34.76"
023A-GT-PGC	418 894	4 351 049	39° 18' 18.10"	20° 03' 33.51"
025-GT-PGC	415 119	4 351 223	39° 18' 22.44"	20° 00' 55.82"
025A-GT-PGC	415 087	4 351 220	39° 18' 22.34"	20° 00' 54.48"
052-GT-PGC	406 059	4 347 641	39° 16' 22.90"	19° 54' 39.38"
052A-GT-PGC	406 104	4 347 661	39° 16' 23.58"	19° 54' 41.27"
057-GT-PGC	403 288	4 346 310	39° 15' 38.65"	19° 52' 44.48"
057A-GT-PGC	403 314	4 346 321	39° 15' 39.02"	19° 52' 45.52"
059-GT-PGC	400 766	4 345 566	39° 15' 13.49"	19° 50' 59.64 "
061-GT-PGC	400 247	4 344 852	39° 14' 50.11"	19° 50' 38.36"
067-GT-PGC	393 312	4 344 355	39° 14' 31.04"	19° 45' 49.39"
069-GT-PGC	392 395	4 347 975	39° 16' 28.02"	19° 45' 09.05"
071-GT-PGC	390 341	4 349 489	39° 17' 16.19"	19° 43' 42.46"
073-GT-PGC	388 126	4 347 795	39° 16' 20.23"	19° 42' 11.03"
076-GT-PGC	386 267	4 352 447	39° 18' 50.23"	19° 40' 50.64"
076A-GT-PGC	386 264	4 352 444	39° 18' 50.13"	19° 40' 50.51"
078-GT-PGC	381 666	4 355 706	39° 20' 33.71"	19° 37' 36.51"
082-GT-PGC	377 114	4 359 122	39° 22' 22.20"	19° 34' 24.12"
082A-GT-PGC	377 105	4 359 125	39° 22' 22.30"	19° 34' 23.74"
088-GT-PGC	372 847	4 362 211	39° 24' 00.14"	19 °31' 23.74"
088A-GT-PGC	372 848	4 362 217	39° 24' 00.33"	19° 31' 23.76"
090-GT-PGC	368 482	4 365 396	39° 25' 41.07"	19° 28' 19.06"
095-GT-PGC	358 761	4 372 484	39° 29' 25.36"	19° 21' 27.19"
097-GT-PGC	350 700	4 378 347	39° 32' 30.56"	19° 15' 45.13"
099-GT-PGC	342 838	4 384 527	39° 35' 45.86"	19° 10' 10.65"
102-GT-PGC	334 676	4 391 179	39° 39' 15.97"	19° 04' 22.64"
104-GT-PGC	327 557	4 396 977	39° 42' 18.86"	18° 59' 18.61"
109-GT-PGC	316 521	4 405 751	39° 46' 55.00"	18° 51' 26.70"
113-GT-PGC	313 336	4 407 813	39° 47' 59.32"	18° 49' 10.76"
113A-GT-PGC	313 328	4 407 816	39° 47' 59.42"	18° 49' 10.43"
120-GT-PGC	307 947	4 412 069	39° 50' 12.95"	18° 45' 19.82"
127-GT-PGC	303 019	4 415 324	39° 51' 54.38"	18° 41' 49.12"

Table/ Πίνακας 3.2: Vibrocore Coordinates/ Συντεταγμένες δοκιμής "Vibrocore"

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Easting [m]	Northing [m]	Latitude North [deg]	Longitude East [deg]
001-GT-VC	438 716	4 352 516	39° 19' 11.58"	20° 17' 20.60"
003-GT-VC	438 151	4 352 394	39° 19' 07.47"	20° 16' 57.06"
007-GT-VC	436 948	4 352 132	39° 18' 58.65"	20° 16' 06.92"
009-GT-VC	435 054	4 351 221	39° 18' 28.60"	20° 14' 48.14"
011-GT-VC	433 303	4 349 053	39° 17' 17.79"	20° 13' 35.79"
017-GT-VC	427 343	4 349 434	39° 17' 28.45"	20° 09' 26.88"
130-GT-VC	298 005	4 422 954	39° 55' 57.42"	18° 38' 09.77"
132-GT-VC	297 277	4 426 892	39° 58' 04.41"	18° 37' 34.68"
133-GT-VC	296 242	4 431 783	40° 00' 42.02"	18° 36' 45.60"
136-GT-VC	294 296	4 442 496	40° 06' 27.50"	18° 35' 11.33"
139-GL-VC	294 327	4 445 541	40° 08' 06.19"	18° 35' 09.14"
141-GL-VC	294 326	4 445 602	40° 08' 08.19"	18° 35' 09.05"
143-GL-VC	294 318	4 445 728	40° 08' 12.25"	18° 35' 08.55"
144-GT-VC	292 466	4 447 810	40° 09' 18.07"	18° 33' 47.94"
144A-GT-VC	292 458	4 447 815	40° 09' 18.24"	18° 33' 47.58"
147-GT-VC	288 389	4 448 735	40° 09' 44.39"	18° 30' 54.69"
149-GT-VC	287 671	4 447 882	40° 09' 16.08"	18° 30' 25.34"
149A-GT-VC	287 669	4 447 880	40° 09' 16.04"	18° 30' 25.26"
151-GT-VC	287 388	4 447 408	40° 09' 00.48"	18° 30' 13.96"

Table/ Πίνακας 3.3: Box Core Coordinates/ Συντεταγμένες λήψης δειγματοληπτών

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Easting [m]	Northing [m]	Latitude North [deg]	Longitude East [deg]
030-GL-BC	410 539	4 350 489	39° 17' 56.99"	19° 57' 44.95"
030A-GL-BC	410 536	4 350 489	39° 17' 56.98"	19° 57' 44.85"
030B-GL-BC	410 538	4 350 487	39° 17' 56.92"	19° 57' 44.93"
030C-GL-BC	410 542	4 350 483	39° 17' 56.80"	19° 57' 45.11"
030D-GL-BC	410 542	4 350 497	39° 17' 57.25"	19° 57' 45.08"
034-GT-BC	410 687	4 350 126	39° 17' 51.32"	19° 57' 45.27"
034-GL-BC	410 678	4 350 129	39° 17' 45.37"	19° 57' 50.94"
042-GL-BC	409 587	4 348 460	39° 16' 50.82"	19° 57' 06.20"
042A-GL-BC	409 588	4 348 459	39° 16' 50.78"	19° 57' 06.25"
045-GL-BC	409 330	4 348 882	39° 17' 04.42"	19° 56' 55.27"
045A-GL-BC	409 326	4 348 880	39° 17' 04.34"	19° 56' 55.14"
050-GL-BC	408 225	4 348 172	39° 16' 40.98"	19° 56' 09.54"
050A-GL-BC	408 226	4 348 170	39° 16' 40.90"	19° 56' 09.56"
051-GL-BC	405 915	4 349 361	39° 17' 18.65"	19° 54' 32.52"
051A-GL-BC	405 916	4 349 358	39° 17' 18.54"	19° 54' 32.58"
056-GL-BC	403 417	4 346 401	39° 15' 41.63"	19° 52' 49.81"
063-GL-BC	400 248	4 344 851	39° 14' 50.08"	19° 50' 38.42"
066-GL-BC	396 209	4 345 866	39° 15' 21.29"	19° 47' 49.37"
075-GL-BC	388 128	4 347 803	39° 16' 20.49"	19° 42' 11.13"
080-GL-BC	381 665	4 355 714	39° 20' 33.95"	19° 37' 36.46"
081-GL-BC	381 815	4 355 914	39° 20' 40.53"	19° 37' 42.58"
085-GL-BC	377 106	4 359 125	39° 22' 22.29"	19° 34' 23.78"
085A-GL-BC	377 103	4 359 124	39° 22' 22.25"	19° 34' 23.67"
086-GL-BC	376 394	4 359 644	39° 22' 38.76"	19° 33' 53.69"
087-GL-BC	372 951	4 362 150	39° 23' 58.22"	19° 31' 28.15"
094-GL-BC	364 092	4 368 605	39° 27' 22.67"	19° 25' 13.13"
098-GL-BC	350 700	4 378 344	39° 32' 30.44"	19° 15' 45.14"
101-GL-BC	342 838	4 384 524	39° 35' 45.75"	19° 10' 10.67"
103-GL-BC	327 555	4 396 979	39° 42' 18.94"	18° 59' 18.55"
107-GL-BC	321 271	4 402 092	39° 45' 00.02"	18° 54' 49.81"
108-GL-BC	316 368	4 405 365	39° 46' 42.36"	18° 51' 20.65"
111-GL-BC	315 928	4 405 686	39° 46' 52.41"	18° 51' 01.83"
114-GL-BC	313 338	4 407 811	39° 47' 59.28"	18° 49' 10.86"
114A-GL-BC	313 309	4 407 822	39° 47' 59.60"	18° 49' 09.64"
119-GL-BC	310 134	4 410 169	39° 49' 13.13"	18° 46' 53.74"
122-GT-BC	307 949	4 412 067	39° 50' 19.92"	18° 45' 19.92"
125-GL-BC	304 735	4 414 065	39° 51' 02.64"	18° 43' 02.64"
125A-GL-BC	304 721	4 414 049	39° 51' 14.48"	18° 43' 02.06"

Table/Πίνακας 3.4: Long Piston Gravity Core Coordinates/ Συντεταγμένες μακρού δειγματολήπτη Piston

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Easting [m]	Northing [m]	Latitude North [deg]	Longitude East [deg]
005-GL-LPGC	438 035	4 352 372	39° 19' 06.72"	20° 16' 52.21"
013-GL-LPGC	-	-	-	-
015-GL-LPGC	-	-	-	-
026-GT-LPGC	412 162	4 350 762	39° 18' 06.45"	19° 58' 52.61"
029-GL-LPGC	410 540	4 350 490	39° 17' 57.01"	19° 57' 45.02"
032-GT-LPGC	410 685	4 350 132	39° 17' 45.47"	19° 57' 51.23"
033-GL-LPGC	410 686	4 350 125	39° 17' 45.25"	19° 57' 51.28"
036-GT-LPGC	409 218	4 351 897	39° 18' 42.17"	19° 56' 49.16"
038-GT-LPGC	409 454	4 350 188	39° 17' 46.82"	19° 56' 59.84"
040-GT-LPGC	409 595	4 348 454	39° 16' 50.62"	19° 57' 06.57"
041-GL-LPGC	409 585	4 348 456	39° 16' 50.68"	19° 57' 06.13"
043-GL-LPGC	409 325	4 348 879	39° 17' 04.32"	19° 56' 55.06"
046-GT-LPGC	408 975	4 349 500	39° 17' 24.32"	19° 56' 40.19"
049-GL-LPGC	408 224	4 348 169	39° 16' 40.87"	19° 56' 09.47"
049-GT-LPGC	-	-	-	-
055-GL-LPGC	403 418	4 346 397	39° 15' 41.52"	19° 52' 49.82"
064-GL-LPGC	395 709	4 344 018	39° 14' 21.13"	19° 47' 29.56"
084-GL-LPGC	377 108	4 359 129	39° 22' 22.40"	19° 34' 23.86"
092-GL-LPGC	364 093	4 368 607	39° 27' 22.72"	19° 25' 13.18"
105-GL-LPGC	321 274	4 402 093	39° 45' 00.07"	18° 54' 49.96"
115-GL-LPGC	313 337	4 407 816	39° 47' 59.44"	18° 49' 10.80"
117A-GT-LPGC	310 131	4 410 174	39° 49' 13.29"	18° 46' 53.61"
117-GT-LPGC	310 122	4 410 168	39° 49' 13.10"	18° 46' 53.24"
118-GL-LPGC	310 126	4 410 174	39° 49' 13.30"	18° 46' 53.41"
124-GL-LPGC	304 733	4 414 066	39° 51' 15.06"	18° 43' 02.58"
126-GT-LPGC	304 737	4 414 062	39° 51' 14.90"	18° 43' 02.72"

Table/ Πίνακας 3.5: Cone Penetration Test Coordinates/ Συντεταγμένες δοκιμών κώνου

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Easting [m]	Northing [m]	Latitude North [deg]	Longitude East [deg]
002-GT-CPT	438 714	4 352 520	39° 19' 11.70"	20° 17' 20.51"
004-GT-CPT	438 155	4 352 396	39° 19' 07.55"	20° 16' 57.23"
008-GT-CPT	436 953	4 352 133	39° 18' 58.68"	20° 16' 07.10"
010-GT-CPT	435 062	4 351 224	39° 18' 28.69"	20° 14' 48.47"
012-GT-CPT	433 305	4 349 055	39° 17' 17.86"	20° 13' 35.89"
018-GT-CPT	427 348	4 349 432	39° 17' 28.36"	20° 09' 27.09"
020-GT-CPT	424 967	4 350 034	39° 17' 47.15"	20° 07' 47.45"
022-GT-CPT	421 631	4 350 899	39° 18' 14.17"	20° 05' 27.82"
024-GT-CPT	418 922	4 351 042	39° 18' 17.90"	20° 03' 34.66"
053-GT-CPT	406 049	4 347 631	39° 16' 22.60"	19° 54' 39.00"
058-GT-CPT	403 287	4 346 307	39° 15' 38.56"	19° 52' 44.40"
060-GT-CPT	400 770	4 345 565	39° 15' 13.46"	19° 50' 59.81"
062-GT-CPT	400 243	4 344 847	39° 14' 49.94"	19° 50' 38.19"
068-GT-CPT	393 320	4 344 352	39° 14' 30.92"	19° 45' 49.70"
070-GT-CPT	392 404	4 347 978	39° 16' 28.12"	19° 45' 09.43"
072-GT-CPT	390 346	4 349 490	39° 17' 16.22"	19° 43' 42.67"
074-GT-CPT	388 125	4 347 789	39° 16' 20.05"	19° 42' 11.01"
077-GT-CPT	386 269	4 352 451	39° 18' 50.37"	19° 40' 50.74"
079-GT-CPT	381 664	4 355 712	39° 20' 33.88"	19° 37' 36.41"
089-GT-CPT	372 847	4 362 212	39° 24' 00.19"	19° 31' 23.75"
091-GT-CPT	368 481	4 365 402	39° 25' 41.27"	19° 28' 18.98"
091A-GT-CPT	368 485	4 365 399	39° 25' 41.16"	19° 28' 19.17"
096-GT-CPT	358 763	4 372 490	39° 29' 25.54"	19° 21' 27.27"
100-GT-CPT	342 847	4 384 521	39° 35' 45.68"	19° 10' 11.04"
110-GT-CPT	316 518	4 405 749	39° 46' 54.92"	18° 51' 26.56"
121-GT-CPT	307 951	4 412 073	39° 50' 13.10"	18° 45' 19.98"
128-GT-CPT	303 013	4 415 327	39° 51' 54.46"	18° 41' 48.86"
129-GT-CPT	299 478	4 418 243	39° 53' 26.01"	18° 39' 16.96"
131-GT-CPT	298 009	4 422 955	39° 55' 57.47"	18° 38' 09.94"
131A-GT-CPT	298 008	4 422 950	39° 55' 57.30"	18° 38' 09.90"
134-GT-CPT	296 243	4 431 779	40° 00' 41.90"	18° 36' 45.64"
135-GT-CPT	295 205	4 436 668	40° 03' 19.42"	18° 35' 56.32"
137-GT-CPT	294 294	4 442 495	40° 06' 27.46"	18° 35' 11.05"
137A-GT-CPT	294 293	4 442 501	40° 06' 27.64"	18° 35' 11.20"
138-GT-CPT	294 327	4 445 541	40° 08' 06.20"	18° 35' 09.14"
138A-GT-CPT	294 324	4 445 551	40° 08' 06.50"	18° 35' 09.02"
140-GT-CPT	294 326	4 445 600	40° 08' 08.12"	18° 35' 09.05"
142-GT-CPT	294 316	4 445 730	40° 08' 12.31"	18° 35' 08.48"
145-GT-CPT	292 466	4 447 810	40° 09' 18.08"	18° 33' 47.94"
145A-GT-CPT	292 465	4 447 814	40° 09' 18.21"	18° 33' 47.91"
145B-GT-CPT	292 465	4 447 825	40° 09' 18.55"	18° 33' 47.87"
146-GT-CPT	289 849	4 448 956	40° 09' 52.87"	18° 31' 56.07"
148-GT-CPT	288 393	4 448 689	40° 09' 42.90"	18° 30' 54.92"
150-GT-CPT	287 672	4 447 879	40° 09' 16.01"	18° 30' 25.41"
150A-GT-CPT	287 672	4 447 874	40° 09' 15.83"	18° 30' 35.41"
152-GT-CPT	287 387	4 447 406	40° 09' 00.42"	18° 30' 13.94"

Table/ Πίνακας 3.6: Long Cone Penetration Test Coordinates / Συντεταγμένες μακρών δοκιμών κώνου

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Easting [m]	Northing [m]	Latitude North [deg]	Longitude East [deg]
006-GL-LCPT	438 033	4 352 371	39° 19' 06.68"	20° 16' 52.12"
014-GL-LCPT	431 079	4 349 586	39° 17' 34.48"	20° 12' 02.78"
016-GL-LCPT	430 989	4 349 582	39° 17' 34.30"	20° 11' 59.02"
016A-GL-LCPT	430 977	4 349 582	39° 17' 34.30"	20° 11' 58.53"
027-GT-LCPT	412 193	4 350 781	39° 18' 07.07"	19° 58' 53.88"
028-GL-LCPT	-	-	-	-
031-GL-LCPT	-	-	-	-
035-GT-LCPT	409 217	4 351 897	39° 18' 42.15 "	19° 56' 49.12"
037-GL-LCPT	-	-	-	-
039-GT-LCPT	409 590	4 348 454	39° 16' 50.62"	19° 57' 06.33"
044-GL-LCPT	409 330	4 348 877	39° 17' 04.25"	19° 56' 55.28"
047-GT-LCPT	408 971	4 349 499	39° 17' 24.30"	19° 49' 56.99"
048-GL-LCPT	408 226	4 348 169	39° 16' 40.87"	19° 56' 09.56"
054-GL-LCPT	403 416	4 346 397	39° 15' 41.51"	19° 52' 49.75"
065-GL-LCPT	395 711	4 344 016	39° 14' 21.10"	19° 47' 29.61"
083-GL-LCPT	377 108	4 359 125	39° 22' 22.28"	19° 34' 23.86"
093-GL-LCPT	364 093	4 368 599	39° 27' 22.46"	19° 25' 13.17"
106-GL-LCPT	321 273	4 402 087	39° 44' 59.85"	18° 54' 49.91"
112-GL-LCPT	313 336	4 407 817	39° 47' 59.48"	18° 49' 10.76"
116-GL-LCPT	310 130	4 410 171	39° 49' 13.22"	18° 46' 53.59"
123-GL-LCPT	304 734	4 414 068	39° 51' 15.13"	18° 43' 02.60"

Table/ Πίνακας 3.7: Piston Gravity Core Water Depth / Βάθος νερού δειγματολήπτη Piston

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Date/Time <sup>(1)</sup>	USBL - Reduced <sup>(2)</sup>	Echo Sounder - Reduced <sup>(3)</sup>	Charted - Reduced <sup>(4)</sup>
		[m]	[m]	[m]
019-GT-PGC	09-Jul-2011 15:03	103.7	103.9	102.6
019A-GT-PGC	09-Jul-2011 16:05	103.9	104.0	102.7
021-GT-PGC	09-Jul-2011 13:36	120.1	120.2	119.2
023-GT-PGC	09-Jul-2011 11:20	149.5	149.5	148.2
023A-GT-PGC	09-Jul-2011 12:24	150.4	149.6	149.2
025-GT-PGC	09-Jul-2011 09:10	209.0	210.0	207.7
025A-GT-PGC	09-Jul-2011 10:00	209.7	210.9	208.8
052-GT-PGC	09-Jul-2011 04:57	917.1	918.6	919.9
052A-GT-PGC	09-Jul-2011 06:47	917.1	918.6	915.3
057-GT-PGC	08-Jul-2011 23:46	1114.2	1118.5	1112.0
057A-GT-PGC	09-Jul-2011 02:07	1115.6	1118.3	1113.2
059-GT-PGC	08-Jul-2011 20:56	1185.6	1192.9	1188.4
061-GT-PGC	08-Jul-2011 17:59	1226.9	1227.3	1225.7
067-GT-PGC	08-Jul-2011 14:04	1383.9	1385.5	1382.2
069-GT-PGC	08-Jul-2011 10:36	1347.6	1347.9	1345.2
071-GT-PGC	08-Jul-2011 06:59	1361.0	1360.5	1358.7
073-GT-PGC	08-Jul-2011 03:11	1408.8	1407.1	1406.4
076-GT-PGC	07-Jul-2011 16:17	1370.9	1371.7	1369.2
076A-GT-PGC	07-Jul-2011 22:33	1370.5	1371.7	1369.2
078-GT-PGC	07-Jul-2011 11:20	1368.4	1367.9	1367.7
082-GT-PGC	06-Jul-2011 20:37	1349.3	1349.1	1349.3
082A-GT-PGC	07-Jul-2011 06:00	1349.4	1349.2	1349.6
088-GT-PGC	06-Jul-2011 10:58	1313.9	1312.6	1313.1
088A-GT-PGC	06-Jul-2011 15:34	1314.0	1312.6	1313.0
090-GT-PGC	06-Jul-2011 05:13	1266.4	1264.7	1264.6
095-GT-PGC	05-Jul-2011 23:47	1202.2	1201.4	1200.6
097-GT-PGC	05-Jul-2011 18:55	1164.2	1163.1	1162.0
099-GT-PGC	05-Jul-2011 13:31	1116.6	1115.9	1114.8
102-GT-PGC	05-Jul-2011 09:00	1016.6	1017.6	1014.5
104-GT-PGC	05-Jul-2011 04:13	900.6	900.7	898.7
109-GT-PGC	14-Jul-2011 05:07	726.5	726.2	724.7
113-GT-PGC	14-Jul-2011 00:57	648.1	647.2	646.4
113A-GT-PGC	14-Jul-2011 02:42	647.7	647.4	646.1
120-GT-PGC	13-Jul-2011 21:43	389.1	387.6	387.2
127-GT-PGC	13-Jul-2011 19:43	141.7	136.1	134.2
Time Zone	:	GMT + 2 hour		
Reduced Water Depth	:	relative to Vertical Datum		
Vertical Datum	:	Lowest Astronomical Tide		

**Notes**

- (1) Date and time at start of lowering equipment.
- (2) Water depth obtained from USBL readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (3) Water depth inferred from echo sounder readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (4) Water depth inferred from Fugro-supplied bathymetry chart, reduced to Vertical Datum.

Table/ Πίνακας 3.8: Vibrocore Water Depth/ Βάθος νερού δοκιμής "Vibrocore".

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Date/Time <sup>(1)</sup>	USBL - Reduced <sup>(2)</sup>	Echo Sounder - Reduced <sup>(3)</sup>	Charted - Reduced <sup>(4)</sup>
		[m]	[m]	[m]
001-GT-VC	24-Jul-2011 21:48	25.0	23.6	25.3
003-GT-VC	24-Jul-2011 22:41	56.6	56.2	56.0
007-GT-VC	24-Jul-2011 23:45	73.3	73.5	73.0
009-GT-VC	25-Jul-2011 01:00	73.1	73.6	72.8
011-GT-VC	25-Jul-2011 02:31	62.1	62.9	61.7
017-GT-VC	25-Jul-2011 05:41	97.1	97.1	97.0
130-GT-VC	24-Jul-2011 10:09	112.8	113.4	112.7
132-GT-VC	24-Jul-2011 08:47	110.1	110.5	110.0
133-GT-VC	24-Jul-2011 07:16	104.1	104.6	103.9
136-GT-VC	24-Jul-2011 05:12	86.1	86.4	86.0
139-GL-VC	24-Jul-2011 03:43	83.8	84.0	83.7
141-GL-VC	24-Jul-2011 02:54	81.3	82.1	81.2
143-GL-VC	24-Jul-2011 01:54	79.5	79.6	79.6
144-GT-VC	23-Jul-2011 22:26	82.2	82.7	82.2
144A-GT-VC	24-Jul-2011 00:19	82.1	82.5	82.1
147-GT-VC	23-Jul-2011 21:53	66.5	67.5	66.4
149-GT-VC	15-Jul-2011 10:13	49.0	52.2	49.3
149A-GT-VC	23-Jul-2011 20:39	48.7	52.1	49.0
151-GT-VC	15-Jul-2011 09:29	32.4	32.8	32.9
Time Zone		: GMT + 2 hour		
Reduced Water Depth		: relative to Vertical Datum		
Vertical Datum		: Lowest Astronomical Tide		

Notes:

- (1) Date and time at start of lowering equipment.
- (2) Water depth obtained from USBL readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (3) Water depth inferred from echo sounder readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (4) Water depth inferred from Fugro-supplied bathymetry chart, reduced to Vertical Datum.

Table/ Πίνακας 3.9: Box Core Water Depth / Βάθος νερού δειγματολήπτη

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Date/Time <sup>(1)</sup>	USBL - Reduced <sup>(2)</sup>	Echo Sounder - Reduced <sup>(3)</sup>	Charted - Reduced <sup>(4)</sup>
		[m]	[m]	[m]
030-GL-BC	09-Jul-2011 22:56	477.3	476.0	487.5
030A-GL-BC	10-Jul-2011 01:20	485.4	476.1	487.8
030B-GL-BC	10-Jul-2011 02:09	488.0	475.8	487.8
030C-GL-BC	10-Jul-2011 03:16	488.0	475.9	487.8
030D-GL-BC	10-Jul-2011 04:41	485.7	476.0	485.4
034-GT-BC	10-Jul-2011 06:15	508.5	507.4	507.9
034-GL-BC	10-Jul-2011 07:28	508.8	507.4	508.1
042-GL-BC	10-Jul-2011 09:40	665.5	663.6	663.8
042A-GL-BC	10-Jul-2011 11:00	664.3	663.4	663.5
045-GL-BC	10-Jul-2011 12:40	693.2	693.4	692.4
045A-GL-BC	10-Jul-2011 14:13	693.3	693.4	692.6
050-GL-BC	10-Jul-2011 16:10	759.7	762.4	759.1
050A-GL-BC	10-Jul-2011 18:10	759.7	762.5	759.2
051-GL-BC	10-Jul-2011 20:23	868.0	871.8	867.4
051A-GL-BC	10-Jul-2011 22:24	867.8	870.6	867.3
056-GL-BC	11-Jul-2011 01:29	1110.9	1114.3	1109.9
063-GL-BC	11-Jul-2011 04:28	1226.6	1227.3	1225.6
066-GL-BC	11-Jul-2011 07:41	1306.2	1308.5	1305.2
075-GL-BC	11-Jul-2011 11:57	1407.4	1409.6	1406.3
080-GL-BC	11-Jul-2011 16:15	1368.7	1371.0	1367.6
081-GL-BC	11-Jul-2011 19:21	1366.8	1368.0	1365.6
085-GL-BC	11-Jul-2011 22:33	1350.6	1352.0	1349.6
085A-GL-BC	12-Jul-2011 01:28	1350.7	1352.0	1349.6
086-GL-BC	12-Jul-2011 04:29	1359.9	1361.2	1358.6
087-GL-BC	12-Jul-2011 07:59	1316.9	1317.8	1315.6
094-GL-BC	12-Jul-2011 11:14	1231.2	1229.2	1228.0
098-GL-BC	12-Jul-2011 15:13	1164.6	1163.1	1162.0
101-GL-BC	12-Jul-2011 18:28	1115.8	1118.4	1114.8
103-GL-BC	12-Jul-2011 22:27	899.0	900.2	898.7
107-GL-BC	13-Jul-2011 01:24	802.4	798.7	802.1
108-GL-BC	13-Jul-2011 03:42	719.9	720.5	719.5
111-GL-BC	13-Jul-2011 05:45	710.3	711.1	709.7
114-GL-BC	13-Jul-2011 07:54	646.9	646.8	646.5
114A-GL-BC	13-Jul-2011 09:29	646.0	648.1	645.6
119-GL-BC	13-Jul-2011 11:22	525.5	524.3	525.0
122-GT-BC	13-Jul-2011 12:49	387.7	387.1	387.3
125-GL-BC	13-Jul-2011 14:33	177.1	176.2	176.9
125A-GL-BC	13-Jul-2011 15:14	176.7	176.2	176.5

Time Zone : GMT + 2 hour  
 Reduced Water Depth : relative to Vertical Datum  
 Vertical Datum : Lowest Astronomical Tide

Notes:

- (1) Date and time at start of lowering equipment.
- (2) Water depth obtained from USBL readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (3) Water depth inferred from echo sounder readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (4) Water depth inferred from Fugro-supplied bathymetry chart, reduced to Vertical Datum.

Table/ Πίνακας 3.10: Long Piston Gravity Core Water Depth/ Βάθος νερού μακρού δειγματολήπτη Piston

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)				
Location	Date/Time <sup>(1)</sup>	USBL - Reduced <sup>(2)</sup>	Echo Sounder - Reduced <sup>(3)</sup>	Charted - Reduced <sup>(4)</sup>
		[m]	[m]	[m]
005-GL-LPGC	09:48 29-Aug-2011	64.9	64.2	64.1
013-GL-LPGC	-	-	-	-
015-GL-LPGC	-	-	-	-
026-GT-LPGC	15:20 29-Aug-2011	304.0	300.1	303.2
029-GL-LPGC	09:27 30-Aug-2011	487.3	481.3	486.6
032-GT-LPGC	02:44 30-Aug-2011	507.8	501.4	506.9
049-GL-LPGC	04:45 31-Aug-2011	759.8	754.8	759.2
049-GT-LPGC	-	-	-	-
055-GL-LPGC	11:27 31-Aug-2011	1110.9	1110.5	1109.7
064-GL-LPGC	17:27 31-Aug-2011	1352.6	1351.9	1352.3
084-GL-LPGC	00:46 01-Sep-2011	1350.4	1349.3	1349.3
092-GL-LPGC	07:59 01-Sep-2011	1228.2	1227.3	1227.8
105-GL-LPGC	16:02 01-Sep-2011	803.2	799.9	802.2
033-GL-LPGC	20:16 29-Aug-2011	509.0	501.6	508.1
036-GT-LPGC	02:58 29-Aug-2011	594.2	592.4	593.3
038-GT-LPGC	17:01 30-Aug-2011	522.8	521.6	522.2
040-GT-LPGC	21:23 28-Aug-2011	663.7	663.9	663.2
041-GL-LPGC	17:00 28-Aug-2011	664.7	664.7	663.7
043-GL-LPGC	22:09 30-Aug-2011	692.9	692.5	692.6
046-GT-LPGC	00:44 28-Aug-2011	659.0	656.0	658.3
115-GL-LPGC	10:01 27-Aug-2011	645.9	646.4	646.4
117A-GT-LPGC	21:47 02-Sep-2011	523.1	525.1	524.9
117-GT-LPGC	04:16 02-Sep-2011	525.7	524.3	524.3
118-GL-LPGC	21:15 01-Sep-2011	525.7	525.2	524.6
124-GL-LPGC	10:04 02-Sep-2011	177.7	177.2	176.8
126-GT-LPGC	16:34 02-Sep-2011	177.9	177.2	177.0
Time Zone	:	GMT + 2 hour		
Reduced Water Depth	:	relative to Vertical Datum		
Vertical Datum	:	Lowest Astronomical Tide		

Notes:

- (1) Date and time at start of lowering equipment.
- (2) Water depth obtained from USBL readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (3) Water depth inferred from echo sounder readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (4) Water depth inferred from Fugro-supplied bathymetry chart, reduced to Vertical Datum.

Table/ Πίνακας 3.11: Cone Penetration Test Water Depth/ Βάθος νερού δοκιμής κώνου

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)					
Location	Date/Time <sup>(1)</sup>	USBL - Reduced <sup>(2)</sup> [m]	Echo Sounder - Reduced <sup>(3)</sup> [m]	CTD - Reduced <sup>(4)</sup> [m]	Charted - Reduced <sup>(5)</sup> [m]
002-GT-CPT	10:49 19-Jul-2011	25.8	25.6	25.4	25.0
004-GT-CPT	09:27 19-Jul-2011	56.6	56.4	56.1	56.8
008-GT-CPT	11:53 19-Jul-2011	73.7	73.6	73.4	73.0
010-GT-CPT	12:53 19-Jul-2011	73.5	73.3	73.2	72.8
012-GT-CPT	14:19 19-Jul-2011	62.5	62.3	62.1	61.7
018-GT-CPT	15:51 19-Jul-2011	97.5	97.5	97.4	97.0
020-GT-CPT	18:31 19-Jul-2011	103.2	103.3	103.2	102.0
022-GT-CPT	19:49 19-Jul-2011	119.4	119.7	119.6	119.0
024-GT-CPT	21:04 19-Jul-2011	148.2	148.7	148.7	148.5
053-GT-CPT	09:36 20-Aug-2011	924.2	915.1	924.2	922.4
058-GT-CPT	14:46 20-Aug-2011	1113.4	1111.8	1113.4	1112.4
060-GT-CPT	20:02 20-Aug-2011	1191.0	1187.7	1191.0	1189.0
062-GT-CPT	00:46 21-Aug-2011	1227.0	1224.3	1227.0	1227.0
068-GT-CPT	12:03 08-Sep-2011	1382.8	1383.7	1387.1	1381.9
070-GT-CPT	09:50 08-Sep-2011	1345.8	1342.6	1350.0	1345.1
072-GT-CPT	07:45 08-Sep-2011	1359.2	1355.9	1363.4	1358.5
074-GT-CPT	13:00 07-Sep-2011	1407.5	1402.7	1411.7	1406.0
077-GT-CPT	20:08 06-Sep-2011	1370.1	1366.8	-	1369.1
079-GT-CPT	17:32 06-Sep-2011	1368.6	1365.6	-	1367.7
089-GT-CPT	17:25 01-Aug-2011	1314.2	1310.8	1317.7	1313.0
091-GT-CPT	09:47 01-Aug-2011	1266.2	1263.9	1268.7	1264.6
091A-GT-CPT	13:50 06-Sep-2011	1266.3	1264.0	1269.5	1264.6
096-GT-CPT	03:19 01-Aug-2011	1202.1	1199.8	1200.9	1200.6
100-GT-CPT	21:19 31-Jul-2011	1116.3	1115.0	1118.7	1114.8
110-GT-CPT	12:47 31-Jul-2011	725.5	724.9	725.0	724.6
121-GT-CPT	08:09 31-Jul-2011	388.3	386.0	388.7	387.8
128-GT-CPT	18:05 18-Jul-2011	134.3	134.7	134.6	134.2
129-GT-CPT	16:47 18-Jul-2011	119.2	119.9	119.2	119.0
131-GT-CPT	15:10 18-Jul-2011	113.1	113.3	113.0	112.7
131A-GT-CPT	15:24 18-Jul-2011	113.1	113.3	113.2	112.7
134-GT-CPT	13:20 18-Jul-2011	104.4	105.5	104.3	103.9
135-GT-CPT	11:42 18-Jul-2011	97.0	97.1	96.8	96.6
137-GT-CPT	09:32 18-Jul-2011	86.4	86.4	86.1	86.1
137A-GT-CPT	09:43 18-Jul-2011	86.4	86.4	86.2	86.0
138-GT-CPT	07:57 18-Jul-2011	84.2	84.2	-	83.8
138A-GT-CPT	08:08 18-Jul-2011	84.0	84.3	-	83.5
140-GT-CPT	07:06 18-Jul-2011	81.7	81.6	81.5	81.3
142-GT-CPT	05:45 18-Jul-2011	80.0	80.0	79.8	79.6
145-GT-CPT	04:16 18-Jul-2011	82.5	82.5	82.2	82.2
145A-GT-CPT	04:27 18-Jul-2011	82.1	82.4	82.3	82.2
145B-GT-CPT	04:38 18-Jul-2011	82.5	82.3	82.3	82.2
146-GT-CPT	03:15 18-Jul-2011	66.4	66.3	66.1	66.2
148-GT-CPT	01:37 18-Jul-2011	66.6	66.1	66.2	66.5
150-GT-CPT	00:14 18-Jul-2011	49.6	49.0	49.1	49.3
150A-GT-CPT	00:31 18-Jul-2011	49.8	49.3	49.3	49.6
152-GT-CPT	23:03 17-Jul-2011	33.1	32.9	32.6	32.8
Time Zone	:	GMT + 2 hour			
Reduced Water Depth	:	relative to Vertical Datum			
Vertical Datum	:	Lowest Astronomical Tide			



**Notes**

- (1) Date and time at start of lowering equipment.
- (2) Water depth obtained from USBL readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (3) Water depth inferred from echo sounder readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (4) Water depth inferred from Fugro-supplied bathymetry chart, reduced to Vertical Datum.

Table/ Πίνακας 3.12: Long Cone Penetration Test Water Depth/ Βάθος νερού μακριάς δοκιμής κώνου

Geodetic Datum: WGS84, Grid: UTM Zone 34N, (CM21°E)					
Location	Date/Time <sup>(1)</sup>	USBL - Reduced <sup>(2)</sup> [m]	Echo Sounder - Reduced <sup>(3)</sup> [m]	CTD - Reduced <sup>(4)</sup> [m]	Charted - Reduced <sup>(5)</sup> [m]
006-GL-LCPT	23:45 13-Aug-2011	66.4	63.3	64.6	64.2
014-GL-LCPT	03:53 14-Aug-2011	75.2	73.6	73.5	73.0
016-GL-LCPT	06:33 14-Aug-2011	80.4	78.8	78.7	78.2
016A-GL-LCPT	06:59 14-Aug-2011	80.8	80.8	79.2	78.2
027-GT-LCPT	07:57 16-Aug-2011	297.2	293.9	296.3	298.5
028-GL-LCPT	-	-	-	-	-
031-GL-LCPT	-	-	-	-	-
035-GT-LCPT	15:54 14-Aug-2011	595.0	591.5	595.3	593.4
037-GL-LCPT	-	-	-	-	-
039-GT-LCPT	22:19 14-Aug-2011	665.7	663.8	666.3	663.8
044-GL-LCPT	01:39 13-Aug-2011	694.6	692.7	695.2	692.3
047-GT-LCPT	06:31 08-Aug-2011	660.7	654.3	661.2	660.2
048-GL-LCPT	03:57 15-Aug-2011	761.1	758.1	761.7	759.2
054-GL-LCPT	14:42 15-Aug-2011	1112.5	1110.1	1114.5	1110.8
065-GL-LCPT	16:08 16-Aug-2011	1354.4	1350.7	1357.3	1352.8
083-GL-LCPT	03:20 17-Aug-2011	1351.9	1356.2	1353.4	1349.6
093-GL-LCPT	09:45 18-Aug-2011	-	1227.1	1231.9	1227.9
106-GL-LCPT	20:15 19-Aug-2011	803.4	799.9	805.3	801.6
112-GL-LCPT	17:45 07-Aug-2011	648.1	646.4	648.3	646.4
116-GL-LCPT	11:59 07-Aug-2011	526.4	524.1	526.4	525.3
123-GL-LCPT	01:45 07-Aug-2011	178.5	177.0	177.4	177.0
Time Zone : GMT + 2 hour					
Reduced Water Depth : relative to Vertical Datum					
Vertical Datum : Lowest Astronomical Tide					

Notes:

- (1) Date and time at start of lowering equipment.
- (2) Water depth obtained from USBL readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (3) Water depth inferred from echo sounder readings at start of drilling / sampling / testing, reduced to Vertical Datum.
- (4) Water depth inferred from Fugro-supplied bathymetry chart, reduced to Vertical Datum.

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX K: CONTACT WITH AUTHORITIES**

- K.1 ESIA Correspondence**
- K.2 Supplementary PEIA Correspondence**
- K.3 ESIA Correspondence**

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX K:**

### **CONTACT WITH AUTHORITIES**

- K.1 ESIA Correspondence**
- K.2 Supplementary PEIA Correspondence**
- K.3 ESIA Correspondence**



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ  
ΚΑΙ ΤΟΥΡΙΣΜΟΥ  
8<sup>Η</sup> ΕΦΟΡΕΙΑ ΒΥΖ/ΝΩΝ ΑΡΧΑΙΟΤΗΤΩΝ

Ταχ. Δ/ση: Βυζαντινό Μουσείο  
Ταχ. Κώδικας: 45221- Κάστρο  
Πληροφορίες: Δ. Παπαϊωάννου  
Τηλ. : (26510) - 25989, 39580  
Fax: 2651039349  
e-mail: 8eba@culture.gr

Α Κ Ο Υ Σ	
ΑΡ. ΠΡΩΤ.	ΗΜΕΡΑ ΔΗΜΟΣΙΕΥΣΗΣ
1701	13/12/11
Ε. ΠΡΟΤΟΠΑΝΗΔΑ (με) Ιταλικά, αριθ. πρωτ.	
Δ. ΧΟΥΡΜΟΥΖΙΔΗ	
Η. ΓΕΩΡΓΟΥΝΤΖΟΥ	

2-12-11  
6550

✓ Προς: Asprofos Engineering  
Ελ. Βενιζέλου 284  
176 75 Καλλιθέα - Αθήνα  
Κοιν: 1. ΥΠ.ΠΟ.Τ  
ΓΔΑΠΚ/ΔΒΜΑ/Τμήμα  
Αρχαιολογικών Χώρων, Μνημείων  
και Αρχαιογνωστικής Έρευνας  
2. ΔΒ' ΕΠΚΑ  
Κύπρου 68 - 46100 Ηγουμενίτσα

**Θέμα:** Υποθαλάσσιος διασυνδεδημένος αγωγός φυσικού αερίου Ελλάδας - Ιταλίας.

- Σχετ: α) Το με αρ. πρωτ. 165/2.03.2010 έγγραφό μας.
- β) Το με αρ. πρωτ. ΥΠΠΟΤ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/24269/1319/12.05.2010 έγγραφο της ΔΒΜΑ του ΥΠΠΟΤ.
- γ) Την με αρ. πρωτ. οικ. 130221/17.09.2010 έγκριση της Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης του Υ.Π.Ε.Κ.Α./ΓΔΠ/ΕΥΠΠΕ/Τμήμα Α'
- δ) Το με αρ. πρωτ. 1471/20.04.2011 έγγραφό μας.
- ε) Το με αρ. πρωτ. ΥΠΠΟΤ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/40850/1337/17.05.2011 έγγραφο της ΔΒΜΑ του ΥΠΠΟΤ.
- στ) Το με αρ. πρωτ. 1734/ΦΣ/δχ/21.11.2011 έγγραφό σας.

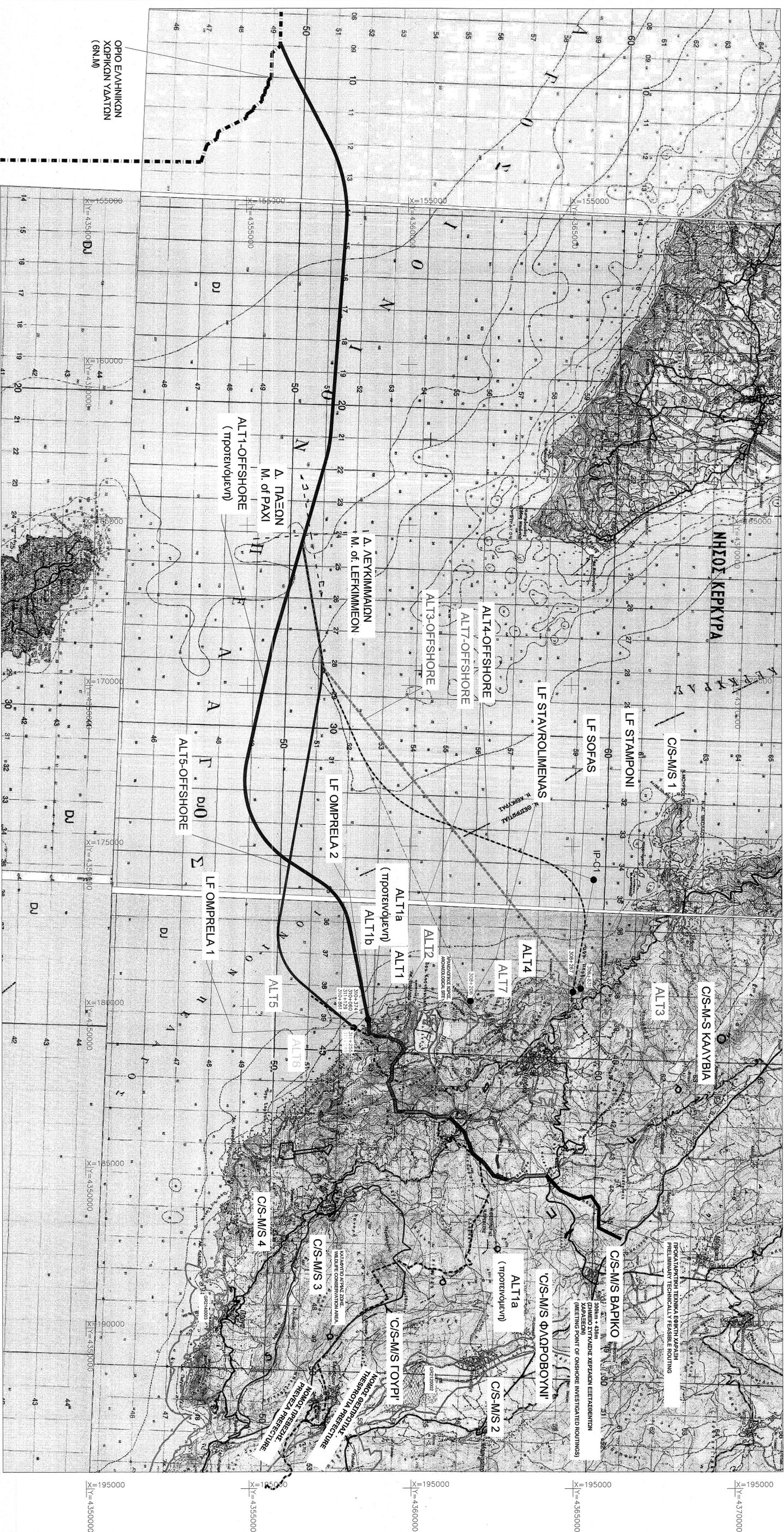
Σε συνέχεια των ανωτέρω σχετικών εγγράφων και σε απάντηση του (στ) εγγράφου σας γνωρίζουμε ότι δεν έχουμε αντίρρηση για την όδευση του αγωγού φυσικού αερίου, όπως αυτή απεικονίζεται στην προτεινόμενη χάραξη ALT1a (κόκκινου χρώματος), και αποτελείται από: α) χερσαίο τμήμα, όπου στη θέση Φλωροβοούνι χωροθετούνται οι εγκαταστάσεις μέτρησης και συμπίεσης, καθώς και βοηθητικές - υποστηρικτικές εγκαταστάσεις και β) υποθαλάσσιο τμήμα με σημείο προσαιγιάλωσης τη θέση ΟΜΠΡΕΛΑ 2.

Κατά τα λοιπά, σε ότι αφορά τις αρμοδιότητες της Υπηρεσίας μας ισχύουν οι όροι που αναφέρονται στις (β) και (ε) σχετικές αποφάσεις της Διεύθυνσης Βυζαντινών και Μεταβυζαντινών Αρχαιοτήτων του ΥΠ.ΠΟ.Τ.

Συνημμένα

Θεωρημένος χάρτης

Η Διευθύντρια της Εφορείας  
  
ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ  
ΚΑΙ ΤΟΥΡΙΣΜΟΥ  
8<sup>Η</sup> ΕΦΟΡΕΙΑ ΒΥΖ/ΝΩΝ ΑΡΧΑΙΟΤΗΤΩΝ



**ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS**

AP. ΣΧΕΔΙΩΤ / DWG No	ΤΙΤΛΟΣ / TITLE
8098-000-00-94-01	ΜΑΡΜΑΡΑ ΟΡΘΟΓΩΝΙΟΓΡΑΦΙΑ / RECORDING PLAN

**ΥΠΟΜΝΗΜΑ ΛΕΓΕΝΔ**

- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ**
- ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT1
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT1a (ΠΡΟΤΕΙΝΟΜΕΝΗ)
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT1b
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT2
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT1-OFFSHORE (ΠΡΟΤΕΙΝΟΜΕΝΗ)
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT3
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT3-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT4
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT4-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT5
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT5-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT6
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT7-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΕΣ ΘΕΣΕΙΣ ΧΕΡΣΑΙΩΝ ΕΚΚΑΤΑΣΤΑΣΕΩΝ
  - ΕΝΔΕΙΚΝΥΤΙΚΕΣ ΘΕΣΕΙΣ ΠΡΟΣΑΝΑΤΙΛΑΔΙΣΗΣ

**ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ**

- ΠΕΡΙΟΧΕΣ ΔΙΚΤΥΟΥ NATURA
- ΚΑΤΑΦΥΓΤΙΟ ΑΙΓΥΑΣ ΣΖΗΣ
- ΠΑΡΚΟ ΑΝΑΨΥΧΗΣ
- ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΩΡΟΙ

**ΥΠΟΛΟΜΕΣ ΚΑΙ ΛΟΙΠΑ ΣΤΟΙΧΕΙΑ**

- ΠΡΟΒΛΕΠΟΜΕΟ ΒΙΟ. ΠΛ.
- ΛΑΤΟΜΕΙΟ
- ΟΡΙΑ ΟΡΓΑΝΙΣΜΩΝ ΤΟΠΙΚΗΣ ΑΥΤΟΔΙΟΙΚΗΣΗΣ



**Asprofos engineering**

ΤΕΧΝΙΚΟ ΚΑΙ ΕΓΚΑΤΑΣΤΑΣΙΑΚΟ ΓΡΑΦΕΙΟ

IGI Poseidon s.a.

ΑΝΤΙΣΤΡΩΜΑΤΑ ΑΕ-117240

ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΕΠΙΠΤΩΣΕΩΝ

ΕΠΙΘΕΤΙΚΟΣ ΧΑΡΤΗΣ

ΚΑΛ. ΜΕΛΕΤΗ: 7240-AU-AUT-01.dwg  
ΕΚΔΟΣΗ: 14.11.2017

ΚΑΛ. ΜΕΛΕΤΗ	ΚΑΛ. ΔΩΜ. ΑΝ. ΑΝ.	ΚΑΛ. ΔΩΜ. ΑΝ. ΑΝ.	ΚΑΛ. ΔΩΜ. ΑΝ. ΑΝ.
1:50,000	1:50,000	1:50,000	1:50,000
1:50,000	1:50,000	1:50,000	1:50,000
1:50,000	1:50,000	1:50,000	1:50,000



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ  
ΚΑΙ ΤΟΥΡΙΣΜΟΥ  
18<sup>η</sup> ΕΦΟΡΕΙΑ ΒΥΖΑΝΤΙΝΩΝ  
ΑΡΧΑΙΟΤΗΤΩΝ  
ΑΡΤΑΣ - ΠΡΕΒΕΖΑΣ

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜ. ΛΗΨΗΣ
1693	9/12/11
Εφ. ΠΡΟΤΟΠΗΓΑ	
Λ. ΖΑΜΠΑ	
Α. ΧΟΥΡΜΟΥΖΙΑΔΗΣ	
Η. ΓΕΩΡΓΙΟΥ ΝΤΖΟΖ	
Φ. ΣΠΑΝΙΔΗΣ	

Αρτα, 1-12-2011  
Αρ. πρωτ. 2601

Ταχ. Δ/ση: Αράχθου και  
Μονωλιάσσης  
Ταχ. Κωδ.: Αρτα, 47 100  
Πληρ/ρίες:  
Τηλέφωνα: 26810/24636, 24637  
Fax: 26810/79821

**ΠΡΟΣ:**

✓ ΑΣΠΡΟΦΩΣ Α.Ε.  
Ελευθερίου Βενιζέλου 284  
176 75 Καλλιθέα, Αθήνα

**ΚΟΙΝ:**

1. Εφορεία Εναλίων Αρχαιοτήτων  
Ερεχθείου 59  
117 42 Αθήνα
2. Υπηρεσία Νεωτέρων Μνημείων &  
Τεχνικών Έργων Ηπείρου  
Ασωπίου 9  
45444 Ιωάννινα
3. ΛΓ'ΕΠΚΑ  
Εθνικής Αντιστάσεως 108-110  
48100, Πρέβεζα

09/12/11 000

**Θέμα:** «Υποθαλάσσιος Διασυνδεδημένος Αγωγός Φυσικού Αερίου Ελλάδας - Ιταλίας»

**Σχετικό:** το υπ' αριθμ. πρωτ. 2136/30-8-2010 έγγραφό μας.

Σε συνέχεια του ανωτέρω σχετικού σας γνωστοποιούμε ότι από πλευράς αρμοδιοτήτων της Υπηρεσίας μας δεν υπάρχει αντίρρηση για τη δημιουργία του Υποθαλάσσιου Διασυνδεδημένου Αγωγού Φυσικού Αερίου Ελλάδας - Ιταλίας και συγκεκριμένα η πραγματοποίηση της προτεινόμενης χάραξης ALT1a, όπως αυτή απεικονίζεται στο συνημμένο εποπτικό χάρτη.

Σε περίπτωση που κατά τη διάρκεια των οποιωνδήποτε εκσκαφικών εργασιών εντοπιστούν αρχαία λείψανα αρμοδιότητας μας, η Υπηρεσία μας θα προβεί στην άμεση διακοπή τους και θα ακολουθήσει ανασκαφική έρευνα, όπως ορίζουν οι διατάξεις του Ν. 3028/28.06.2002, η οποία θα επιβαρύνει τον προϋπολογισμό του έργου.

Η παρούσα άδεια δεν αντικαθιστά τυχόν απαιτούμενη έγκριση από άλλη συναρμόδια κρατική υπηρεσία.



Η Προϊσταμένη της Εφορείας

Αναθνήκη Γσιλιτάκου  
Αρχαιολόγος με Α' βαθμό



**ΑΔΜΗΕ**

Πληροφορίες : Α. ΒΛΑΧΟΣ  
Τηλέφωνο : 210 3492150

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜΕΡΑ ΛΗΨΗΣ
1704	14/12/11
Φ. ΕΠΑΝΙΔΗΣ	
Α. ΖΑΜΠΑΣ	
Ε. ΠΡΟΤΟΠΑΝΗΛΑ (με)	
Δ. ΧΟΥΡΜΟΥΖΙΑΔΗΣ	
Η. ΓΕΩΡΓΙΟΥΤΖΟΣ	

14/12/11 30

9 ΔΕΚ. 2011

ΑΡ./ΗΜ.: 30314

Προς : Asprofos engineering  
Ελ. Βενιζέλου 284,  
176 75 – Καλλιθέα  
Τηλ. : 210 9491600  
Fax : 210 9491610

Περίληψη : Υποθαλάσσιος Διασυνδεδημένος Αγωγός Φυσικού Αερίου Ελλάδας – Ιταλίας.  
Αρ. Έργου: AF-11-7240

Σχετικά : Το αρ.1746/ΦΣ/δχ/21.11.2011 έγγραφό σας (ΔΣΣΜ/10326/5.12.2011)

Σε απάντηση του παραπάνω σχετικού επιβεβαιώνουμε ότι, οι εμπλοκές των υφιστάμενων εγκαταστάσεων ΥΤ&ΥΤ με τη χάραξη του Υποθαλάσσιου Αγωγού Φυσικού Αερίου Ελλάδας – Ιταλίας, περιορίζονται στη διασταύρωση της όδευσης της υφιστάμενης Γραμμής Μεταφοράς 150kV **ΑΡΑΧΘΟΣ – ΗΓΟΥΜΕΝΙΤΣΑ** (ΑΗ) με τη χάραξη του χερσαίου τμήματος Α.Φ.Α. στο άνοιγμα μεταξύ των πυλώνων ΑΗ 181-ΑΗ 182, όπως σημειώνεται στο συνημμένο χάρτη. Οι συντεταγμένες x,y των κέντρων των πύργων ΑΗ 181 και ΑΗ 182 έχουν μετρηθεί στο πεδίο με τις τιμές (187234.489, 4365752.697) και (186909.835, 4366086.804) αντίστοιχα. Το τετράγωνο εδράσεως κάθε πυλώνα είναι  $11 \times 11 = 121m^2$ .

Από την πλευρά μας δεν υπάρχουν περιορισμοί ως προς τη χάραξη του ΑΦΑ, αρκεί η ζώνη έργου του αγωγού να μην θέτει σε κίνδυνο την ασφάλεια των πυλώνων (προτεινόμενη απόσταση ασφαλείας 50μ).

Κατά τα άλλα ισχύουν οι περιορισμοί που περιλαμβάνονται στο συνημμένο «ΕΝΗΜΕΡΩΤΙΚΟ ΚΕΙΜΕΝΟ ΓΙΑ ΤΟ ΚΑΘΕΣΤΩΣ ΠΟΥ ΔΙΕΠΕΙ ΤΙΣ ΓΡΑΜΜΕΣ ΤΟΥ ΣΥΣΤΗΜΑΤΟΣ ΜΕΤΑΦΟΡΑΣ».

Κ. ΜΑΥΡΟΜΑΤΟΣ  
Τομέαρχης  
Τομέα Ισχυρών Ρευμάτων

Συνημμένα:

- 1 χάρτης
- 3 σελίδες

Κοινοποίηση:

- Β.Δ/ντής Ν.Κρητικός
- ΤΙΔΠ
- ΤΥ



# ΔΗΜΟΣΙΑ ΕΠΙΧΕΙΡΗΣΗ ΗΛΕΚΤΡΙΣΜΟΥ Α. Ε. ΔΙΕΥΘΥΝΣΗ ΣΥΣΤΗΜΑΤΟΣ ΜΕΤΑΦΟΡΑΣ

Αγ. Άννης 70 - 122 41 Αιγάλεω

## ΕΝΗΜΕΡΩΤΙΚΟ ΚΕΙΜΕΝΟ ΓΙΑ ΤΟ ΚΑΘΕΣΤΩΣ ΠΟΥ ΔΙΕΠΕΙ ΤΙΣ ΓΡΑΜΜΕΣ ΤΟΥ ΣΥΣΤΗΜΑΤΟΣ ΜΕΤΑΦΟΡΑΣ

1. Για όλες τις Γραμμές του Συστήματος Μεταφοράς έχει συσταθεί υπέρ της ΔΕΗ με την νόμιμη διαδικασία και με αναγκαστική απαλλοτρίωση, **δουλεία εναερίου διελεύσεως** για την εγκατάσταση, διέλευση και συντήρηση τους. Το πλάτος της δουλείας αυτής είναι **20 μ. κατά μήκος και εκατέρωθεν των αξόνων των ΓΜ 150 kV** (συνολικό πλάτος διαδρόμου δουλείας 40 μ.) και **25 μ. κατά μήκος και εκατέρωθεν του άξονα των ΓΜ 400 kV** (συνολικό πλάτος διαδρόμου δουλείας 50 μ.). Σε περίπτωση που περισσότερες από μία Γραμμές Μεταφοράς οδεύουν παράλληλα τότε το πλάτος της δουλείας διελεύσεως είναι μεγαλύτερο.
2. Για τις ανωτέρω ΓΜ υπάρχουν δύο τύποι δουλείας εναερίου διελεύσεως που διέπουν αυτές.
  - Στον ένα τύπο δουλείας εναερίου διελεύσεως των ΓΜ βάσει του περιεχομένου της που έχει συσταθεί υπέρ της ΔΕΗ, **απαγορεύεται** η ανέγερση κτισμάτων ή εγκαταστάσεων μέσα στους υπόψη διαδρόμους δουλείας αυτών, σε ορισμένα τμήματα των ΓΜ.
  - Στον δεύτερο τύπο δουλείας εναερίου διελεύσεως των ΓΜ βάσει του περιεχομένου της που έχει συσταθεί υπέρ της ΔΕΗ, επιτρέπεται η οικοδόμηση, αλλά **επιβάλλονται περιορισμοί για λόγους ασφαλείας όσον αφορά τη δόμηση, το ύψος των οικοδομών που βρίσκονται μέσα στο διάδρομο δουλείας, καθώς επίσης και τη χρήση τους** (π.χ. απαγορεύονται αποθήκες πυρομαχικών και πετρελαιοειδών, εργοστάσια, βιοτεχνίες που αναδίδουν βλαβερά αέρια για τους αγωγούς των ΓΜ κλπ).  
Επιβάλλεται όμως να τηρηθούν τα προβλεπόμενα **διάκενα ασφαλείας** από τους αγωγούς των ΓΜ. Τα μέγιστα επιτρεπόμενα ύψη καθορίζονται από τη ΔΕΗ μετά από αίτηση των ενδιαφερομένων και τα οποία δεν έχουν σχέση με τα ύψη που ορίζονται από τις ισχύουσες πολεοδομικές διατάξεις. Σχετικά ισχύουν οι αρ. 161/24.11.81, 118/10.12.85 και 62/9.7.87 Εγκύκλιοι Υπουργείου ΠΕΧΩΔΕ.
3. Οι **πύργοι** των υπόψη Γραμμών Μεταφοράς που διέρχονται από την περιοχή μελέτης, **εδράζονται σε τετράγωνα διαφόρων διαστάσεων τα οποία έχουν προσκτηθεί με αναγκαστική απαλλοτρίωση και αποτελούν ιδιοκτησία της ΔΕΗ.**
4. Τα τετράγωνα εδράσεως των πύργων των ΓΜ ,που είναι ιδιοκτησία της ΔΕΗ και βρίσκονται μέσα στα όρια μελέτης, πρέπει απαραίτητα να μην εμπίπτουν μέσα σε δρόμους ή άλλους χώρους που διακινούνται οχήματα ή άλλα τροχοφόρα, γιατί εκτός από το ενδεχόμενο δημιουργίας παραβιάσεων, **θα υπάρξουν και συνθήκες επικίνδυνες για την ασφάλεια και λειτουργία των ΓΜ** (ηλεκτρικά ατυχήματα κλπ.). Συνεπώς δεν θα πρέπει να σημειωθεί παραβίαση του χώρου και των τετραγώνων εδράσεως των πύργων των ΓΜ ιδιοκτησίας ΔΕΗ. Πριν από την έναρξη

- οποιονδήποτε σχετικών εργασιών οι ενδιαφερόμενοι πρέπει να ειδοποιήσουν την αρμόδια υπηρεσία ΔΕΗ ώστε να καθοριστούν επί τόπου τα όρια των τετραγώνων εδράσεως.
5. Πρέπει να εξασφαλίζεται η **ελεύθερη προσπέλαση ολόκληρο το 24ωρο προς τα τετράγωνα εδράσεως των πύργων ΓΜ 150 kV & 400 kV** (διέλευση προσωπικού και οχημάτων ΔΕΗ) κατά τις εργασίες επιθεωρήσεως, συντηρήσεως, επισκευών κλπ. Αυτά ισχύουν και για τα τμήματα των ΓΜ που βρίσκονται μέσα στις υπόψη περιοχές. Σημειώνουμε ότι θα πρέπει να λαμβάνεται μέριμνα ώστε για τους πύργους των ΓΜ που τυχόν βρίσκονται μέσα σε οικοδομικά τετράγωνα **να αφηθεί διάδρομος προσπελάσεως πλάτους 3 μ. προς τον πλησιέστερο εγκεκριμένο δρόμο.**
  6. Γενικά απαγορεύεται η αναρρίχηση ατόμων στους πύργους ΓΜ της ΔΕΗ όπως και η πρόσδεση και στήριξη αντικειμένων σ' αυτούς. Σωλήνες υδρεύσεως, αποχετεύσεως, αγωγοί κάθε είδους, οδοί κλπ. πρέπει να βρίσκονται έξω τα εδαφοτεμάχια εδράσεως των πύργων ΓΜ και κατά το δυνατό μακριά από αυτά.
  7. Κατά την **διέλευση γερανοφόρων οχημάτων** κάτω από τους αγωγούς ΓΜ, αυτά πρέπει να έχουν σε οριζόντια θέση τον ιστό τους για να αποφεύγεται έτσι επικίνδυνη προσέγγιση με τους αγωγούς. Τα **οχήματα και μηχανήματα** που εδράζονται ή κινούνται μέσα στους διαδρόμους δουλείας διελεύσεως των ΓΜ θα πρέπει να **μην υπερβαίνουν σε ύψος τα αντίστοιχα επιτρεπόμενα ύψη οικοδομήσεως που δίνονται από τη ΔΕΗ** (μετά από αίτηση των ενδιαφερομένων).
  8. Επιπρόσθετα σας γνωστοποιούμε και τα εξής:
    - Σύμφωνα με τις διατάξεις του άρθρου 81 του **Κανονισμού και Λατομικών εργασιών** (απόφαση αρ. 11/5<sup>η</sup>/Φ/17402/12.12.84 Υπουργού Ενέργειας και Φυσικών Πόρων ΦΕΚ/931/Β/31.12.84) απαγορεύεται η χρήση εκρηκτικών σε απόσταση μικρότερη από 150 μ. από το αξονικό κατακόρυφο επίπεδο των ΓΜ, καθώς και η εκτέλεση οποιασδήποτε μεταλλευτικής ή λατομικής εργασίας σε απόσταση μικρότερη από 70 μ. από το κέντρο βάσεως των πύργων ΓΜ.
    - Σύμφωνα με τις διατάξεις του άρθρου 88 του ανωτέρω **Κανονισμού Μεταλλευτικών και Λατομικών Εργασιών**, η θέση εδράσεως του πύργου γεωτρήσεως θα επιλέγεται έτσι ώστε κάθε σημείο να απέχει το λιγότερο 25 μ. από την προβολή στο έδαφος των αγωγών των Γραμμών Μεταφοράς της ΔΕΗ.
    - Μέσα στη ζώνη δουλείας των ΓΜ **απαγορεύεται η ανέγερση και λειτουργία κτισμάτων ή εγκαταστάσεων που δημιουργούν δυσμενείς συνθήκες για την ασφάλεια και λειτουργία των** (αποθήκες πυρομαχικών, πετρελαιοειδών, εργοστάσια που αναδίδουν βλαβερούς καπνούς ή αέρια, λατομεία κλπ.).  
Σύμφωνα με το **Προεδρικό Διάταγμα αρ. 118/2006 (ΦΕΚ 119/16.06.2006) άρθρο 5 παραγρ. 2**, επιτρέπεται η ίδρυση και λειτουργία **πρατηρίων καυσίμων** εφόσον οι αντλίες και οι διανομείς ευρίσκονται εκτός του διαδρόμου δουλείας διελεύσεως τυχόν υφιστάμενων ΓΜ ηλεκτρικής ενέργειας τάσεως μεγαλύτερης των 66.000 Volts, όπως ο διάδρομος δουλείας έχει καθοριστεί στην εκάστοτε θέση σύμφωνα με τις διατάξεις της ΔΕΗ.

- Επίσης σύμφωνα με το Προεδρικό Διάταγμα αρ. 595/1984 (ΦΕΚ 218/Α/31.12.1984 άρθρο4) "περί όρων και προϋποθέσεων εγκατάστασης και λειτουργίας πρατηρίων διανομής υγραερίων κλπ." απαγορεύεται η λειτουργία τους σε απόσταση μικρότερη από 50μ. από τον άξονα των ΓΜ.
  - **Σας υπενθυμίζουμε** το άρθρο 79 του Προεδρικού διατάγματος 1073/81 και το Προεδρικό Διάταγμα 305/96 εναρμόνισης με Οδηγία της Ευρωπαϊκής Ένωσης καθώς επίσης και το άρθρο 7 παρ.2 του Νόμου 1396/1983 : «περί μέτρων ασφαλείας σε εργοτάξια οικοδομών και πάσης φύσεως έργων» σύμφωνα με τα οποία “Εάν πλησίον εργοταξίου διέρχονται αγωγοί ηλεκτρικού ρεύματος, ειδοποιείται εγγράφως υπό του εκτελούντος το έργο, προ της ενάρξεως των εργασιών, η αρμόδια υπηρεσία της ΔΕΗ. Τα μέτρα ασφαλείας τα οποία πρέπει να ληφθούν, εξετάζονται από κοινού υπό της ΔΕΗ, του εκτελούντα τα έργον και του επιβλέποντος τούτο Μηχανικού. Κατόπιν δε της εγγράφου εγκρίσεως της αρμοδίας υπηρεσίας της ΔΕΗ λαμβάνονται όλα τα κατά περίπτωσιν ενδεικνυόμενα περαιτέρω προστατευτικά μέτρα και ιδίως κατασκευή προστατευτικών σανιδωμάτων”.
9. Στην περίπτωση ένταξης των περιοχών στο εγκεκριμένο σχέδιο πόλεως, η ΔΕΗ θεωρεί σκόπιμο και προτείνει, όταν αυτό είναι εφικτό, οι ζώνες δουλείας διελεύσεως των ΓΜ να περιλαμβάνονται σε **ευρύτερους χώρους πρασίνου ή στο προβλεπόμενο ποσοστό ακάλυπτων χώρων** ώστε να αποφευχθούν μελλοντικά διαμαρτυρίες και ενοχλήσεις των ενδιαφερόμενων
  10. Επισημαίνουμε ότι οι υφιστάμενες εγκαταστάσεις του Διασυνδεδεμένου Συστήματος Μεταφοράς (Γραμμές Μεταφοράς, πύργοι ΓΜ) στην περιοχή του ακινήτου σας είναι εμφανείς επί του εδάφους, επομένως είναι εφικτό να αποτυπωθούν από τους ενδιαφερομένους στα σχέδια που θα χρησιμοποιηθούν για τον καθορισμό των ορίων οικισμών.
  11. Η **μη εφαρμογή των ανωτέρω δημιουργεί σοβαρούς κινδύνους για την ασφάλεια και ζωή των ενδιαφερομένων και τρίτων, για τους οποίους η ΔΕΗ και το προσωπικό της δεν θα φέρουν καμία ευθύνη, η οποία θα βαρύνει αποκλειστικά και μόνο τους ενδιαφερόμενους.**

Είμαστε στη διάθεση σας για διευκρινήσεις ή συμπληρωματικές πληροφορίες.



ΑΔΙΑΒΑΘΜΗΤΟ

ΕΠΕΙΓΟΝ

ΠΡΟΣ : **ASPROFOS**  
Ελ. Βενιζέλου 284  
ΤΚ 17675, Καλλιθέα

ΠΟΛΕΜΙΚΗ ΑΕΡΟΠΟΡΙΑ  
ΓΕΝΙΚΟ ΕΠΙΤΕΛΕΙΟ ΑΕΡΟΠΟΡΙΑΣ  
ΚΛΑΔΟΣ Γ' - ΔΝΣΗ ΥΠΟΔΟΜΗΣ (Γ2)  
ΤΜΗΜΑ 2  
Τηλ.: 210-6593226  
Φ.550/ ΑΔ. 694468  
Σ. 2341  
Αθήνα, 16 Δεκ 11

ΚΟΙΝ : ΓΕΕΘΑ/Γ2  
ΓΕΑ/Γ2/2

**ΘΕΜΑ:** Υποθαλάσσιος Διασυνδεδητήριος Αγωγός Φυσικού Αερίου Ελλάδας-Ιταλίας

ΣΧΕΤ.: α. Φ.550/689614/Σ.1047/19-05-10/ ΓΕΑ/Γ5  
β. Φ.100.1/149386/Σ.4868/28-05-10/ΓΕΕΘΑ/ΔΥΠΟ  
γ. Αρ. Πρωτ. 1743/ΦΣ/δχ/21-11-11/ASPROFOS

1. Σε συνέχεια των (α) και (β) σχετικών, σας γνωρίζουμε ότι δεν υπάρχει αντίρρηση για το έργο του «Υποθαλάσσιου Διασυνδεδητήριου Αγωγού Φυσικού Αερίου Ελλάδας-Ιταλίας».

2. Ενημερωτικά, σας γνωρίζουμε ότι μετά την ολοκλήρωση της ΜΠΕ είναι αναγκαίο να αποσταλεί στο ΓΕΕΘΑ/Γ2 για σχολιασμό και από τα τρία Επιτελεία.

Υποπύραρχος (Μ) Κ. Ζαγγογιάννης  
Δντής Γ' ΚΛ/ΓΕΑ

Ακριβές Αντίγραφο

ΜΥ (Δ-Λ) με Α. Βορτιό  
Σταμάτος Κ. Σπυροπούλος  
Προϊστάμενος Γραμματείας ΓΕΑ/Γ2

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ	ΗΜ. ΑΝΗΕΣΤ
1702	13/12/11
Φ. ΕΠΑΛΙΔΗΣ	
Α. ΖΑΜΠΑΣ	
Ε. ΠΡΟΤΟΠΑΛΛΑΚΗΣ	
Δ. ΧΟΥΡΜΑΖΙΔΗΣ	
Η. ΓΕΩΡΓΟΥΝΤΖΟΣ	

ΠΡΟΣ : VIII ΜΠ/3° ΕΓ

ΚΟΙΝ : ΓΕΣ/ΔΙΣΧΕΑ – ΔΥΠΟ/2°  
 Α'ΣΣ/ΔΙΣΧΕΔ  
 ΑΣΠΡΟΦΟΣ Α.Ε  
Ελ. Βενιζέλου 284  
Τ.Κ 17675-Αθήνα

ΓΕΝΙΚΟ ΕΠΙΤΕΛΕΙΟ ΣΤΡΑΤΟΥ  
 ΔΙΕΥΘΥΝΣΗ ΥΠΟΔΟΜΗΣ/2°  
 Τηλέφ. (Εσωτ.) 6553445  
 Φ. 916.74/321 /254137  
 Σ. 3187  
 Αθήνα, 7 Δεκ 2011  
 Συνημμένα: Δυο (2) χάρτες

ΘΕΜΑ : Μελέτη Περιβαλλοντικών Επιπτώσεων (ΜΠΕ) του Έργου " Αγωγός Φυσικού Αερίου -Χερσαίο Τμήμα Μήκους 8,5 χλμ εντός Ορίων Ν.Θεσπρωτίας και Ν.Πρεβέζης"

ΣΧΕΤ. : Α.Π 1744/ΦΣ/δχ/21 Νοε.2011/ΑΣΠΡΟΦΟΣ Α.Ε

1. Σας γνωρίζουμε, ότι με το σχετικό περιήλθαν στο ΓΕΣ 2 χάρτες μελέτης, για την μελέτη χωροθέτησης του έργου του θέματος.
2. Προκειμένου το ΓΕΣ να γνωματεύσει για το υπόψη θέμα, απαιτείται να έχουμε τις απόψεις σας για την επίδραση του έργου στους σχεδιασμούς και τις εγκαταστάσεις του ΓΕΣ.
3. Λαμβανομένης υπόψη της ισχύουσας ανατρεπτικής προθεσμίας για τη διατύπωση της γνώμης της Στρατιωτικής Υπηρεσίας, πρέπει οι απόψεις σας για το ανωτέρω έργο, να έχουν υποβληθεί ιεραρχικά το αργότερο μέχρι 10 Ιαν.2012
4. Σας διαβιβάζουμε συνημμένα με υποχρέωση επιστροφής των, τους χάρτες της σχετικής μελέτης και παρακαλούμε για τις ενέργειές σας.

Ακριβές Αντίγραφο  
  
 Γεώργιος Αθανάσιος  
 Αρχιτέκτων Μηχανικός

Ταξίαρχος Δημήτριος Μπαλαφούτης  
 Διευθυντής Γ' Κλάδου



IGI POSEIDON

04 MAY 2011

Pr. Nr.:

1360

ΑΝΩΝΥΜΗ ΕΠΙΧΕΙΡΗΣΗ ΗΛΕΚΤΡΙΣΜΟΥ Α.Ε.

Διανομή

Διεύθυνση Περιφέρειας Πελοποννήσου-Ηπείρου

4 MAI. 2011

ΑΡ./ΗΜ.: ΔΠΠ-Η/

1262

Πληροφορίες : Α. Νικολετάτος  
 Τηλέφωνο : 2610 366504  
 e-mail :

Προς : IGI Poseidon  
 Μαρίνου Αντύπα 92,  
 141 21 Ηράκλειο Αττικής

Περίληψη : Παροχή στοιχείων για την ηλεκτροδότηση του Σταθμού Μέτρησης και Συμπίεσης του έργου "Υποθαλάσσιος Διασυνδεδετήριος Αγωγός Φυσικού Αερίου Ελλάδος-Ιταλίας" σε περιοχή της πρώην Κοινότητας Πέρδικας, του Δήμου Ηγουμενίτσας, του Νομού Θεσπρωτίας.

Σχετικά : Το με αριθμ. πρωτ. 503/24-02-2011 έγγραφο.

Σε συνέχεια του σχετικού, που αφορά την ηλεκτροδότηση του Σταθμού Μέτρησης και Συμπίεσης του έργου "Υποθαλάσσιος Διασυνδεδετήριος Αγωγός Φυσικού Αερίου Ελλάδος-Ιταλίας" και μετά από το αίτημά σας για εκτιμώμενη απαιτούμενη ισχύ περίπου 3,5 MW (περίπου 4.100 KVA), σας γνωρίζουμε τα εξής :

1. Η χορήγηση της απαιτούμενης ισχύος θα γίνει στην εναλλακτική θέση "Φλωροβούνι" και όχι στην ισχύουσα θέση "Βαρικό", λόγω μη δυνατότητας όδευσης εναερίου δικτύου Μ.Τ. εξαιτίας της μορφολογίας του εδάφους.
2. Για τη χορήγηση της παραπάνω ισχύος απαιτείται η κατασκευή νέας εναέριας γραμμής Μ.Τ. με αγωγούς ACSR διατομής 95 mm<sup>2</sup> μήκους 16 km περίπου, από τον Υ/Σ 150/20 kV Μούρτου έως τη θέση του έργου της περίληψης. Επιπρόσθετα, σας γνωρίζουμε ότι για την εξασφάλιση της εφεδρικής ηλεκτροδότησης του Σταθμού σας, σε περίπτωση βλάβης της ως άνω κύριας γραμμής Μ.Τ. θα υπάρχει η δυνατότητα τροφοδότησης της παροχής σας από άλλη ροηφόρο γραμμή με κατασκευή νέας διακλάδωσης Μ.Τ. εναερίου δικτύου αγωγών ACSR διατομής 95 mm<sup>2</sup> μήκους 5 km περίπου. Η διαδικασία εναλλαγής τροφοδοσίας της παροχής σας από το κύριο στο εφεδρικό δίκτυο θα γίνεται από τεχνικό προσωπικό της Υπηρεσίας μας.
3. Σύμφωνα με σχετική προμελέτη της Υπηρεσίας μας και στο πλαίσιο των αναφερομένων στην προηγούμενη παράγραφο, η συμμετοχή σας για την ηλεκτροδότηση των εγκαταστάσεων σας υπολογίστηκε βάση του Συστήματος Συμμετοχών Πελατών Μ.Τ. που ισχύει για όλη την επικράτεια και της αιτούμενης Συμφωνημένης Ισχύος και ανέρχεται στο ποσό των 844.205,90 € πλέον ΦΠΑ 23% για Εξωτερική Παροχή Μ.Τ. (P-43) ή σε 855.133,63 € πλέον ΦΠΑ 23% για Εσωτερική Παροχή Μ.Τ. εντός κτιρίου (BKII-Βροχοειδές). Το ποσό αυτό προκαταβάλλεται και αναλύεται ως εξής :

Κόστος έργων της παραγράφου 2, το οποίο ανέρχεται συνολικά στο ποσό των 646.000,00 € πλέον ΦΠΑ 23% και περιλαμβάνει το κόστος κατασκευής της νέας γραμμής Μ.Τ. από τον Υ/Σ 150/20 kV Μούρτου, την εγκατάσταση

Ακτή Δυμαίων 15 , 262 22 Πάτρα, Τηλ.: 2610 366400, FAX: 2610329835, www.dei.gr



νέου Διακόπτη Ισχύος στον ίδιο Υ/Σ καθώς επίσης και την κατασκευή της νέας διακλάδωσης από άλλη ροηφόρο γραμμή για την εξασφάλιση της εφεδρικής τροφοδότησής σας.

- Συμμετοχή Ση στις δαπάνες παροχής, η οποία ανέρχεται στο ποσό των 14.005,90 € πλέον ΦΠΑ 23% και αντιστοιχεί στο κόστος των απαιτούμενων έργων για την κατασκευή της παροχής Μ.Τ. Εξωτερικού Τύπου (Ρ-43) και την εγκατάσταση της μετρητικής διάταξης που θα τοποθετηθεί έξω από τις εγκαταστάσεις του Σταθμού σας καθώς και του μέσου προστασίας. Στην περίπτωση κατασκευής της παροχής Μ.Τ. σε εσωτερικό χώρο εντός κτιρίου (ΒΚΙΙ), τότε η αντίστοιχη συμμετοχή σας Ση ανέρχεται στο ποσό των 24.933,63 € πλέον ΦΠΑ 23%.
  - Συμμετοχή Σ1 στις δαπάνες λόγω ενισχύσεως των εγκαταστάσεων Μεταφοράς τάσεων 150 kV ή 400 kV, η οποία ανέρχεται στο ποσό των 184.200,00 € πλέον ΦΠΑ 23%.
4. Οι παραπάνω προϋποθέσεις ηλεκτροδότησής σας ισχύουν για χρονικό διάστημα δύο μηνών από έκδοσης της παρούσας επιστολής. Εάν επανέλθετε μετά την παραπάνω ημερομηνία, η ηλεκτροδότησή σας θα επανεξεταστεί σύμφωνα με τις προϋποθέσεις ηλεκτροδότησης που θα ισχύουν τότε. Επισημαίνουμε ότι τα αντίστοιχα ποσά έχουν υπολογισθεί από προμελέτη των απαιτούμενων έργων ηλεκτροδότησης. Όταν θα μας ενημερώσετε για την αποδοχή των ως άνω όρων και ξεκινήσει η τελική διαδικασία ηλεκτροδότησής σας, θα προχωρήσουμε στην οριστική μελέτη των απαιτούμενων έργων, αφού προηγουμένως προκαταβάλλεται το 8% του προϋπολογισμού τους, και θα σας γνωρίσουμε το οριστικό ποσό της συμμετοχής σας.
5. Περιμένοντας να μας γνωρίσετε εγγράφως το αργότερο μέχρι την 30-05-2011 τις απόψεις σας για όσα αναφέρονται στις προηγούμενες παραγράφους, παραμένουμε στη διάθεσή σας για οποιεσδήποτε συμπληρωματικές πληροφορίες ή διευκρινίσεις επιθυμείτε.

Σπ. Ν. Μυλωνάς

Διευθυντής Περιφέρειας Πελοποννήσου - Ηλείου



Διεύθυνση Περιφέρειας Πελοποννήσου - Ηλείου

ΑΡ./ΗΜ.: ΔΠΠ-Η/

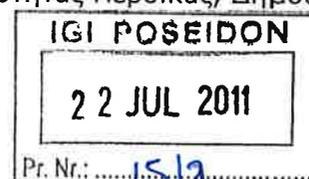
19 ΙΟΥΛ. 2011

2271

Πληροφορίες: Βλαχογιάννης Φ.  
Τηλέφωνο: 2610 366575Προς: IGI Poseidon  
Μαρίνου Αντύπα 92,  
141 21 Ηράκλειο Αττικής

Περίληψη: Παροχή στοιχείων για την ηλεκτροδότηση του Σταθμού Μέτρησης και Συμπίεσης του έργου «Υποθαλάσσιος Διασυνδεδετήριος Αγωγός Φυσικού Αερίου Ελλάδος-Ιταλίας» σε περιοχή της πρώην Κοινότητας Πέρδικας, Δήμου Ηγουμενίτσας, Νομού Θεσπρωτίας.

Σχετικά: α. IGI POSEIDON /503/24-2-2011  
β. ΔΕΗ/ΔΠΠ-Η/1262 /4-5-2011



Σε απάντηση του α' σχετικού σας εγγράφου σας γνωρίζουμε επιπρόσθετα τα παρακάτω στοιχεία του δικτύου που αφορούν την ηλεκτροδότηση του Σταθμού Μέτρησης και Συμπίεσης :

- Η ονομαστική τάση του δικτύου τροφοδοσίας είναι 20KV και η μέγιστη ισχύς βραχυκύκλωσης για επιλογή του εξοπλισμού είναι 250 MVA.
- Τα χαρακτηριστικά της τάσης που παρέχεται από τα δημόσια δίκτυα διανομής είναι σε συμφωνία με το Ευρωπαϊκό πρότυπο EN 50160. Το Πρότυπο αυτό δίνει τα όρια μέσα στα οποία κυμαίνονται τα κύρια χαρακτηριστικά της ηλεκτρικής τάσης στους ακροδέκτες παροχής του πελάτη, σε συστήματα Διανομής Χαμηλής & Μέσης Τάσης, υπό κανονικές συνθήκες λειτουργίας. Το Πρότυπο προβλέπει εξαιρέσεις, οι οποίες όμως αφορούν κυρίως τις έκτακτες καταστάσεις και τις παρεμβάσεις πελατών ή τρίτων.
- Οι απαιτήσεις στις διατάξεις προστασίας της τροφοδοσίας (για επιλογική προστασία με την ΔΕΗ), θα καθορισθεί μετά από την οριστικοποίηση της απόφασης που θα ληφθεί, ως προς τον τύπο της παροχής που θα επιλεγεί σύμφωνα με το β' σχετικό με το οποίο έχετε ενημερωθεί και για τον τρόπο που θα γίνει η κανονική και εφεδρική τροφοδότηση της παροχής σας από πλευράς γραμμών ΜΤ.

Παραμένουμε στη διάθεσή σας για οποιοσδήποτε πληροφορίες ή διευκρινήσεις επιθυμείτε.

Σπ. Ν. Μυλωνάς  
Διευθυντής Περιφέρειας Πελοποννήσου - Ηλείου



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΠΕΡΙΦΕΡΕΙΑ ΗΠΕΙΡΟΥ  
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΑΝΑΠΤΥΞΙΑΚΟΥ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟΥ,  
ΠΕΡΙΒΑΛΛΟΝΤΟΣ & ΥΠΟΔΟΜΩΝ  
Δ/ΝΣΗ ΤΕΧΝΙΚΩΝ ΕΡΓΩΝ ΠΕΡΙΦΕΡΕΙΑΣ ΗΠΕΙΡΟΥ  
ΤΜΗΜΑ ΣΥΓΚΟΙΝΩΝΙΑΚΩΝ ΕΡΓΩΝ

Ταχ. Δ/ση: Πλ. Πύρρου 1, Διοικητήριο  
Ταχ. Κώδικας: 452 21  
Πληροφορίες: Θ. Ρίζου  
Τηλέφωνο: 26510-87348  
FAX: 26510-87449

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΑΡΙΘΜΟΣ
1705	15/12/11
Φ. ΕΠΑΝΔΡΑΣΗ	
Α. ΖΑΜΠΑΣ	
Ε. ΠΡΟΤΟΝΑΜΑ (ΜΕ)	
Δ. ΧΟΥΡΜΟΥΖΙΔΗΣ	
Κ. ΓΕΩΡΓΟΥΝΤΣΟΣ	
ΠΡΟΣ: ΑΣΠΡΟΦΟΣ Α.Ε.	

15/12/1130

Ιωάννινα 6/12/2011

Αριθ. πρωτ.: 87175/9035

Ελ. Βενιζέλου 284  
176 75 Καλλιθέα - ΑΘΗΝΑ

**ΘΕΜΑ:** Μελέτη Περιβαλλοντικών Επιπτώσεων του έργου: «Υποθαλάσσιος Διασυνδεδημένος Αγωγός Φυσικού Αερίου Ελλάδας-Ιταλίας»

**ΣΧΕΤ.:** Το με αρ. πρωτ. 1741/ΦΣ/δχ/21-11-2011 έγγραφο σας

Απαντώντας στο σχετικό έγγραφό σας, σας πληροφορούμε ότι στην περιοχή της προτεινόμενης χάραξης ALT1a η Υπηρεσία μας δεν εκτελεί, ούτε έχει προγραμματίσει την εκτέλεση κάποιου έργου.

Συνημμένα:

Χάρτης κλίμακας 1:50.000

Ο ΠΕΡΙΦΕΡΕΙΑΡΧΗΣ

ΑΛΕΞΑΝΔΡΟΣ ΚΑΧΡΙΜΑΝΗΣ

Εσωτ. Διανομή

1. Χ.Α.
2. Φάκελος έργου
3. Θ. Ρίζου



ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ

Ο υπάλληλος της Δ/σης  
Τεχνικών Έργων Περιφέρειας



20/12/1330



Διαχειριστής Ελληνικού Συστήματος  
Μεταφοράς Ηλεκτρικής Ενέργειας Α.Ε.  
Κάστωρος 72, 18545 Πειραιάς.

ΑΡ./ΗΜ.: ΔΕΣΜΗΕ/18146/12.12.2011

Πληροφορίες: Η. Ζαφειρόπουλος  
Τηλέφωνο : 210 9466947

Προς: Ασπροφός Α. Ε.  
Ελ. Βενιζέλου 284  
176 75 Καλλιθέα  
Αθήνα

Θέμα: Υποθαλάσσιος διασυνδετήριος αγωγός φυσικού αερίου Ελλάδος – Ιταλίας

Σχετικά: (α) Ασπροφός ΑΕ/1747/21.11.11(εισερχ.ΔΕΣΜΗΕ/17925/7.12.11)

Αναφορικά με τα αιτήματα που διατυπώνονται στο (α) σχετικό και αφορούν τη γνωμοδότηση της Υπηρεσίας μας για την εμπλοκή μελλοντικών έργων ανάπτυξης και ενίσχυσης του Συστήματος Μεταφοράς με τον υποθαλάσσιο διασυνδετήριο αγωγό φυσικού αερίου Ελλάδος – Ιταλίας, όπως αυτή εικονίζεται στο σχέδιο 7240-AU-AUT-01 με κλίμακα 1:50000 του α' σχετικού, σημειώνουμε ότι η όδευση αυτή δεν εμπλέκεται με κάποιο μελλοντικό έργο ενίσχυσης του Συστήματος Μεταφοράς που αναφέρεται στη Μελέτη Ανάπτυξης Συστήματος Μεταφοράς περιόδου 2010-2014.

Όσον αφορά πιθανή εμπλοκή της όδευσης που μελετάτε με τα υπάρχοντα έργα του Ελληνικού Συστήματος Μεταφοράς Ηλεκτρικής Ενέργειας, η Διεύθυνση Συντήρησης Συστήματος Μεταφοράς (ΔΣΣΜ) της ΑΔΜΗΕ Α.Ε. θα σας ενημερώσει αρμοδίως.

Είμαστε στη διάθεσή σας για οποιαδήποτε διευκρίνιση.

Ι. Δασκαλάκης  
Διευθυντής Συντήρησης  
Εξοπλισμού Συστήματος

**Κοινοποίηση:**  
-ΑΔΜΗΕ /ΔΣΣΜ

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜ. ΑΝΤΙΣΤ.
1716	20-12-11
Κ. Ζαφειρόπουλος	
Φ. ΣΠΑΝΙΔΗΣ	
Ε. ΠΡΟΤΟΠΑΝΝΑ	
Δ. ΧΟΥΡΜΟΥΖΙΑΔΗΣ	
Η. ΓΕΩΡΓΟΥΝΤΖΟΣ	



ΑΣΠΡΟΦΟΣ	
ΑΡΧΑ	ΗΜΕΡΑ
0065	20/2/12
Φ. ΕΛΑΧΙΛΗΣ	
Α. ΖΑΜΠΑΣ	
Ε. ΠΡΟΤΟΛΑΝΑ	
Η. ΓΕΩΡΓΙΟΥ	
Δ. ΧΑΥΡΑΝΩΤΙΔΗΣ	

Πρέβεζα: ...16/ 02 /2012

Αριθμ. Πρωτ.: 4536

**ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ**  
**ΠΕΡΙΦΕΡΕΙΑ ΗΠΕΙΡΟΥ**  
**ΔΗΜΟΣ ΠΡΕΒΕΖΑΣ**

Υπηρεσία: Δ/ση Τεχνικών  
 Υπηρεσιών & Περιβάλλοντος  
 Τεχνική Υπηρεσία

**ΠΡΟΣ ΤΟΝ ΔΗΜΟ ΠΑΡΓΑΣ**

Αρμόδιος: Σταύρος Παπανίκας  
 Ταχ. Δ/ση:  
 Τηλ. : 26820 26891

ΚΟΙΝ. 1) ΔΗΜΟΣ ΠΡΕΒΕΖΑΣ /ΤΕΧΝΙΚΗ  
 ΥΠΗΡΕΣΙΑ  
 2) ASPROFOS ENGINEERING  
 ΕΛ. ΒΕΝΙΖΕΛΟΥ 34  
 17675 ΚΑΛΛΙΘΕΑ

ΘΕΜΑ : ΥΠΟΘΑΛΑΣΣΙΟΣ ΔΙΑΣΥΝΔΕΤΗΡΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ  
 ΑΕΡΙΟΥ ΕΛΛΑΔΑΣ – ΙΤΑΛΙΑΣ

ΣΧΕΤ. ΕΓΓΡΑΦΟ ΤΗΣ ΑΣΠΡΟΦΟΣ 1733/ΦΣ/δχ /21.11.11

Σας στέλνουμε το σχετικό έγγραφο της ASPROFOS ENGINEERING μαζί με την οριζοντιογραφία 7240-AU-OM-01 - 1:50.000, όπου φαίνονται οι εναλλακτικές χαράξεις του αγωγού φυσικού αερίου Ελλάδας - Ιταλίας για το τμήμα που βρίσκεται εντός των ορίων των νομών Πρέβεζας - Θεσπρωτίας καθώς και τους πινάκες συντεταγμένων των χαράξεων που το συνοδεύουν για τις δίκες σας ενέργειες.

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
 ΠΕΡΙΦΕΡΕΙΑ ΗΠΕΙΡΟΥ  
 ΔΗΜΟΣ ΠΡΕΒΕΖΑΣ  
 ΚΩΝΣΤΑΝΤΙΝΑ ΜΟΡΑΪΤΗ  
 ΤΟΠΟΓΡΑΦΟΣ ΜΗΧΑΝΙΚΟΣ



09/12/093

ΑΣΠΡΟΦΟΣ			
ΑΡ. ΠΡΟΤΟΚ.	ΗΜΕΡΑ	ΜΗΝ	ΕΤΟΣ
1695	9	12	11
Φ. ΕΠΑΝΩΙΔΗΣ			
Α. ΖΑΜΠΑΣ			
Ε. ΠΡΩΤΟΠΑΝΝΑ			
Δ. ΧΟΥΡΜΟΥΖΙΑΔΗΣ			
Η. ΓΕΩΡΓΟΥΛΤΖΟΣ			

## ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΑΠΟΚΕΝΤΡΩΜΕΝΗ ΔΙΟΙΚΗΣΗ ΗΠΕΙΡΟΥ - ΔΥΤ. ΜΑΚΕΔΟΝΙΑΣ  
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΧΩΡ/ΙΚΗΣ & ΠΕΡ/ΚΗΣ ΠΟΛΙΤΙΚΗΣ  
Δ/ΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ & ΧΩΡΙΚΟΥ ΣΧΕΔΙΑΣΜΟΥ ΗΠΕΙΡΟΥ  
ΤΜΗΜΑ: Περ/κου & Χωρικού Σχεδιασμού

Ιωάννινα, 8 Δεκεμβρίου 2011

Αριθ. Πρωτ.: 54622/3342

Σχετικά:

ΠΡΟΣ: Ασπροφός Α.Ε.  
Ελ. Βενιζέλου 284,  
176 75 Καλλιθέα Αθήνα  
(υπόψη κ. Φ. Σπανίδη)

Ταχ. Δ/ση : Μ. Κοτοπούλη 62  
Ριζάρειος Παλιτεία  
Μονάδα Γ1 (3<sup>ος</sup> όραφος)

Ταχ. Κώδικας : 454 45

Πληροφορίες : Ε. Στραπατσάκη, Γ. Παπαγιάννης

Τηλέφωνο : 26510 - 90225, 90242

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Ιστοσελίδα : [www.apdhp-dm.gov.gr](http://www.apdhp-dm.gov.gr)

E-mail : [grapagiannis@apdhp-dm.gov.gr](mailto:grapagiannis@apdhp-dm.gov.gr)

**ΘΕΜΑ:** Απόψεις σχετικά με τον Υποθαλάσσιο διασυνδετήριο αγωγό φυσικού Αερίου Ελλάδας - Ιταλίας.

## ΣΧΕΤ:

- α) Το με αρ. 1740/ΦΣ/δχ/21.11.2011 έγγραφό σας με το συνημμένο χάρτη (κλ. 1:50000).  
β) Το με αρ. 6002/5.2.2009 έγγραφο της Υπηρεσίας μας.

Υστερα από το ανωτέρω σχετικό έγγραφο σας ενημερώνουμε ότι η Υπηρεσία μας συμφωνεί κατ' αρχάς, με την διέλευση του αγωγού φυσικού αερίου στην ευρύτερη περιοχή της Περιφέρειας Ηπείρου με τα συνοδά έργα που απαιτούνται (π.χ. κύριες και υποστηρικτικές εγκαταστάσεις κ.α.).

Επιπρόσθετα σας κάνουμε γνωστά τα παρακάτω:

- Από τα στοιχεία που διαθέτει η Υπηρεσία μας και σύμφωνα με όσα απεικονίζονται στον χάρτη κλ. 1:50.000 σε πρώτη φάση, και ιδιαίτερα για την ALT-1a, δεν προκύπτουν απαγορεύσεις και ασυμβατότητες τόσο με την υποθαλάσσια όδευση όσο και με την διαδρομή του χερσαίου τμήματος (μήκους 8,5 χλμ. περίπου) και την θέση των εγκαταστάσεων μέτρησης, συμπίεσης και υποστήριξης.
- Αποψη μας είναι ότι θα πρέπει να γίνουν οι απαραίτητες γεωλογικές διερευνήσεις ώστε να εντοπιστούν και επιλυθούν τυχόν γεωλογικά ζητήματα (όπως π.χ. ρήγματα, ρηξινεγείς περιοχές κ.α)
- Επίσης θεωρούμε ότι θα πρέπει, μεταξύ άλλων, να ληφθούν υπόψη για τη διέλευση και προσαρμογή του αγωγού τα θεσμοθετημένα όρια οικισμών, οι προτεινόμενες από τα ΣΧΟΟΑΠ επεκτάσεις τους, τυχόν αρχαιολογικοί χώροι και πολυσύχναστες παραλίες κολύμβησης κ.α.

Είμαστε στη διάθεσή σας για οποιαδήποτε πληροφορία και διευκρινήσεις.

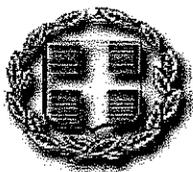
Εσωτερική Διανομή:

- Χρ. Αρχείο
- Φ.2.9.2 Π.Ε. Θεσπρωτίας

Με Ε.Γ.Γ.

Ο αναπλ. Τμηματάρχης Περ/κού &amp; Χωρ/κού Σχεδιασμού

Γιάννης Παπαγιάννης



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΑΠΟΚΕΝΤΡΩΜΕΝΗ ΔΙΟΙΚΗΣΗ ΗΠΕΙΡΟΥ- Δ. ΜΑΚΕΔΟΝΙΑΣ  
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΔΑΣΩΝ & ΑΓΡΟΤΙΚΩΝ ΥΠΟΘΕΣΕΩΝ  
**ΔΙΕΥΘΥΝΣΗ ΔΑΣΩΝ ΘΕΣΠΡΩΤΙΑΣ**  
ΤΜΗΜΑ: ΠΡΟΣΤΑΣΙΑΣ, ΔΙΟΙΚΗΣΗΣ & ΔΙΑΧΕΙΡΙΣΗΣ  
ΔΑΣΩΝ & ΔΗΜΟΣΙΟΥ ΚΑΤΗΓΟΡΟΥ

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜΕΡ. ΑΡΧΙΦΕΣΣ
9	9/1/12
Φ. ΕΠΑΝΙΛΗΣ	
Α. ΖΑΜΠΑΣ,	
Ε. ΠΡΟΤΟΠΑΛΛΑ (ΜΕ)	
Η. ΓΕΩΡΓΙΑΝΟΥ	
ΝΤΖ. ΣΤ.	

09/01/1500

Ηγουμένισσα: 3-01-2012  
Αριθ. Πρωτ.: 54511/836/2011

Ταχ. Δ/ση: Παν. Τσαλδάρη 21  
Τ.Κ 46100 - Ηγουμένισσα  
Πληροφορίες: Ι. Λώλος  
Τηλ.: 26650-28347  
FAX: 26650- 28345  
EMAIL: ilolos @ epirus.gov.gr  
Site:// <http://www.apdhp-dm.gov.gr>

✓  
ΠΡΟΣ : **ΑΣΠΡΟΦΟΣ engineering**  
Ελ. Βενιζέλου 284  
Τ.Κ. 176.75 – Καλλιθέα  
Αθήνα

ΘΕΜΑ : «Υποθαλάσσιος Διασυνδεδημένος Αγωγός Φυσικού Αερίου Ελλάδας-Ιταλίας».

ΣΧΕΤ. : α) Το αριθμ. 1750/ΦΣ/δχ/21-11-2011 έγγραφο σας .

β) Τα αριθμ. 5504/5-1-2011 και 1333/26-04-2011 προγενέστερα έγγραφά μας

Σε απάντηση του παραπάνω με (α) σχετικό έγγραφο σας , που αναφέρεται στο αντικείμενο του θέματος , με το οποίο ζητάτε να σας επιβεβαιώσουμε εκ νέου , στα πλαίσια της περιβαλλοντικής αδειοδότησης του έργου « Υποθαλάσσιος Διασυνδεδημένος Αγωγός Φυσικού Αερίου Ελλάδας-Ιταλίας », την θετική γνώμη της Υπηρεσίας μας, για την όδευση τμήματος του αγωγού του εν λόγω έργου, που διέρχεται από την περιοχή ευθύνης της Δ/σης Δασών Θεσπρωτίας , όπως αυτή εκφράστηκε κατά την προγενέστερη φάση και στα πλαίσια της Προκαταρκτικής Περιβαλλοντικής Αδειοδότησης , σας γνωρίζουμε ότι για την Υπηρεσία μας , εξακολουθούν να ισχύουν τα όσα αναφέρονται στα με (β) σχετικό προγενέστερα έγγραφά μας.

Με γνώμονα όμως, τα όσα διαλαμβάνονται στα παραπάνω σχετικά έγγραφα μας, στην σχετική απόφαση έγκρισης των περιβαλλοντικών όρων της Μ.Π.Ε., για την κάλυψη των υποχρεώσεων που απορρέουν από την Δασική Νομοθεσία, αναφορικά με τις επεμβάσεις σε δασικού χαρακτήρα εκτάσεις και την προστασία αυτών (ιδιαίτερα των εκατέρωθεν του υπό κατασκευή αγωγού υπαρχόντων), θα πρέπει με σαφήνεια να περιληφθούν και τα παρακάτω :

- Δεν θα γίνει εναπόθεση πλεοναζόντων προϊόντων εκσκαφής σε ρέματα , ή σε επιφάνειες που φέρουν δασική βλάστηση και αν υπάρξουν , αυτά θα διατεθούν σύμφωνα με τις διατάξεις της Δασικής Νομοθεσίας .
- Θα ληφθεί κάθε πρόνοια, για την προστασία ( κυρίως αντιπυρικής) της εκατέρωθεν του προς υλοποίηση έργου δασικής βλάστησης και η οποιαδήποτε φθορά αυτής, θα περιορισθεί στην ελάχιστη δυνατή έκταση.
- Εάν υπάρξουν προϊόντα υλοτομίας, αυτά θα διατεθούν σύμφωνα με τις διατάξεις της Δασικής Νομοθεσίας.

- Για τυχόν απόληψη απαιτούμενων αδρανών υλικών και την δημιουργία λατομείων σε δασικού χαρακτήρα εκτάσεις , θα πρέπει να τηρηθεί η διαδικασία που ορίζουν τα άρθρα 45 & 57 του Ν. 998/79.
- Για την επέμβαση στις με δασικό χαρακτήρα εκτάσεις , απαιτείται η απαραίτητα η έκδοση έγκριση επέμβασης, σύμφωνα με το άρθρο 58 παρ 2 του Ν. 998/79 και όπως αυτό αρχικώς αντικαταστάθηκε με το άρθρο 13 παρ. 3 του Ν.1822/1988 και μετέπειτα με το άρθρο 2 παρ. 3 Ν. 2941/2001 .
- Εφόσον από τις επεμβάσεις για την κατασκευή του έργου , προκύψει ανάγκη αποκατάστασης της καταστραφείσας Δασικής βλάστησης , για την βελτίωση της αισθητικής του τοπίου , αυτή θα πραγματοποιηθεί (τόσο οι φυτοτεχνικές μελέτες , όσο και οι εργασίες) σε βάρος των πιστώσεων του έργου , ενώ η έγκριση των σχετικών φυτοτεχνικών μελετών, θα γίνει από την αρμόδια Δασική Υπηρεσία, σύμφωνα με το άρθρο 16 του Ν.998/79. Να χρησιμοποιηθούν δε αυτόχθονα είδη.

Μ.Ε.Γ.Γ.  
ΑΠΟΚΕΝΤΡΩΜΕΝΗΣ ΔΙΟΙΚΗΣΗΣ  
ΗΠΕΙΡΟΥ & ΜΑΚΕΔΟΝΙΑΣ







ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ  
ΚΑΙ ΤΟΥΡΙΣΜΟΥ  
ΑΒ' ΕΦΟΡΕΙΑ ΠΡΟΪΣΤΟΡΙΚΩΝ  
& ΚΛΑΣΙΚΩΝ ΑΡΧΑΙΟΤΗΤΩΝ  
ΘΕΣΣΠΡΩΤΙΑΣ

Ταχ. Δ/ση: Κύπρου 68 - Ηγουμενίτσα  
Ταχ. Κώδ.: 461 00  
Πληρ/ρίες: Κασ. Λάζαρη  
Τηλέφωνα: 26650.29177 / 8  
FAX: 26650.25133

06 / 12 / 1400

Ηγουμενίτσα, 29.11.2011  
Αριθ. Πρωτ.: 3607

**ΠΡΟΣ:** Asprofos Engineering  
Ελ. Βενιζέλου 284  
176 75 Καλλιθέα - Αθήνα

**ΚΟΙΝ.:** 1. Υπουργείο Πολιτισμού και Τουρισμού  
α) ΓΔΑΠΚ/ΔΠΙΚΑ/ Τμήμα  
Αρχαιολογικών Χώρων, Μνημείων  
και Αρχαιογνωστικής Έρευνας  
β) ΓΔΑΠΚ/ΔΒΜΜ/Τμήμα  
Αρχαιολογικών Χώρων, Μνημείων  
και Αρχαιογνωστικής Έρευνας  
Μπουμπουλίνας 20  
106 82 Αθήνα  
2. 8<sup>η</sup> Εφορεία Βυζαντινών Αρχαιοτήτων  
Κάστρο Ιωαννίνων  
452 21 Ιωάννινα  
3. Εφορεία Εναλίων Αρχαιοτήτων  
Καλλισπέρη 30  
117 42 Αθήνα

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ	ΗΜ. ΛΗΨΕΩΣ
1685	6/12/11
Φ. ΣΘΑΝΙΔΗΣ (xg)	
Α. ΖΑΜΠΑΣ (xg)	
Ε. ΠΡΟΤΟΠΑΠΠΑ (μs)	
Δ. ΧΟΥΡΜΟΥΖΙΑΔΗΣ (xg)	

**ΘΕΜΑ:** «Γνωμοδότηση για την προτεινόμενη όδευση του αγωγού φυσικού αερίου στο πλαίσιο του έργου Υποθαλάσσιος διασυνδεδημένος Αγωγός Φυσικού Αερίου Ελλάδας – Ιταλίας»

**ΣΧΕΤ.:** (α). Το με αρ. πρωτ. 4986/02.12.2008 έγγραφό μας  
(β). Το με αρ. πρωτ. 55/19.01.2010 έγγραφό μας  
(γ). Το με αρ. πρωτ. 1504/03.05.2010 έγγραφό μας  
(δ). Η με αρ. πρωτ. ΥΠΠΟΤ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/24269/1319/12.05.2010 απόφαση της Γενικής Διεύθυνσης Αρχαιοτήτων και Πολιτιστικής Κληρονομιάς του ΥΠ.ΠΟ.Τ.  
(ε). Το με αρ. πρωτ. 816/23.03.2011 έγγραφό μας  
(στ). Η με αρ. πρωτ. ΥΠΠΟΤ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/40850/1337/17.05.2011 απόφαση της Γενικής Διεύθυνσης Αρχαιοτήτων και Πολιτιστικής Κληρονομιάς του ΥΠ.ΠΟ.Τ.  
(ζ). Το με αρ. πρωτ. 1736/ΦΣ/δχ/21.11.2011 έγγραφό σας

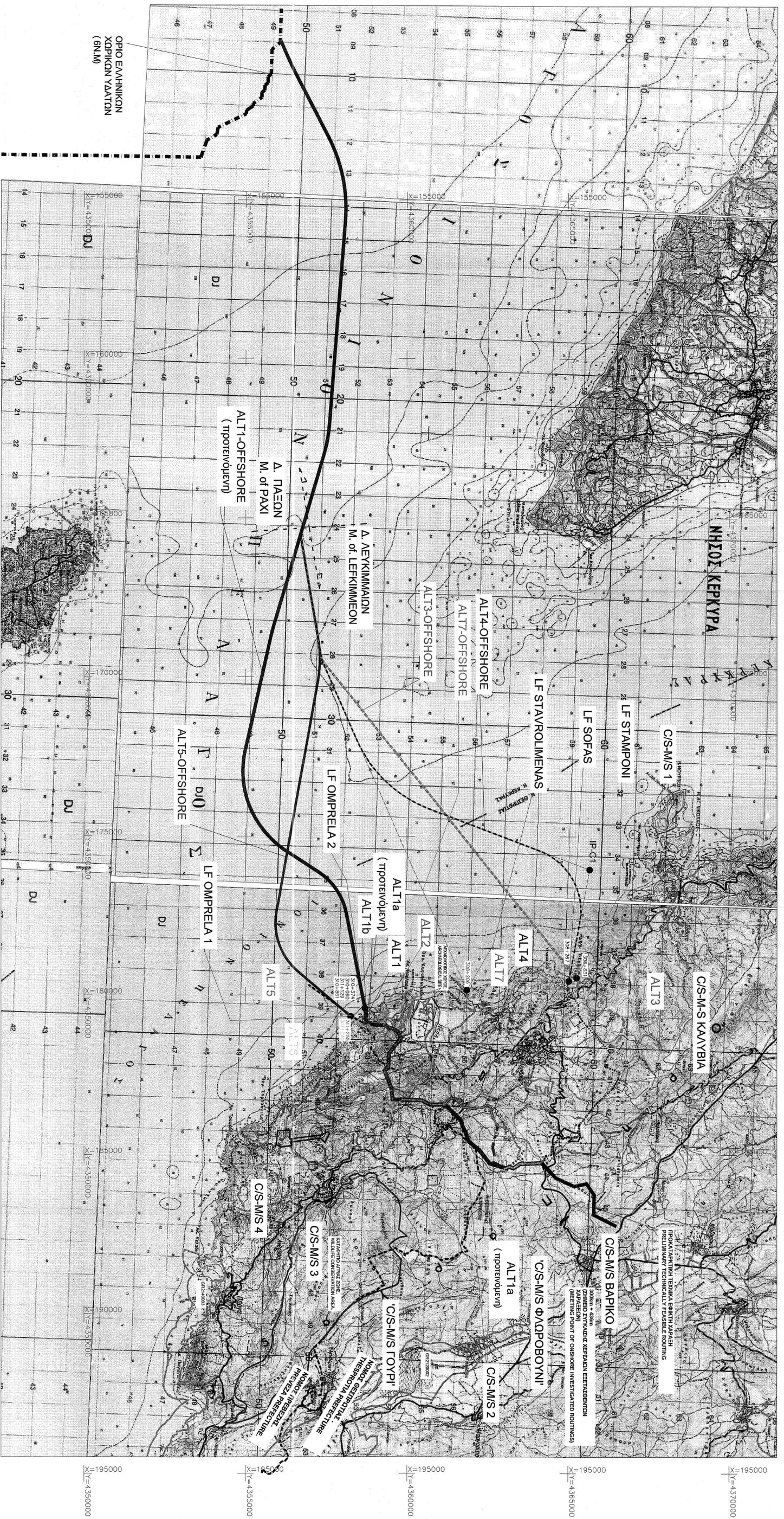
Σε συνέχεια των (α) ~ (στ) σχετικών και σε απάντηση του (ζ), που αφορά στην προτεινόμενη στην υπό εκπόνηση Μελέτη Περιβαλλοντικών Επιπτώσεων όδευση του αγωγού φυσικού αερίου στο πλαίσιο του έργου «Υποθαλάσσιος διασυνδεδημένος Αγωγός Φυσικού Αερίου Ελλάδας – Ιταλίας», σας γνωρίζουμε ότι η Υπηρεσία μας δεν έχει καταρχήν αντίρρηση για την προτεινόμενη χάραξη του αγωγού, εφόσον τηρηθούν τα αναφερόμενα στις (δ) και (στ) σχετικές αποφάσεις της Γενικής Διεύθυνσης Αρχαιοτήτων και Πολιτιστικής Κληρονομιάς του ΥΠ.ΠΟ.Τ.

Ακριβές Αντίγραφο

Ο Αναπλ. Διευθυντής της Εφορείας

Κωνσταντίνος Σουρέρεφ  
Αρχαιολόγος

ΜΠΙΚΑΣ ΚΩΝΣΤΑΝΤΙΝΟΣ  
ΑΕΔΙΚ. ΥΠ. ΠΟ. Τ. ΑΡΧ. ΕΦ. ΑΡΧΑΙΟΛΟΓΩΝ



**ΣΤΙΚΤΑ ΣΧΕΜΑ / REFERENCE DRAWINGS**

ΑΡ. ΣΧΕΜΙΟΥ / DWG NO	ΤΙΤΛΟΣ / TITLE
8298-000-00-34-01	ΔΙΑΓΡΑΜΜΑ ΟΡΘΟΓΩΝΙΟΓΡΑΦΩΣ RECORDING PLAN

- ΥΠΟΜΝΗΜΑ ΛΕΓΕΝΔ**
- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ**
1. ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ
  2. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT1
  3. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT1a (ΠΡΟΤΕΙΝΟΜΕΝΗ)
  4. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT1b
  5. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT2
  6. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT1-OFFSHORE (ΠΡΟΤΕΙΝΟΜΕΝΗ)
  7. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT3
  8. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT3-OFFSHORE
  9. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT4
  10. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT4-OFFSHORE
  11. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT5
  12. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT6
  13. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT5-OFFSHORE
  14. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT7
  15. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT7-OFFSHORE
  16. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT7-OFFSHORE
  17. ΕΝΔΕΙΚΝΥΣΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ ALT7-OFFSHORE

- ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ**
18. ΠΕΡΙΟΧΕΣ ΔΙΚΤΥΟΥ NATURA
  19. ΚΑΤΑΦΥΓΤΟ ΑΡΡΙΑΣ ΖΩΝΗΣ
  20. ΠΑΡΚΟ ΑΝΑΨΥΧΗΣ
  21. ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΩΡΟΙ
- ΥΠΟΔΟΜΕΣ ΚΑΙ ΛΟΙΠΑ ΣΤΟΙΧΕΙΑ**
22. ΠΡΟΒΛΕΠΟΜΕΝΟ ΒΙΟ. Π.Α.
  23. ΛΑΤΟΜΕΙΟ
  24. ΟΡΙΑ ΟΡΓΑΝΙΣΜΩΝ ΤΟΠΙΚΗΣ ΑΥΤΟΔΙΟΙΚΗΣΗΣ

**Asprotos engineering**

IGI Poseidon s.a.

ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΟΥ ΕΠΙΠΛΩΣΕΩΣ

ΚΩΔΙΚΟΣ: ΑΡ. ΣΧ. ΑΡ. 7240-AU-AUT-01

ΣΚΑΛΑ: ΑΡ. ΣΧ. ΑΡ. 7240-AU-AUT-01

ΚΑΙΝΟΤΟΜΙΑ: ΑΡ. ΣΧ. ΑΡ. 7240-AU-AUT-01

ΕΠΙΣΤΗΜΟΝΙΚΟ ΚΑΙ ΤΕΧΝΙΚΟ ΠΡΟΣΩΠΟ

ΑΡ. ΤΙΤΛΟΥ	ΑΡ. ΣΧ. ΑΡ.	ΑΡ. ΣΧ. ΑΡ.	ΑΡ. ΣΧ. ΑΡ.
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24

14.11.2011



ΟΡΓΑΝΙΣΜΟΣ

ΣΙΔΗΡΟΔΡΟΜΩΝ ΕΛΛΑΔΟΣ Α.Ε.

ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΥΠΟΔΟΜΗΣ

ΔΙΕΥΘΥΝΣΗ ΕΓΚΑΤΑΣΤΑΣΕΩΝ & ΜΕΛΕΤΩΝ

ΥΠΗΡΕΣΙΑ ΔΙΑΚΗΡΥΞΕΩΝ, ΜΕΛΕΤΩΝ  
& ΧΑΡΑΞΕΩΝ

19/01/1400

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜ. ΑΝΑΦΕΣ
0026	19/1/12
Φ. ΣΠΑΝΙΔΗΣ	
Α. ΖΑΜΠΑΣ	
Ε. ΠΡΟΤΟΠΛΑΜΑ	
Δ. ΧΟΥΡΜΟΥΖΙΑΔΗΣ	
Η. ΓΕΡΓΟΥΝΙΖΟΣ	

Βαθμός Ασφαλείας

Αθήνα, 12-01-12

Αριθ. Πρωτ. Βαθμός προτεραιότητας  
2645220

Ταχ. Δ/ση: Καρόλου 1  
10437 ΑΘΗΝΑ

Πληροφορίες: Γ. Κόντε  
Τηλέφωνο: 210-5297295  
Fax.: 210-5244430

ΠΡΟΣ: ΑΣΠΡΟΦΟΣ Α.Ε.

Ελ. Βενιζέλου 284  
176 75 Καλλιθέα  
Τηλ 210- 9491600  
Fax 210 - 9491610

**ΘΕΜΑ:** Υποθαλάσσιος διασυνδετήριος αγωγός  
φυσικού αερίου Ελλάδος - Ιταλίας

ΣΧΕΤ. :

ΚΟΙΝ.: ΚΦ

α) Έγγραφο σας υπ' αρ. 1742/ΦΣ/δχ/21-11-2011

Σε συνέχεια του ως άνω σχετικού με το οποίο μας υποβάλατε (1) οριζοντιογραφία κλίμακας 1: 50000 και πίνακα συντεταγμένων με την προτεινόμενη και τις εναλλακτικές χαράξεις του υποθαλάσσιου αγωγού φυσικού αερίου Ελλάδος – Ιταλίας και βάσει των στοιχείων της Υπηρεσίας μας σας γνωρίζουμε ότι δεν προκύπτει εμπλοκή με τα υπό μελέτη έργα μας.

Σημειώνεται πάντως ότι κρίνεται σκόπιμο εκ μέρους σας η πληροφόρηση μας με τυχόν επικαιροποιημένα στοιχεία μελετών ώστε να αποφευχθεί οποιαδήποτε εμπλοκή με μελλοντικές μελέτες μας στην περιοχή των έργων σας.

Παραμένουμε στη διάθεση σας για οποιαδήποτε πληροφορία και διευκρίνιση χρειαστεί.

Συν: (1) θεωρημένη σειρά

Ακριβές αντίγραφο

Γ. Κόντε



Προς :  
ΔΕΗ, Διεύθυνση Περιφέρειας Πελοποννήσου και Ηπείρου  
Ακτή Δυμαίων 15  
Τ.Κ. 26222, Πάτρα

Αθήνα, 24 Φεβρουαρίου 2011  
Αρ. Πρωτ. : 503

Υπόψη : *κου Ρεγκλή*  
Τηλ.2610-336846, φαξ 2610-329835

Κοιν.  
ΔΕΗ, ΔΠΠΗ, Περιοχή Ιωαννίνων  
Χρήστου Κάτσαρη 4  
ΤΚ 45110, Ιωάννινα

Υπόψη : *κου Λέκκα*  
Τηλ.26510-26846, φαξ 26510-25668

Από :  
Εταιρεία «Υποθαλάσσιος Αγωγός Φυσικού Αερίου  
Ελλάδος-Ιταλίας Ποσειδών Α.Ε»  
(Θυγατρική της ΔΕΠΑ Α.Ε.)

Έργο : Υποθαλάσσιος Διασυνδεδητήριος Αγωγός Φυσικού Αερίου Ελλάδος-Ιταλίας

Θέμα : Παροχή στοιχείων σχετικά με την παροχή ρεύματος προς τον μελλοντικό Σταθμό Μέτρησης και Συμπύεσης σε περιοχή της πρώην Κοινότητας Πέρδικας του δήμου Ηγουμενίτσας του Νομού Θεσπρωτίας

Κύριοι,

Θα θέλαμε να σας ενημερώσουμε ότι η Εταιρεία «Υποθαλάσσιος Αγωγός Φυσικού Αερίου Ελλάδος-Ιταλίας Ποσειδών Α.Ε.» («ΥΑΦΑ ΠΟΣΕΙΔΩΝ»), θυγατρική της ελληνικής Εταιρείας ΔΕΠΑ και της Ιταλικής Εταιρείας EDISON, έχει συσταθεί με σκοπό τον σχεδιασμό, την κατασκευή και την λειτουργία του υποθαλάσσιου Διασυνδεδητήριου Αγωγού Ελλάδος-Ιταλίας, ο οποίος θα μεταφέρει από τις ακτές της Ηπείρου προς το Οτράντο της Ιταλίας ποσότητες Φυσικού Αερίου προερχόμενες από τις χώρες της Κασπίας Θάλασσας.

Στα πλαίσια της υλοποίησης του Σχεδιασμού του ανωτέρω Έργου, βρίσκεται σε εξέλιξη η εκπόνηση της Μελέτης Εφαρμογής του Έργου από την Κοινοπραξία των Εταιρειών INTECSEA - IV Oil& Gas (με έδρα την Ολλανδία).

Προκειμένου να προχωρήσει η εκπόνηση των ανωτέρω Μελετών και ειδικότερα σε θέματα που σχετίζονται με την ηλεκτροδότηση του Σταθμού Μέτρησης και Συμπύεσης, με εκτιμώμενη απαιτούμενη ισχύ περίπου 3.5MW, παρακαλούμε να μας ενημερώσετε για τα πιο κάτω στοιχεία:

- Την τάση του δικτύου τροφοδοσίας (source supply voltage)
- Την διακύμανση της τάσης και της συχνότητας του δικτύου από το οποίο θα τροφοδοτηθεί η εγκατάσταση (source voltage and frequency variation)
- Τις τιμές (ελάχιστη/μέγιστη) διακοπής της τροφοδοσίας, σε Kilo-ampere ή MVA rms (source fault levels minimum/maximum in Kilo-ampere or MVA rms)
- Το σύστημα γείωσης του δικτύου τροφοδοσίας (source earthing system)
- Τις απαιτήσεις αρμονικής παραμόρφωσης του δικτύου τροφοδοσίας (source harmonic distortion (THD) requirements)
- Το σημείο σύνδεσης με το δίκτυο τροφοδοσίας (location of source tie-in point)

- Την περιγραφή της διάταξης διασύνδεσης μεταξύ του δικτύου της ΔΕΗ και του Σταθμού Μέτρησης και Συμπίεσης (source scope interface between Energy Supplier and Compressor - Metering Station Owner)
- Την δυνατότητα τροφοδοσίας του Σταθμού Μέτρησης και Συμπίεσης της ΥΑΦΑ ΠΟΣΕΙΔΩΝ από δύο ανεξάρτητες γραμμές υψηλής ή μέσης τάσης (Single or dual incoming Power Source)
- Απαιτήσεις (διατάξεις) προστασίας της τροφοδοσίας (source protection requirements)
- Εκτίμηση (τάξη μεγέθους) της συνολικής δαπάνης σύνδεσης του Σταθμού Μέτρησης και Συμπίεσης με το δίκτυο της ΔΕΗ για την τροφοδοσία από μία ή δύο ανεξάρτητες γραμμές (rough estimation of the total cost)

Επισυνάπτεται απόσπασμα Σχεδίου σε Κλίμακα 1:50.000, όπου σημειώνεται η ισχύουσα θέση του Σταθμού Μέτρησης και Συμπίεσης (θέση Βαρικό) και η εξεταζόμενη εναλλακτική (θέση Φλωροβούνι).

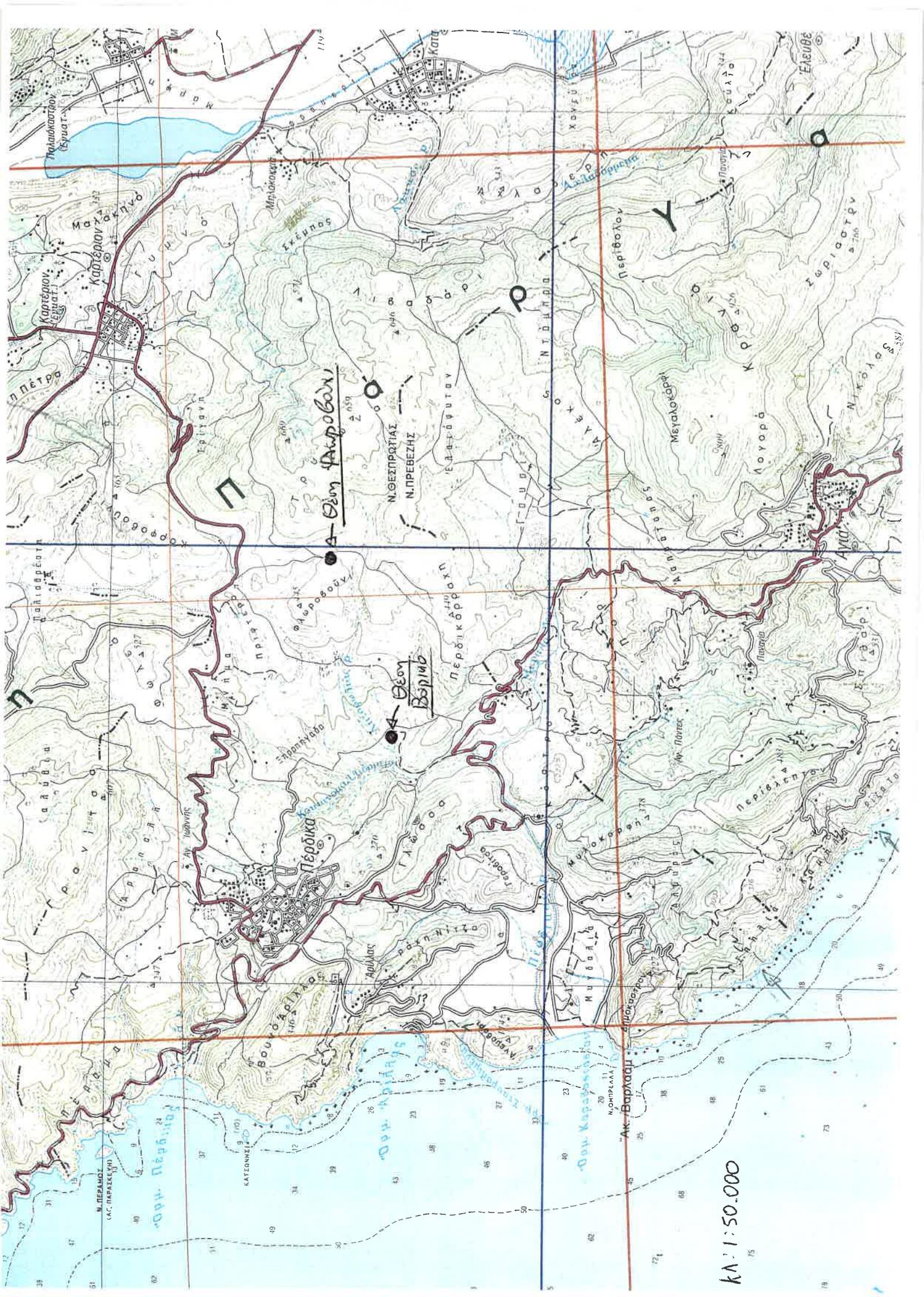
Για οποιαδήποτε διευκρίνιση μπορείτε να επικοινωνήσετε με τον κ. Τυρογιάννη (τηλ 210 2701281, 210 2701216, 6955191059).

Με εκτίμηση



Α.Νάτσικας  
Τεχνικός Διευθυντής  
ΥΑΦΑ Ποσειδών

Μαρίνου Αντύπα 92  
141 21 Ηράκλειο Αττικής  
Τηλ: 210 2701050  
Fax: 210 2751067  
[www.igi-poseidon.com](http://www.igi-poseidon.com)



ΚΛ: 1:50.000



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΑΠΟΚΕΝΤΡΩΜΕΝΗ ΔΙΟΙΚΗΣΗ  
ΗΠΕΙΡΟΥ – ΔΥΤΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ  
ΓΕΝΙΚΗ Δ/ΝΣΗ ΕΣΩΤΕΡΙΚΗΣ ΛΕΙΤΟΥΡΓΙΑΣ  
ΔΙΕΥΘΥΝΣΗ ΔΙΟΙΚΗΣΗΣ  
ΤΜΗΜΑ ΔΙΟΙΚΗΤΙΚΟΥ – ΟΙΚΟΝΟΜΙΚΟΥ  
ΝΟΜΟΥ ΘΕΣΣΠΡΩΤΙΑΣ

17/02/13.

Ηγουμενίτσα, 13 Φεβρουαρίου 2012

Αρ. Πρωτ.: 375/7755

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜ. ΑΝΘΕΞ
0063	17/2/12
Φ. ΕΠΑΝΙΤΗΣ	
ΣΑΚΗΛΑΣ	
Ε. ΠΡΟΤΟΝΑΠΠΑ	
Α. ΧΑΡΜΟΥΣΙΔΗΣ	

Ταχ. Δ/ση: Π. Τσαλδάρη 31  
Ταχ. Κώδικας: 46 100 Ηγουμενίτσα  
Πληροφορίες: Γ. Καντή  
Τηλέφωνο: 26650 27115  
Fax: 26650 23196  
E-mail: kantrig@apdhp-dm.gov.gr  
Δικτ. τόπος: http://www.apdhp-dm.gov.gr

Προς: Την Τεχνική Υπηρεσία  
Δήμου Ηγουμενίτσας  
Σουλίου 3  
46100 Ηγουμενίτσα

**ΘΕΜΑ: «Υποθαλάσσιος Διασυνδετήριος Αγωγός Φυσικού Αερίου Ελλάδας – Ιταλίας»**

Σας αποστέλλουμε το από 21-11-2011 έγγραφο της Εταιρείας ΑΣΠΡΟΦΟΣ ΑΕ, με τα συνημμένα του, το οποίο περιήλθε στις 10-2-2012 εκ παραδρομής στην Υπηρεσία μας, για τις δικές σας ενέργειες.

Μ.Ε.Γ.Γ.Α.Δ.  
Η Προϊσταμένη

Αρτεμις Μαρκουλή – Γιώγου

**Κοιν.:**

1. Δήμο Ηγουμενίτσας  
Σουλίου 3  
46100 Ηγουμενίτσα
2. Asprofos engineering  
Ελ. Βενιζέλου 284  
17675 Καλλιθέα  
ΑΘΗΝΑ



Για την Ορθότητα  
Η Προϊσταμένη  
Τμήματος Γραμματείας  
ΣΤΕΛΛΑ ΤΑΧΙΔΑΚΟΥ



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ Π.Ε.ΧΩ.Δ.Ε.  
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ  
Δ/ΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΟΥ ΣΧΕΔΙΑΣΜΟΥ  
ΤΜΗΜΑ ΔΙΑΧΕΙΡΙΣΗΣ ΦΥΣΙΚΟΥ  
ΠΕΡΙΒΑΛΛΟΝΤΟΣ

Αθήνα, 2 . 12. 2011

Α.Π. :161773 / 2923

Δ/νση : Τρικάλων 36  
Τ.Κ. : 11526  
Πληροφορίες : Α. Οικονόμου  
Τηλέφωνο: 210/ 692.1952  
FAX. : 210 – 691.8487

ΠΡΟΣ: **Asprofos A. E.**  
Ελ. Βενιζέλου 284  
Τ. Κ. 17675 - Αθήνα

**Θέμα : «Υποθαλάσσιος Διεσυνδετήριος Αγωγός Φυσικού Αερίου Ελλάδος – Ιταλίας»**

- Σχετ. :**
- 1 Το με α.π. 1738 / ΦΣ / δχ / 21. 11.. 2011 έγγραφό σας με το οποίο διαβιβάσθηκε στη Δ/νση Περ/κου Σχεδιασμού /ΤΔΦΠ του ΥΠΕΧΩΔΕ ο φάκελος της ΠΠΕ του εν θέματι έργου (α.π. ΥΠΕΧΩΔΕ/ΤΔΦΠ/111048 / 1239 / 24. 4. 09)
  - 2 Το με α.π. 135130 / 3876 / 19.12. 2008 έγγραφο με θέμα: «Εκπόνηση ΠΠΕ για το Υποθαλάσσιο τμήμα του Αγωγού Φυσικού Αερίου για τη Διασύνδη της Ελλάδας με την Ιταλία».

Σε απάντηση του ως άνω (1) σχετικού, με το οποίο διαβιβάσθηκε στο Τμήμα Διαχείρισης Φυσικού Περιβάλλοντος αίτημά σας ως προς το εν θέματι έργο και στο πλαίσιο των αρμοδιοτήτων μας, σας γνωρίζουμε ότι η Υπηρεσία μας εμμένει στις απόψεις που είχαν εκφρασθεί με το (2) σχετικό του παρόντος έγγραφο της.

**Συνημμένα**

1 χάρτης ασπρόμαυρος κλιμ: 1:50000

**Ε.Δ.**

1. Χρονολογικό Αρχείο Δ.Π.Σ.
2. Χρονολογικό Αρχείο Τ.Δ.Φ.Π.
3. Τ.Δ.Φ.Π.
4. Α. Οικονόμου

**Ο ΔΙΕΥΘΥΝΤΗΣ**

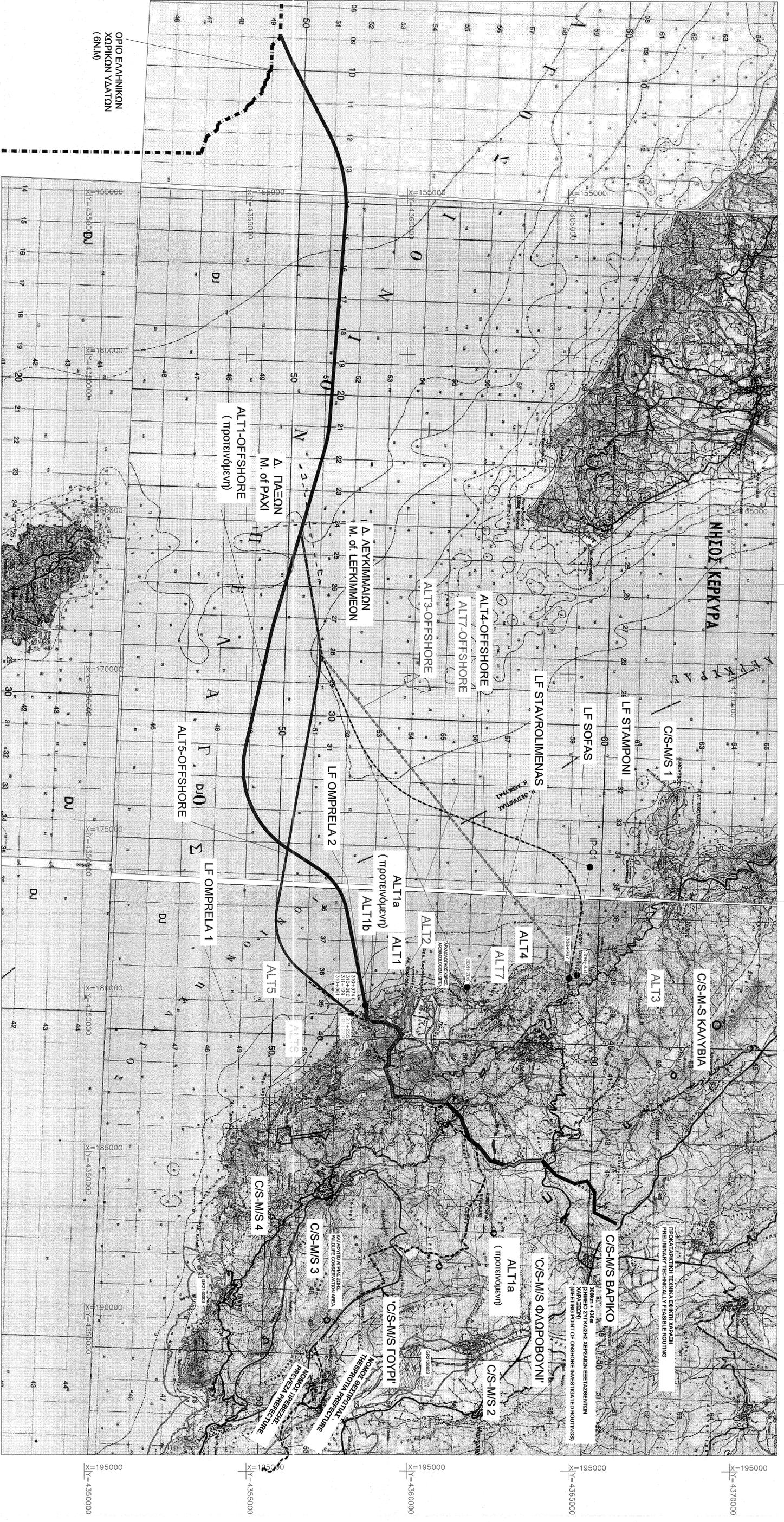
**Γ. ΜΑΝΟΥΡΗΣ**  
**Δρ. Πολ/κός Μηχ/κός**



ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ  
Προϊόντ του Γραφείου Γραμματείας

α/α

**Β. ΓΕΛΑΤΣΟΡΑ**



**ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS**

ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8099-000-00-94-01	ΔΙΑΓΡΑΜΜΑ ΟΡΘΟΓΟΝΙΟΓΡΑΦΙΑΣ/REGONING PLAN

**ΥΠΟΜΝΗΜΑ/LEGEND**

- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ**
- ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΡΓΙΚΤΗ ΧΑΡΑΞΗ
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT1
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT1a (ΠΡΟΤΕΙΝΟΜΕΝΗ)
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT1b
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT2
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT3 (ΠΡΟΤΕΙΝΟΜΕΝΗ)
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT3
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT3-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT4
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT4-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT5
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT6
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT6-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT7
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT7-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT7-OFFSHORE
  - ΕΝΔΕΙΚΝΥΤΙΚΗ ΧΑΡΑΞΗ ALT7-OFFSHORE

- ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ**
- ΠΕΡΙΟΧΕΣ ΔΙΚΤΥΟΥ NATURA
  - ΚΑΤΑΦΥΓΙΟ ΑΙ ΠΙΛΑΣ ΖΩΗΣ
  - ΠΑΡΚΟ ΑΝΑΨΥΧΗΣ
  - ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΑΡΟΙ
- ΥΠΟΛΟΜΕΣ ΚΑΙ ΛΟΙΠΑ ΣΤΟΙΧΕΙΑ**
- ΠΡΟΒΛΕΠΟΜΕΟ ΒΙΟΛΙΑ
  - ΛΑΤΩΜΕΙΟ
  - ΟΡΙΑ ΟΡΓΑΝΙΣΜΩΝ ΤΟΠΙΚΗΣ ΑΥΤΟΔΙΟΙΚΗΣΗΣ

**Asprofos engineering**

**IGI Poseidon s.a.**

ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΟΥ ΕΠΙΠΤΩΣΕΩΝ

ΤΙΤΛΟΣ - TITLE: IGI Poseidon

ΚΑΜΑΚΑ  
 SCALE: 1:50,000  
 AP. IX. ΕΡΓΑΤΗ  
 CLIENT DWG No: 7240-AU-AUT-01.dwg

14.11.2011

0	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
1	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
2	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
3	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
4	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
5	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
6	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
7	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
8	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
9	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
10	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
11	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
12	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
13	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
14	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
15	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
16	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ
17	14.11.11	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ	ΕΡΓΟΝΟΜΙΑ



20/12/11

(FAX)

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΑΝΑΠΤΥΞΗΣ,  
ΑΝΤΑΓΩΝΙΣΤΙΚΟΤΗΤΑΣ ΚΑΙ ΝΑΥΤΙΛΙΑΣ  
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΛΙΜΕΝΩΝ  
ΚΑΙ ΛΙΜΕΝΙΚΗΣ ΠΟΛΙΤΙΚΗΣ  
ΔΙΕΥΘΥΝΣΗ : ΛΙΜΕΝΙΚΩΝ ΥΠΟΔΟΜΩΝ  
ΤΜΗΜΑ : β'  
ΤΑΧ.Δ/ΝΣΗ : Ακτή Βασιλειάδη  
Πύλη Ε1, 1<sup>ος</sup> όροφος  
ΤΑΧ. ΚΩΔΙΚΑΣ: 185 10 Πειραιάς  
Πληροφορίες : Υπ/ρχος Λ.Σ. (Τ)  
Νασκουδάκης Ηλ.  
ΤΗΛΕΦΩΝΟ : 210-4064161  
FAX : 210-4191037  
e-mail : [dlyb@yeg.gr](mailto:dlyb@yeg.gr)

Πειραιάς, 16-12-2011  
Αριθ. Πρωτ.: 8221.Λ17/24/11

ΑΣΠΡΟΦΟΣ		
ΑΡ. ΠΡΩΤΟΚ.	ΗΜ. ΑΡΧΗΓΩΣ	
1713	9/12/11	
Φ. ΕΩΑΝΙΔΗΣ		
Λ. ΖΑΜΠΑΣ		
Ε. ΠΡΟΤΟΠΑΛΛΑ		
Α. ΧΟΥΡΜΟΥΖΙΔΗΣ		
Η. ΓΕΩΡΓΙΟΥΤΣΟΣ		

ΠΡΟΣ: ΑΣΠΡΟΦΩΣ engineering  
(fax:210-9491610)

ΚΟΙΝ.: 1) 3<sup>Η</sup> ΠΕΔΙΑΣ (υ.τ.α.)  
2) Κ.Α. ΗΓΟΥΜΕΝΙΤΣΑΣ  
3) Κ.Α. ΚΕΡΚΥΡΑΣ

**ΘΕΜΑ:** Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση του έργου:  
«Υποθαλάσσιος Διασυνδετήριος Αγωγός Φυσικού Αερίου Ελλάδας Ιταλίας».

**ΣΧΕΤ.:** α) Το αρ. πρ. 8221.Λ17/05/19/05-05-2010 έγγραφο μας.  
β) Η αρ. πρ. 130221/17-09-2010 γνωμοδότηση ΥΠΕΚΑ/ΕΥΠΕ Α'.  
γ) Η αρ. πρ. 200088/08-07-2011 γνωμοδότηση ΥΠΕΚΑ/ΕΥΠΕ Α'.  
δ) Τα αρ. πρ. 1752/ΦΣ/δγ/21-11-2011 έγγραφο εταιρίας ΑΣΠΡΟΦΩΣ Α.Ε..

1.- Σε συνέχεια ανωτέρω (δ) σχετικού εγγράφου σας, σας γνωρίζουμε τα κάτωθι:

α) Επί της Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης του εν θέματι έργου η Υπηρεσία μας εξέφρασε τις απόψεις της με το (α) σχετικό έγγραφο προς το ΥΠΕΚΑ/ΓΔΠ/ΕΥΠΕ Α'. Εν συνεχεία, η Ειδική Υπηρεσία Περιβάλλοντος του ΥΠΕΚΑ, αφού έλαβε υπόψη της και το ανωτέρω (α) σχετικό έγγραφό μας, γνωμοδότησε όσον αφορά την ΠΠΕΑ του έργου με (β) και (γ) σχετική.

β) Όσον αφορά την επιλεγμένη θέση προσαιγιάλωσης «ΟΜΠΡΕΛΑ 2», το Κ.Α. ΗΓΟΥΜΕΝΙΤΣΑΣ γνωστοποίησε στην Υπηρεσία μας ότι η θέση αυτή αποτελείται ως επί το πλείστον από βραχώδη ακτή, αλλά οι μεμονωμένες ενδιάμεσες αμμώδεις παραλίες που την απαρτίζουν δέχονται αρκετούς λουόμενους κατά τους θερινούς μήνες (η πρόσβαση πραγματοποιείται μόνο από τη θάλασσα). Επιπλέον, ο βόρειος χερσαίος χώρος της υπόψη περιοχής προσαιγιάλωσης γειτνιάζει με χώρο αρχαιολογικού ενδιαφέροντος, ο δε παράκτιος θαλάσσιος χώρος προσελκύει επαγγελματίες και ερασιτέχνες αλιείς. Τα παραπάνω θα πρέπει να ληφθούν υπόψη κατά την εκπόνηση της Μελέτης Περιβαλλοντικών Επιπτώσεων.

γ) Η Υπηρεσία μας θα τοποθετηθεί εκ νέου στο επόμενο στάδιο της Μελέτης Περιβαλλοντικών Επιπτώσεων.

2.- Παρακαλούμε για την ενημέρωσή σας.

Ο ΔΙΕΥΘΥΝΤΗΣ

ΠΛΟΙΑΡΧΟΣ Δ.Σ.  
ΣΠΑΝΟΣ Ι. ΝΙΚΟΛΑΟΣ

III. ΕΣΩΤΕΡΙΚΗ ΔΙΑΝΟΜΗ

1. Γρ. κ. ΥΠΑΑΝ (υ.τ.α.)
2. Γρ. κ. ΥΦΥΠΟΥΡΓΟΥ (υ.τ.α.)
3. Γρ. κ. ΓΓΛΠ (υ.τ.α.)





23/12/1130

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ Π.Ε.Χ.Ω.Δ.Ε.  
ΓΕΝ. ΓΡΑΜΜ. ΔΗΜ. ΕΡΓΩΝ  
ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΔΗΜ. ΕΡΓΩΝ  
ΜΕΓΑΛΩΝ ΕΡΓΩΝ ΔΥΤ. ΕΛΛΑΔΟΣ  
ΤΜΗΜΑ : Μελετών Έργων

Αθήνα, 22 - 12 - 2011

Αριθμ. Πρωτ. 3542 / ΜΣ 625

Ταχ. Δ/ση : Παράσχου 100  
Ταχ. Κώδικας : 114 75 - Αθήνα  
Πληροφορίες : Κ. Φλώρου  
Τηλέφωνο : 210 64 45 347  
FAX : 210 64 00 311 - 64 54 368  
E - mail : [mede@tee.gr](mailto:mede@tee.gr)  
E - mail : [medegr@tee.gr](mailto:medegr@tee.gr)

ΠΡΟΣ : ΑΣΠΡΟΦΟΣ Α.Ε.  
Ελευθερίου Βενιζέλου 284  
Καλλιθέα 176 75  
Αθήνα

ΘΕΜΑ: Χάραξη του Υποθαλάσσιου Αγωγού Φυσικού Αερίου Ελλάδας - Ιταλίας.

ΣΧΕΤ. : Το με αριθμ. Πρωτ.1748/ΦΣ/δχ/21-11-11 έγγραφο της ΑΣΠΡΟΦΟΣ.

Σε συνέχεια του παραπάνω σχετικού εγγράφου, σας γνωρίζουμε ότι τόσο η προτεινόμενη όσο και οι εναλλακτικές χαράξεις του Υποθαλάσσιου Αγωγού Φυσικού Αερίου, όπως αυτές απεικονίζονται στον συνημμένο χάρτη σε κλίμακα 1:50.000, δεν εμπλέκονται στο κατασκευαζόμενο τμήμα: Ι/Κ Καρτερίου -Ι/Κ Πάργας της μελέτης «Μελέτη Οδού Ηγουμενίτσας – Πρέβεζας. Βελτίωση κατά τμήματα».

Ως εκ τούτου σας επιστρέφουμε θεωρημένο τον παραπάνω χάρτη για δική σας χρήση.

#### ΣΥΝΗΜΜΕΝΑ

Ένας (1) χάρτης κλίμακας 1:50.000

#### ΕΣΩΤΕΡΙΚΗ ΔΙΑΝΟΜΗ

- 1) ΓΘ 01, ΜΣ 625
- 2) Τ.Μ.Ε.
- 3) Χ.Α.

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜ. ΛΗΨΕΩΣ
1898	23/12/11
Φ. ΣΠΑΝΙΔΗΣ	
Α. ΖΑΚΛΙΑΣ	
Ε. ΠΡΟΤΟΠΑΛΛΑ (φ.6.)	
Η. ΓΕΩΡΓΟΥΝΤΖΟΣ	
Δ. ΧΩΡΗΛΟΥ ΣΠΑΝΙΔΗΣ	

Ο ΠΡΟΪΣΤΑΜΕΝΟΣ ΤΜΗΜΑΤΟΣ

ΜΕΛΕΤΩΝ ΕΡΓΩΝ

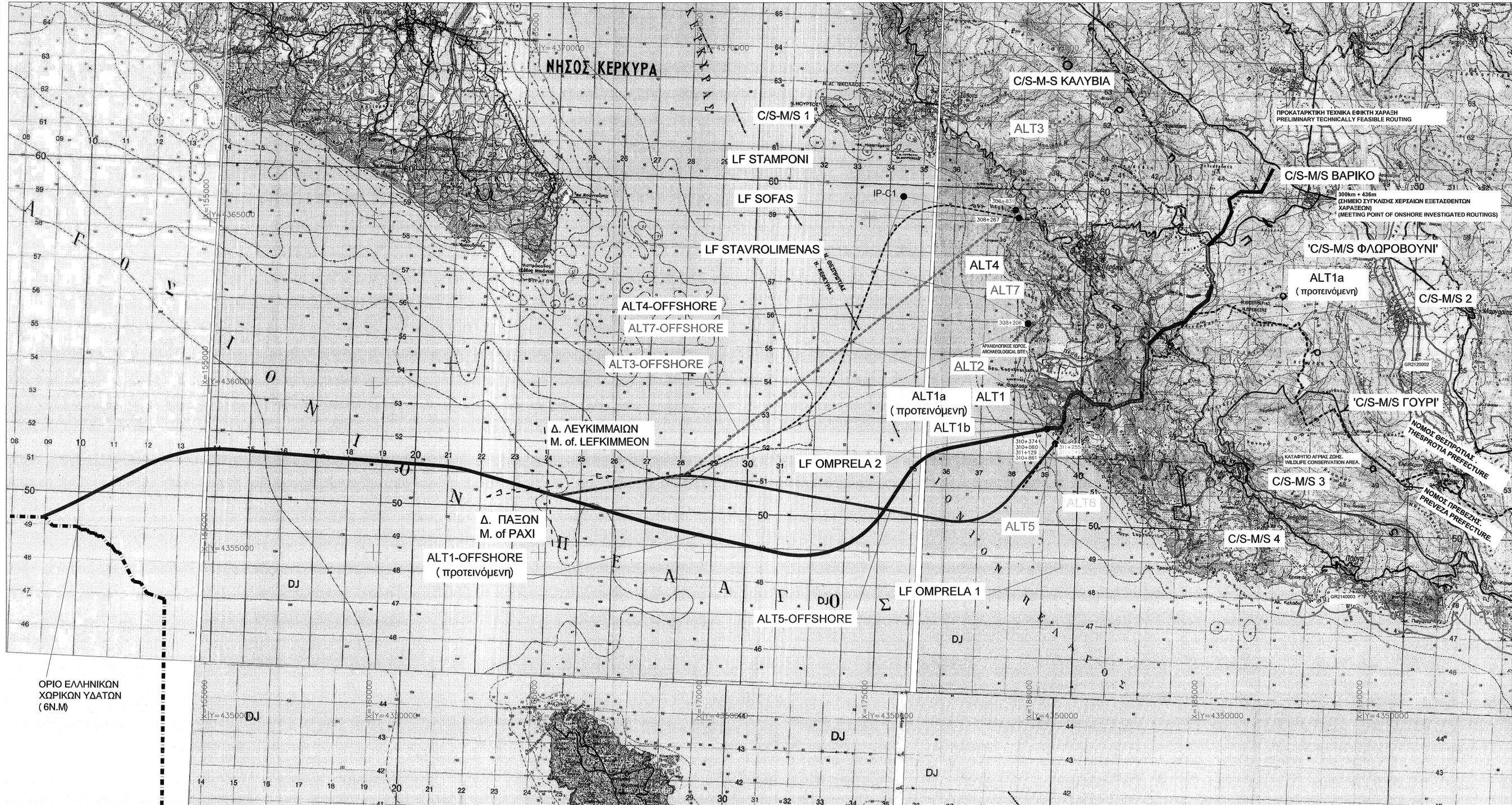
Δ. ΓΙΑΝΝΑΚΟΠΟΥΛΟΣ

ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ

Ο ΤΜΗΜΑΡΧΗΣ ΔΙΟΙΚΗΤΟΥ - ΟΙΚΟΝΟΜΟΥ



Κ. ΤΣΑΤΣΑΡΩΝΗΣ



ΟΡΙΟ ΕΛΛΗΝΙΚΩΝ  
 ΧΩΡΙΚΩΝ ΥΔΑΤΩΝ  
 (6N.M)

ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS	
ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8089-000-00-94-01	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN

**ΥΠΟΜΝΗΜΑ/LEGEND**

- ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ**
1. ——— ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ  
 PRELIMINARY TECHNICALLY FEASIBLE ROUTING
  2. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT1
  3. ——— ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT1a (ΠΡΟΤΕΙΝΟΜΕΝΗ)
  4. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT1b
  5. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT2
  6. ——— ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT1-OFFSHORE  
 (ΠΡΟΤΕΙΝΟΜΕΝΗ)
  7. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT3
  8. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT3-OFFSHORE
  9. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT4
  10. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT4-OFFSHORE
  11. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT5
  12. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT6
  13. ——— ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT5-OFFSHORE
  14. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT7
  15. - - - - - ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΙΑ ΧΑΡΑΞΗ ALT7-OFFSHORE
  16. □ ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΧΕΡΣΙΑΙΩΝ ΕΓΚΑΤΑΣΤΑΣΕΩΝ
  17. ● ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΠΡΟΣΑΓΙΑΛΩΣΗΣ

- ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ**
18. ——— ΠΕΡΙΟΧΕΣ ΔΙΚΤΥΟΥ ΝΑΤΥΡΑ
  19. ——— ΚΑΤΑΦΥΓΙΟ ΑΓΡΙΑΣ ΖΩΗΣ
  20. ——— ΠΑΡΚΟ ΑΝΑΦΥΧΗΣ
  21. ——— ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΩΡΟΙ

- ΥΠΟΔΟΜΕΣ ΚΑΙ ΛΟΙΠΑ ΣΤΟΙΧΕΙΑ**
22. ——— ΠΡΟΒΛΕΠΟΜΕΟ ΒΙΟ.ΠΑ.
  23. ——— ΛΑΤΟΜΕΙΟ
  24. - - - - - ΟΡΙΑ ΟΡΓΑΝΙΣΜΩΝ ΤΟΠΙΚΗΣ ΑΥΤΟΔΙΟΙΚΗΣΗΣ

ΕΥΔΕ/ΜΕΔΕ / Τ.Μ. ΜΕΛΕΤΩΝ  
 Η ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
 ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ ΚΑΙ ΚΛΙΜΑΤΟΣ  
 ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΡΟΓΡΑΜΜΑΤΩΝ  
 ΔΙΕΥΘΥΝΣΗ ΜΕΛΕΤΩΝ ΚΑΙ ΕΡΕΥΝΑΣ  
 Κ. ΦΛΩΡΟΥ ΑΘΗΝΑ 22.11.2011

ΑΝΑΒΕΒΗ	ΗΜΕΡΟΜΗΝΙΑ	ΠΕΡΙΓΡΑΦΗ	ΠΡΟΕΤΟΙΜΑΣΙΑ	ΣΧΕΔΙΑΣΜΟΣ	ΕΛΕΓΧΟΣ	ΕΠΙΡΡΟΗ
REVISION	DATE	DESCRIPTION	PREPARED	DRAWN	CHECKED	APPROVED
0	14.11.11	ΠΡΩΤΗ ΕΚΔΟΣΗ / FIRST ISSUE	DPH	DPH	EAP	PHS

	ΣΤΟ ΕΓΧΡΩΜΟ ΑΥΤΟ ΕΝΑΙ ΤΗΝ ΕΠΙΛΕΞΗΝ ΤΗΣ ΧΡΩΜΑΤΟΚΑΤΑΣΤΑΣΗΣ ΚΑΙ ΤΗΣ ΚΑΤΑΚΕΤΗ ΑΝΤΙΣΤΡΟΦΗΣ ΚΑΛΩΔΙΩΝ ΚΑΙ ΤΩΝ ΣΥΝΑΡΤΗΜΑΤΩΝ ΤΩΝ ΟΡΓΑΝΙΣΜΩΝ ΤΩΝ ΚΑΤΑΦΥΓΙΩΝ ΚΑΙ ΤΩΝ ΠΡΟΤΕΙΝΟΜΕΝΩΝ.	ΕΠΙΡΡΟΗ ΓΙΑ ΚΑΤΑΚΕΤΗ APPROVED FOR CONSTRUCTION
	Ο ΔΟΚΙΜΑΣΤΗΣ ΕΛΕΓΧΕΙ ΤΟΝ ΣΧΕΔΙΟΝ ΚΑΙ ΤΟΝ ΠΡΟΤΕΙΝΟΜΕΝΟΝ.	ΗΜΕΡΟΜΗΝΙΑ DATE
ΠΕΛΑΤΗΣ-CLIENT IGI Poseidon s.a.	ΔΙΕΥΘΥΝΤΗΣ ΕΡΓΟΥ PROJECT MANAGER ΟΝΟΜΑ NAME PHILIPPOS SPANDIS	ΑΡ. ΣΥΜΒΟΛΟΥ CONTRACT No: AF-117240
ΤΙΤΛΟΣ - TITLE ΠΡΟΘΑΛΑΣΙΟΣ ΑΓΩΓΟΣ ΦΤΙΣΚΟΤ' ΑΕΡΙΟΥ 'ΠΟΣΕΙΔΩΝ'	ΑΝΤΙΚΑΤΑΣΤΗΘΗΚΗ ΑΠΟ SUPERSEDED BY:	ΑΝΤΙΚΑΤΑΣΤΗΘΗΚΗ ΑΠΟ SUPERSEDES THE:
ΚΑΜΑΚΑ SCALE 1:50.000	ΑΡ. ΣΧ. ΑΦ. AF. DWG No: 7240-AU-AUT-01	ΣΤΡΩΣΗ SHEET 1
ΚΑΔ. ΜΗΧΕΤΡ. ΑΡΧΙΤΕΚΤ. ΕΛΛΗΝΙΚΗΣ ΔΗΜΟΚΡΑΤΙΑΣ ELECTRONIC FILE CODE 7240-AU-AUT-01.dwg	ΗΜΕΡΟΜΗΝΙΑ ΤΕΛΕΤΗΣ LAST ACCESS DATE 14.11.2011	ΑΝΑΒΕΒΗ REVISION 1

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX K:**

### **CONTACT WITH AUTHORITIES**

- K.1 ESIA Correspondence
- K.2 **Supplementary PEIA Correspondence**
- K.3 ESIA Correspondence



**ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ**  
**ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ**  
**& ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ**  
**ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ**  
**ΕΥΠΕ**

Αθήνα, 8 Ιουλίου 2011

Α.Π. 200088

(ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)

**ΤΜΗΜΑ Α'**

Ταχ. Δ/ση : Λ. Αλεξάνδρας 11  
 Τ. Κ. : 114 73  
 Πληροφορίες : Κ. Γιαβής  
 Τηλέφωνο : 210 641 7962  
 Φ.Α.Χ. : 210 643 0637

ΠΡΟΣ: ΠΙΝΑΚΑ ΑΠΟΔΕΚΤΩΝ

**Θέμα :** Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση του σταθμού μέτρησης και συμπίεσης του έργου: «ΕΛΛΗΝΟΪΤΑΛΙΚΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ- ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ ».

**Έχοντας υπόψη:**

1. Το Ν. 1650/86 (ΦΕΚ 160/Α) «Για την προστασία του Περιβάλλοντος» όπως τροποποιήθηκε με το Ν.3010/02 (ΦΕΚ 91/Α/25.04.2002)
2. Την Κοινή Υπουργική Απόφαση Η.Π.15393/2332/5.8.02 (ΦΕΚ 1022/Β/5.8.2002) «Κατάταξη δημόσιων και ιδιωτικών έργων και δραστηριοτήτων σε κατηγορίες, σύμφωνα με το άρθρο 3 του Ν.1650/86 (Α'160) όπως αντικαταστάθηκε με το άρθρο 1 του Ν. 3010/02 "Εναρμόνιση του Ν. 1650/86 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ κ.α. (Α' 91)"», όπως τροποποιήθηκε και ισχύει.
3. Την Κοινή Υπουργική Απόφαση Η.Π. 11014/703/Φ104/14.3.03 (ΦΕΚ 332/Β/20.3.2003) «Διαδικασία Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης (Π.Π.Ε.Α.) και Έγκρισης Περιβαλλοντικών Όρων (Ε.Π.Ο.), σύμφωνα με τα άρθρο 4 του Ν.1650/86 (Α'160) όπως αντικαταστάθηκε με το άρθρο 2 του Ν. 3010/02 "Εναρμόνιση του Ν. 1650/86 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ... και άλλες διατάξεις (Α' 91)"».
4. Την με α.π. οικ. 130201/17.09.10 Θετική Γνωμοδότηση για Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση (ΠΠΕΑ) του έργου του θέματος.
5. Το με α.π. 5677/15.06.11 έγγραφο της IGI Poseidon με το οποίο κατατέθηκε συμπληρωματικός φάκελος Προμελέτης Περιβαλλοντικών Επιπτώσεων του αναφερομένου στο θέμα έργου (α.π. ΕΥΠΕ 200088/16.06.11).
6. Τα από 01.02.2011 Πρακτικά της Βουλής των Ελλήνων για αξιολόγηση νέων θέσεων εγκατάστασης για το σταθμό μέτρησης και συμπίεσης, κατά τη συνεδρίαση της Επιτροπής Παραγωγής και Εμπορίου της Βουλής.
7. Το υπ. αρ. 816/23.03.11 έγγραφο της ΛΒ' Εφορείας Προϊστορικών & Κλασικών Αρχαιοτήτων του ΥΠΠΟΤ στο οποίο δεν εκφράζεται αντίρρηση για τον σταθμό μέτρησης και συμπίεσης στη θέση ΦΛΩΡΟΒΟΥΝΙ.

8. Το με α.π. 1333/26.04.11 έγγραφο της Δ/σης Δασών Θεσπρωτίας χωρίς αντίρρηση για τον σταθμό μέτρησης και συμπίεσης στη θέση ΦΛΩΡΟΒΟΥΝΙ.
9. Το με α.π. Β1/Φ33/40850/1337/17.05.11 έγγραφο της Δ/σης Βυζαντινών & Μεταβυζαντινών Αρχαιοτήτων του ΥΠΠΟΤ με το οποίο δεν εκφράζονται καταρχήν αντιρρήσεις-γνωμοδότηση υπό όρους (α.π. ΕΥΠΕ 199579/25.05.11)

### **Γ ν ω μ ο δ ο τ ο ύ μ ε**

Θετικά - ύστερα από την αξιολόγηση της Συμπληρωματικής Προμελέτης Περιβαλλοντικών Επιπτώσεων και έχοντας υπόψη τα 6, 7, 8, και 9 σχετικά έγγραφα - ως προς την νέα χωροθέτηση των εγκαταστάσεων του σταθμού μέτρησης και συμπίεσης, στη θέση ΦΛΩΡΟΒΟΥΝΙ, για τη λειτουργία του *ΕΛΛΗΝΟΪΤΑΛΙΚΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ - ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ*, όπως εμφανίζεται στην οριζοντιογραφία 7240-AU-OM-01, κλίμακας 1:5.000 της Συμπληρωματικής Προμελέτης Περιβαλλοντικών Επιπτώσεων (ΠΠΕ), που συνοδεύει την παρούσα γνωμοδότηση.

Το έργο αφορά στην εγκατάσταση του σταθμού μέτρησης και συμπίεσης, στη θέση ΦΛΩΡΟΒΟΥΝΙ καθώς και εναλλακτική χάραξη Α, (IP-A0 έως IP-A11) του Αγωγού Φυσικού Αερίου, μήκους τριών χλμ. περίπου. Ο αγωγός διέρχεται από δασικές, κτηνοτροφικές και εκτός σχεδίου εκτάσεις ενώ δεν επηρεάζονται οικιστικές και τουριστικές χρήσεις.

Στη Μελέτη Περιβαλλοντικών Επιπτώσεων του έργου, θα πρέπει να περιλαμβάνεται η αξιολόγηση των επιπτώσεων στο περιβάλλον από την εν λόγω θέση εγκατάστασης του σταθμού μέτρησης και συμπίεσης και την τροποποιημένη όδευση του ΑΦΑ καθώς και η εξέταση εναλλακτικών λύσεων.

Η παρούσα Γνωμοδότηση κοινοποιείται στο Περιφερειακό Συμβούλιο Ηπείρου, συνοδευόμενη από ένα αντίγραφο της συμπληρωματικής Π.Π.Ε. προκειμένου να δημοσιοποιηθεί σύμφωνα με τα αναφερόμενα στην παράγραφο 3 του άρθρου 5 του Ν. 1650/86 όπως τροποποιήθηκε με το άρθρο 3 του Ν. 3010/02. Η δαπάνη δημοσιοποίησης βαρύνει το φορέα του έργου.

**Ο ΓΕΝΙΚΟΣ ΔΙΕΥΘΥΝΤΗΣ ΠΕΡΙΒΑΛΛΟΝΤΟΣ ΥΠΕΚΑ**

**ΕΛ. ΤΗΛΙΓΑΔΑΣ**

**ΠΙΝΑΚΑΣ ΑΠΟΔΕΚΤΩΝ**

1. ΔΕΠΑ Α.Ε.-IGI POSEIDON  
Μαρίνου Αντύπα 92, 141 21 Αθήνα  
(συν. 1 αντ. ΣΠΠΕ)
2. ΥΠΕΚΑ  
α) Δ/νση Χωροταξίας  
Αμαλιάδος 17, 115 23 Αθήνα  
β) Δ/νση Αισθητικών Δασών, Δρυμών & Θήρας  
Χαλκοκονδύλη 31, 10164 Αθήνα  
γ) Δ/νση Εγκαταστάσεων Πετρελαιοειδών  
Μεσογείων 119, 101 92 Αθήνα
3. Υπ. Αγροτικής Ανάπτυξης & Τροφίμων  
Δ/νση Χωροταξίας & Προστ. Περ/ντος  
Πατησίων 207 & Σκαλιστήρη 19, 10164 Αθήνα
4. Υπ. Πολιτισμού & Τουρισμού  
α) Δ/νση Προϊστ.& Κλασ. Αρχαιοτήτων  
β) Δ/νση Βυζ/νων και Μεταβυζ/νων Αρχαιοτήτων  
Μπουμπουλίνιας 20, 10682 Αθήνα  
γ) ΛΒ' ΕΠΚΑ, Κύπρου 68, 46100 Ηγουμενίτσα  
δ) 8η ΕΒΑ, Βυζαντινό Μουσείο, 452 21 Ιωάννινα
5. Υπ. Αγροτικής Ανάπτυξης & Τροφίμων  
Δ/νση Χωροταξίας & Προστ. Περ/ντος  
Πατησίων 207 & Σκαλιστήρη 19, 10164 Αθήνα
6. ΓΕΕΘΑ/ΔΥΠΟ/ΤΕΥ  
Μεσογείων 227-231, 154 51 Αθήνα
7. Περιφερειακό Συμβούλιο  
Περιφέρειας Ηπείρου  
Πλατεία Πύρρου 1, 452 21 Ιωάννινα  
(συν. 1 αντ. ΣΠΠΕ)

**ΕΣΩΤ. ΔΙΑΝΟΜΗ**

1. ΕΥΠΕ (συν. 1 αντ. ΣΠΠΕ)
2. Χρον. Αρχείο
3. Τμήμα Α'
4. Κ. Γιαβής

**ΑΝΑΡΤΗΤΕΑ ΠΡΑΞΗ**



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ  
& ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ  
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ  
ΕΥΠΕ  
(ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
ΤΜΗΜΑ Α'

Ταχ. Δ/ση : Λ. Αλεξάνδρας 11  
Τ. Κ. : 114 73  
Πληροφορίες : Κ. Γιαβής  
Τηλέφωνο : 210 641 7962  
F.A.X. : 210 643 0637

Αθήνα, 17 Σεπτεμβρίου 2010

Α.Π. οικ. 130221

ΠΡΟΣ: ΠΙΝΑΚΑ ΑΠΟΔΕΚΤΩΝ

Θέμα :

Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση του Έργου  
«ΕΛΛΗΝΟΙΤΑΛΙΚΟ ΣΥΛΛΟΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ»  
ΕΛΛΗΝΙΚΟ ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

Έχοντας υπόψη:

1. Το Ν. 1650/86 (ΦΕΚ 160/Α) «Για την προστασία του Περιβάλλοντος» όπως τροποποιήθηκε με το Ν.3010/02 (ΦΕΚ 91/Α/25.04.2002)
2. Την Κοινή Υπουργική Απόφαση Η.Π.15393/2332/5.8.02 (ΦΕΚ 1022/Β/5.8.2002) «Κατάταξη δημόσιων και ιδιωτικών έργων και δραστηριοτήτων σε κατηγορίες, σύμφωνα με το άρθρο 3 του Ν.1650/86 (Α'160) όπως αντικαταστάθηκε με το άρθρο 1 του Ν. 3010/02 "Εναρμόνιση του Ν. 1650/86 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ κ.α. (Α' 91)", όπως τροποποιήθηκε και ισχύει.
3. Την Κοινή Υπουργική Απόφαση Η.Π. 11014/703/Φ104/14.3.03 (ΦΕΚ 332/Β/20.3.2003) «Διαδικασία Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης (Π.Π.Ε.Α.) και Έγκρισης Περιβαλλοντικών Όρων (Ε.Π.Ο.), σύμφωνα με τα άρθρο 4 του Ν.1650/86 (Α'160) όπως αντικαταστάθηκε με το άρθρο 2 του Ν. 3010/02 "Εναρμόνιση του Ν. 1650/86 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ... και άλλες διατάξεις (Α' 91)"».
4. Τα με α.π. 257/10.11.09 και 293/11.12.09 έγγραφα της ΙΓΙ Ροσείδον με τα οποία κατατέθηκε επικαιροποιημένος φάκελος Προμελέτης Περιβαλλοντικών Επιπτώσεων του αναφερομένου στο θέμα έργου και συμπληρωματικά στοιχεία αντίστοιχα (α.π. ΕΥΠΕ 146147/10.11.09, 148451/14.12.09).
5. Το με α.π. οικ. 148674/16.12.09 έγγραφο της ΕΥΠΕ/ΥΠΕΚΑ με το οποίο αντίγραφο της ΠΠΕ διαβιβάστηκαν στις συναρμόδιες Υπηρεσίες για απόψεις.
6. Το υπ. αρ. Φ4/5/226/19.01.10 έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων με το οποίο ζητούνται συμπληρωματικά στοιχεία (α.π. ΕΥΠΕ 121112/28.01.10)
7. Το με αρ. πρ. 1088/21.01.10 έγγραφο της Δ/σης Χωροταξίας του ΥΠΕΚΑ χωρίς αντίρρηση για το έργο του θέματος (α.π. ΕΥΠΕ 120967/26.01.10, 121064/26.01.10)
8. Το με α. π. Φ542/292/10 Σ6137/29.03.10 έγγραφο του Γενικού Επιτελείου Ναυτικού χωρίς αντίρρηση-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ ΕΜΠ 3/09.04.10).

9. Τα υπ. αρ. 366/22.04.10 και 368/23.04.10 έγγραφα της IGI Poselidon με διευκρινήσεις και συμπληρωματικά στοιχεία για το έργο του θέματος (α.π. ΕΥΠΕ 124602/23.04.10, 124614/23.04.10)
10. Το με α.π. Δ3/Α/376/07.05.10 έγγραφο της Δ/σης Εγκαταστάσεων Πετρελαιοειδών του ΥΠΕΚΑ με το οποίο δεν εκφράζεται αντίρρηση για το έργο (α. π. ΕΥΠΕ 125311/11.05.10)
11. Τα υπ. αρ. 55/19.01.10 και 1504/03.05.10 έγγραφα της ΑΒ' Εφορείας Προϊστορικών & Κλασικών Αρχαιοτήτων του ΥΠΠΟΤ στα οποία δεν εκφράζεται αντίρρηση για το προτεινόμενο έργο-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ 121201/29.01.10, 125366/12.05.10).
12. Το με αρ. πρ. 8221.Α17/05/05.05.10 έγγραφο της Δ/σης Λιμενικών Υποδομών του Υπ. Οικονομίας, Ανταγωνιστικότητας & Ναυτιλίας, όπου δεν εκφράζεται αντίρρηση για το έργο-υπό όρους γνωμοδότηση (Α.Π. ΕΥΠΕ 125111/06.05.10).
13. Το υπ. αρ. Φ4/5/2120/26.04.10 έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων με το οποίο δεν εκφράζονται αντιρρήσεις-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ 125038/03.05.10)
14. Το με α. π. Φ100.1/149386/Σ4868/28.05.10 έγγραφο της Δ/σης Υποδομής του ΓΕΕΘΑ χωρίς αντίρρηση-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ 126095/31.05.10, 126294/03.06.10)
15. Το από 26.05.10 έγγραφο της Γενικής Γραμματείας της Περιφέρειας Ηπείρου με συνημμένο ψήφισμα και υπόμνημα των κατοίκων Πέρδικας Θεσπρωτίας, σύμφωνα με το οποίο αντιδρούν στην υλοποίηση του προτεινόμενου έργου.
16. Το με α.π. Β1/Φ33/24269/1319/12.05.10 έγγραφο της Δ/σης Βυζαντινών & Μεταβυζαντινών Αρχαιοτήτων του ΥΠΠΟΤ με το οποίο δεν εκφράζονται αντιρρήσεις-γνωμοδότηση υπό όρους (α.π. ΕΥΠΕ 125630/18.05.10)
17. Το υπ. αρ. 385/01.06.10 έγγραφο της IGI Poselidon με συμπληρωματικά στοιχεία για το έργο του θέματος (α.π. ΕΥΠΕ 126278/02.06.10)
18. Το υπ. αρ. 690345/18.08.10 έγγραφο της ΔΕΠΑ Α.Ε. με το οποίο αιτείται την έκδοση θετικής γνωμοδότησης για ΠΠΕΑ για την εναλλακτική θέση ΟΜΠΕΛΑ 2-ΒΑΡΙΚΟ (α.π. ΕΥΠΕ 129271/18.08.10)
19. Το με α.π. οικ. 129273/18.08.10 έγγραφο της ΕΥΠΕ/ΥΠΕΚΑ με το οποίο αντίγραφα της ΠΠΕ διαβιβάστηκαν στη ΛΓ' ΕΠΚΑ, στη 18<sup>η</sup> ΕΒΑ και στην Δ/ση Αγροτικής Ανάπτυξης Πρέβεζας για απόψεις
20. Τα με α. π. 2136/30.08.10 έγγραφο της 18ης Εφορείας Βυζαντινών Αρχαιοτήτων του ΥΠΠΟΤ στο οποίο δεν εκφράζεται αντίρρηση για το έργο του θέματος (α.π. ΕΥΠΕ 129577/01.09.10)
21. Το γεγονός ότι το προτεινόμενο έργο είναι έργο εθνικής σημασίας για την ενεργειακή διασφάλιση της χώρας καθώς και για την ενεργειακή διασύνδεση της Κεντρικής Ασίας με την Κεντρική Ευρώπη μέσω Ιταλίας.

### Γνωμοδοτούμε

Θετικά - ύστερα από τη διαδικασία της Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης - ως προς την κατασκευή και λειτουργία του έργου:

ΕΛΛΗΝΟΪΤΑΛΙΚΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ - ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ, όπως εμφανίζεται στην οριζοντιογραφία 8089-000-00-AU-01, κλίμακας 1:50.000 της Προμελέτης Περιβαλλοντικών Επιπτώσεων (ΠΠΕ), που συνοδεύει την παρούσα γνωμοδότηση.

Το έργο αφορά στην εγκατάσταση αγωγού φυσικού αερίου (ΑΦΑ) υψηλής πίεσης που θα αποτελείται από: α) χερσαίο τμήμα, μήκους 10 χλμ. περίπου, στα όρια των Ν. Θεσπρωτίας και Πρέβεζας και β) υποθαλάσσιο τμήμα, μήκους 144 χλμ. περίπου, με σημείο προσαυγιάλωσης τη θέση ΟΜΠΡΕΛΑ 2 και το οποίο θα διέρχεται νότια της Νήσου Κέρκυρας και βόρεια των Παξών μέχρι το μέσο του θαλάσσιου στενού μεταξύ Ελλάδας και Ιταλίας ανατολικά του Οτράντο της Νότιας Ιταλίας. Στο χερσαίο τμήμα του αγωγού, στη θέση ΒΑΡΙΚΟ, θα χωροθετηθούν εγκαταστάσεις μέτρησης και συμπίεσης, καθώς και βοηθητικές/υποστηρικτικές εγκαταστάσεις.

Κατά την παρούσα γνωμοδότηση λήφθηκαν κατ' αρχήν υπόψη τα ακόλουθα:

1. Οι γενικές και ειδικές κατευθύνσεις της χωροταξικής πολιτικής, που προκύπτουν από εγκεκριμένα χωροταξικά, ρυθμιστικά και πολεοδομικά σχέδια ή άλλα σχέδια χρήσεων γης. Σύμφωνα με τα Περιφερειακά Πλαίσια Χωροταξικού Σχεδιασμού και Αειφόρου Ανάπτυξης των Περιφερειών της χώρας, η μεταφορά και η διανομή Φυσικού Αερίου θεωρείται σημαντικός παράγοντας ανάπτυξης για όλη τη χώρα, καθιστώντας την ενεργειακό κέντρο των Βαλκανίων και της Δυτικής Ευρώπης.
2. Η περιβαλλοντική ευαισθησία της περιοχής που ενδέχεται να θιγεί από το έργο. Οι περιοχές ανάπτυξης τόσο του χερσαίου τμήματος του έργου, όσο και του υποθαλάσσιου τμήματος, δεν βρίσκονται εντός θεσμοθετημένης ζώνης προστασίας ή εντός ζώνης αρχαιολογικού ενδιαφέροντος. Από την εγκατάσταση και λειτουργία του προτεινόμενου έργου δεν πρόκειται να υπάρξουν σημαντικές επιπτώσεις στο ευρύτερο φυσικό και ανθρωπογενές περιβάλλον.
3. Τα χαρακτηριστικά των ενδεχόμενων σημαντικών περιβαλλοντικών επιπτώσεων όπως το μέγεθος, η πολυπλοκότητα, η ένταση και η έκτασή τους, η διάρκεια, η συχνότητα και η αναστρεψιμότητά τους. Από την εγκατάσταση του προτεινόμενου έργου αναμένεται να υπάρξουν μικρές επιπτώσεις στο φυσικό περιβάλλον κατά μήκος του αγωγού, οι οποίες είναι αναστρέψιμες με τα κατάλληλα μέτρα αποκατάστασης.
4. Τα οφέλη για την εθνική οικονομία, την εθνική ασφάλεια, τη δημόσια υγεία και η εξυπηρέτηση άλλων λόγων δημοσίου συμφέροντος. Το εν λόγω έργο αποτελεί τμήμα του κεντρικού αγωγού που θα συνδέσει το Ελληνικό Σύστημα Φυσικού Αερίου με το αντίστοιχο Ιταλικό προκειμένου να γίνει δυνατή η μεταφορά Φυσικού Αερίου από την περιοχή της Κασπίας και την Κεντρική Ασία προς την Ιταλία και την Κεντρική Ευρώπη.
5. Οι θετικές επιπτώσεις στο φυσικό και ανθρωπογενές περιβάλλον σε μία ευρύτερη περιοχή από εκείνη που επηρεάζεται άμεσα από το έργο. Από τη λειτουργία του έργου αναμένονται θετικές επιδράσεις σε μια ευρύτερη περιοχή από εκείνη που επηρεάζεται από το έργο λόγω της χρήσης φυσικού αερίου στη χώρα και θεωρείται καύσιμο φιλικό προς το περιβάλλον (με την δυνατότητα που έχει ο αγωγός να εξασφαλίσει φυσικό αέριο από Ιταλία και Β. Αφρική σε περίπτωση ανάγκης εφοδιασμού της χώρας)

Επίσης η θετική γνωμοδότηση δίδεται με τους ακόλουθους όρους και προϋποθέσεις:

- α. ότι δεν έρχεται σε αντίθεση με περιορισμούς, που έχουν τεθεί στην περιοχή με ειδικές διατάξεις και που ενδεχομένως δεν επιτρέπουν την κατασκευή του υπόψη έργου
- β. ότι θα ληφθούν υπόψη οι παρατηρήσεις και υποδείξεις των αρμοδίων Αρχαιολογικών Υπηρεσιών του ΥΠΠΟΤ.

Ο φορέας οφείλει στο στάδιο της έγκρισης των περιβαλλοντικών όρων να υποβάλει στην Ειδική Υπηρεσία Περιβάλλοντος (ΕΥΠΕ) του ΥΠΕΚΑ Μελέτη Περιβαλλοντικών Επιπτώσεων (ΜΠΕ), τύπου Ι, η οποία θα πρέπει να περιλαμβάνει τουλάχιστον τα εξής:

1. Περιγραφή του έργου συμπεριλαμβανομένων των εναλλακτικών λύσεων
2. Περιγραφή της υφιστάμενης κατάστασης του περιβάλλοντος με τα απαραίτητα στοιχεία και τεκμηριώσεις προκειμένου να γίνει αξιολόγηση και εκτίμηση των κυριότερων άμεσων και έμμεσων περιβαλλοντικών επιπτώσεων του έργου:
  - στον άνθρωπο, στην πανίδα και στην χλωρίδα

- στο έδαφος, στα νερά, στον αέρα, στο κλίμα και στο τοπίο
  - στα υλικά αγαθά και στην πολιτιστική κληρονομιά
  - στην αλληλεπίδραση μεταξύ των παραγόντων που αναφέρονται στις προηγούμενες περιπτώσεις
3. Περιγραφή των μέτρων που προβλέπονται να ληφθούν προκειμένου να αποφευχθούν, να μειωθούν και εφόσον είναι δυνατόν να επανορθωθούν σημαντικές δυσμενείς επιπτώσεις στο περιβάλλον.
  4. Να περιγράφονται οι τρόποι αποκατάστασης των χώρων επέμβασης (εκσκαφές θεμελιώσεων, τυχόν διάνοιξη οδών προσπέλασης κ.λ.π.).
  5. Να εξευρεθούν και να αναφέρονται οι χώροι απόθεσης πλεοναζόντων υλικών και παραπροϊόντων εκσκαφής, για τους οποίους θα έχουν εξασφαλιστεί οι απαραίτητες άδειες.
  6. Συνοπτική περιγραφή των κύριων εναλλακτικών λύσεων που μελετά ο κύριος του έργου και υπόδειξη των κύριων λόγων της επιλογής του, λαμβανομένων υπόψη των επιπτώσεων τους στο περιβάλλον.
  7. Απλή (μη τεχνική) περίληψη των πληροφοριών που αναφέρονται στις προηγούμενες παραγράφους.

Επίσης ο φάκελος της ΜΠΕ θα πρέπει να συνοδεύεται από την παρούσα θετική γνωμοδότηση (ΠΠΕΑ) της Γενικής Δ/ντριας Περι/ντος του ΥΠΕΚΑ μαζί με αντίγραφο των θεωρημένων από την ΕΥΠΕ του ΥΠΕΚΑ τοπογραφικών σχεδίων από όπου θα φαίνεται η προεπιλεγείσα όδευση του έργου.

Όλα τα αντίγραφα της ΜΠΕ θα πρέπει να είναι υπογεγραμμένα και σφραγισμένα από τον μελετητή και τον φορέα του έργου. Επίσης πρέπει να συνοδεύονται από υπεύθυνη δήλωση του μελετητή που θα αναφέρει ότι είναι κάτοχος Μελετητικού Πτυχίου της κατηγορίας 27, με ημερομηνία κτήσης και διάρκειας ισχύος.

Τα κείμενα και οι χάρτες της ΜΠΕ υποβάλλονται και σε ηλεκτρονική μορφή.

Η παρούσα αποτελεί Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση της προγραμματιζόμενης δραστηριότητας και συνίσταται σε γνωμοδότηση ως προς τη θέση, το μέγεθος, το είδος, την εφαρμοζόμενη τεχνολογία, τα γενικά τεχνικά χαρακτηριστικά, τη χρήση των φυσικών πόρων, τη συσσωρευτική δράση με άλλα έργα, την παραγωγή αποβλήτων, τη ρύπανση και τις οχλήσεις, καθώς και τον κίνδυνο ατυχημάτων ιδίως από τη χρήση ουσιών και τεχνολογίας και δεν υποκαθιστά πιθανές απαιτούμενες άδειες και εγκρίσεις από άλλους φορείς (Υπ. Αγροτικής Ανάπτυξης & Τροφίμων, Αρχαιολογική Υπηρεσία, κλπ).

Η οριστική και δεσμευτική άποψη της Διοίκησης, επί των προαναφερόμενων και συναφών θεμάτων, θα δοθεί με την αξιολόγηση της ΜΠΕ και την Απόφαση Έγκρισης Περιβαλλοντικών Όρων με την οποία μπορεί να επιβάλλει προϋποθέσεις, όρους, περιορισμούς και διαφοροποιήσεις για την πραγματοποίηση του έργου ή της δραστηριότητας ή και να αποφασίσει τη μη υλοποίησή του, σύμφωνα με τις εκάστοτε ισχύουσες διατάξεις.

Η διάρκεια ισχύος της παρούσας είναι πέντε (5) χρόνια, χρονικό διάστημα μέσα στο οποίο πρέπει να υποβληθεί η Μελέτη Περιβαλλοντικών Επιπτώσεων του έργου.

Μετά την παρέλευση των πέντε χρόνων χωρίς να έχει υποβληθεί η ΜΠΕ, απαιτείται είτε να τηρηθεί εκ νέου η διαδικασία της Περιβαλλοντικής Εκτίμησης και Αξιολόγησης του έργου.

Η παρούσα Γνωμοδότηση κοινοποιείται στα Νομαρχιακά Συμβούλια των Ν.Α. Θεσπρωτίας και Πρέβεζας, συνοδευόμενη από ένα αντίγραφο Π.Π.Ε. προκειμένου να δημοσιοποιηθεί σύμφωνα με τα αναφερόμενα στην παράγραφο 3 του άρθρου 5 του Ν. 1650/86 όπως τροποποιήθηκε με το άρθρο 3 του Ν. 3010/02.

Η δαπάνη δημοσιοποίησης βαρύνει το φορέα του έργου.

Η ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΤΡΙΑ  
ΠΕΡΙΒΑΛΛΟΝΤΟΣ ΥΠΕΚΑ  
Π. ΚΑΡΑΜΠΙΝΗ-ΣΑΒΒΙΔΟΥ



ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ

Ε. ΑΛΕΥΡΑ

#### ΠΙΝΑΚΑΣ ΑΠΟΔΕΚΤΩΝ

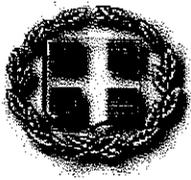
1. ΔΕΠΑ Α.Ε.-ΙΓΙ POSEIDON  
Μαρίνου Αντύπα 92, 141 21 Αθήνα  
(συν. 1 αντ. ΠΠΕ)
2. ΥΠΕΚΑ
  - α) Δ/ση Χωροταξίας  
Αμαλιάδος 17, 115 23 Αθήνα
  - β) Δ/ση Αισθητικών Δασών, Δρυμών & Θήρας  
Χαλκοκονδύλη 31, 10164 Αθήνα
  - γ) Δ/ση Εγκαταστάσεων Πετρελαιοειδών  
Μεσογείων 119, 101 92 Αθήνα
3. Υπ. Αγροτικής Ανάπτυξης & Τροφίμων  
Δ/ση Χωροταξίας & Προστ. Περ/ντος  
Πατησίων 207 & Σκαλιστήρη 19, 10164 Αθήνα
4. Υπ. Πολιτισμού & Τουρισμού
  - α) Δ/ση Προϊστ.& Κλασ. Αρχαιοτήτων
  - β) Δ/ση Βυζ/νων και Μεταβυζ/νων Αρχαιοτήτων  
Μπουμπουλίνας 20, 10682 Αθήνα
  - γ) ΛΒ' ΕΠΚΑ, Κύπρου 68, 46100 Ηγουμενίτσα
  - δ) 8η ΕΒΑ, Βυζαντινό Μουσείο, 452 21 Ιωάννινα
  - ε) ΛΓ' ΕΠΚΑ, ΕΘ. Αντίστασης 108-110, 481 00 Πρέβεζα
  - στ) 18η ΕΒΑ, Αράχθου & Μανωλιάσσης, 471 00 Άρτα
  - ζ) Εφορεία Εναλίων Αρχαιοτήτων, Καλλιστήρη 30, 117 42 Αθήνα
5. Υπ. Αγροτικής Ανάπτυξης & Τροφίμων  
Δ/ση Χωροταξίας & Προστ. Περ/ντος  
Πατησίων 207 & Σκαλιστήρη 19, 10164 Αθήνα
6. ΓΕΕΘΑ/ΔΥΠΟ/ΤΕΥ  
Μεσογείων 227-231, 154 51 Αθήνα

7. Νομαρχιακό Συμβούλιο  
Ν.Α. Θεσπρωτίας  
Π. Τσαλδάρη 18, 46100 Ηγουμενίτσα  
(συν. 1 αντ. ΠΠΕ)
8. Νομαρχιακό Συμβούλιο  
Ν.Α. Πρέβεζας  
Σπηλιάδου 8, 481 00 Πρέβεζα  
(συν. 1 αντ. ΠΠΕ)
9. Δ/ση Αγροτικής Ανάπτυξης (ΝΕΧΩΠ)  
Ν.Α. Πρέβεζας
10. Δ/ση Αγροτικής Ανάπτυξης (ΝΕΧΩΠ)  
Ν.Α. Θεσπρωτίας,  
Διοικητήριο, 461 00 Ηγουμενίτσα

**ΕΣΩΤ. ΔΙΑΝΟΜΗ**

1. ΕΥΠΕ (συν. 1 αντ. ΠΠΕ)
2. Χρον. Αρχείο
3. Τμήμα Α'
4. Κ. Γιαβής

βδδς: \ΥΡΕΗ\ΟΔΕ\Χοροτάκ\ΠΠΕΑ ΑΦΑ-Ι61.doc



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
 ΑΠΟΚΕΝΤΡΩΜΕΝΗ ΔΙΟΙΚΗΣΗ ΗΠΕΙΡΟΥ-Α. ΜΑΚΕΔΟΝΙΑΣ  
 ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΔΑΣΩΝ & ΑΓΡΟΤΙΚΩΝ ΥΠΟΘΕΣΕΩΝ  
 ΔΙΕΥΘΥΝΣΗ ΔΑΣΩΝ ΘΕΣΠΡΩΤΙΑΣ

ΤΜΗΜΑ: ΠΡΟΣΤΑΣΙΑΣ, ΔΙΟΙΚΗΣΗΣ & ΔΙΑΧΕΙΡΙΣΗΣ  
 ΔΑΣΩΝ & ΔΗΜΟΣΙΟΥ ΚΑΤΗΓΟΡΟΥ

Ταχ. Δ/ση: Παν. Τσαλδάρη 21  
 Τ.Κ 46100 - Ηγουμενίτσα  
 Πληροφορίες: Ι. Λώλος  
 Τηλ.: 26650-22241  
 FAX: 26650- 28345  
 EMAIL: ilolos @ epirus.gov.gr  
 Site:// <http://www.apdhp-dm.gov.gr>

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LZ		
MV		
ES	✓	

κ. Πρατόπληκη,  
 κ. Γεωργακίου

ASPROFOS		
ΑΡ. ΠΡΩΤ.	ΗΜ.	ΛΗΞΕΙΣ
892	6/5/11	
Φ. ΓΙΑΝΝΙΔΗΣ		

ΠΡΟΣ : ASPROFOS engineering  
 Ελ. Βενιζέλου 284  
 Τ.Κ. 176.75 – Καλλιθέα  
 Αθήνα

ΚΟΙΝ. : α) Δήμο Ηγουμενίτσας  
 Σουλίου 3  
 Τ.Κ. 46100 – Ηγουμενίτσα

β) Περιφ. Ενότητα Θεσπρωτίας  
 Δ/ση Αγροτικής Ανάπτυξης  
 & Οικονομίας  
 Διοικητήριο

ΘΕΜΑ : Υποθαλάσσιος Διασυνδεδημένος Αγωγός Φυσικού Αερίου Ελλάδας-Ιταλίας

ΣΧΕΤ. : α) Το αριθμ.545/ΦΣ/δχ/15-03-2011 έγγραφο σας

Σε απάντηση του παραπάνω σχετικού εγγράφου σας , που αναφέρεται στο αντικείμενο του θέματος και ύστερα από αυτοψία και έλεγχο αρμοδίου υπαλλήλου της Υπηρεσίας , σας γνωρίζουμε τα ακόλουθα :

Τα προτεινόμενα γήπεδα εγκατάστασης του Μετρητικού Σταθμού (εναλλακτικές θέσεις ) και των συνακόλουθων τροποποιήσεων της όδευσης του Αγωγού Φυσικού Αερίου και όπως αυτά περιγράφονται στο από 18-3-2011 Τοπογραφικό διάγραμμα κλίμακας 1:5000 με αρ. σχεδ. 7240-AU-OM-01 που συνέταξε η εταιρεία σας , καταλαμβάνουν –διασχίζουν τα τεμάχια 129,130,131 και 126 Συμπληρωματικής Διανομής Αγροκτήματος Καταβόθρας έτους 1961 τα οποία στους κτηματολογικούς πίνακες αναγράφονται ως « Λειβάδια ή Χερσολείβαδα » προς κτηνοτροφική αποκατάσταση , ως και του τεμαχίου 1575 αγροκτήματος Πέρδικας Διανομής 1956 – Αναμόρφωση 1972 το οποίο στους κτηματολογικούς πίνακες αναγράφεται ως « Δάσος κοινότητας Πέρδικας» και βρίσκονται στην θέση με την γενική ονομασία < Φλωροβούνι > όπου το μεγαλύτερο μέρος τους υπάγονται στα διοικητικά όρια της Τ.Κ. Καταβόθρας της Δ.Ε. Μαργαριτίου ενώ ένα μικρό τμήμα της Β εναλλακτικής θέσης υπάγεται στα διοικητικά όρια της Δ.Κ. Πέρδικας , αμφότεροι του Δήμου Ηγουμενίτσας .

Επίσης τα παραπάνω γήπεδα χωροθέτησης του Μετρητικού Σταθμού αλλά και ο αγωγός διέλευσης του Φυσικού Αερίου στην συγκεκριμένη περιοχή, απλώνονται – διέρχονται και επί εκτάσεων που φέρουν δασική βλάστηση, διέπονται από τις διατάξεις της Δασικής Νομοθεσίας κατά την έννοια της παρ 2 του άρθρου 3 Ν. 998/79. Για τον λεπτομερή χαρακτηρισμό αυτών, απαιτείται η προσκόμιση από εσάς τοπογραφικών διαγραμμάτων μικρής κλίμακας και εξαρτημένα από το Εθνικό Τριγωνομετρικό Δίκτυο.

Σύμφωνα με το άρθρο 58 παρ 2 του Ν. 998/79 και όπως αυτό αρχικώς αντικαταστάθηκε με το άρθρο 13 παρ. 3 του Ν.1822/1988 και μετέπειτα με το άρθρο 2 παρ. 3 Ν. 2941/2001, δύναται να σας χορηγηθεί έγκριση επέμβασης για την κατασκευή του εν λόγω έργου, αρκεί να ακολουθηθεί η διαδικασία που ορίζουν οι παραπάνω διατάξεις.

Τέλος δε σας πληροφορούμε ότι επειδή ιδιοκτησιακά οι παραπάνω εκτάσεις διαχειρίζονται, κατά το μεγαλύτερο μέρος από την Δ/ση Αγροτικής Ανάπτυξης & Οικονομίας της Περιφερειακής Ενότητας Θεσπρωτίας (ως εποικιστικές που υπόκεινται στο ειδικό καθεστώς της κτηνοτροφικής αποκατάστασης) και κατά μικρότερο μέρος ως Δημοτικές από τον Δήμο Ηγουμενίτσας, πριν την χορήγηση της παραπάνω αδειάς απαιτείται και η σύμφωνη γνώμη αυτών.

Μ.Ε.Γ.Γ.

ΑΠΟΚΕΝΤΡΩΜΕΝΗΣ ΔΙΟΙΚΗΣΗΣ  
ΗΠΕΙΡΟΥ-Α. ΜΑΚΕΔΟΝΙΑΣ

Ο Προϊστάμενος της  
Δ/σης Δασών



Αθανάσιος Γκαντζιός  
Δασολόγος με Α'θμο



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ  
ΚΑΙ ΤΟΥΡΙΣΜΟΥ  
ΔΒ' ΕΦΟΡΕΙΑ ΠΡΟΪΣΤΟΡΙΚΩΝ  
& ΚΛΑΣΙΚΩΝ ΑΡΧΑΙΟΤΗΤΩΝ  
ΘΕΣΠΡΩΤΙΑΣ

01/04/1530

Ηγουμενίτσα, 23.03.2011  
Αριθ. Πρωτ. 816

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Ελ. Βενιζέλου 284  
176 75 Καλλιθέα - Αθήνα

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜ. ΛΗΨΗΣ
18714	14/11
Φ. ΕΠΑΝΩΙΔΗΣ	
Α. ΖΑΜΠΑΣ	
Ε. ΠΡΟΤΟΠΑΜΑ	
Η. ΓΕΡΓΟΥΝΤΣΟΣ	

ΚΟΙΝ.: 1. Υπουργείο Πολιτισμού και Τουρισμού  
α) ΓΔΑΠΚ/ΔΙΠΚΑ/ Τμήμα  
Αρχαιολογικών Χώρων, Μνημείων  
και Αρχαιογνωστικής Έρευνας  
β) ΓΔΑΠΚ/ΔΒΜΜ/Τμήμα  
Αρχαιολογικών Χώρων, Μνημείων  
και Αρχαιογνωστικής Έρευνας  
Μπουμπουλίνας 20 - 106 82 Αθήνα  
2. 8<sup>η</sup> Εφορεία Βυζαντινών Αρχαιοτήτων  
Κάστρο Ιωαννίνων - 452 21 Ιωάννινα

ΘΕΜΑ: «Γνωμοδότηση για τη νέα χωροθέτηση του Μετρητικού Σταθμού συμπίεσης του έργου Υποθαλάσσιος διασυνδετήριος Αγωγός Φυσικού Αερίου Ελλάδας - Ιταλίας»

- ΣΧΕΤ.: (α). Το με αρ. πρωτ. 4986/02.12.2008 έγγραφό μας  
(β). Το με αρ. πρωτ. 55/19.01.2010 έγγραφό μας  
(γ). Το με αρ. πρωτ. 1504/03.05.2010 έγγραφό μας  
(δ). Η με αρ. πρωτ. ΥΠΠΟΤ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/24269/1319/12.05.2010 απόφαση της Γενικής Διεύθυνσης Αρχαιοτήτων και Πολιτιστικής Κληρονομιάς του ΥΠΠΟΤ  
(ε). Η με αρ. πρωτ. 464/16.02.2011 έκθεση αυτοψίας της εκπροσώπου της Υπηρεσίας μας  
(στ). Το με αρ. πρωτ. 543/ΦΣ/δχ/15.03.2011 έγγραφό σας

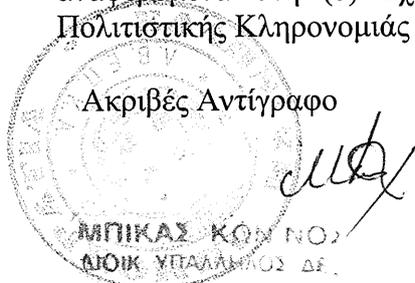
Σε συνέχεια των (α) ~ (ε) σχετικών και σε απάντηση του (στ), που αφορά στη νέα χωροθέτηση του Μετρητικού σταθμού του υποθαλάσσιου διασυνδετήριου Αγωγού φυσικού αερίου Ελλάδας - Ιταλίας στην περιοχή Φλωροβούνι, μεταξύ των Δ.Ε. Καρτερίου και Πέρδικας του Δήμου Ηγουμενίτσας Ν. Θεσπρωτίας και των συνακόλουθων τροποποιήσεων της όδευσης του αγωγού στο εν λόγω σημείο του έργου, σας γνωρίζουμε ότι η Υπηρεσία μας δεν έχει καταρχήν αντίρρηση για καμία από τις δύο προτεινόμενες λύσεις χωροθέτησης, καθώς αυτές βρίσκονται σε μεγάλη απόσταση από τον κηρυγμένο αρχαιολογικό χώρο του Δυμοκάστρου, δεν έχουν καθόλου οπτική επαφή με αυτόν, ενώ παράλληλα στο προτεινόμενο σημείο κατασκευής του σταθμού δεν εντοπίζονται ορατές αρχαιότητες.

Κατά τα λοιπά, σε ό,τι αφορά στις αρμοδιότητες της Υπηρεσίας μας, ισχύουν τα αναφερόμενα στη (δ) σχετική απόφαση της Γενικής Διεύθυνσης Αρχαιοτήτων και Πολιτιστικής Κληρονομιάς του ΥΠ.ΠΟ.Τ. και στο (γ) σχετικό έγγραφό μας.

Ακριβές Αντίγραφο

Η Διευθύντρια της Εφορείας

Αναστασία Τζιγκουνάκη  
Αρχαιολόγος





Π/φος	Δ/φος	Ημερομηνία	Όνομα αρχείου
Χαραλαμπόπουλος		1.2.2011	BAFA0201.MX1

## ΒΟΥΛΗ ΤΩΝ ΕΛΛΗΝΩΝ

### ΠΕΡΙΟΔΟΣ ΙΓ΄ - ΣΥΝΟΔΟΣ Β΄

#### ΔΙΑΡΚΗΣ ΕΠΙΤΡΟΠΗ ΠΑΡΑΓΩΓΗΣ ΚΑΙ ΕΜΠΟΡΙΟΥ

#### ΑΔΙΟΡΘΩΤΑ

### Π Ρ Α Κ Τ Ι Κ Ο

(Άρθρο 40 παρ. 1 του Κ.τ.Β.)

Στην Αθήνα σήμερα, 1 Φεβρουαρίου 2011, ημέρα Τρίτη και ώρα 16.30΄, στην Αίθουσα «Προέδρου Δημητρίου Γεωργ. Παπασπύρου» (150), συνεδρίασε η Διαρκής Επιτροπή Παραγωγής και Εμπορίου, υπό την προεδρία του Προέδρου αυτής, κυρίου Ιωάννη Δριβελέγκα, με θέμα ημερήσιας διάταξης:

Ενημέρωση των μελών της Επιτροπής από τον Υφυπουργό Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής, κ. Ιωάννη Μανιάτη, για την πορεία εξέλιξης του ελληνοϊταλικού αγωγού φυσικού αερίου «IGI- ΠΟΣΕΙΔΩΝ».

Στη συνεδρίαση παρέστησαν ο Υφυπουργός Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής, κ. Ιωάννης Μανιάτης, καθώς και αρμόδιοι υπηρεσιακοί παράγοντες.

Ο Πρόεδρος της Επιτροπής, αφού διαπίστωσε την ύπαρξη απαρτίας, κήρυξε την έναρξη της συνεδρίασης και έκανε την α΄ ανάγνωση του καταλόγου των μελών της Επιτροπής. Παρόντες ήταν οι Βουλευτές κ.κ.:

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ (Πρόεδρος της Επιτροπής): Κυρίες και κύριοι συνάδελφοι, αρχίζουμε τη συνεδρίαση της Επιτροπής μας.

Σήμερα είναι μια ειδική περίπτωση. Ο Υφυπουργός Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής, κ. Ιωάννης Μανιάτης, θα μας ενημερώσει για την πορεία εξέλιξης του ελληνοϊταλικού αγωγού φυσικού αερίου «IGI- ΠΟΣΕΙΔΩΝ».

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Σε αυτή τη συνεδρίαση της Επιτροπής μας, επειδή αφορά την Περιφέρεια της Ηπείρου, έχουν κληθεί οι συνάδελφοι απ' όλα τα κόμματα που εκλέγονται στην Περιφέρεια της Ηπείρου και έχουν ζητήσει να έρθουν ο Περιφερειάρχης κ. Καρχιμάκης, ο κ. Κάτσινος, Δήμαρχος Ηγουμενίτσας και ο Πρόεδρος του ΤΕΕ κ. Δρακατσίνος.

Θα κάνει την παρουσίαση ο κ. Υφυπουργός με τους συνεργάτες του, μετά θα πάρουν το λόγο οι συνάδελφοι Βουλευτές και εφόσον συμφωνείτε, να δώσουμε το λόγο στον Πρόεδρο και στον Περιφερειάρχη, το Δήμαρχο, στους καλεσμένους δηλαδή, από 2-3 λεπτά.

Ο κ. Υπουργός έχει το λόγο.

ΙΩΑΝΝΗΣ ΜΑΝΙΑΤΗΣ (Υφυπουργός Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής): Κύριε Πρόεδρε, θέλω να ευχαριστήσω θερμά για την αποδοχή της πρότασής μας να συζητήσουμε στην Επιτροπή Παραγωγής και Εμπορίου τον αγωγό «ΙΓΙ-ΠΟΣΕΙΔΩΝ».

Θα ήθελα να πω, χωρίς καμία δόση υπερβολής, κυρίες και κύριοι συνάδελφοι, ότι πρόκειται για ένα έργο εθνικής σημασίας, στο οποίο ουσιαστικά θεωρώ ότι συμφωνούμε όλοι, τόσο για τη χρησιμότητα και σκοπιμότητα ύπαρξής του, όσο και για τον τρόπο με τον οποίο μπορεί αυτό να υλοποιηθεί.

Θέλω να σας πω, επίσης, κύριε Πρόεδρε ότι έχω ζητήσει και είναι μαζί μου και μπορούν να απαντήσουν σε επιμέρους ερωτήσεις, ο Αντιπρόεδρος της ΔΕΠΑ κ. Σπύρος Παλαιογιάννης, που θα κάνει και τη βασική παρουσίαση, ο κ. Επαμεινώνδας Χολέρης, ο αρμόδιος για να δίνει τις περιβαλλοντικές αδειοδοτήσεις, επίσης, είναι ο κ. Γιάννης Ζήσιμος, εκ μέρους του άλλου εταίρου της ΔΕΠΑ, της Edison, που μπορεί επίσης να επιλύσει επιμέρους απορίες, καθώς, επίσης και εκ μέρους της ΑΣΠΡΟΦΩΣ που είναι ο μελετητικός οίκος του συγκεκριμένου project.

Κύριε Πρόεδρε, έχουμε φέρει όλους τους ανθρώπους που έχουν εμπλακεί, διότι εκτιμώ ότι πιθανά από τις τοποθετήσεις των συναδέλφων, ίσως να αναδειχθούν θέματα, στα οποία εγώ δεν θα είχα και την ειδική γνώση να μπορέσω να απαντήσω.

Το έργο αυτό έχει μια ειδική σημασία και μάλιστα έχει αποκτήσει τις τελευταίες ημέρες και μια έντονη, κυρίες και κύριοι συνάδελφοι, επικαιρότητα σε πανευρωπαϊκό επίπεδο. Θέλω να δείτε μόνο το πρώτο σλάιντ, που είναι ουσιαστικά οι αγωγοί που

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σχεδιάζεται να υλοποιηθούν στην Ελλάδα, για να σας εξηγήσω αμέσως μετά, γιατί πρόκειται για ένα πάρα πολύ σοβαρό έργο.

Ο αγωγός, τον οποίο βλέπετε με την πράσινη γραμμή, είναι ο Southstream, ο οποίος θα μεταφέρει ρωσικό αέριο διασχίζοντας σε ένα μήκος 900 περίπου χιλιομέτρων υποθαλάσσια τη Μαύρη Θάλασσα, θα προσαιγιαλωθεί στη Βουλγαρία και στη συνέχεια, ένας κλάδος του θα τραβήξει βόρεια για την κεντρική Ευρώπη και ένας άλλος, νότια, θα περάσει ουσιαστικά μέσω Βουλγαρίας από το Στρυμνοχώρι το Νομό Σερρών, θα κατέβει, θα διασχίσει όλη τη Βόρεια Ελλάδα και θα περάσει απέναντι στην Ιταλία. Αυτός είναι ο νότιος κλάδος του Southstream.

Για τον συγκεκριμένο αγωγό έχει ήδη συγκροτηθεί κοινή ελληνορωσική εταιρεία 50% ελληνική, ο ΔΕΣΦΑ δηλαδή και 50% ρωσική, η Gazprom, προκειμένου να προχωρήσει στην υλοποίηση του συγκεκριμένου έργου. Είναι ένα μεγάλο έργο το οποίο μπορεί να βοηθήσει στην ενεργειακή ασφάλεια της Ευρώπης.

Ο δεύτερος αγωγός, ο οποίος έχει πια και άμεση σχέση με το θέμα, το οποίο θα συζητήσουμε σήμερα, είναι αυτό που βλέπετε με την κόκκινη γραμμή, είναι ο περίφημος αγωγός Nabucco. Ο αγωγός Nabucco είναι ένας μέγα-αγωγός, δυναμικότητας 31 δισεκατομμυρίων κυβικών μέτρων το χρόνο, ένας πολύ μεγάλος αγωγός, ο οποίος θα μεταφέρει φυσικό αέριο από το Αζερμπαϊτζάν, πιθανά το Τουρκμενιστάν, πιθανά το Κουρδικό Ιράκ και δεν ξέρω από πού αλλού, μέσω Τουρκίας, Βουλγαρίας, Ρουμανίας προς τις χώρες της κεντρικής Ευρώπης.

Εδώ θέλω να σημειώσω και έχει τη σημασία του –θα έρθω σε αυτό– ότι ο αγωγός Nabucco, ο οποίος στηρίζεται έντονα –πολύ έντονα θα μπορούσα να πω– από την Ε.Ε. και όχι μόνο, είναι ένας αγωγός, ο οποίος δεν διέρχεται από την Ελλάδα. Άρα από την πλευρά της γεωπολιτικής και γεωοικονομικής σημασίας, είναι ένας αγωγός που είναι χρήσιμος για την ενεργειακή ασφάλεια της Ευρώπης, για την Ελλάδα, όμως, δεν έχει απολύτως καμία σημασία και η Ελλάδα δεν έχει κάποιο λόγο να τον αντιπαλεύει, αλλά δεν έχει και κάποιο ιδιαίτερο γεωπολιτικό λόγο να τον στηρίζει πάρα πολύ.

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(Συνέχεια ομιλίας κ. ΙΩΑΝΝΗ ΜΑΝΙΑΤΗ, Υφυπουργού Περιβάλλοντος, Ενέργειας  
και Κλιματικής Αλλαγής)

Ο τρίτος αγωγός, που είναι και το δικό μας αντικείμενο, είναι ο αγωγός ITGI. Είναι ο αγωγός, ο οποίος θα μεταφέρει φυσικό αέριο από το πεδίο ..... του Αζερμπαϊτζάν από την Κασπία θάλασσα, θα διασχίσει το υφιστάμενο δίκτυο αγωγών φυσικού αερίου της Τουρκίας - ήδη ουσιαστικά υπάρχει αυτή η διασύνδεση - θα περάσει από τους Κήπους στην Ελλάδα και στη συνέχεια, διασχίζοντας ανατολική Μακεδονία και Θράκη, κεντρική Μακεδονία και Ήπειρο, θα βγει από την περιοχή της Θεσπρωτίας και με έναν υποθαλάσσιο αγωγό 145 χλμ. θα βγει απέναντι, στο Τράντο της Ιταλίας. Αυτός λοιπόν είναι ο αγωγός για τον οποίο βρισκόμαστε εδώ. Υπάρχει και ένας τρίτος αγωγός, ο αγωγός TAP, ο οποίος σε μεγάλο βαθμό ακολουθεί την όδευση του ITGI, όμως στο ύψος περίπου της Καστοριάς, σηκώνεται βόρεια, περνά από την Αλβανία, διασχίζει τη νότιο Αλβανία και στη συνέχεια βγαίνοντας στα παράλια της Αλβανίας, περνά απέναντι στην Ιταλία. Αυτό λοιπόν είναι το πλέγμα των τριών αγωγών που έχουν ξεκινήσει να συζητούνται και να σχεδιάζονται εδώ και τρία έως πέντε χρόνια. Στους αγωγούς αυτούς, η Ελλάδα έχει μια σταθερή θέση, καθώς στηρίζουμε τους αγωγούς που διέρχονται από το έδαφός μας, όμως, οφείλω να σημειώσω ότι για εμάς, για την Ελλάδα, ο αγωγός ITGI έχει μια μεγάλη, πρωτεύουσα, πολιτική σημασία και προτεραιότητα. Ο αγωγός αυτός στην πραγματικότητα πήρε σάρκα και οστά και θεσμικά το 2007 με τριμερή διακυβερνητική συμφωνία Ελλάδας - Ιταλίας - Τουρκίας, συμμετέχει στην πραγματικότητα σε αυτή την τριμερή συμφωνία και το Αζερμπαϊτζάν και στη συνέχεια ακολούθησε το 2010 η εξειδίκευση της εμπορικής συμφωνίας για την υλοποίηση του αγωγού που έγινε ανάμεσα στην ελληνική εταιρία ΔΕΠΑ, την ιταλική EDISON και την τουρκική ..... Την ερχόμενη Παρασκευή είναι το συμβούλιο κορυφής της Ε.Ε. με μοναδικό θέμα συζήτησης, τα θέματα της ενέργειας. Πρέπει να σας πω ότι, για την ελληνική πλευρά, για την ελληνική δημοκρατία, το ζήτημα των αγωγών και κυρίως αυτών που διασφαλίζουν την ενεργειακή επάρκεια και ασφάλεια της Ευρώπης είναι ένα κορυφαίο πολιτικό θέμα. Ο Έλληνας Πρωθυπουργός και ο Έλληνας Υπουργός Εξωτερικών θα τονίσουν για άλλη μια φορά, όπως έχουν πράξει και με άλλες διεθνείς ευκαιρίες, τη μεγάλη προτεραιότητα και σπουδαιότητα που δίνει η Ελλάδα στην υλοποίηση

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του αγωγού ITGI. Το ίδιο δε, θα πράξει και ο άλλος εταίρος του αγωγού που είναι η Ιταλία, μέσα από την αντίστοιχη κυβερνητική της εκπροσώπηση. Τις προηγούμενες ημέρες πρέπει να σας πω ότι υπήρξε μια εξέλιξη σε κορυφαίο επίπεδο της Ε.Ε.. Επειδή το μεγάλο διακύβευμα όλων των αγωγών δεν είναι το πώς θα γίνει ο αγωγός ή το πώς θα χρηματοδοτηθεί, αλλά κυρίως το πού θα βρουν φυσικό αέριο. Οι πελάτες σήμερα είναι διασφαλισμένοι και αναμένουμε ότι η Ευρώπη την υπόλοιπη δεκαετία - δεκαπενταετία, να αυξήσει την κατανάλωση ενέργειας της από φυσικό αέριο κατά περίπου 50%. Άρα θα έχουμε πολύ πιο αυξημένη ανάγκη ως Ευρώπη για παραπανίσιες ποσότητες φυσικού αερίου. Το μεγάλο λοιπόν στοιχείο όλων των αγωγών είναι το πού θα βρουν κοιτάσματα φυσικού αερίου και το μόνο ρεαλιστικό σε ορατό χρονικό ορίζοντα κοίτασμα που είναι διαθέσιμο, είναι το κοίτασμα του Αζερμπαϊτζάν ..... Στο κοίτασμα αυτό συμμετέχουν αρκετές εταιρείες που το εκμεταλλεύονται και πρέπει να σας πω ότι ο Ελληνοϊταλικός αγωγός, ο ITGI, έχει τέτοια διαστασιολόγηση, τέτοια διάμετρο, που ταιριάζει απόλυτα με το δυναμικό που έχει εντοπιστεί από το ..... Έχουμε μια δυναμικότητα της τάξης των οκτώ με δέκα περίπου δισεκατομμυρίων κυβικών μέτρων το χρόνο. Είναι αυτή ακριβώς η ποσότητα την οποία μπορεί να μεταφέρει ο ITGI και την οποία μπορεί να δώσει το βεβαιωμένο κοίτασμα του ..... Σε αντίθεση με τον αγωγό ..... ο οποίος έχει μια υπερτριπλάσια προβλεπόμενη χωρητικότητα και αντιλαμβάνεστε πάρα πολύ ότι για να χρηματοδοτήσουν τράπεζες αυτό το έργο, εάν δεν υπάρχει διασφαλισμένο φυσικό αέριο, είναι εξαιρετικά δύσκολο να είναι χρηματοδοτήσιμο με τραπεζικά κριτήρια. Το λέω αυτό διότι, όλοι μας γνωρίζουμε ότι στην επιλογή των αγωγών δεν μπαίνουν μόνο οικονομικά και εμπορικά κριτήρια, αλλά και πολιτικά κριτήρια. Αυτό λοιπόν που εμείς θέλουμε να στείλουμε ως μήνυμα προς όλες τις πλευρές είναι ότι ο αγωγός ITGI, είναι ένας αγωγός απολύτως ώριμος, απολύτως έτοιμος να λειτουργήσει, έτοιμος να διασφαλίσει με τη δική του διαστασιολόγηση, τραπεζική χρηματοδότηση, ταιριάζει απολύτως στο μοναδικό διαθέσιμο κοίτασμα που υπάρχει στην ευρύτερη περιοχή της Κασπίας, άρα στη συνάντηση κορυφής της Παρασκευής, η Ελλάδα θα μιλήσει για άλλη μια φορά και θα ζητήσει να μην υπάρξει καμία διαδικασία από καμία πλευρά η οποία πιθανόν να καθυστερήσει την υλοποίηση ενός έργου απολύτως απαραίτητου για την ενεργειακή ασφάλεια της Ευρώπης. Θέλω επίσης να σας ενημερώσω ότι το υποθαλάσσιο τμήμα αυτού του αγωγού - που

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ονομάζεται Ποσειδών και έχει ένα συνολικό μήκος περίπου 145 χιλιόμετρα - χρηματοδοτείται με 100 περίπου εκατομμύρια ευρώ από το πρόγραμμα ανασυγκρότησης της ευρωπαϊκής οικονομίας, άρα έχει διασφαλισμένη και κοινοτική χρηματοδότηση. Ο συγκεκριμένος δε αγωγός, έχει και ένα κλάδο μεγάλης ενεργειακής σπουδαιότητας, είναι ο αγωγός IGB, ο οποίος από την Κομοτηνή, θα σηκωθεί βόρεια, θα φτάσει στο Χάσκοβο και θα τροφοδοτήσει το δίκτυο φυσικού αερίου της Βουλγαρίας. Είναι λοιπόν ένας αγωγός, ο οποίος από τη μια θα ενισχύσει την ενεργειακή ασφάλεια της Ευρώπης περνώντας μέσα από το δίκτυο της Ιταλίας. Από την άλλη, μέσα από τον αγωγό IGB, θα στηρίξει το δίκτυο φυσικού αερίου της Βουλγαρίας, η οποία προχωρά με γρήγορους ρυθμούς σε συνεννόηση με την ελληνική ΔΕΠΑ. Ταυτόχρονα με την Ελληνοβουλγαρική συνεργασία σε αυτό τομέα, προχωρά με γρήγορους ρυθμούς και η Βουλγαρορουμανική συνεργασία για τον αντίστοιχο ιντερκονέκτορα, ώστε να συνδεθεί το Βουλγαρικό με το Ρουμανικό δίκτυο φυσικού αερίου και στην πραγματικότητα, να συγκροτηθεί ένα δίκτυο νέων εναλλακτικών πηγών και οδεύσεων τροφοδοσίας με φυσικό αέριο για την ευρύτερη περιοχή της νοτιοανατολικής Ευρώπης.

Επίσης και ο αγωγός IGB συγχρηματοδοτείται από το πρόγραμμα ανασυγκρότησης της ευρωπαϊκής οικονομίας με άλλα 45 εκατομμύρια ευρώ. Θέλω επίσης να συμπληρώσω ότι υπάρχουν ορισμένες προτάσεις από διάφορες πλευρές της Ε.Ε. και από διάφορα κράτη - μέλη που λένε το εξής.

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(Συνέχεια ομιλίας κ. Ιωάννη Μανιάτη, Υφυπουργού Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής)

Ίσως δεν πρέπει να βιαστούμε τόσο, ας είναι ώριμο ο ITGI, το μεγάλο έργο που πρέπει να προωθηθεί είναι ο NAPUCO και ας βρούμε μια διαδικασία «συγχώνευσης» των δύο αυτών μεγάλων έργων και ας περιμένουμε λίγο να υπάρξει η ταυτόχρονη ωρίμανση και των δύο έργων, που σημαίνει και να βρούμε χρήματα εκεί που δεν υπάρχουν, πολύ περισσότερο όμως να βρούμε τριπλάσια, από την υφιστάμενη σήμερα, ποσότητα αερίου, προκειμένου να τροφοδοτηθεί ο NAPUCO. Επειδή, σε μια δημόσια συζήτηση όπως είναι η σημερινή, όλοι αντιλαμβανόμαστε τι σημαίνει ένα τέτοιο σενάριο, πιθανά. Εγώ θέλω, εδώ στην εθνική αντιπροσωπεία, στην Επιτροπή μας, να σημειώσω ότι η Ελληνική δημοκρατία δεν είναι αντίθετη στην υλοποίηση του NAPUCO, αλλά θεωρεί ότι ο ITGI, ως μια πρώτη φάση του ενεργειακού διαδρόμου της νοτιοανατολικής Ευρώπης, μπορεί από μόνος του να προχωρήσει και όταν βρεθούν, όποτε βρεθούν, νέα κοιτάσματα στο Τουρκμενιστάν, στο Κουρδικό Ιράκ ή οπουδήποτε αλλού, τα οποία θα τεκμηριώσουν την οικονομική βιωσιμότητα και του NAPUCO, τότε ας προχωρήσει και αυτό το έργο.

Θα τελειώσω, κύριε Πρόεδρε, λέγοντας σας μόνο ότι, όπως αντιλαμβάνεστε, στον πολύ σκληρό ανταγωνισμό που υπάρχει ανάμεσα στα τρία projects που σας προανέφερα, ο NAPUCO, ο ITGI και ο ΤΑΠ, έχει πολύ μεγάλη σημασία για το consortium αξιοποίησης του κοιτάσματος φυσικού αερίου Σαχ Ντενίζ 2 στο Αζερμπαϊτζάν, έχει μεγάλη σημασία ποιο έργο έχει μεγαλύτερη ωριμότητα. Όταν λέμε ωριμότητα, εννοούμε να έχει μελετητική, αδειοδοτική και κατασκευαστική ωριμότητα από τη μια και από την άλλη να έχει ωριμότητα χρηματοδότησης και υλοποίησης. Πρέπει να σας πω, λοιπόν, ότι προκειμένου η Ελληνική πλευρά να ενισχύσει την ωριμότητα, την αδειοδοτική του ITGI, πρόσφατα τον Σεπτέμβριο και τον Δεκέμβριο του 2010, οι ελληνικές υπηρεσίες, οι υπηρεσίες του κ....., οι υπηρεσίες που αδειοδοτούν περιβαλλοντικά αδειοδότησαν και το κομμάτι το χερσαίο, από την Κομοτηνή μέχρι τα παράλια της Θεσπρωτίας, περίπου 10 χιλιόμετρα, όλο το χερσαίο κομμάτι αλλά και για το υποθαλάσσιο, συν το κομμάτι των 10 χιλιομέτρων που βγαίνει στη Θεσπρωτία, στην ευρύτερη περιοχή της Πέρδικας. Η έγκριση αυτή, που δόθηκε Σεπτέμβριο και Δεκέμβριο του 2010 αντίστοιχα, είναι έγκριση προκαταρκτική, είναι προκαταρκτική

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Περιβαλλοντική Εκτίμηση και Αξιολόγηση (ΠΕΠΕΑ). Γνωρίζετε πολύ καλά ότι κατά την πορεία υλοποίησης του έργου θα ακολουθήσει και άλλη διαδικασία, θα είναι κανονική μελέτη περιβαλλοντικών επιπτώσεων και η έγκριση των περιβαλλοντικών όρων. Άρα, έχουμε και άλλα στάδια μπροστά μας. Όμως, πρέπει να σας πω ότι για την πλευρά της ΔΕΠΑ και της EDISON που διαπραγματεύονται, μπορώ να σας πω κάθε βδομάδα τους τελευταίους μήνες, Λονδίνο, Μπακού, οπουδήποτε υπάρχει διεθνής συνάντηση για το ποιος θα διασφαλίσει το αέριο, το κοίτασμα του Σαχ Ντενίζ 2 για το consortium το Ελληνο-Ιταλικό, ήταν ένα πολύ μεγάλο όπλο, το γεγονός ότι είχαμε διασφαλίσει την προκαταρκτική περιβαλλοντική αδειοδότηση. Κύριε πρόεδρε, δεν έχω να προσθέσω κάτι άλλο. Θέλω να πω ότι το θέμα που τίθεται, αυτή τη στιγμή, είναι κατά πόσο στην περιοχή της Θεσπρωτίας, όπου προσαγιαλώνεται ο αγωγός και αντίστοιχα δημιουργείται ο σταθμός συμπίεσης. Έχουμε ακολουθήσει τις απαραίτητες ασφαλείς περιβαλλοντικές προδιαγραφές και προϋποθέσεις, διότι πρέπει να σας πω ότι στο υπόλοιπο κομμάτι, στα 570 χιλιόμετρα περίπου του χερσαίου αγωγού, που περνά από τους νόμους Ροδόπης, Ξάνθης, Καβάλας, Σερρών, Θεσσαλονίκης, Ημαθίας, Κοζάνης, Γρεβενών, Τρικάλων, Ιωαννίνων και Θεσπρωτίας, σε όλο αυτό το κομμάτι, η περιβαλλοντική αδειοδότηση δεν συνάντησε κάποια δυσκολία. Εκεί που υπάρχει πρόβλημα είναι στο κομμάτι της Πέρδικας, της προσαγιαλωσης, είναι το κομμάτι του υποθαλάσσιου αγωγού και τα 10 χιλιόμετρα του χερσαίου. Θα ήθελα λίγο την υπομονή σας. Απλώς, ο κ. Παλαιογιάννης να μας παρουσιάσει, πολύ σύντομα, τις προσπάθειες που έκανε η ΔΕΠΑ, προκειμένου να βρει τη βέλτιστη, περιβαλλοντικά και αναπτυξιακά, λύση. Πρέπει να σας πω ότι με δική μου προεδρία έχουν γίνει δύο ή τρεις ή τέσσερις σύσκεψεις στο Υπουργείο, προκειμένου να αξιολογήσουμε όλες τις πιθανές εναλλακτικές λύσεις που υπάρχουν. Αντίστοιχα, να σας πω ότι η μελέτη που παραλάβαμε από την προηγούμενη διοίκηση της ΔΕΠΑ και την προηγούμενη κυβέρνηση, προσπαθήσαμε να την βελτιστοποιήσουμε, διερευνώντας άλλες τρεις ακόμη εναλλακτικές λύσεις, για να καταλήξουμε τελικά σε αυτό το οποίο θα σας παρουσιαστεί. Άρα, από τη δική μας τουλάχιστον πλευρά, τεχνικά, επιστημονικά και πολιτικά, αν θέλετε, θεωρούμε ότι έχουμε εξαντλήσει ό,τι δυνατότητες είχε η Ελληνική πολιτεία και η Ελληνική διοίκηση, προκειμένου να βρούμε μια λύση με το ελάχιστο δυνατό περιβαλλοντικό κόστος.

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ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ: Το λόγο έχει ο κ. Παλαιογιάννης.

ΣΠΥΡΙΔΩΝ ΠΑΛΑΙΟΓΙΑΝΝΗΣ (Αντιπρόεδρος και Διευθύνων Σύμβουλος της ΔΕΠΑ): Ευχαριστώ, κύριε Πρόεδρε, κύριοι βουλευτές. Ο κ. Υπουργός παρουσίασε το πιο πολιτικό περιβάλλον και τις συνθήκες μέσα στις οποίες η ΔΕΠΑ σε συνεργασία με την EDISON, η εταιρία «IGI Poseidon» κατ' ουσίαν, πολεμάμε, προκειμένου να διασφαλίσουμε και την υλοποίηση του έργου το οποίο υποστηρίζουμε και την εξασφάλιση αερίου από το κοιτάσμα Σαχ Ντενίζ 2 του Αζερμπαϊτζάν. Στην ουσία, από το περασμένο Σεπτέμβριο, αρχίσαμε με τις διαπραγματεύσεις και έχει τεράστια σημασία να επιβεβαιώσουμε και να είμαστε έτοιμοι, ανά πάσα στιγμή, να ανταποκριθούμε στο άνοιγμα του λεγόμενου τέταρτου διαδρόμου, όπως ανέφερε ο Υπουργός.

Πριν σας παρουσιάσω τι κάναμε ακριβώς για το σημείο, αυτό το slide δείχνει ακριβώς το όραμα της ΔΕΠΑ, στα πλαίσια της πολιτικής που έχει το Υπουργείο. Όχι μόνο να ανοίξει το τέταρτο διάδρομο, αλλά να καταστήσει τη χώρα και μια χώρα εισαγωγής αερίου από διάφορες πηγές και ταυτόχρονα να δημιουργήσουμε τις προϋποθέσεις να γίνουμε ενεργειακός κόμβος στην περιοχή μας, κάτι που άρχισε να διαφαίνεται από τα τέλη της δεκαετίας του 90 και έκτοτε προσπαθούμε πρωτοπορώντας, ανοίγοντας τον αγωγό διασύνδεσης Ελλάδος-Τουρκίας το 2003, ο οποίος τέθηκε σε λειτουργία το 2007. Να δούμε λίγο το ιστορικό, πως αναζητήσαμε, πώς διερευνήσαμε και επιλέξαμε τελικά τις θέσεις προσαιγιάλωσης και χωροθέτησης των χερσαίων εγκαταστάσεων. Τι είναι αυτές οι θέσεις; Ο ένας αγωγός, όπως είπαμε, είναι ο χερσαίος αγωγός από τους Κήπους, από την Κομοτηνή μέχρι την Ηγουμενίτσα, για να δώσουμε έτσι ένα στίγμα. Από κει και πέρα, στη Θεσπρωτία, θα ξεκινήσει ο υποθαλάσσιος αγωγός, ο Ποσειδών. Από το 1999, όταν συζητήθηκε κάποια στιγμή η αντίθετη όδευση, να έρθει αέριο από την Ιταλία, είχαν εξεταστεί από την εταιρία ASPROFOS, συνολικά έντεκα πιθανές θέσεις προσαιγιάλωσης του αγωγού, με προτεινόμενες τότε, το Σταυρολιμένα και το Σοφά στην κοινότητα Πέρδικας. Το 2004, το κοινοτικό συμβούλιο Πέρδικας και το νομαρχιακό συμβούλιο Θεσπρωτίας ενέκριναν την κατασκευή, με προτεινόμενη τη θέση προσαιγιάλωσης Σοφάς. Το 2005, διερευνήθηκε από την εταιρία INTEQ, μια περιοχή βόρεια της Αγιάδας, κοντά στα σύνορα με την Αλβανία, προκειμένου να πάμε τον αγωγό βορειότερα. Αυτό θα είχε ένα οικονομικό όφελος για τις εταιρείες μας, διότι θα ήταν μικρότερη η απόσταση μέχρι την

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Ιταλία. Συναντήσαμε δυσκολίες που έχουν να κάνουν με τη ναυσιπλοΐα, που έχουν να κάνουν με λόγους ασφαλείας, με τα γεωλογικά δεδομένα του βυθού της θάλασσας κ.λπ. Έτσι απορρίφθηκε αυτή η θέση. Το 2007 κατατέθηκε η προμελέτη περιβαλλοντολογικών επιπτώσεων που είχε, το σχέδιο έτσι, που είχε εκπονήσει η ASPROFOS και τότε, προτεινόταν ως θέση προσαιγιάλωσης και πάλι ο Σταυρολιμένας, με εναλλακτική θέση το Σοφά.

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(Συνέχεια ομιλίας κ. ΣΠΥΡΙΔΩΝΑ ΠΑΛΑΙΟΓΙΑΝΝΗ, Αντιπροέδρου και Διευθύνοντα Συμβούλου της ΔΕΠΑ)

Το 2009, προχωρήσαμε και εξετάσαμε συνολικά άλλες 5 θέσεις προσαιγιάλωσης που φαίνονται σε αυτό το slide. Ο Σταυρολιμένας είναι στη μέση, η θέση Σοβάς και Σταμπώνη είναι πιο πάνω και οι θέσεις ομπρέλα 1 και ομπρέλα 2 είναι λίγο πιο κάτω. Από τεχνικής και οικονομικής άποψης οι βορειότερες θέσεις ήταν οι πιο κατάλληλες. Παρόλα αυτά το 2010 η νέα διοίκηση της ΔΕΠΑ ήρθε αντιμέτωπη με μια σειρά από ενστάσεις που υπήρχαν από την τοπική κοινωνία. Ευαισθητοποιηθήκαμε και κατ' εντολή του Υπουργείου Περιβάλλοντος Ενέργειας και Κλιματικές Αλλαγής επισκεφθήκαμε την περιοχή προκειμένου να διαμορφώσουμε οι ίδιοι γνώμη για το τι συμβαίνει στην περιοχή και να δούμε ποια είναι τα τοπικά προβλήματα. Ταυτόχρονα, με πρωτοβουλίες Υπουργού Περιβάλλοντος Ενέργειας και Κλιματική Αλλαγής που και ο ίδιος ανέφερε έγινε σειρά συσκέψεων τόσο με υπηρεσιακούς παράγοντες τόσο της ΔΕΠΑ όσο και του Υπουργείου, αλλά ταυτόχρονα και με εκπροσώπους διαφόρων φορέων.

Επιπρόσθετα, ακούγοντας το Υπουργείο τις φωνές ή τις προτάσεις τοπικών φορέων, φτάσαμε να ερευνήσουμε άλλες δύο πρόσθετες θέσεις, οι οποίες για μια σειρά από συγκεκριμένους λόγους απορρίφθηκαν. Τελικά, όπως προανέφερε ο Υπουργός, το Σεπτέμβριο του 2010 εκδόθηκε η προέγκριση χωροθέτησης για τη θέση ομπρέλα 2 Βαρικό, η οποία είναι πιο αποδεκτή από την τοπική κοινωνία. Η θέση αυτή για την εταιρία μας έχει ένα πρόσθετο κόστος 5 εκατομμυρίων ευρώ, αλλά ακούγοντας την τοπική κοινωνία θεωρήσαμε ότι αξίζει τον κόπο να φτάσουμε σε μια λύση η οποία θα είναι πιο κατάλληλη για την περιοχή.

Αν μου επιτρέψετε θα ήθελα να δείξω ορισμένες φωτογραφίες που έχουμε πάρει από παρόμοιες εγκαταστάσεις. Οι εγκαταστάσεις αυτές είναι εγκαταστάσεις συντήρησης και μέτρησης του αγωγού και στη συνέχεια ένας αγωγός, ο οποίος θάβεται και το ίδιο συμβαίνει και μέσα στη θάλασσα σε βάθος 25 μέτρων. Όπως βλέπετε, είναι ένας σταθμός μέτρησης και συμπίεσης στην Μεσίνα της νότιας Ιταλίας και δίπλα βλέπετε κατοικημένες περιοχές. Ο σταθμός αυτός είναι τέσσερις φορές μεγαλύτερης δυναμικότητας από ότι είναι ο δικός μας και δεν υπάρχει πρόβλημα. Μπορούμε να δούμε ότι στις γύρω περιοχές υπάρχουν οικισμοί σε πολύ κοντινή απόσταση. Αυτή είναι μια άλλη άποψη του ίδιου

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σταθμού και βλέπετε ότι γειτονεύει με παραθαλάσσιους οικισμούς. Το μόνο που προδίδει ότι ένας αγωγός προσαιγιαλώθηκε και τελικά φτάνει στις εγκαταστάσεις μέτρησης είναι αυτή η πινακίδα σήμανσης ώστε να γνωρίζουν όλοι ότι εκεί περνάει ένας αγωγός. Αυτοί είναι σταθμοί συμπίεσης στο Gernsheim της Γερμανίας. Όπως βλέπετε και εκεί είναι πάρα πολύ κοντά σε οικισμούς. Το ίδιο συμβαίνει σε μια περιοχή της Ισπανίας όπου περνούν κάποιοι αγωγοί που έρχονται από την Αλγερία.

Εδώ θα ήθελα να δείξω κάτι που δημοσιεύθηκε σε ένα τοπικό site στην περιοχή. Εικονίζεται με τη βοήθεια της ψηφιακής τεχνολογίας ένας σταθμός που δεν ανταποκρίνεται στην πραγματικότητα. Πρόκειται για ένα σταθμό ηλεκτροπαραγωγής που χωροθέτησαν ηλεκτρονικά, αλλά δεν υπάρχει φυσικά. Η δική μας εγκατάσταση είναι της τάξεως των 50 megawatt, μια μονάδα ηλεκτροπαραγωγής είναι των 400 megawatt και μιλάμε για πολύ μεγάλη διαφορά. Φυσικά, δεν έχει δεξαμενές και φυσικά δεν έχει πλοία τα οποία θα φαίνονται. Η εγκατάσταση αυτή θα είναι αρκετά μέσα στην περιοχή, περίπου επτά χιλιόμετρα από την ακτή και περίπου δύο με τρία χιλιόμετρα από τον οικισμό της Πέρδικας. Μια τέτοια εγκατάσταση, όπως ανέφερε και ο Υπουργός, μπορεί να έχει ευεργετικές επιπτώσεις και στην περιφερειακή ανάπτυξη και στην απασχόληση και βεβαίως, θα φτάσει το φυσικό αέριο και σε μια περιοχή που σήμερα δεν υπάρχει. Ευχαριστώ.

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ (Πρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Καχριμάνης.

ΑΛΕΚΟΣ ΚΑΧΡΙΜΑΝΗΣ (Περιφερειάρχης Ηπείρου): Κύριε Υπουργέ, κύριε Πρόεδρε, εμάς μας ενδιαφέρει πολύ το θέμα και το θεωρούμε ένα θέμα υψίστης εθνικής σημασίας, αλλά και τα παράλια της Θεσπρωτίας είναι κάτι πιο τώρα εξελίσσεται και δίνει μεγάλη ανάσα στην τουριστική ανάπτυξη της ηπείρου, την οποία θεωρούμε ενιαία από τα παράλια μέχρι τα ορεινά. Πράγματι, έγιναν, όπως ειπώθηκε από τους προλαλήσαντες, τεράστια προσπάθεια από το 1999 μέχρι να φτάσουμε στο 2010 που έχει γίνει πλέον χωροθέτηση του έργου. Έχουν γίνει πολλές συζητήσεις με την τοπική κοινωνία, την κοινωνία της Πέρδικας και χθες βρήκαμε κάποιους ανθρώπους από αυτούς. Αυτό που τους ενδιαφέρει σήμερα είναι που θα είναι το εργοστάσιο συμπίεσης. Αυτή τη θέση που δείχνετε σήμερα δεν την αποδέχονται, θέλουν να πάει πιο βαθιά και όταν λέμε επτά μισή χιλιόμετρα να είναι σε ευθεία γραμμή και όχι σε τεθλασμένη που είναι τώρα και προτείνουν τη θέση

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Φλωροβούνι. Ένα θέμα είναι αυτό χωρίς να αλλάξει η διαδικασία όπως πηγαίνει από τη θέση ομπρέλα μέχρι το Βαρικό σήμερα, αλλά να φτάσει το εργοστάσιο λίγο πιο βαθιά για να μην είναι κοντά στον οικισμό της Πέρδικας που η θέση Βαρικό είναι από 1000 μέχρι 1500 μέτρα σε ευθεία γραμμή.

Το δεύτερο που ενδιαφέρει είναι όταν φτάνει στην περιοχή των Ιωαννίνων και έχει δύο τρόπους να περάσει την περιοχή. Η κυρία που προτείνεται είναι μέσα από κομμάτι του πάρκου της βόρειας Πίνδου και η δεύτερη είναι περίπου παράλληλα με την Εγνατία οδό. Εμείς δεν έχουμε ρωτηθεί μέχρι σήμερα, αλλά προτείνουμε όπως πάει η Εγνατία είναι η δεύτερη περίπτωση που είναι μέσα στις προτάσεις και νομίζουμε ότι αυτή δεν δημιουργεί πρόβλημα

Το τρίτο είναι ότι εφόσον θα περάσει ο αγωγός από την περιοχή μας έχουμε το δικαίωμα και εμείς στην ήπειρο να ζητάμε αέριο στην περιοχή μας, γιατί αυτή τη στιγμή η Αθήνα έχει 9,5 βαθμούς και στα ορεινά είναι 5 με 6 βαθμούς. Σας ευχαριστώ πολύ.

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ (Πρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Κάτσινος.

ΓΕΩΡΓΙΟΣ ΚΑΤΣΙΝΟΣ (Δήμαρχος Ηγουμενίτσας): Κύριε Πρόεδρε, κ. Μανιάτη, σας ευχαριστώ πάρα πολύ για την πρόσκλησή σας. Έτυχε να είμαι νομαρχιακός σύμβουλος πάρα πολλά χρόνια και το θέμα το παρακολούθησα από τη γένεση του. Ειπώθηκαν κάποιες ανακρίβειες από τον κ. Αναπληρωτή Διευθύνοντα της ΔΕΠΑ. Η κοινότητα της Πέρδικας, η τοπική κοινωνία γενικότερα αντίθετη εδώ και πάρα πολλά χρόνια και είχε γίνει και σχετικό δημοψήφισμα με 99%.

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Θ. ΠΑΠΑΔΟΠΟΥΛΟΥ	Θ. ΠΑΠΑΔΟΠΟΥΛΟΥ	1.2.11	ΒΕΦΑ0201.ΡΤ1

(Συνέχεια ομιλίας κ. ΓΕΩΡΓΙΟΥ ΚΑΤΣΙΝΟΥ, Δημάρχου Ηγουμενίτσας)

Για να μην μπει η μονάδα συμπίεσης και ο αγωγός εκτός ορίων Πέρδικας και Συβότων, όπου όλοι ίσως τα έχετε επισκεφθεί, καθώς είναι πανέμορφα. εκτός από το δημοψήφισμα, έχουν γίνει παραστάσεις, μπορεί να έχουν γίνει λάθος χειρισμοί στο παρελθόν, μπορεί να εξετάστηκαν εναλλακτικές θέσεις, όμως η τοπική κοινωνία και οι φορείς της δεν ενημερώθηκαν γιατί αποκλείστηκαν άλλες εναλλακτικές θέσεις και επιλέχθηκε η θέση Βαρικό και η «ομπρέλα 2» για την οποία υπάρχει και σχετική προμελέτη. Δεν θέλω να καταλογίσω ευθύνες, εμείς σαν καινούρια δημοτική αρχή βρισκόμαστε ένα τετελεσμένο γεγονός, βρισκόμαστε μια χωροθέτηση της μονάδας στη θέση Βαρικό και στην ομπρέλα της προσαιγιάλωσης.

Το έργο είναι εθνικής σημασίας, όλοι το λένε και όλοι το δεχόμαστε, όμως, θα πρέπει να δείτε ότι μπορεί να υπάρξει βελτίωση στα θέση της μονάδας συμπίεσης - για τον αγωγό δεν υπάρχει κανένα πρόβλημα, σε κάποια σύσκεψη που συμμετείχα στο υπουργείο με τον κ. Μανιάτη έγιναν κάποιες διευκρινίσεις, μπορεί να υπάρξει κάποια μικρή μετατόπιση - αλλά στο θέμα της μονάδας συμπίεσης, θα πρέπει να υπάρξει αλλαγή. Εκείνο που ζητάμε εμείς σε ένα τετελεσμένο, πλέον, γεγονός, είναι μια μετακίνηση της μονάδας περί το 1,5 χιλιόμετρο πίσω, καθώς είναι επάνω στην ώθηση του αγωγού, πιστεύουμε πως δεν δημιουργείται καθυστερήσεις που επικαλείται η ΔΕΠΑ, για να εκμηδενιστούν και τελευταίες αντιδράσεις της τοπικής κοινωνίας. Ελπίζουμε και ζητάμε στην οριστική μελέτη θα εκληφθεί αυτό σοβαρά υπόψη. Βέβαια, υπάρχουν και τα ανταποδοτικά τέλη, τα οποία πρέπει κάθε στιγμή να τα θέσουμε στο τραπέζι.

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ (Πρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Ρεκατσίνης.

ΓΕΩΡΓΙΟΣ ΡΕΚΑΤΣΙΝΑΣ (Πρόεδρος Τεχνικού Επιμελητηρίου Ηπείρου): Κύριε πρόεδρε, κύριε υπουργέ, κυρίες και κύριοι βουλευτές, ευχαριστώ για τη δυνατότητα που δίνετε σήμερα σαν πρόεδρος του τεχνικού επιμελητηρίου Ελλάδας, τμήματος Ηπείρου, να παρευρεθώ στη σημερινή παρουσίαση και συζήτηση για ένα θέμα μείζονος σημασίας όπως είναι αυτό του φυσικού αερίου. Το τεχνικό επιμελητήριο ζητεί εδώ και πάρα πολλά χρόνια, από τις αρχές της δεκαετίας 1990, την έλευση του φυσικού αερίου στην Ήπειρο.

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<b>Θ. ΠΑΠΑΔΟΠΟΥΛΟΥ</b>	<b>Θ. ΠΑΠΑΔΟΠΟΥΛΟΥ</b>	<b>1.2.11</b>	<b>ΒΕΦΑ0201.ΡΤ1</b>

Σήμερα μας δίνεται η δυνατότητα μέσα από ένα έργο μείζονος εθνικής σημασίας, φυσικό αέριο να έρθει στην Ήπειρο, γιατί εμείς μιλάμε όχι μόνο για διέλευση, αλλά και για έλευση. Δηλαδή, το φυσικό αέριο όταν θα έρθει στην Ήπειρο μέσω της εταιρίας παροχής αερίου, για την οποία θα πρέπει να συζητάμε ήδη από σήμερα, να αποτελεί και την έλευση του φυσικού αερίου στην περιοχή της Ηπείρου, όμως, όχι μόνο, αλλά και με διακλάδωση να κατέβει και προς την δυτική Ελλάδα.

Θα πρέπει να διαχωρίσουμε το έργο σε δύο σκέλη. Το ένα αφορά το έργο της ΔΕΣΦΑ και το δεύτερο αφορά το έργο της ΔΕΠΑ. Το έργο της ΔΕΣΦΑ αφορά τον αγωγό φυσικού αερίου από τα σύνορα μέχρι τη θέση όπου τα χωροθετηθεί το εργοστάσιο συμπίεσης. Δεν μας δόθηκε ο χρόνος να το εξετάσουμε εκτενώς. Υπάρχουν και από εμάς, όπως είπε ο κ. περιφερειάρχης, με μια πρώτη ματιά που ρίξαμε στη μελέτη, κάποιες ενστάσεις τις οποίες βεβαίως να αξιολογήσουμε εφόσον δούμε επιστημονικά αυτό το κομμάτι του έργου. Το δεύτερο που είναι και το πιο σημαντικό κομμάτι του έργου που αφορά την ΔΕΠΑ και είναι η χωροθέτηση του εργοστασίου συμπίεσης και ο αγωγός από το εργοστάσιο συμπίεσης μέχρι την προσαιγιάλωση. Εμείς έχουμε συμμετάσχει μέχρι τώρα σε όλες τις συζητήσεις που έχουν γίνει τα τελευταία χρόνια. Θέλω να πω ότι υπήρξε μια μεγάλη αστοχία αρχικά στη μελέτη και αυτό γιατί η προσαιγιάλωση έγινε στο Σταυρολιμένα Πέρδικας. Αυτό κρίθηκε από εμάς ως απαράδεκτο και μάλιστα το εργοστάσιο ήταν πολύ κοντά, ενάμισι χιλιόμετρο από αυτή την προσαιγιάλωση. Ακολούθησαν πολλές συζητήσεις και συναντήσεις, έγινε μία δεύτερη πρόταση με την οποία εμείς καταρχήν συμφωνήσαμε και είχαμε πει ότι όμως πρέπει να κοιτάξουμε και για άλλες θέσεις. Ήταν η θέση Σοφάς στην προσαιγιάλωση και Καλύβια στο εργοστάσιο. Με τις πιέσεις που υπήρξαν στην τοπική κοινωνία υπήρξαν οι δύο επόμενες προτάσεις, που ήταν στην αρχική μελέτη, «Ομπρέλα 2 – Βαρικό» και «Ομπρέλα 1 – Γουρί». Εμείς επισκεφθήκαμε αυτές τις δύο εναλλακτικές λύσεις που πήγαιναν πακέτο. Βρισκόμαστε στη φάση που η ΥΠΕ έχει δοθεί για γνωμοδότηση σε όλους τους φορείς - και εδώ θα πρέπει να πω ότι παρέλειψε ίσως από λάθος να δώσει το θέμα για γνωμοδότηση τον φορέα διαχείρισης βόρειας Πίνδου και στον φορέα διαχείρισης της (:::), δύο πολύ σημαντικούς φορείς, που θα έπρεπε να λάβουν γνώση αυτής της μελέτης προκειμένου να γνωμοδοτήσουν. Εμείς συζητήσαμε μετά από πολύ μεγάλη ανάλυση και συμμετοχή πολλών συναδέλφων όλη αυτή την εμπειρία που

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είχαμε και είπαμε ότι το έργο θα πρέπει οπωσδήποτε να προχωρήσει. Η θέση Βαρικό 1 έχει προβλήματα γεωτεχνικά και σεισμικά. Η θέση Βαρικό 2 μπορεί να μείνει στην ίδια θέση ή να πάει λίγο πιο κάτω σε απόσταση 200-300 μέτρων όπου δεν δημιουργεί κανένα πρόβλημα. Σε ό,τι αφορά το εργοστάσιο συμπίεσης, εμείς θεωρούμε ότι και η θέση Γουρί και η θέση Βαρικό είναι θέσεις που δεν δημιουργούν περιβαλλοντικά προβλήματα, θέσεις που δεν έχουν οπτική επαφή με την κοινότητα Πέρδικας κ.λπ. όμως, η περιοχή είναι τέτοια που μας δίνει τη δυνατότητα να κοιτάξουμε για μια τρίτη, τέταρτη θέση, έτσι ώστε να μπορούμε να βρούμε τη βέλτιστη θέση, γιατί έργο χωρίς κοινωνική συναίνεση σήμερα δεν μπορεί να γίνει. Και επειδή το έργο είναι εξαιρετικής σημασίας όχι μόνο για τη χώρα σε αυτή τη δύσκολη οικονομική συγκυρία, αλλά και για την ίδια την Ήπειρο νομίζω ότι όλοι οι φορείς της Ηπείρου να συναινέσουν, έτσι ώστε όλοι μαζί να βρούμε τη βέλτιστη λύση, προκειμένου αυτό το έργο να μπορέσει να ολοκληρωθεί.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ (Αντιπρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Σαλαγιάννης.

ΝΙΚΟΛΑΟΣ ΣΑΛΑΓΙΑΝΝΗΣ: Ας μας περιγράψει κάποιος ποιες είναι οι επιπτώσεις του συγκεκριμένου συστήματος στο περιβάλλον; Δηλαδή, ποιοι είναι οι φόβοι; Διότι ακούσαμε πολλά, αλλά δεν ακούσαμε αυτό.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ (Αντιπρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Τολέρης για να μας εξηγήσει ποιος είναι ο κίνδυνος ενός ατυχήματος.

ΕΠΑΜΕΙΝΩΝΔΑΣ ΤΟΛΕΡΗΣ (Διευθυντής ειδικής υπηρεσίας περιβάλλοντος ΥΠΕΚΑ): Ο κ. υπουργός και ο κ. Παλαιογιάννης σας έδωσαν μία εικόνα του έργου. Το έργο είναι από την Κομοτηνή μέχρι τα μέσα περίπου της Αδριατικής, γιατί έχουμε και ζητήματα διεθνών συμβάσεων και υποχρεώσεων, με κρίσιμο τμήμα την προσαιγιάλωση στη Θεσπρωτία και τον σταθμό συμπίεσης στη Θεσπρωτία, εάν και το έργο χαρακτηρίζεται από άλλους δύο σταθμούς συμπίεσης, ένα στην Κομοτηνή και ένας στη Μεσημβρία της Θεσσαλονίκης. Παρόλο που ο σταθμός Θεσσαλονίκη είναι πολύ πιο κοντά σε σπίτια, δεν δημιουργήθηκε κανένα πρόβλημα. Η μελέτη έχει δημοσιοποιηθεί στους αρμόδιους φορείς. Τέτοιου τύπου έργα και το συγκεκριμένο, χαρακτηρίζονται από γραμμικότητα, πρόκειται για ένα γραμμικό έργο, σε μια στενή λωρίδα γης της τάξης περίπου επέμβασης το μέγιστο 20 μέτρα. Λέω επέμβασης και εννοώ το χαντάκι που μπαίνει το έργο, ο ίδιος ο αγωγός, καθώς

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και τον εργοταξιακό δρόμο που θα είναι από τη μια πλευρά του έργου καθώς και μια εργοταξιακή buffer zone που δεν πρόκειται να θιγεί, η οποία είναι για έκτακτη ανάγκη.

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(Συνέχεια ομιλίας κ. Επαμεινώνδα Τολέρου,

Διευθυντή της Ειδικής Υπηρεσίας Περιβάλλοντος ΥΠΕΚΑ)

Χαρακτηρίζεται, επίσης, και από τα εργοστάσια συμπίεσης. Τα εργοστάσια συμπίεσης δεν είναι τίποτε άλλο παρά μικρές μονάδες παραγωγής ηλεκτρικής ενέργειας, οι οποίες καίνε ευγενές καύσιμο, φυσικό αέριο, το οποίο χαρακτηρίζεται από χαμηλές εκπομπές τόσο, κυρίως, καπνού - είναι μηδενικές - αλλά ακόμα και διοξειδίου και μονοξειδίου του άνθρακος - η καύση είναι πολύ καλύτερη, είναι σε χαμηλότερες θερμοκρασίες και, ως εκ τούτου, έχουμε και λιγότερα αζωτοξείδια. Γενικώς, γνωρίζουμε όλοι ότι το φυσικό αέριο είναι ένα ευγενές καύσιμο και η ρύπανση που προκαλεί στο περιβάλλον είναι πολύ μικρή.

Τα βασικά χαρακτηριστικά του σταθμού συμπίεσης είναι τα εξής: Είναι 2 x 25 Μεγαβάτ – είναι, δηλαδή, ένας σταθμός παραγωγής των 50 Μεγαβάτ, λίγο ως πολύ, ηλεκτρικής ενέργειας - χωρίς σημαντικές εκπομπές ρύπων, στο βαθμό που το καύσιμο που χρησιμοποιείται είναι ευγενές. Δεν μπορεί, λοιπόν, να χαρακτηριστεί ως μια βαριά πηγή ρύπανσης.

Το έργο, ως γραμμικό έργο, διασχίζει όλη τη βόρεια Ελλάδα και την Ήπειρο, περνάει από περιοχές και προστατευόμενες.

Όσον αφορά στα θέματα ασφάλειας, αν και εκφεύγουν από τα θέματα αρμοδιότητας περιβαλλοντικής αδειοδότησης, τα έργα χαρακτηρίζονται από σημαντική ασφάλεια στο βαθμό που μεταφέρουν φυσικό αέριο και είναι σημαντικό αυτό που σας λέω. Δεν είναι Irg, δεν είναι υδροποιημένο πετρελαϊκό αέριο, είναι φυσικό αέριο. Ως εκ τούτου, δεν υπάρχει περίπτωση να γίνει ποτέ το φαινόμενο «public», όταν σπάσουν οι δεξαμενές, που εδώ δεν έχουμε και δεξαμενές. Από πλευράς ασφάλειας, το έργο χαρακτηρίζεται από υψηλό επίπεδο προστασίας, δηλαδή, δεν έχουμε ατυχήματα από τέτοιου τύπου εγκαταστάσεις.

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ΧΡΗΣΤΟΣ ΚΑΤΣΟΥΡΑΣ: Κύριε Πρόεδρε, πράγματι, καταλαβαίνουμε και στη Θεσπρωτία τα τελευταία χρόνια ότι γίνεται μια προσπάθεια η θέση της χώρας σε μια

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συγκεκριμένη περιοχή να μην έχει έναν περιφερειακό, αλλά έναν κεντρικό ρόλο στα ζητήματα της ενέργειας και αυτό είναι απολύτως σεβαστό. Καταλαβαίνω, επίσης, ότι οι δρόμοι αυτοί των αγωγών - είναι περίεργο βέβαια αυτό - στην ιστορία είναι οι ίδιοι δρόμοι με τους δρόμους του εμπορίου, γι' αυτό και έρχεται πάλι στη Θεσπρωτία. Όλο αυτό το διάστημα θα έπρεπε ο διάλογος, που είχε ανοίξει, να έχει δύο χαρακτηριστικά, όπως πρέπει να έχει κάθε διάλογος: Πρώτον, ένα οργανωμένο πλαίσιο και, δεύτερον, μια αφετηρία, ότι ξεκινάμε από το μηδέν. Για πολλούς λόγους, αλλά θεωρώ σταθμό την πρώτη προμελέτη, αυτό δεν έγινε. Η Δ.Ε.Π.Α. έφερε μια προμελέτη στον Σταυρολιμένα - όσοι δεν γνωρίζουν την περιοχή δεν μπορούν να το καταλάβουν, είναι δύσκολο - και, από εκεί και πέρα, προκάλεσε μια ιστορία αντιδράσεων, που πολλές φορές, εάν θέλουμε να είμαστε ειλικρινείς, έφτανε στα όρια της υπερβολής. Είχε, όμως, και στοιχεία αλήθειας μέσα.

Οι ευθύνες για το πώς έγινε ο διάλογος ανήκουν σε όλους. Για παράδειγμα, το ζήτημα θα μπορούσε να είχε λυθεί, εάν μια προσωπική μου πρόταση στο νομαρχιακό συμβούλιο είχε ακουστεί πριν από κάποια χρόνια - μοιάζει με τις προτάσεις που ακούστηκαν από το δήμαρχο και από τον περιφερειάρχη - και είχε γίνει μια μικρή παραχώρηση ο σταθμός να είναι εκτός των ορίων και ο αγωγός ας περάσει μέσα από τα όρια της Πέρδικας. Ή θα μπορούσε να είχε λυθεί, εάν σε μία από τις συσκέψεις που κάναμε πέρυσι είχε ακουστεί αυτό που ακούγεται φέτος και ήμασταν συγκεκριμένοι σε προτάσεις, να πάει, π.χ., ενάμιση με δύο χιλιόμετρα πίσω. Οι ευθύνες, βέβαια, όπως είπα, βαρύνουν όλους, σε άλλη βαρύτητα καθένα - και τη Δ.Ε.Π.Α. και την πολιτεία και το Υπουργείο και την τοπική κοινωνία και εμένα - αλλά είναι αλήθεια ότι για πρώτη φορά ξεκίνησε από το Υπουργείο μια προσπάθεια να λυθεί το πρόβλημα, γι' αυτό και έγιναν δύο - τρεις συσκέψεις με τους τοπικούς φορείς, αλλά απουσίαζε κάθε φορά νομίζω η λογική. Παρά το ότι ο δήμαρχος είπε ότι δεν είναι αποδεκτή η θέση - και είναι κοντά στην αλήθεια αυτό που είπε - το ότι προτείνει και ο δήμαρχος και ο περιφερειάρχης μια συγκεκριμένη λύση δείχνει ότι είμαστε κοντά σε μια λύση που θα έχει τη συναίνεση της τοπικής κοινωνίας. Ας το δούνε οι αρμόδιοι αυτό.

Εγώ, όμως, θα ήθελα να προχωρήσω - επειδή δεν μπορούμε αποσπασματικά να βλέπουμε το ζήτημα - και σε κάποιες συγκεκριμένες ερωτήσεις: Ειπώθηκε πρόχειρα, εάν

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θα γίνει ή όχι σταθμός lng στην περιοχή. Θα ήθελα να υπάρχει μια ξεκάθαρη απάντηση σ' αυτό το ζήτημα και για τους ντόπιους.

Δεύτερον, είπατε, κύριε Υπουργέ, ότι είναι 8 με 10 δισ. κυβικά το χρόνο. Για πόσα χρόνια; Γνωρίζουμε;

Επίσης, είπατε ότι υπάρχει ο IGP για Βουλγαρία. Πόσοι θα πάνε προς τα εκεί και πόσοι θα μείνουν τελικά στον ίδιο τον αγωγό;

Πώς κατοχυρώνεται η τοπική κοινωνία της Ηπείρου, αλλά ιδιαίτερα της Θεσπρωτίας, ότι μπορεί να γίνει δίκτυο φυσικού αερίου στην περιοχή και μπορεί αυτό να είναι μέσα στα αντισταθμιστικά; Εάν μπορεί κάποιος να το κατοχυρώσει αυτό, έχετε προβλέψει πότε θα έρθει το αέριο στην Ήπειρο;

Επίσης, υπάρχει απόσταση ασφαλείας, με βάση τα παραγόμενα, όποια και αν είναι αυτά, οξειδία του αζώτου, όπου πρέπει να είναι κάποιος οικισμός; Τι λένε τα διεθνή πρότυπα;

Υπάρχει κατοχύρωση ότι τα κοιτάσματα, που αναφέρονται, υπάρχουν πραγματικά;

Τέλος, όλοι μπορεί να προσπαθούμε να διαμορφώσουμε μια ηπειρωτική περιφερειακή συνείδηση, όμως, νομίζω ότι στη συζήτηση για τα αντισταθμιστικά η Θεσπρωτία πρέπει να έχει τον πρώτο λόγο.

Φυσικά, και το έργο πρέπει να γίνει, αλλά με όσες παρατηρήσεις έκανα. Είναι κατανοητό.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ (Αντιπρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Καλογιάννης.

ΣΤΑΥΡΟΣ ΚΑΛΟΓΙΑΝΝΗΣ: Ακούσαμε, σε γενικές γραμμές, το ιστορικό του θέματος, το ιστορικό της χωροθέτησης του αγωγού και της μονάδας συμπίεσης. Επιτρέψτε μου, κύριε Πρόεδρε, να κάνω μια μικρή αναδρομή και να πω ότι πριν από ενάμιση χρόνο αυτά τα οποία συζητάμε τώρα και μας φαίνονται μάλλον εύλογα και υπάρχουν μικρές αντιδράσεις τα τορπίλισε η τότε αντιπολίτευση με τους αρμόδιους τομεάρχες του ΠΑ.ΣΟ.Κ., τομεάρχες περιβάλλοντος, τουρισμού και ανάπτυξης, λέγοντας στην Πέρδικα Θεσπρωτίας ότι «δεν υπάρχει περίπτωση εμείς να αφήσουμε να χωροθετηθεί ένα τέτοιο έργο σε μια περιοχή που αναπτύσσεται τουριστικά».

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(Συνέχεια ομιλίας κ. ΣΤΑΥΡΟΥ ΚΑΛΟΓΙΑΝΝΗ)

Η ουσία είναι ότι την επομένη των εκλογών το Υπουργείο Περιβάλλοντος κίνησε εν κρυπτώ, από όλους, την διαδικασία χωροθέτησης του αγωγού. Εν κρυπτώ εννοώ ότι η κοινή γνώμη αλλά και οι Βουλευτές, τουλάχιστον σε ό,τι με αφορά, θεωρούσαμε ότι δεν συνεχίζεται η διαδικασία. Σας αναφέρω δε, για να τεκμηριώσω αυτό που λέω, ότι η διαδικασία χωροθέτησης έχει ημερομηνίες από όλες τις υπηρεσίες μετά τις εκλογές του Σεπτεμβρίου του 2009. Έτσι δεν είναι κύριε Υπουργέ;

Φθάσαμε, λοιπόν, να έχουμε χωροθετήσει σήμερα τον αγωγό και την μονάδα. Θα ήθελα να απευθυνθώ στον κύριο Υπουργό και να ρωτήσω που βρίσκεται σήμερα το θέμα. βρίσκεται σε εξέλιξη η δεύτερη φάση της περιβαλλοντικής αδειοδότησης; Η μελέτη περιβαλλοντικών επιπτώσεων; Αν ναι, ποιο είναι το χρονοδιάγραμμα υλοποίησής της, πότε ολοκληρώνεται και πότε θα κατατεθεί για διαβούλευση;

Επίσης, θα ήθελα να ρωτήσω τον κύριο Υπουργό αν έχει προχωρήσει η μελέτη εφαρμογής του έργου σύμφωνα με τα χρονοδιαγράμματα, τα οποία έχουμε πάρει και αν έχει προχωρήσει επίσης η μελέτη επαλήθευσης της εφαρμογής του έργου και ποιο είναι το χρονοδιάγραμμα ολοκλήρωσής της;

Τρίτον και βασικό δεν γνωρίζουμε, κύριε Υπουργέ, ποια είναι η χάραξη του αγωγού από την Πέρδικα Θεσπρωτίας και εκείθεν. Ξέρουμε ότι συνδέει την Πέρδικα με την Κομοτηνή. Έχουμε ζητήσει και μέσω του κοινοβουλευτικού ελέγχου και θα παρακαλούσα πολύ αν έχουμε την χάραξη να την γνωρίζουμε τουλάχιστον οι Βουλευτές για να ενημερώσουμε τους συμπολίτες μας.

Ένα ερώτημα το οποίο είναι ειδικότερο και θα ήθελα να ρωτήσω τον κύριο Τολέρη είναι εάν οι ΝΕΧΟΠ των δύο νομών Πρέβεζας και Θεσπρωτίας έχουν γνωμοδοτήσει. Απ' ότι γνωρίζω έχει γνωμοδοτήσει εκ των υστέρων μόνο η ΝΕΧΟΠ Πρεβέζης η οποία θέτει σοβαρά θέματα. Δεν γνωρίζω αν το ίδιο έγινε και για την ΝΕΧΟΠ Θεσπρωτίας και αν ναι θα παρακαλούσα πολύ να έχουμε την άποψη της ΝΕΧΟΠ.

Επί της ουσίας, κύριε Υπουργέ, καταλήγοντας είπατε ότι ουσιαστικά το θέμα έχει λήξει για το Υπουργείο, αν κατάλαβα καλά. Η ερώτησή μου είναι παραπλήσια με αυτή που έθεσε και ο κύριος Περιφερειάρχης, ο Δήμαρχος αλλά και ο συνάδελφος κύριος Κατσούρας, εξετάζει το Υπουργείο την δυνατότητα μετακίνησης για λίγες εκατοντάδες

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μέτρα της μονάδας συμπίεσης; Από τεχνικής άποψης διαβεβαιώνουν οι τοπικοί φορείς ότι αυτό μπορεί να γίνει. Από άποψης περιβαλλοντικής αδειοδότησης επίσης εκτιμώ ότι εάν υπάρξει εντολή από το Υπουργείο μπορεί να κινηθεί πολύ γρήγορα. Θα παρακαλούσα πολύ για την απάντησή σας.

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ΕΥΑΓΓΕΛΟΣ ΑΡΓΥΡΗΣ: Συμμετείχα σε αυτή την Επιτροπή πάρα πολλά χρόνια και από την έναρξη αυτής της θητείας μου που περνά τα 15 χρόνια, τότε περίπου άρχισε δειλά δειλά να ακούγεται η χάραξη μιας πολιτικής και για ενεργειακή πολιτική στην Ελλάδα. Θα θυμίσω για τα τελευταία, επί Κυβερνήσεως της ΝΔ με υπουργό τον κύριο Σιούφα, τότε γινόταν πολύ μεγάλη συζήτηση για την χάραξη αυτού του αγωγού και τότε, οι Ηπειρώτες χωρίς να γνωρίζουν πού ακριβώς θα είναι αυτή η χάραξη, το μόνο που ζητούσαμε ήταν αν η διέλευση θα γίνει και έλευση. Δηλαδή, αν θα είχαμε και τα ευεργετήματα, αν θα μπορούσαμε να τύχουμε αυτής της κοινής αποδοχής που έχουν όλες οι περιοχές όταν διέρχεται ο αγωγός από κάπου να έχουν και την δυνατότητα να χρησιμοποιήσουν το φυσικό αέριο.

Ακούσθηκε και ακούγεται τελευταία ότι υπήρξε μια αντίδραση και θα έλεγα ότι είχαμε μια πρώτη χωροθέτηση. Η πρώτη χωροθέτηση μιλούσε για Σταυρολιμένα. Υπάρχει κανένας ηπειρώτης που θα μπορούσε να δεχθεί τον Σταυρολιμένα; Κανείς. Και αν θα μπορούσε σήμερα, από την Επιτροπή αυτή, όσοι δεν έχουν πάει σ' αυτή την περιοχή να πήγαιναν και να έβλεπαν την περιοχή του Σταυρολιμένα και την πρώτη χάραξη, την πρώτη διέλευση του αγωγού, τότε το μόνο που θα έκαναν είναι ότι θα έκαναν πολύ περισσότερα απ' αυτά που διεκδικούν σήμερα οι Ηπειρώτες, να προστατευθεί αυτό το συγκεκριμένο περιβάλλον.

Νομίζω ότι θα αδικήσουμε τον κύριο Υφυπουργό αν δεν πούμε ότι έχει ξεκινήσει μια μεγάλη αγωνιώδη προσπάθεια να βρεθεί εκείνη η δυνατή λύση και από τις συζητήσεις τις οποίες κάνουμε φαίνεται ότι αυτή την αγωνία την εκφράζει και με οποιοδήποτε εναλλακτικό κόστος και η ΔΕΠΑ. Για να μην αδικούμε ούτε και την ΔΕΠΑ, η οποία δέχεται στα σενάρια και μια εναλλακτικότητα των σεναρίων εκείνων που απ' ότι έχω ακούσει εγώ, πολλές φορές ακουμπάνε και τα 15 εκατομμύρια. Νομίζω ότι κανείς δεν θα διαφωνήσει για

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την ελληνικότητα αυτού του αγωγού. Είναι ίσως όχι απλά εθνικό θέμα, αλλά πρώτης προτεραιότητας για όλους μας. Άρα, λοιπόν, το πρώτο πράγμα που πρέπει να εξασφαλίσουμε είναι η ελληνικότητα του αγωγού αυτού και για να γίνει αυτό πρέπει οπωσδήποτε να προλάβουμε τις όποιες άλλες εξελίξεις, τα ανέλυσε άλλωστε ο κύριος Μανιάτης.

Νομίζω ότι η τοποθέτηση του κυρίου Περιφερειάρχη και του νέου δημάρχου που εκφράζει τις θέσεις και τις αγωνίες της Ηπείρου σε επίπεδο νέας αιρετής διοίκησης συνηγορούν μαζί με μια νέα επιστημονική προσέγγιση του Τεχνικού Επιμελητηρίου, που λέει ότι είμαστε πολύ καλά αρκεί να δούμε και τις τελευταίες λεπτομέρειες μια και η χωροθέτηση που γίνεται σήμερα στο εργοστάσιο θα μπορούσε να υπάρξει μια μικρή μετακίνηση, η οποία άλλωστε –απ’ ό,τι λέει ο Δήμαρχος και απ’ ό,τι φαίνεται και από άλλους πιο ειδικούς- ότι είναι στην ίδια γραμμή, δηλαδή δεν έχει παρέκκλιση από την γραμμή της διέλευσης του αγωγού. Νομίζω ότι η πρόταση του κυρίου Περιφερειάρχη και του νέου δημάρχου, όπως φάνηκε και από τον Πρόεδρο του Τεχνικού Επιμελητηρίου, που το Τεχνικό Επιμελητήριο έχει ασχοληθεί πολύ περισσότερο, έτσι θα μας πήγαινε σ’ αυτό που όλοι ζητάμε. Την κοινωνική συναίνεση. Να πάμε, δηλαδή, όσο γίνεται πολύ πιο κοντά σε αυτό που θα αποδεχθεί η τοπική κοινωνία, γιατί είναι αλήθεια πως όσοι έχουν πάει εκεί μπορούν κάλλιστα, να αποδεχθούν τους φόβους που υπάρχουν στην τοπική κοινωνία.

Κλείνοντας κύριε Υπουργέ, πιστεύω ότι αν γίνει πράξη αυτό που ειπώθηκε από τους κυρίους Περιφερειάρχη, Δήμαρχο και Πρόεδρο του Τεχνικού Επιμελητηρίου, νομίζω ότι θα προχωρήσουμε με πολύ καλύτερους όρους. Και για να μην βιάζονται κάποιιοι θα πρέπει να πω ότι η Διεύθυνση Αγροτικής Ανάπτυξης, το 2009 με έγγραφό της έχει γνωμοδότηση, κύριε Καλογιάννη.

ΣΤΑΥΡΟΣ ΚΑΛΟΓΙΑΝΝΗΣ: Εγώ ρώτησα για την ΝΕΧΟΠ.

ΕΥΑΓΓΕΛΟΣ ΑΡΓΥΡΗΣ: Πρακτικό ΝΕΧΟΠ με το οποίο γνωμοδοτεί θετικά, γιατί έχετε επιλεκτική μνήμη ...

ΣΤΑΥΡΟΣ ΚΑΛΟΓΙΑΝΝΗΣ: Κύριε Πρόεδρε, παρακαλώ πολύ δεν διέκοψα τον κύριο Αργύρη και δεν έκανα τέτοιους χαρακτηρισμούς. Αναφέρομαι κύριε Αργύρη σε σειρά εγγράφων που έχω στα χέρια μου και λείπουν τα συγκεκριμένα έγγραφα.

ΕΥΑΓΓΕΛΟΣ ΑΡΓΥΡΗΣ: Εδώ είναι, κύριε Καλογιάννη.

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ΣΤΑΥΡΟΣ ΚΑΛΟΓΙΑΝΝΗΣ: Αν τα έχετε εσείς κύριε Αργύρη, επιλεκτικά, εγώ τα ζήτησα από το Υπουργείο και δεν τα πήρα. Αν τα έχετε εσείς κανένα πρόβλημα.

ΕΥΑΓΓΕΛΟΣ ΑΡΓΥΡΗΣ: Είναι πολύ μεγάλο το έργο για να το βάλουμε μπροστά σε μια αντιπαράθεση. Πρέπει να το κατανοήσουμε, αλλά είναι επίσης πολιτικός πολιτισμός όταν πρέπει να αποδεχόμαστε τα πράγματα όπως έχουν. Πρέπει να κατανοήσουμε απόλυτα ότι κανείς τομεάρχης δεν είπε ότι δεν πρέπει να γίνει το έργο. Απλά όλοι όσοι ήρθαν εκεί, μηδέν εξαιρουμένων όλων των κομμάτων, κανείς δεν δέχθηκε την χωροθέτηση στον Σταυρολιμένα. Κανείς.

ΣΤΑΥΡΟΣ ΚΑΛΟΓΙΑΝΝΗΣ: Κύριε Πρόεδρε, επικαλούμαι δηλώσεις του κυρίου Κουβέλη, του κυρίου Χρυσοχοϊδη και της τομεάρχου τότε Τουριστικής Ανάπτυξης της κυρίας Γκερέκου.

ΕΥΑΓΓΕΛΟΣ ΑΡΓΥΡΗΣ: Κύριε Καλογιάννη, έχουμε δήμαρχο στα Γιάννενα να τα λύσουμε αυτά τα θέματα.

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ΕΥΑΓΓΕΛΟΣ ΑΡΓΥΡΗΣ(Γ' Αντιπρόεδρος της Βουλής): Οι υποδείξεις για την ομπρέλα 2 είναι από το νομαρχιακό συμβούλιο και από τον πρώην Νομάρχη. Η ομπρέλα 2, που σήμερα όλοι λέμε να μετατοπισθεί και σωστά πρέπει να μετατοπισθεί, είναι υπόδειξη από τον προηγούμενο Νομάρχη. Ας σταματήσουν λοιπόν αυτά τα πράγματα, να πάμε ένα βήμα μπροστά. Το βήμα μπροστά είναι να κάνουμε αυτό που κάνει ο κ. Μανιάτης, μια μεγάλη προσπάθεια μαζί με τους τοπικούς φορείς, γιατί χρειάζεται αυτή την κοινωνική συναίνεση. Είναι εδώ ο Περιφερειάρχης, ο Δήμαρχος, το Τεχνικό Επιμελητήριο, όλοι οι Βουλευτές Ηπείρου να καταλήξουμε σε κάτι, που να σταματήσει όλη αυτή την κωλυσιεργία, για να προχωρήσει το έργο.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ(Προεδρεύων της Επιτροπής): Το λόγο έχει ο κ. Οικονόμου.

ΑΘΑΝΑΣΙΟΣ ΟΙΚΟΝΟΜΟΥ: Την Ήπειρο με τα νέα δεδομένα, θα πρέπει να την αντιμετωπίζουμε ενιαία για να τις δώσουμε τις δυνατότητες και τις αξίες τις οποίες έχει.

Το ερώτημα είναι αν θα γίνει το έργο και για να δούμε αν θα γίνει πρέπει να το τοποθετήσουμε στην ευρωπαϊκή του διάσταση. Ο κ. Υπουργός το είπε και εμείς μαλώνουμε, φυλακισμένοι στο παρελθόν, πώς και γιατί έγινε και αν έγινε εν κρυπτώ. Είμαστε εδώ για να τα δούμε όλα στο φως. Καταλαβαίνω το άγχος σας κύριε Καλογιάννη, που υπήρξατε ο αντίστοιχος Υπουργός, αλλά ας τα δείτε με ευρυκαρδία.

Δεν πρέπει να αναφερόμαστε στο παρελθόν. Αυτή τη στιγμή υπάρχει ένας αγωγός. Συμφωνούμε σε μερικά πράγματα, ότι είναι φιλικότερος στο περιβάλλον, ότι πρέπει να ολοκληρωθούν οι περιβαλλοντικές μελέτες, να περάσει με τον καλύτερο δυνατό τρόπο και από το νομό Ιωαννίνων, να δίνει τη δυνατότητα η Ήπειρος να πάρει αυτό το αέριο και να δημιουργηθούν και οι υποδομές ακόμη και για την δυτική Ελλάδα.

Ας προχωρήσουμε και σε αυτά που διαφωνούμε, αν και κακώς διαφωνούμε γιατί δεν παύει να είναι εθνικό έργο. Έχει αυτός ο αγωγός οφέλη πέρα από τα τοπικά και εθνικά; Έρχεται σε αντιδιαστολή με τον αγωγό Ναμπούκο; Υπάρχει ανταγωνιστικός αγωγός στην Αλβανία που μπορεί να σταματήσει αυτό το έργο; Οι τοπικές αντιδράσεις υποδαυλίζονται καμιά φορά όχι από περιβαλλοντικές ευαισθησίες, αλλά από τέτοιου είδους εθνικές μας διαφορές; Το έχουμε αναρωτηθεί όταν υιοθετούμε κατ' ανάγκη όλες τις τοπικές διαφωνίες; Πιθανόν να μην έχουν, πιθανόν όμως να έχουν και να πρέπει να αναρωτηθούμε. Είναι

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τελικά οι περιβαλλοντικές ευαισθησίες; Έχουμε δει και σε άλλο νομοσχέδιο ότι δεν είναι, είναι ευαισθησίες ιδιοκτησίας.

Πριν από 30 χρόνια σ' αυτήν την περιοχή, αν γινόταν ένα εργοστάσιο συμπίεσης δεν θα ασχολούνταν κανείς, δεν θα ενδιαφερόταν κανείς. Πριν από 6 μήνες αν λέγανε εργοστάσιο LNG ούτε θα ξέραμε τι είναι. Παρακολουθούμε μια επικαιρότητα, η οποία μας κάνει να χάνουμε το δάσος και να ασχολούμαστε με το δέντρο. Ούτε έχει σημασία τι συνέβη στο παρελθόν, ούτε αν μας καλύπτουν οι διαβεβαιώσεις ότι δεν υπάρχουν περιβαλλοντικές επιπτώσεις ή οι τοπικές διαφωνίες. Είναι αν το έργο πρέπει να ολοκληρωθεί. Πείτε μας κύριε Υπουργέ, υπάρχει η δυνατότητα να μετακινηθεί ή όχι, υπάρχει πίεση χρόνου, γιατί είμαστε και σε ένα ανταγωνιστικό περιβάλλον; Μπορεί να γίνουν άλλοι αγωγοί και να μην γίνει αυτός ο αγωγός που έχει και εθνικό και τοπικό συμφέρον για την Ήπειρο ή όχι; Αν δεν υπάρχει πίεση χρόνου, μετακινήστε τον εκεί που λένε οι τοπικές κοινωνίες, αλλά κάποια στιγμή πρέπει να ξέρουμε ότι οι τοπικές κοινωνίες θα βάλουν μια τελεία στο διάλογο.

Όλα αυτά που ειπώθηκαν βοήθησαν στην σωστότερη τοποθέτηση του σημείου του εργοστασίου συμπίεσης και πρέπει να μην χάνουμε το συνολικότερο έργο, που είναι και προς όφελος και της Ελλάδος και της περιοχής της Ηπείρου. Θέλουμε μια διαβεβαίωση. Υπάρχει ο χρόνος να μετακινηθεί το εργοστάσιο συμπίεσης; Θα γίνει η διακλάδωση που θα βοηθήσει τις υποδομές στην Ήπειρο; Αυτά τα δύο για μένα είναι κυρίαρχα και βεβαίως σε κάθε περίπτωση να μην χαθεί η δυνατότητα να ολοκληρωθεί το έργο. Όσον αφορά όλα τα υπόλοιπα, έχουμε άλλα πεδία και άλλες πίστεις να διαφωνούμε.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ(Προεδρεύων της Επιτροπής): Το λόγο έχει ο κ. Παντούλας.

ΜΙΧΑΗΛ ΠΑΝΤΟΥΛΑΣ: Νομίζω ότι και εμάς εδώ ως πρόσωπα τον καθένα ξεχωριστά, αλλά πολύ περισσότερο τους πολίτες που θα παρακολουθήσουν αυτή τη συζήτηση και πιο πολύ τους ανθρώπους στη Θεσπρωτία, πολύ λίγο τους ενδιαφέρει για το τι έγινε στο παρελθόν. Σήμερα μιλάμε ούτως εχόντων των πραγμάτων.

Δε νομίζω ότι κανένας από εμάς και σε προσωπικό και σε συλλογικό επίπεδο, θέλει να φανεί κατώτερος των περιστάσεων. Ξέρουμε όμως, ότι μέσα από τον ορθόδοξο ή ανορθόδοξο διάλογο που έγινε και μέσα από την αγωνία που κατέθεσαν οι τοπικοί φορείς,

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έγιναν πολλές αλλαγές και αυτό πρέπει να το χρεώσουμε στα θετικά αυτής της προσπάθειας.

Δεύτερον, θέλω να μιλήσω για τα θέματα που έχουν μείνει σε εκκρεμότητα, τα οποία ειπώθηκαν από τον Περιφερειάρχη, από το ΤΕΕ, από το Δήμαρχο Ηγουμενίτσας και από τους Βουλευτές που μίλησαν μέχρι τώρα. Η νέα χωροθέτηση, όπως προτείνεται στον άξονα, είναι τόσο απαγορευτική στην κατασκευή του έργου; Και αν όπως έγιναν οι τρεις άλλες αλλαγές, η τέταρτη αλλαγή ενισχύει την κοινωνική συναίνεση, δε νομίζω ότι αυτό πρέπει να το αντιμετωπίζουμε αρνητικά εξ υπαρχής.

Επίσης, η διέλευση του αγωγού θα είναι έλευση του φυσικού αερίου στην Ήπειρο και στη δυτική Ελλάδα; Αυτό ενισχύει την κοινωνική συναίνεση, εφόσον γίνει. Νομίζω ότι πρέπει να το λάβετε πάρα πολύ σοβαρά υπόψη, διότι το τι συμβαίνει στο διεθνές περιβάλλον και στη γειτονιά μας σε σχέση με ανταγωνιστές, το ξέρουμε όλοι. Εμείς λοιπόν, συνεπόμενοι από μια αγωνία για τον τόπο μας, αλλά και για την πατρίδα μας, δεν νομίζω να γίνουμε νεροκουβαλητές των συμφερόντων κάποιων άλλων, που παίζουν αντίστοιχα παιχνίδια στην περιοχή και θέλουν να δρέψουν αυτοί τα οφέλη από μια τέτοια παρέμβαση.

Το έργο λοιπόν υπερβαίνει κατά πολύ και τα όρια της Επιτροπής, του Υπουργείου, της Ηπείρου. Είναι ένα εθνικών διαστάσεων έργο. Νομίζω ότι έτσι προσλαμβάνει η εταιρεία τις αντιδράσεις και τις διαφωνίες των τοπικών παραγόντων και νομίζω ότι είναι πολύ θετική αυτή η προσπάθεια που γίνεται, ώστε να φτάσουμε σε μια πλήρη ομοφωνία στο μεγαλύτερο δυνατό βαθμό, γιατί τα οφέλη που θα προκύψουν για όλους θα είναι καθοριστικά στον τομέα της ανάπτυξης, αλλά και των άλλων εθνικών συμφερόντων που υπηρετούνται μέσα απ' αυτό το έργο.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ(Προεδρεύων της Επιτροπής): Το λόγο έχει ο κ. Χαραλαμπίδης.

ΓΕΩΡΓΙΟΣ – ΕΡΝΕΣΤΟΣ ΧΑΡΑΛΑΜΠΟΠΟΥΛΟΣ: Σαφώς το θέμα της Ηπείρου είναι και όλης της Ελλάδας, ιδιαίτερα της βόρειας, σε μια επάρκεια φτηνής και περιβαλλοντικά φιλικής ενέργειας. Όταν μιλάμε όλο το κουρασμένο εξάμηνο, αν θα ανατιμηθούν οι τιμές του οικιακού πετρελαίου κ.λπ.. Η ενεργειακή μας πολιτική στα πλαίσια του 20 – 20 -20 κ.λπ.. Αυτό για την Ελλάδα.

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Το πρώτο ερώτημα μου είναι γιατί η Πάτρα, που είναι μια μεγάλη πόλη, δεν έχει πρόβλεψη για να πάρει αέριο. Επειδή είναι νότια; Το πρώτο θέμα είναι της περιφερειακής διάστασης και της ανάπτυξης της περιφέρειας και της προστασίας του περιβάλλοντος της περιφέρειας σχετικά με τους αγωγούς.

Δεύτερον, είπατε κύριε Μανιάτη και έτσι είναι, ότι η ζήτηση της Ευρώπης στα επόμενα χρόνια θα είναι 50%. Βεβαίως, οι περισσότερες χώρες της Ευρώπης έχουν μια συγκροτημένη ενεργειακή πολιτική και για τις εναλλακτικές πηγές ενέργειας ή υπάρχουν πυρηνικά εργοστάσια στη Γερμανία, Ισπανία, Βρετανία ή όπως εξήγγειλε ο Σαρκοζί έκανε 10 δις. ευρώ επένδυση για να δημιουργήσει αιολικά πάρκα offshore που θα παράγουν 3000Mwatt.

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(Συνέχεια ομιλίας κ. Γεώργιου –Ερνέστου Χαραλαμπόπουλου)

Βεβαίως, η Ευρώπη και ιδιαίτερα η Γερμανία, η Πολωνία και οι Βαλτικές Χώρες θέλουν να έχουν εναλλακτικές διαδρομές και να μην εξαρτώνται μόνο από την Ρωσική Ομοσπονδία. Όλα αυτά όμως, αν δούμε τον χάρτη που μας παρουσιάσατε και μας εξηγήσατε, απ' ότι καταλαβαίνω περνάνε από την Τουρκία. Δηλαδή, εκτός από το πρώτο σενάριο του South Stream με ρώσικο αέριο και ο Ναμπούκο και ο ITGI είναι αέριο του Αζερμπαϊτζάν που θα περάσουν από ένα αγωγό του Ναμπούκο, όπου θα περνάει και το αέριο του ITGI. Η Τουρκία είναι ένα οικόπεδο ανάμεσα σε εμάς και στους παρόχους, εμάς και της Ιταλίας γιατί φαίνεται ότι ο Ναμπούκο δελεάζει πιο πολύ τη Γερμανία και όλη εκείνη την περιοχή, ενώ ο δικό μας μάλλον, δελεάζει την Ιταλία και εκεί υπάρχουν κάποιες ισορροπίες και κάποιες ποσότητες.

Αναρωτιέμαι, εάν αυτό μας οδηγεί και σε παράλληλες σκέψεις. Έχουμε την περίπτωση της Αρμενίας και του Αζερμπαϊτζάν. Η Αρμενία και το Αζερμπαϊτζάν θέσανε στο συμβούλιο της Ευρώπης το θέμα του Ναγκόρνο Καραμπάχ. Πρέπει να δούμε ότι αυτά τα πράγματα σε ότι αφορά τη γεωστρατηγική της ενέργειας μπορεί να επηρεάσουν και εξωτερικές πολιτικές, παγιωμένες από εμάς. Δεν σημαίνει ότι εγώ είμαι υπέρ της άλλης. Μπαίνει η Τουρκία στο παιχνίδι. Αν δεν φύγει η Τουρκία μπορούμε να πάρουμε το αέριο από το Αζερμπαϊτζάν; Όχι. Βεβαίως, να δούμε αν θα τον φτιάξουμε εμείς πρώτοι, για να μην το φτιάξουνε οι άλλοι από την Κομοτηνή μέχρι τη Θεσπρωτία, αλλά απ' ότι είδα έχουμε Memorandum agreements υπογράψει.

Το δεύτερο ερώτημα είναι, εκτός από την Πάτρα, πότε βλέπετε ότι θα τελειώσει αυτή η υπόθεση; Σενάριο ένα South Stream. Σενάριο δύο Ναμπούκο. Σενάριο τρία ITGI. Δηλαδή, πότε, αν υποθέσουμε ότι θα είναι όλα στημένα και το αέριο θα περνάει από κάποιους αγωγούς, θα φτάνει σε εμάς και θα πηγαίνει παραπέρα; Εάν στο ένα, δύο, τρία που η Ευρώπη βλέπει να μην είναι εξαρτώμενη μόνο από τη Ρωσία, αλλά να έχει και εναλλακτικές όπως είπατε εσείς κύριε Υπουργέ, πηγές εφοδιασμού όπως το Αζερμπαϊτζάν ή την Ναμπούκο και εμείς που λέμε με τους Ιταλούς ITGI είναι και το τέταρτο σενάριο αυτό που συζητείται έντονα τελευταία. Ανακοινώθηκε και από την Κύπρο η βεβαιότητα πρόβλεψης κοιτασμάτων τύπου Λεβιάθαν, δηλαδή, μπαίνει και το τέταρτο σενάριο και ευτυχώς δεν παρεμβάλλεται τουρκικό οικόπεδο.

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ΚΩΝΣΤΑΝΤΙΝΟΣ ΜΟΥΣΟΥΡΟΥΛΗΣ : Το 2010, συμφώνησαν το Αζερμπαϊτζάν και η Τουρκία ότι το αέριο θα παραδίδεται στα ελληνοτουρκικά σύνορα. Εφόσον, έγινε αυτό γιατί η Κυβέρνηση σας παραχώρησε χωρίς λόγο και άνευ ανταλλάγματος συμμετοχή στον ελληνο -ιταλικό αγωγό στην περιοχή του Ιονίου, στην Μπότας που είναι τούρκικη εταιρεία; Αυτό είναι το πρώτο βασικό και θεμελιώδες ερώτημα για εμένα.

Δεύτερο ερώτημα. Ακούσαμε για τον άλλο αγωγό, τον ΤΑΠ ο οποίος απ' όσα γνωρίζω, έχει ίδια περίπου χωρητικότητα με τον ελληνο-ιταλικό, έχει καλύτερους όρους πρόσβασης τρίτων σε σχέση με τον ελληνο-ιταλικό, υποστηρίζεται επίσης από την Ε.Ε, διαθέτει φυσικό αέριο, μάλλον, εξασφαλισμένο και βέβαια, λαμβάνοντας υπόψη και το γεγονός ότι οι τράπεζες ωθούν τα περισσότερα έργα σε συγχώνευση πως η Κυβέρνηση σχεδιάζει να σταθεροποιήσει, αν θέλετε, έναντι αυτών των «πλεονεκτημάτων» του ΤΑΠ τον ελληνο-ιταλικό;

Τρίτο ερώτημα. Όσον αφορά τα κόστη ο ελληνο-ιταλικός είναι περίπου 500 εκατ. ευρώ, θα ήθελα να δω αν υπάρχει κάποια επικαιροποίηση. Να θυμίσω στους συναδέλφους ότι η τότε κυβέρνηση επενδύοντας στο Νότιο Ενεργειακό Διάδρομο είχε επιτύχει να εγγραφεί το έργο ως έργο απόλυτης προτεραιότητας, να λάβει εξαίρεση πρόσβασης τρίτων για 25 χρόνια και όπως είπατε και εσείς 100 εκατ. ευρώ, χρηματοδότηση από το πρόγραμμα ανάκαμψης, μαζί με 45 εκατ. ευρώ από τον IGB. Αυτή τη στιγμή καταλαβαίνω και λόγω της χωροθέτησης, υπάρχει ένα θέμα από την απορρόφηση αυτών των πόρων και πως θα το αντιμετωπίσετε; Σε σχέση με το αέριο που θα γεμίσει αυτόν τον αγωγό, εφόσον γίνει, ποιος διαπραγματεύεται η Κυβέρνηση ή το δίδυμο DEPA - EDISSON; Ανεξάρτητα από το ποιος, με ποιόν διαπραγματεύεται; Για παράδειγμα, ποιος είναι πιο κοντά SUDDENICE 2 σε σχέση με την ελεγχόμενη αγορά του κοιτάσματος αυτού; Τον έχουν βρει οι δύο εταιρείες; Έχει έρθει η Κυβέρνηση σε συμφωνία μαζί του ή σε προκαταρκτικές διαβουλεύσεις;

Τέταρτο ερώτημα. Πώς εξελίσσονται τα έργα του ITGI του ελληνο-τουρκικο-ιταλικού αγωγού εκτός Ελλάδος; Αναφέρω συγκεκριμένα στον αγωγό Μπακού - Ερζερούμ ο οποίος στην ουσία συνιστά, από ότι θυμάμαι, πάντα προϋπόθεση για να

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μεταφερθεί αυτό το αέριο στην Ευρώπη. Θα κλείσω με τα περιβαλλοντικά. Με απόλυτο σεβασμό στις ευαισθησίες των συναδέλφων της Ηπείρου, γνωρίζοντας τεχνικές παραμέτρους του σταθμού συμπίεσης- που δεν είναι εργοστάσιο είναι σταθμός συμπίεσης- και το γεγονός ότι χωρίς τέτοιο σταθμό δεν υπάρχει έργο, δηλαδή, τίθεται σε αμφιβολία το έργο θέλω να πω δύο πράγματα. Το πρώτο έχει να κάνει με την αγωνία του Ηπειρώτη. Θα έλεγα ότι η αγωνία του Ηπειρώτη δεν πρέπει να έχει σχέση με την αγωνία που θα αισθανόταν ο κάτοικος της Αιτωλοακαρνανίας αν προχωρούσε η επένδυση του LPG στον Αστακό. Το λέω αυτό για να διαστασιολογήσουμε τα έργα.

Επίσης, κύριε Υπουργέ, θα ήθελα στην παρέμβαση σας να μας πείτε αυτός ο περίφημος ενεργειακός σχεδιασμός της κυβέρνησης που περιλαμβάνει LPG το οποίο ξαφνικά γίνεται LNG στη Δυτική πλευρά της Ελλάδας, άρα, ενδέχεται, να είναι ανταγωνιστικό με τον ελληνο-ιταλικό αγωγό, που καταλήγει επιτέλους; Κλείνω με το εξής, επειδή, χειρίστηκα τις αντιδράσεις των Βουλευτών του ΠΑΣΟΚ, με την υπόθεση της χωροθέτησης της περιβαλλοντικής αδειοδότησης του σταθμού συμπίεσης, τότε με την ιδιότητα του Γενικού Γραμματέα του Υπουργείου Ανάπτυξης, θέλω να πω ότι η δημαγωγία και ο λαϊκισμός εξακολουθούν να έχουν αντίκρισμα που ελπίζω να μην το πληρώσετε και να πρυτανεύσει η λογική.

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ΙΩΑΝΝΗΣ ΖΙΩΓΑΣ : Θα κάνω τρεις συγκεκριμένες ερωτήσεις. Πρώτον αν ο ITGI είναι παρακλάδι του Ναμπούκο. Είναι ερώτηση που προέκυψε από το σχεδιάγραμμα που δόθηκε. Επίσης, με δεδομένο ότι ο ΤΑΠ είναι συντομότερος και επομένως οικονομικότερος που στηρίζεται η αισιοδοξία ότι θα προκριθεί ο ITGI και όχι ο ΤΑΠ; Τέλος με δεδομένα τα Ισραηλινά κοιτάσματα, κατά πόσο εκτιμάμε αυτά και τον αγωγό μέσω Κύπρου; Κατά πόσο εκτιμάμε ότι η νέα αυτή πραγματικότητα θα επηρεάσει τις εξελίξεις στην υλοποίηση του έργου;

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ΑΣΤΕΡΙΟΣ ΠΟΝΤΟΥΛΗΣ : Θα αρχίσω από ζητήματα τοπικής φύσης που ετέθησαν. Βεβαίως, υπάρχουν εκεί στην περιοχή οι Βουλευτές, οι δήμαρχοι, οι περιφερειάρχες που έχουν και τον πρώτο λόγο στην διαχείριση του θέματος.

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(Συνέχεια ομιλίας κ. Αστέριου Ροντούλη)

Εμείς θα αρκεστούμε να πούμε ότι, όσον αφορά στο σταθμό συμπύεσης και το εργοστάσιο ηλεκτρικής ενέργειας, θα πρέπει να υπάρξει η κατάλληλη χωροθέτηση, σε σχέση με τον παράλληλο χώρο της Θεσπρωτίας, γιατί στην περιοχή εμφανίζεται μια αξιοσημείωτη τουριστική κίνηση. Άρα, λοιπόν, θα πρέπει να δοθεί στους ανθρώπους αυτούς η αίσθηση της περιβαλλοντικής ασφάλειας. Θεωρούμε δε πάρα πολύ σημαντικό το να υπάρξει μια δέσμη αντισταθμιστικών μέτρων και αυτό μπορεί να περιλαμβάνει είτε έργα υποδομών στην περιοχή, είτε θέσεις εργασίας κατά τη φάση που θα γίνεται το έργο και κατά τη φάση λειτουργίας του έργου και, βεβαίως, αντισταθμιστικά τέλη, που πρέπει να δοθούν στους Οργανισμούς Τοπικής Αυτοδιοίκησης της περιοχής. Νομίζω ότι η Κυβέρνηση κινείται σε μια τέτοια λογική των πραγμάτων.

Έρχομαι τώρα, όμως, να θέσω κάποια ερωτήματα, που είναι ευρύτερης σημασίας και έχουν σχέση με τη γεωπολιτική διάσταση των πραγμάτων. Όλοι αυτοί οι αγωγοί που είπαμε, δηλαδή ο ITGI ο NAMPUCCO, ο IGB, ο TAP, εάν γίνουν όλοι, είναι αγωγοί που συνθέτουν το λεγόμενο «νότιο διάδρομο της Ε.Ε.», έναν διάδρομο που τον επιθυμεί διακαώς η Ε.Ε., γιατί θέλει ενεργειακή ασφάλεια, θέλει μια φθηνή ενεργειακή πρώτη ύλη και, κυρίως, θέλει διαφοροποίηση των πηγών ενέργειας, ούτως, ώστε να μην υπάρχει μια μονοσήμαντη εξάρτηση από τη Ρωσία. Ο νότιος, όμως, αυτός διάδρομος της Ε.Ε. εμφανίζει κάποια προβλήματα, κάποιες ευπάθειες. Το ένα ευπαθές σημείο είναι ότι συναντάται με τον αγωγό NAMPUCCO και, ήδη, καταδείχτηκε από τον Υφυπουργό, ο οποίος είπε ότι, για να λειτουργήσει ο αγωγός, θα πρέπει να εξευρεθούν και να παρθούν κοιτάσματα από το Τουρκμενιστάν. Εμάς μας ενδιαφέρει - μιας και που ο αγωγός NAMPUCCO δεν διέρχεται από τη χώρα - ο αγωγός ITGI, το άλλο σκέλος του νότιου διαδρόμου της Ε.Ε.. Και εδώ υπάρχει ένα ευπαθές σημείο, για το οποίο θα ήθελα μια απάντηση, κύριε Υφυπουργέ και συνίσταται στις σχέσεις Τουρκίας - Αζερμπαϊτζάν, γιατί εδώ νομίζω ότι υπάρχει εμπλοκή. Δεν ξέρω αν υπάρχει μια «καταρχήν συμφωνία», που μπορεί να υπάρχει τώρα τελευταία, αλλά αυτό το «καταρχήν» με ανησυχεί. Δηλαδή, μπορεί να υπάρξει επιπλοκή στο όλο ζήτημα; Γιατί, για να λειτουργήσει ο αγωγός ITGI, όπως σωστά είπατε, πρέπει να πάρει φυσικό αέριο από το Αζερμπαϊτζάν. Άρα, λοιπόν, θα

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θέλαμε μια ενημέρωση για το πού έχουν φτάσει οι σχέσεις Τουρκίας - Αζερμπαϊτζάν, σε σχέση με τον εν λόγω αγωγό.

Βεβαίως, θα ήθελα να ρωτήσω και κάτι άλλο: Μπορούμε να κάνουμε μια κίνηση στρατηγικής σημασίας στο νότιο διάδρομο και να δημιουργήσουμε ένα terminal LNG στην Καβάλα, για να πάρει υγροποιημένο φυσικό αέριο, το οποίο θα παίξει σημαντικό ρόλο στην τροφοδότηση με φυσικό αέριο ακόμα και του NABUCCO. Δηλαδή, όλο αυτό το πλέγμα των αγωγών, όταν και αν γίνουν, θα μπορούσε να πάρει φυσικό αέριο από ένα terminal, που θα δημιουργηθεί στην περιοχή της Καβάλας και έτσι να συνδέσουμε και το νότιο διάδρομο και να επαυξήσουμε τη γεωπολιτική σημασία, που έχουν οι αγωγοί αυτοί για τη χώρα. Για αυτό θα ήθελα μια απάντηση, εάν υπάρχει στο σχεδιασμό της δημόσιας επιχείρησης φυσικού αερίου.

Καταλήγοντας, θα ήθελα να κάνω ένα γενικό σχόλιο. Οι περιβαλλοντικές ανησυχίες από τις τοπικές κοινωνίες είναι θεμιτές, δεν πρέπει, όμως, να μπαίνουν εμπόδιο στην αναπτυξιακή προοπτική της χώρας και στη γεωπολιτική της αναβάθμιση. Εκ παραλλήλου, νομίζω ότι είναι αυτονόητο και αποδεκτό απ' όλους να εισακούγονται οι ανησυχίες των τοπικών κοινωνιών, γιατί εκεί υπάρχουν άνθρωποι, υπάρχουν οικογένειες, υπάρχει μια υπαρκτή οικονομική πραγματικότητα, η οποία δεν πρέπει να διασαλευθεί και μια υπαρκτή οικονομική πραγματικότητα, που εμφανίζει αξιοσημείωτη δυναμική ανάπτυξης, στηριζόμενη στον τουρισμό. Όλα αυτά θα πρέπει να τα λάβουμε υπόψη και με τις ενέργειές μας να ισορροπήσουμε τα δύο διακυβεύματα, την τοπική οικονομική ανάπτυξη και τη γεωπολιτική σημασία που ένα τέτοιο έργο δίνει στη χώρα.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ (Αντιπρόεδρος της Επιτροπής): Το λόγο έχει η κυρία Αμμανατίδου.

ΕΥΑΓΓΕΛΙΑ ΑΜΜΑΝΑΤΙΔΟΥ – ΠΑΣΧΑΛΙΔΟΥ: Εγώ θέλω να ρωτήσω τον κ. Υπουργό και τους υπόλοιπους που έκαναν την ενημέρωση, εάν υπήρξαν γνωμοδοτήσεις από τις νομαρχιακές αυτοδιοικήσεις από εκεί όπου θα περάσει ο φυσικός αγωγός - και μιλάμε για όλη τη βόρεια Ελλάδα και την Ήπειρο. Είπατε ότι θα ξεκινήσει από το Χάσκοβο, το οποίο είναι περίπου είκοσι με τριάντα χιλιόμετρα, αν θυμάμαι καλά, πάνω από το Αρμένιο, θα κατεβεί στην Κομοτηνή, όπου εκεί θα γίνει ο πρώτος σταθμός συμπίεσης, θα συνεχίσει, ο δεύτερος σταθμός θα γίνει στη Θεσσαλονίκη, στην Νέα Μεσημβρία - και γι'

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αυτό θα ήθελα να κάνετε μια περαιτέρω ενημέρωση - και ο τρίτος θα φτάνει στα παράλια του Ιονίου, στη Θεσπρωτία. Εκεί, υπήρχαν αντιδράσεις - και μάλιστα έγινε και ένα δημοψήφισμα το 2008 - διότι υπήρχε μια ζώνη, η οποία στο χωροταξικό ήταν ζώνη τουρισμού και οικιστικής θερινής κατοικίας, οπότε, ευλόγως, οι χρήσεις γης των δεν ελήφθησαν υπόψη - και θέλω να δω εάν έχουν ληφθεί τώρα με τα νέα δεδομένα και με τις μετακινήσεις που γίνονται και αν έχουν ληφθεί υπόψη οι χρήσεις γης σε όλη την πορεία του φυσικού αγωγού - εκεί, βέβαια, που επηρεάζει - όχι εκεί που πάει υπόγεια, εκεί που είναι οι σταθμοί - την ανάπτυξη της περιοχής.

Όσον αφορά στη Νέα Μεσήμβρια, επειδή αναφέρατε «εκεί είναι πολύ κοντά στα σπίτια, αλλά δεν έκαναν έτσι», θέλω να σας πω πως είναι γνωστό μόνο στον πρώην δήμαρχο της περιοχής και σε κάποια μέλη του δημοτικού συμβουλίου, τα οποία τότε είχαν αντιδράσει και μετά, εάν δεν κάνω λάθος, έκαναν ένα ταξίδι στην Ουγγαρία και πείστηκαν. Όμως, δεν έχει περάσει αυτό το θέμα από το δημοτικό συμβούλιο, δηλαδή, δεν έχει ενημερώσει το δημοτικό συμβούλιο και ο κόσμος δεν το γνωρίζει. Άρα, πιθανόν, να είχαμε όμοιες αντιδράσεις με των κατοίκων της περιοχής της Θεσπρωτίας, χωρίς να είμαι και 100% σίγουρη. Αυτό που λέω είναι ότι ο κόσμος δεν είναι ενημερωμένος για την ιστορία των σταθμών συμπίεσης. Δεν ξέρω τι γίνεται και στην Κομοτηνή, πού χωροθετείται και εάν εκεί υπάρχουν αντιδράσεις.

Αυτό είναι φυσικό αέριο transit, δεν είναι οικιακό. Η ενημέρωση που έχω για τον σταθμό της Νέας Μεσήμβριας - και θέλω να μου πείτε εάν είναι σωστή - είναι ότι θα δώσει, πιθανόν στη ΒΙ.ΠΕ. Σίνδου και στην ΒΙ.ΠΕ. Αγκιάλου αέριο για βιομηχανική χρήση, αλλά δεν θα δώσει στην ίδια την περιοχή της Νέας Μεσήμβριας, γιατί είναι transit και δεν είναι οικιακό.

Ύστερα από ένα αίτημα της Ελλάδας και της Ιταλίας, η Ε.Ε. έχει εγκρίνει την εξαίρεση του συγκεκριμένου έργου από την πρόσβαση τρίτων στα δίκτυα για περίοδο 25 ετών, στη διάρκεια των οποίων την αποκλειστική εκμετάλλευση θα έχουν η Δ.Ε.Π.Α. και η ιταλική ENTISON. Αυτό ακούγεται πάρα πολύ καλό. Όμως, η Δ.Ε.Π.Α. ετοιμάζεται για ιδιωτικοποίηση. Έχει το 65% το ελληνικό δημόσιο και το 35% το έχουν τα ΕΛ.ΠΕ.. Εάν χάσει το δημόσιο τον έλεγχο, καταλαβαίνετε πού οδεύουμε. Εάν ιδιωτικοποιηθεί περαιτέρω η Δ.Ε.Π.Α. και πάψει να υπάρχει αυτό το 65% - 35%, δεν θα έχουμε πρόβλημα με αυτή την

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απόφαση της Ε.Ε. για είκοσι πέντε χρόνια; Εδώ, θέλω μια απάντηση, γιατί είναι πολύ σοβαρό το θέμα.

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<b>ΛΥΡΗ</b>	<b>ΦΟΥΝΤΗ</b>	<b>01/02/2011</b>	<b>BKFA0201XL1</b>

Βέβαια θα πρέπει να διασφαλισθεί, η ασφάλεια από όπου περνά ο αγωγός φυσικού αερίου. Πρέπει να υπάρχει τεράστια προσοχή στην διαχείριση, τον σταθμό συμπίεσης και τον μετρητικό σταθμό που θα είναι στην Θεσπρωτία.

Υπάρχουν οι αντιδράσεις αυτές ειδικά στην Θεσπρωτία γιατί εμείς θεωρούσαμε ότι οι κάτοικοι της Πέρδικας και των Συβότων είχαν σοβαρότατες ενστάσεις γιατί το θέμα τους ήταν πολύ σοβαρό.

Τώρα που έχουμε την οικονομική κρίση και μόλις άρχισαν να έχουν μια τουριστική επισκεψιμότητα, καταστρέφονται.

Το θέμα της ΔΕΠΑ και της περαιτέρω ιδιωτικοποίησης έχει μεγάλη σημασία για την συγκεκριμένη σύμβαση.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ: Τον λόγο έχει ο κύριος Χατζηδάκης.

ΚΩΣΤΗΣ ΧΑΤΖΗΔΑΚΗΣ: Κύριε Πρόεδρε, έγινε εκτεταμένη συζήτηση για τα περιβαλλοντικά θέματα.

Καταλαβαίνω την ευαισθησία των συναδέλφων για το περιβάλλον και να πιστεύω ότι η Πολιτεία θα λάβει κάθε δυνατή μέριμνα ώστε η ανάπτυξη των αγωγών να μην γίνει επί ζημιά του περιβάλλοντος. Άλλωστε η μέχρι τώρα εμπειρία επί του θέματος είναι θετική. Διότι έχουμε αγωγούς φυσικού αερίου εν λειτουργία και δεν έχουμε παράπονα των κατοίκων για την λειτουργία τους και τις επιπτώσεις στο περιβάλλον.

Φαντάζομαι ότι θα μπορούμε να τα καταφέρουμε και στο μέλλον.

Θέλω να σταθώ στην ουσία δηλαδή στο θέμα της πολιτικής για τους αγωγούς και στην εμπορική αντίληψη της Κυβέρνησης, ως προς την προώθηση των αγωγών.

Καταλαβαίνω ότι στην αρχή της συνεδρίασης ο Υπουργός είπε ότι ο αγωγός ITGI είναι προτεραιότητα για την Κυβέρνηση.

Διερωτώμαι όμως κύριε Υπουργέ ποια είναι η θέση σας για το «Southstream», που είναι ένας άλλος αγωγός ίσης σημασίας. Ποια πολιτική έχετε επί του θέματος;

Που βρίσκονται οι συζητήσεις με την Ρώσικη πλευρά και τους άλλους εμπλεκομένους;

Να μην πείτε αν έχετε κάποιο νέο σε σχέση με έναν άλλο αγωγό μη φυσικού αερίου.

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<b>ΛΥΡΗ</b>	<b>ΦΟΥΝΤΗ</b>	<b>01/02/2011</b>	<b>BKFA0201XL1</b>

Αναφέρομαι στον αγωγό Μπουργκάς – Αλεξανδρούπολη, όπου είχαμε σημειώσει πως αρχικά είχαν γίνει ατυχείς δηλώσεις από τον Πρωθυπουργό.

Κατόπιν, υπήρξε αδράνεια εκ μέρους της Κυβέρνησης. Στο θέμα του ITGI, είμαστε όπως και εσείς υπέρ της πολλαπλότητας των οδεύσεων και των πηγών, για να μην υπάρχει εξάρτηση της χώρας από μια και μόνη πηγή.

Γι' αυτό τον λόγο είχαμε προωθήσει συμφωνίες με πολλές και διαφορετικές χώρες σχεδόν με όλους τους γείτονές μας.

Είχαμε συμφωνίες σε σχέση με τους αγωγούς φυσικού αερίου που ενισχύουν την γεωστρατηγική θέση της χώρας. Όμως όλα αυτά πρέπει να προωθηθούν και να μην μείνουν σχέδια λόγω ατυχών χειρισμών ή λόγω έλλειψης καίριων παρεμβάσεων. Ξέρουμε από την αρχή ότι ο αγωγός αυτός έχει πρόβλημα σε σχέση με την διαθεσιμότητα του αερίου.

Δηλαδή, κατά πόσο οι Αζέροι είναι δεσμευμένοι ότι θα διαθέσουν το αέριο αυτό. Μπορείτε να μας πείτε ποιες εξελίξεις υπάρχουν και πόσο βέβαιο είναι ότι έχουν ξεπερασθεί τα προβλήματα μεταξύ Τουρκίας και Αζερμπαϊτζάν και κατά πόσο οι Αζέροι είναι ουσιαστικά δεσμευμένοι, μέσα στα χρονοδιαγράμματα που αρχικά είχαν τεθεί να δώσουν το αέριο το οποίο απαιτείται.

Επίσης, σύμφωνα με την δική μου πληροφόρηση οι Αζέροι φαινόταν ότι δεν θα ήθελαν μόνο την ΔΕΠΑ και την Edison στον ITGI, ενδεχομένως θα ήθελαν και άλλες. Είναι ακριβές αυτό;

Όλα αυτά τα στοιχεία είναι χρήσιμα για την πληροφόρηση των συναδέλφων και για την διαμόρφωση της πολιτικής μας.

Σε σχέση με την αναβάθμισης δυναμικότητας του Τουρκικού δικτύου, όπου η τουρκική πλευρά ζητά από την Edison και τη ΔΕΠΑ να επενδύσουν.

Πόσο θα κοστίσει, πόσο μεγάλη επένδυση ζητούν οι Τούρκοι από την ΔΕΠΑ και την Edison και αν οι δύο αυτές εταιρίες είναι σε θέση να κάνουν αυτή την επένδυση ή υπάρχουν ζητήματα προς διευθέτηση.

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(Συνέχεια ομιλίας κ. Νικόλαου Καραθανασόπουλου)

Θα ήθελα να μάθω εάν η υπόθεση του south stream έχει εγκαταλειφθεί από την κυβέρνηση. Οι ανταγωνισμοί για το ποιοι αγωγοί φυσικού αερίου και πετρελαίου θα περάσουν από την περιοχή είναι τεράστιοι. Επίσης, είναι πολύ μεγάλα και τα γεωπολιτικά συμφέροντα. Από αυτή την άποψη όπως ισχύει και ίσχυε ότι οι δρόμοι του φυσικού αερίου και πετρελαίου είναι σπαρμένοι με αίμα, άρα και οι κίνδυνοι πολεμικών συγκρούσεων στην περιοχή είναι μεγάλοι καθώς επίσης είναι ορατή και η αναδιάταξη των συνόρων.

Η τρίτη ενότητα έχει να κάνει με την υπόθεση βιωσιμότητας. Από την παρουσίαση φάνηκε ότι διεκδικείτε το αζέρικο αέριο. Από τη στιγμή που γνωρίζουμε ότι οι γεωπολιτικές συμμαχίες εναλλάσσονται, έσπασε η συμμαχία Τουρκίας – Αζερμπαϊτζάν, άρα το ζήτημα είναι με τι θα τροφοδοτηθεί αυτός ο αγωγός, εφόσον υπάρχει αυτή η στρατηγικού χαρακτήρα συμφωνία μεταξύ Αζέρων και Ρώσων.

Κύριε Υπουργέ, θα θέλαμε να μας δώσετε κάποιες απαντήσεις για την πορεία του ενεργειακού σχεδιασμού στη χώρα μας. Βέβαια, το ζήτημα είναι συνολικότερο, αλλά περιοριζόμαστε στο συγκεκριμένο ζήτημα του αγωγού ανάμεσα στην τουρκία-Ελλάδα-Ιταλία.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ (Αντιπρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Γιαννάκης.

ΜΙΧΑΗΛ ΓΙΑΝΝΑΚΗΣ : Κυρίες και κύριοι συνάδελφοι, το θέμα που σήμερα συζητάμε είναι ιδιαίτερης σημασίας και σπουδαιότητας με την έννοια ότι δεν έχει μόνο την αναπτυξιακή και οικονομική διάσταση, αλλά σαφώς, και μια πολύπλευρη γεωπολιτική διάσταση που τέθηκε από τον Υπουργό. Νομίζω ότι θα συμφωνούσαμε όλοι ότι τέτοιες προσπάθειες πρέπει με μεγάλη προσοχή να σχεδιάζονται, να εντάσσονται σε ένα ευρύτερο ενεργειακό πλάνο και σχεδιασμό και παράλληλα να έχουμε μια συνέχεια. Η παράταξή μας έκανε σημαντικές προσπάθειες τα προηγούμενα χρόνια και νομίζω ότι παραδώσαμε τη σκυτάλη από μια καλή αφετηρία και μένει σήμερα στην κυβέρνηση να αποδείξει στην πράξη ότι μπορεί αυτά τα σημαντικά έργα να τα τρέξει.

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Ακούσαμε για το θέμα του περιβάλλοντος, μίλησαν οι συνάδελφοι και οι φορείς από την Ηπειρο και πιστεύω ότι θα έχουμε απάντηση από τον Υπουργό. Θα ήθελα να τονίσω ότι πολλά στελέχη του ΠΑΣΟΚ πριν από τις εκλογές ήταν αντίθετοι με ό,τι σήμερα σχεδιάζει το Υπουργείο. Αυτή θα έλεγα ότι είναι μια αντίφαση διαχρονική, γιατί και στον Μπουργκάς - Αλεξανδρούπολη είχαμε παρόμοια φαινόμενα. Επειδή ο συνάδελφος κ. Χατζηδάκης έθιξε το θέμα Μπουργκάς – Αλεξανδρούπολη, που είναι και αυτό ένα ώριμο έργο θα ήθελα να ρωτήσω τον κ. Υπουργό το εξής. Κύριε Υπουργέ, τουλάχιστον 7-8 δελτία τύπου του Υπουργείου σας διαχρονικά από τη στιγμή που αναλάβατε τα καθήκοντά σας τονίζουν ότι το συγκεκριμένο νομοσχέδιο θα έρθει στη Βουλή και ακόμη το περιμένουμε 16 μήνες και αυτό δείχνει προχειρότητα.

Θα επανέλθω στον ΑΤΓΙ που είναι ένα εξίσου σημαντικό έργο και θα ήθελα να ρωτήσω ποια είναι η προοπτική συμμετοχής τουρκικής εταιρείας στο συγκεκριμένο έργο. Κύριε Υπουργέ, υπάρχει δελτίο τύπου που αναφέρεστε σε ένα μνημόνιο συνεργασίας που έχετε συνυπογράψει, αλλά θα θέλαμε να μας πείτε κάτι πιο συγκεκριμένο. Επίσης, θα ήθελα να επισημάνω ότι στο δελτίο τύπου για το μνημόνιο συνεργασίας με την τουρκική εταιρεία αναφέρεται χαρακτηριστικά ότι το μνημόνιο αναβαθμίζει τον ΑΤΓΙ, έναντι του Ναμπούκο, λόγω της τουρκικής συμμετοχής. Σύμφωνα με την LA STAMPA ο ιταλός διευθύνων σύμβουλος της EDISON πριν από μερικές ημέρες ζήτησε τη διασύνδεση του ΑΤΓΙ με τον Ναμπούκο. Θα ήθελα να ρωτήσω εάν αυτά τα δύο συμβαδίζουν και ποια είναι η θέση του Υπουργείου πάνω στο συγκεκριμένο θέμα.

Ένα άλλο θέμα αφορά στον ελληνοβουλγαρικό αγωγό. Γνωρίζουμε ότι έχει συμφωνηθεί να αναλάβουν αυτό το έργο δύο εταιρείες με 50% η Ποσειδών που συμμετέχει η EDISON και η ΔΕΠΑ και 50% η βουλγαρική πλευρά. Εδώ προκύπτει το θέμα εάν η Μποτάς μπει στο Ποσειδών θα συμμετέχει και στον ελληνοβουλγαρικό; Είναι κάποια θέματα για τα οποία πρέπει να μας δοθεί κάποια απάντηση γιατί τα θεωρούμε ιδιαίτερα σημαντικά.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ (Αντιπρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Χαντάβας.

ΑΘΑΝΑΣΙΟΣ ΧΑΝΤΑΒΑΣ : Κύριε Υπουργέ, ο αγωγός για τον οποίο συζητάμε σήμερα είναι υψίστης σημασίας, αλλά και ζωτικής σημασίας για την ανάπτυξη. Σας

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συγχαίρω για τις πρωτοβουλίες που πήρατε για την επίσπευση όλων των διαδικασιών και εύχομαι να έχουμε καλά αποτελέσματα στην επικείμενη Σύσκεψη Κορυφής. Επίσης, χαίρομαι που σήμερα είδα μια σύγκλιση απόψεων μεταξύ Βουλής, Περιφέρειας Ηπείρου, Δημάρχου Ηγουμενίτσας, Τεχνικού Επιμελητηρίου Ηπείρου και ακόμη βλέπω ότι υπάρχει μια σύγκλιση σε ό,τι αφορά στο θέμα της χωροθέτησης του σταθμού συμπίεσης και τις επιπτώσεις που μπορεί να έχουν οι δύο μονάδες των 25 μεγαβατ φυσικού αερίου. Από την πολυετή εμπειρία μου στη ΔΕΗ θα ήθελα να διαβεβαιώσω ότι είναι μηδαμινές έως ανεπαίσθητες οι επιπτώσεις στο περιβάλλον. Θα ήμουν περιχαρής εάν και στη δική μου εκλογική περιφέρεια στα Γρεβενά, γίνονταν 10πλάσιες μονάδες από αυτές που προβλέπονται να γίνουν στη Θεσπρωτία.

Κύριε Υπουργέ, σε ό,τι αφορά στη χωροθέτηση, εκτός από τις ενστάσεις στην κατάληξη του αγωγού θα ήθελα να μάθω εάν στο υπόλοιπο τμήμα και ιδιαίτερα σε αυτό της Δυτικής Μακεδονίας έχετε καταλήξει ή υπάρχουν άλλα προβλήματα. Επίσης, θα ήθελα να ρωτήσω εάν για τη Δυτική Μακεδονία θα είναι αγωγός διέλευσης ή έλευσης. Εάν λάβουμε υπόψη μας το καλύτερο σενάριο ότι μας έρθουν όλα βολικά από πλευράς διεθνών διαπραγματεύσεων και αδειοδοτήσεων θα ήθελα να μάθω ποιο είναι το καλύτερο σενάριο υλοποίησης του συγκεκριμένου έργου.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ (Αντιπρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Αθανασιάδης.

ΑΛΕΞΑΝΔΡΟΣ ΑΘΑΝΑΣΙΑΔΗΣ : Κύριε Πρόεδρε, ο κ. Υπουργός είπε ότι συγκεκριμένα στην Ευρώπη η παραγόμενη ενέργεια από αέριο θα φθάσει το 50%. Αυτό σημαίνει ότι η Ελλάδα είναι Ευρώπη και σε λίγο αλλάζει το μείγμα. Ανανεώσιμες πηγές, αέριο, λιγνίτες, υδροηλεκτρικά μεγάλα έργα κ.λπ.. Θα ήθελα να ρωτήσω ποια θα είναι η μελλοντική εξέλιξη του λιγνίτη, διότι με αυτόν αναπνέουμε, από αυτόν ζούμε και ας έχουμε τη ρύπανση. Δεν γίνεται ανάπτυξη χωρίς να έχουμε και κάποια ρύπανση του περιβάλλοντος.

Θα αναφερθώ στο σταθμό συμπίεσης, που πρόκειται να κατασκευαστεί στο διαμέρισμα της Θεσπρωτίας κοντά στα Σύβοτα. Τα τελευταία χρόνια τα Σύβοτα έγιναν και τουριστικός προορισμός, αναπτύχθηκε η περιοχή που έχει ένα εξαιρετικό φυσικό κάλος και εδώ θα πρέπει να τονίσω ότι δεν χρειάζεται άλλο να επιβαρυνθεί. Θα ήταν πολύ εύκολο για

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εμένα και ανέξοδο να υπερασπιστώ το περιβάλλον και να διαφωνήσω με τις αποστάσεις από τη θάλασσα για το που θα γίνει ο σταθμός, ο αγωγός κ.λπ..

Π/φος	Δ/φος	Ημερομηνία	Όνομα αρχείου
<b>ΚΥΡΙΑΖΗ</b>	<b>ΛΥΡΑ</b>	<b>1.2.2011</b>	<b>BMFA0201.KZ2</b>

(Συνέχεια ομιλίας κ. Αλέξανδρου Αθανασιάδη)

Δεν θα το κάνω, όμως, αυτό, σεβόμενος την επένδυση, αφενός μεν τα πολλαπλά οφέλη που έχει αυτή η επένδυση για τη χώρα και βέβαια, για την περιοχή ειδικότερα. Προσωπικά, επιτρέψτε μου να το πω, έχω άμεση σχέση με μονάδες παραγωγής ενέργειας, διότι αυτή ήταν η δουλειά μου και μάλιστα, ασχολήθηκα με ένα μεγάλο κομμάτι της εταιρείας ΑΣΠΡΟΦΩΣ, το 1990 – 1991 και έφτιαξα και ένα σταθμό συμπίεσης στην περιοχή των Σερρών και πολύ συγκεκριμένα, στις Θερμοπηγές.

Αυτό που θέλω να σας πω, ότι ο σταθμός συμπίεσης, κατ' αρχάς, ούτε φαίνεται ούτε θα καταλάβει κανείς ότι υπάρχει. Σε ό,τι αφορά τώρα την μονάδα των 50 mw με καύση το αέριο, η ρύπανση είναι έως μηδενική. Όταν μάλιστα, γίνεται και σε μια περιοχή θαλάσσια, όπου υπάρχουν θαλάσσια ρεύματα, δεν θα καταλαβαίνει κανείς ότι εκεί υπάρχει μονάδα. Είναι μια μικρή μονάδα 50 mw. Θα με ρωτήσετε όμως, τι είναι τα 50 mw. Τα 50 mw μπορούν να τροφοδοτήσουν μια πόλη των 70.000 κατοίκων. Είναι σημαντικό για την περιοχή των Ιωαννίνων και γενικά της Ηπείρου, διότι αυτή η περιοχή έχει ένα έλλειμμα σε ό,τι αφορά τα δίκτυα. Μπορεί η Πτολεμαΐδα να βγάζει τα 4.400 mw, μπορεί η Λάρισα να έχει τους υποσταθμούς, όμως, η Ήπειρος δεν έχει. Η Ήπειρος αναπτύσσεται και πρόκειται να αναπτυχθεί περαιτέρω. Επομένως, είναι επιτακτική η ανάγκη να γίνει η μονάδα των 50 mw.

Σχετικά με τη ρύπανση, εάν κάνετε, αγαπητοί συνάδελφοι, μια επίσκεψη στο Λαύριο, θα σας πείσει, διότι υπάρχουν εκεί μεγάλες μονάδες, είναι περίπου στα 1.200 mw. Εκεί δεν θα καταλάβετε ότι υπάρχει μονάδα και η μονάδα βρίσκεται στις κατοικημένες περιοχές. Πόσο μάλλον όταν μιλάμε για μια περιοχή, όπως είναι τα Σύβοτα και η περιοχή της Πέλλας. Εδώ συζητάμε και ξανασυζητάμε, επιτρέψτε μου να το πω θεωρητικά. Πρέπει, όμως, να καταλάβουμε ότι η χώρα έχει ανάγκη από επενδύσεις. Πρέπει άμεσα να συμφωνήσουμε όλοι και να πάμε επιτόπου και να πείσουμε τους κατοίκους της περιοχής, ότι δεν κινδυνεύουμε από την ρύπανση, εξάλλου η ΔΕΠΑ έχει κάνει τις μελέτες και αυτές δεν είναι τυχαίες. Μπορούμε να κάνουμε ομάδες και να φθάσουμε ως την Πέρδικα. Συμφωνώ ότι καλές είναι οι ευαισθησίες, αλλά εν πάση περιπτώσει, αυτή τη στιγμή η χώρα θα πρέπει να σηκώσει κεφάλι.

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Εγώ θέλω να ρωτήσω μιας και είναι και ο Περιφερειάρχης εδώ, να του κάνω μια ερώτηση. Οι δεξαμενές πετρελαίου που υπάρχουν στα Σύβοτα, δεν ενοχλούν κανένα; Υπάρχουν και μάλιστα ζητάμε νέα χωροθέτηση, για να εγκατασταθούν. Αυτές δεν ενοχλούν κανέναν, οι οποίες είναι πιο επικίνδυνες από αυτό που συζητάμε τώρα. Καταλαβαίνετε τι πρόκειται να γίνει στην περιοχή σε ένα τυχαίο ατύχημα.

Αγαπητοί συνάδελφοι, θεωρώ ότι σε αυτό το θέμα πρέπει να συμφωνήσουμε όλοι και οι διαθέσεις από όλους είναι πάρα πολύ θετικές και θα πρέπει να συμφωνήσουμε ότι το έργο θα πρέπει να γίνει για εθνικούς λόγους, για την περιοχή και για όλους μας. Θα πω, όμως, μόνο στον Υπουργό, από τη στιγμή που περνά ο αγωγός από τη Δυτική Μακεδονία – επειδή χρόνια μιλάμε για συνδυασμένη καύση κύριε Υπουργέ – εμείς για να ανάψουμε μια μονάδα λιγνιτική και να την προθερμάνουμε, θέλουμε 120 τόνους πετρελαίου, επομένως, γιατί να μη φέρουμε το αέριο και να ξεκινήσουν οι μονάδες; Επίσης, γιατί να μην κάνουμε συνδυασμένη καύση εφόσον ο λιγνίτης σιγά – σιγά τελειώνει; Δεν είναι ευκαιρία να κάνουμε ένα σταθμό στα Γρεβενά και από εκεί να περάσει το αέριο στην Πτολεμαΐδα, ώστε να μπορέσουμε να κρατήσουμε την περιοχή ενεργειακή; Εφόσον ξεκινάμε να κάνουμε εκεί τα αιολικά και τα φωτοβολταϊκά πάρκα.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ (Αντιπρόεδρος της Επιτροπής) : Το λόγο έχει ο κ. Καλαφάτης.

ΣΤΑΥΡΟΣ ΚΑΛΑΦΑΤΗΣ : Κύριε Πρόεδρε, είχαμε την ευκαιρία μέσα από τη σημερινή συζήτηση, εκτός των άλλων, να αναδείξουμε και δύο θέματα. Το πρώτο θέμα είναι η ανάδειξη και η παραδοχή από όλες τις πτέρυγες και από όλους τους συναδέλφους, ότι η πολιτική σχετικά με την διπλωματία των αγωγών και ο ενεργειακός σχεδιασμός που αφορούσε τους αγωγούς φυσικού αερίου και όχι μόνον, στην περιοχή μας έτσι όπως αναπτύχθηκε κυρίως τα τελευταία χρόνια και μέχρι το 2009, τελικά ήταν μια σωστή επιλογή. Αναδείχθηκε λοιπόν, πως υπηρέτησε αυτή η επιλογή της Νέας Δημοκρατίας, όταν ασκούσε τη διακυβέρνηση της χώρας, ως μια εθνικά ωφέλιμη επιλογή.

Το δεύτερο σημείο, το οποίο αναδεικνύεται, είναι η ανατροπή θέσεων ή αν θέλετε, η εναλλαγή των θέσεων πολλών συναδέλφων από το ΠΑΣΟΚ, που ως αντιπολίτευση, όχι μονάχα δεν στήριξε μια τέτοια εθνικά ωφέλιμη επιλογή και η παραδοχή γίνεται, σχεδόν από όλους, αλλά πολλές φορές, για λόγους μικροπολιτικούς, προσπάθησε να δυναμιτίσει

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κάποιες προσπάθειες που αφορούσαν ακριβώς την εφαρμογή αυτής της πολιτικής. Συγκεκριμένα, αναφέρθηκε από τους συναδέλφους του Νομού Ιωαννίνων, ότι τέτοιες αντιδράσεις σημειώθηκαν από πλευράς των βουλευτών του ΠΑΣΟΚ, που ήθελαν, ουσιαστικά, να ωφεληθούν μικροπολιτικά.

Ωστόσο, πέρα από την αναγνώριση και την ανάδειξη των σημείων αυτών, πηγαίνουμε μπροστά, διότι πραγματικά, οι αγωγοί φυσικού αερίου και όχι μόνο, η διπλωματία των αγωγών, η εφαρμογή του ενεργειακού σχεδιασμού σε ό,τι αφορά τους αγωγούς, πραγματικά, είναι υψίστης προτεραιότητας και σημασίας. Θέλω να πιστεύω, κύριε Υπουργέ, ότι έτσι το αντιλαμβάνεται και η ίδια η Κυβέρνηση και δεν έχω κανένα λόγο να σταθώ απέναντι σε αυτό. Παρόλα αυτά, θα πρέπει να υπάρξουν κάποια σημεία διευκρινιστικά, όχι τόσο όσον αφορά το σημείο της χωροθέτησης του σταθμού συμπίεσης, όπου εκεί δόθηκαν οι αμοιβαίες εξηγήσεις και τοποθετήθηκαν και οι συνάδελφοι, όπως και από την πλευρά της ΔΕΠΑ, όπου έγινε ξεκάθαρη η θέση της, όσο κάποια ουσιαστικά θέματα.

Είναι πολύ σύντομα και συγκεκριμένα τα ερωτήματα που αφορούν γενικότερα το έργο και κυρίως την υλοποίησή του. Ιδιαίτερα, το ζήτημα του σχεδιασμού και της εφαρμογής της πολιτικής των αγωγών, πολλές φορές φοβάμαι, ότι αναλώνεται περισσότερο σε σχεδιασμό επί χάρτου, ενώ θα πρέπει κυρίως να δούμε τα πραγματικά σημεία υλοποίησης αυτού του σχεδίου. Αναφέρομαι συγκεκριμένα, στα θέματα της κατασκευής και της υλοποίησης της επένδυσης. Για παράδειγμα, τα ερωτήματα τα οποία θα σας πω είναι συγκεκριμένα.

Για να μπορέσει να υπάρξει αυτή η επένδυση, θα πρέπει να υπάρξει η «πρώτη ύλη», που είναι, ουσιαστικά, το φυσικό αέριο από το Αζερμπαϊτζάν. Το ερώτημα είναι συγκεκριμένο. Για να υπάρξει αυτό το final investment decision, θα πρέπει να υπάρξει, εάν θέλετε, μια διασφάλιση ότι αυτό το αέριο υπάρχει, έτσι, ώστε να μπορέσει να πιάσει τόπο η επένδυση, ή βεβαίως, να υπάρχει λόγος για να γίνει μια επένδυση. Μια τόσο υψηλή επένδυση, όπως είναι αυτή του ελληνοϊταλικού αγωγού. Επομένως, το ερώτημα είναι, προσύμφωνο προμήθειας υπάρχει; Υπάρχει μια προδικασία; Υπάρχει έστω κάτι το οποίο να το διασφαλίζει; Δεν με ενδιαφέρει τόσο πολύ το ύψος, όσο εάν υπάρχει ένα σημείο από το οποίο να φαίνεται ότι υπάρχει κάτι που να διασφαλίζει την επένδυση. Διότι επένδυση να γίνει

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σε ένα τόσο μεγάλο έργο, χωρίς να έχει διασφαλιστεί η παροχή του αερίου, φυσικά, αντιλαμβάνεστε, ότι αυτό είναι στον αέρα.

Το δεύτερο ερώτημά μου είναι, το πότε θα εξαχθεί το φυσικό αέριο.

Το τρίτο έχει να κάνει κυρίως με το κατασκευαστικό κομμάτι, όχι μονάχα του ελληνοϊταλικού αγωγού, στο κομμάτι το υποθαλάσσιο, αλλά και στο επίγειο από την Κομοτηνή μέχρι τη Θεσπρωτία και βεβαίως, με τον ενδιάμεσο σταθμό, τη μεσημβρία της Θεσσαλονίκης. Γνωρίζετε πολύ καλά, ότι το έργο είναι υψηλό σε επίπεδο κόστους και νομίζω, ότι είναι πολύ μεγαλύτερο το κόστος κατασκευής, το οποίο πιστεύω, ότι είναι διπλάσιο. Άρα, είναι σημαντικό να γνωρίζουμε από τώρα ποιες είναι οι σκέψεις της Κυβέρνησης για το πρακτικό, διαγωνιστικό κομμάτι και ποιες είναι οι σκέψεις γενικότερα για τον τρόπο κατασκευής αυτού του πολύ μεγάλου project τόσο όσον αφορά το κομμάτι το υποθαλάσσιο, όσο και το επίγειο.

Η τελευταία μου ερώτηση, έχει να κάνει σχετικά με τον χρονικό προσδιορισμό της υλοποίησης της επένδυσης. Εσείς θα μας πείτε, εάν θα πάει πιο πίσω, δηλαδή το 2013 ή το 2014 και εάν συμβαίνει αυτό. Εάν έχει οριστικοποιηθεί από την Ε.Ε. η παράταση της έγκρισης για την κατασκευή σε ένα απώτερο χρονικό σημείο, διότι εξ όσων γνωρίζω, εφόσον θα πάει πιο πέρα ο χρονικός προσδιορισμός της κατασκευής του έργου, απαιτείται, βεβαίως, και η έγκριση της παράτασης αυτής από την Ε.Ε., εφόσον είναι ουσιαστικά, ο βασικός μέτοχος και μέσα από τις εξαιρέσεις που δόθηκαν, αλλά και από την μερική χρηματοδότηση του έργου στην Ε.Ε.. Άρα, είναι αναγκαία, προφανώς και η έγκριση της παράτασης από πλευράς της Ε.Ε., εφόσον πηγαίνει πιο πέρα ο χρονικός προσδιορισμός της υλοποίησης του έργου.

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ (Πρόεδρος της Επιτροπής) : Το λόγο έχει ο κ. Σαλαγιάννης.

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ΝΙΚΟΛΑΟΣ ΣΑΛΑΓΙΑΝΝΗΣ: Κύριε Υπουργέ, θέλω να κάνω μια εκτίμηση γιατί έχω αρκετά χρόνια στο Κοινοβούλιο, αλλά και γύρω στα 20 χρόνια είμαι επαγγελματίας μελετητής των δημοσίων έργων.

Έχετε κάνει πολύ σοβαρή δουλειά και νομίζω ότι είστε πολύ κοντά στην πλήρη αποδοχή από την κοινωνία και τους φορείς της. Εάν κάποιος από τους φορείς έπαιρνε το θάρρος να πει ότι είναι έστω και δίπλα, τότε τελειώνουν όλα. Άρα βρίσκεστε πολύ κοντά στη λύση του προβλήματος.

Επειδή ξέρω πολύ καλά την περιοχή ως μηχανικός, δεν κατανοώ πώς για πρώτη φορά ετέθη το θέμα του Σταυρολιμένα. Είδα στον χάρτη που ακριβώς λέτε να πάτε και δεν νομίζω ότι υπάρχει κανένα απολύτως πρόβλημα. Ακόμα και οι φορείς αυτά λένε.

Νομίζω, λοιπόν, ότι είστε κοντά. Γνωρίζοντας τους επαγγελματίες - φορείς που βρίσκονται σήμερα στην Επιτροπή μας και, κυρίως, τον κ. Παλαιογιάννη, που ξέρω το πόσο σοβαρός επαγγελματίας και πόσο πολιτικά και κοινωνικά ευαίσθητος είναι, απεκόμισα ότι όλοι εδώ κάνουν πολύ σπουδαία δουλειά.

Κλείνοντας θα ήθελα να σας ευχαριστήσω όλους για την ενημέρωση. γιατί με όλα τα γεωπολιτικά θέματα τα οποία τελευταία βρίσκονται σε αναβρασμό, δεν ήξερα πώς ακριβώς κινούνται τα θέματα των αγωγών, γιατί δεν έχω γνώση και σήμερα πήρα μια εικόνα του τι ακριβώς γίνεται.

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ (Πρόεδρος της Επιτροπής): Το λόγο έχει ο κ. Τσιρώνης.

ΔΗΜΗΤΡΙΟΣ ΤΣΙΡΩΝΗΣ: Κύριε Υπουργέ, θέλω να σας ευχαριστήσω σαν ηπειρώτης Βουλευτής, αλλά και σαν Αντιπρόεδρο της Επιτροπής, που είχατε την ευαισθησία δύο φορές μέσα στο 2011 να μας ενημερώσετε για ενεργειακά ζητήματα και για ζητήματα των αγωγών, πρώτα με τον Πρίνο. Τότε σας είχα ρωτήσει εάν αυτό το έργο συναντούσε αντιδράσεις από τους τοπικούς φορείς.

Σας είχα πει τότε για ένα ανάλογο έργο φυσικού αερίου στην Πέρδικα της Ηπείρου, αυτό που συζητάμε σήμερα, ότι είχε αντιδράσεις από τους τοπικούς φορείς. Σε πολύ λίγο διάστημα το πολύ δύο εβδομάδων, πρώτος εσείς είχατε την ευαισθησία να ζητήσετε την σύγκληση της Επιτροπής, αλλά και την παρουσία των φορέων της Ηπείρου. Αυτό δείχνει τη μεγάλη σας ευαισθησία ότι αναζητάτε πραγματικά να βρείτε μια λύση.

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Σχετικά με το ζήτημα της χωροθέτησης του σταθμού συμπίεσης, νομίζω ότι με αυτή την πρώτη εναλλακτική λύση που δίνουμε, είμαστε κοντά στη λύση του προβλήματος. Είμαστε, όμως, μέσα σε μια κατοικημένη περιοχή, μέσα στο χωριό και μπορεί να είμαστε στην ευθεία 5 χιλιομέτρων από τις ακτές. Πιστεύω ότι μπορούμε να πάμε και άλλα 1500 μέτρα πιο πίσω και έτσι δεν υπάρχει ούτε οικονομική επιβάρυνση στο έργο γιατί είναι στην ίδια χάραξη ούτε κανένα τεχνικής φύσεως πρόβλημα.

Νομίζω ότι θα συμφωνήσουμε όλοι σε αυτό και πιστεύω ότι θα το μελετήσετε πολύ σύντομα. Δεν τέθηκε ποτέ από κανέναν φορέα εμάς των ηπειρωτών θέμα ματαίωσης, ακύρωσης ή αναστολής ενός τόσο σοβαρού έργου. Πάντα εμείς σε τέτοιου είδους εθνικά ζητήματα δεν έχουμε κάνει ποτέ πίσω, ειδικότερα, σε όσα αφορούν την ανάδειξη της χώρας, αλλά και της δικής μας περιοχής και συνεπώς δεν τίθεται θέμα για μας η κατασκευή ή μη του έργου. Πλην όμως, επειδή πρόκειται για μια τουριστική περιοχή και η τουριστική αξιοποίηση αυτής της περιοχής αποτελεί τη μοναδική δυνατότητα που έχει και επειδή έχουν δημιουργηθεί οι ακραίες και λανθασμένες ψυχολογικές εντυπώσεις, ότι εκεί μπορεί να υπάρχει μια επιβάρυνση και επειδή ο τουρισμός παίζει και στο θέμα των εντυπώσεων και της ψυχολογίας, αντιλαμβάνεστε ότι και αυτό είναι κρίσιμο και θα πρέπει να το συνεξετάσουμε. Αυτό είναι το πρώτο ζήτημα.

Το σημαντικότερο, όμως, ζήτημα για την περιοχή και για την Ήπειρο γενικότερα είναι το πότε θα έρθει εκεί το φυσικό αέριο. Αυτό νομίζω, κύριε Υπουργέ, ότι σήμερα πρέπει να μας το πείτε και να δεσμευθείτε.

Δεν γνωρίζω, εάν με αυτό το έργο θα έρθει το φυσικό αέριο στην Ήπειρο, αλλά από τον Οκτώβριο του 2011 ακούσαμε ότι το πετρέλαιο θέρμανσης ακριβαίνει, όπως έχει εξαγγελθεί από το Υπουργείο. Νομίζω ότι θα πρέπει να έχουμε και μια άλλη εναλλακτική δυνατότητα και στη δική μας περιοχή, πρώτον για τη θέρμανση και δεύτερον για την κίνηση των εργοστασίων. Άλλωστε η Ήπειρος μπαίνει στην υψηλή ζώνη κινήτρων με το νέο αναπτυξιακό νόμο.

Αντιλαμβάνεστε, λοιπόν, ότι θέλουμε να έχουμε ένα επιπλέον καύσιμο για την κίνηση της παραγωγής και της οικονομικής δραστηριότητας και συνεπώς θα θέλαμε να μας πείτε πότε θα έρθει το φυσικό αέριο στην Ήπειρο.

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Αυτό αποτελεί ένα πάρα πολύ σημαντικό αναπτυξιακό ζήτημα για την περιοχή μας. Σας ευχαριστώ.

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ (Πρόεδρος της Επιτροπής): Ευχαριστούμε τον Αντιπρόεδρο της Επιτροπής μας, τον κ. Τσιρώνη.

Το λόγο έχει η κυρία Σακοράφα.

ΣΟΦΙΑ ΣΑΚΟΡΑΦΑ: Θέλω να θέσω μια επιγραμματική ερώτηση, όσον αφορά στις αδειοδοτήσεις επί χερσαίου εδάφους στη διαδρομή του αγωγού και τις απαλλοτριώσεις, δασικές εκτάσεις και αρχαίους οικισμούς. Τι έγινε με αυτό;

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ (Πρόεδρος της Επιτροπής): Προφανώς θα υπάρχει αυτή η νομοθεσία και θα την τηρούν.

Ολοκληρώσαμε με τις τοποθετήσεις των συναδέλφων.

Το λόγο έχει ο κ. Υπουργός.

ΙΩΑΝΝΗΣ ΜΑΝΙΑΤΗΣ (Υφυπουργός Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής): Κύριε Πρόεδρε, ζητώ συγγνώμη από τους συναδέλφους στις ερωτήσεις των οποίων δεν θα απαντήσω γιατί δεν προλαβαίνω, αλλά θα επιδιώξω να κάνω μια σύνοψη.

Για να είμαι σαφής προς τους συναδέλφους της Ηπείρου θα κάνω την εξής πολιτική δήλωση. Η εντολή που έχει δοθεί στην ΔΕΠΑ από την πολιτική ηγεσία του Υπουργείου είναι ότι δεν θα διστάσει η ΔΕΠΑ να πάρει οποιοδήποτε επιπλέον κόστος, προκειμένου να ικανοποιηθούν οι απαιτήσεις της κοινής γνώμης, αυτές που περιβαλλοντικά και τεχνικά είναι αναγκαίες, προκειμένου να συμβαδίσει με την περιβαλλοντική ευαισθησία και τις ανάγκες της τοπικής κοινωνίας. Άρα, για μας δεν υπάρχει θέμα επιπλέον κόστους.

Η δεύτερη πολιτική παρατήρηση που θα κάνω είναι η εξής. Δεν θα διακινδυνεύσουμε ούτε κατά κεραία την ωριμότητα του έργου και την παρουσίασή του στα διεθνή φόρα με το βασικό του πλεονέκτημα ότι είναι το πιο ώριμο από όλα.

Με βάση αυτές τις δύο πολιτικές επιλογές που προανέφερα, μπορώ να σας πω και το τρίτο συνδυαστικό. Όπως γνωρίζετε μετά την προκαταρκτική, περιβαλλοντική εξέταση και αξιολόγηση, ακολουθεί η μελέτη περιβαλλοντικών επιπτώσεων και οι περιβαλλοντικές αδειοδοτήσεις. Γνωρίζετε πολύ καλά ότι στο επόμενο στάδιο μπορεί να υπάρξουν και πάντα υπάρχουν βελτιώσεις, προσαρμογές και τροποποιήσεις.

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Κυρίες και κύριοι συνάδελφοι, αυτό για το οποίο μπορώ να δεσμευτώ απέναντί σας είναι ότι κατά την πορεία εξέλιξης του έργου, χωρίς σε καμία περίπτωση να δοθεί το μήνυμα εκτός Ελλάδος ότι το έργο ανασχεδιάζεται, το έργο είναι αυτό που είναι και έχει δοθεί στις υπηρεσίες του Υπουργείου να κάνουν κάθε δυνατή βελτίωση προκειμένου να έχουμε συμβατότητα με αυτά που ζητά και η περιβαλλοντική αδειοδότηση και η τοπική κοινωνία.

Θεωρώ αυτονόητο ότι κάποια στιγμή θα πρέπει να συζητήσουμε και τα ανταποδοτικά της κοινωνίας. Να είστε βέβαιοι ότι η ΔΕΠΑ θα αποδειχθεί γενναία απέναντι στην τοπική κοινωνία.

Θέλω να προσθέσω κάτι για την πληροφόρηση όλων των συναδέλφων. Την προηγούμενη Δευτέρα υπήρξε ένα επίσημο δείπνο με πρωτοβουλία του Επιτρόπου Ενέργειας, κ. Ετιγκελ, όπου είχαν προσκληθεί εκπρόσωποι και των 27 κρατών – μελών, προκειμένου να συζητηθούν τα πορίσματα, τα αποτελέσματα της επίσκεψης Μπαρόζο και Έτιγκελ στο Μπακού, όπου η συνεννόησή τους με τον Πρόεδρο Αλίεφ του Αζερμπαϊτζάν, ήταν το κοίτασμα Σαχ Ντενίζ2.

Κύριε Πρόεδρε, προφανώς έγινε κάποιο λάθος από τη Γραμματεία και δεν είχε προσκληθεί ούτε η Ελλάδα ούτε η Ιταλία.

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Εντοπίστηκε το λάθος και διορθώθηκε και συμμετείχε και η Ελλάδα και η Ιταλία.

Θα ήθελα να πω κάτι άλλο και ξεκινώ με τα πολιτικά συμπεράσματα. Υπάρχει ένας προβληματισμός, σε μια προοπτική καλύτερης ενσωμάτωσης της Αλβανίας στο ευρωπαϊκό γίγνεσθαι αλλά και άλλων γειτονικών μας χωρών - βορείων γειτόνων μας, πώς θα τροφοδοτηθούν με αέριο που είναι λογικό να θέλει κάθε χώρα. Πρέπει να σας πω, ότι η αγορά της Αλβανίας είναι αρκετά μικρή και εμείς έχουμε δώσει κατεύθυνση στη ΔΕΠΑ στις επισκέψεις που κάνουν οι εκπρόσωποι της διοίκησής της στα Τίρανα, να είναι απολύτως σαφές ότι με μεγάλη μας χαρά ως Ελλάδα θα στηρίζαμε την ύπαρξη κάθετου αγωγού από τον ITGI, που θα τροφοδοτούσε με φυσικό αέριο τη φίλη, γείτονα Αλβανία. Αυτό θέλω να είναι απόλυτα σαφές.

Στο ερώτημα, «πότε θα τελειώσει ο ITGI;», με όλες τις επιφυλάξεις που μπορεί να έχει κανείς για τέτοια μεγάλα διεθνή έργα που έχουν πολλές ανασφάλειες από πολλές πλευρές, μπορώ να σας πω ότι ο σχεδιασμός μιλάει για το 2013, 2014, 2015, θα το δούμε αλλά είναι σε έναν ορατό ορίζοντα.

Πρέπει να σας πω ότι η πορεία εξέλιξης και υλοποίησης ενός αγωγού φυσικού αερίου με την πορεία προώθησης των ερευνών εξόρυξης του αερίου στο πεδίο, είναι αλληλένδετα πράγματα. Και τα δύο κονσόρτσιουμ, το ένα κονσόρτσιουμ που προσπαθεί να εξερευνήσει το πεδίο και το άλλο κονσόρτσιουμ του αγωγού, ζητούν δεσμεύσεις το ένα από το άλλο. Αυτό συμβαίνει και στη συγκεκριμένη περίπτωση. Το κονσόρτσιουμ αξιοποίησης, εκμετάλλευσης του Σαχ Ντενίζ 2 ζητά δεσμεύσεις και κυρίως ζητά να διασφαλιστεί πέρα από τα λόγια, ποιο έργο, ποιος αγωγός θα γίνει πιο γρήγορα. Γιατί νοιάζεται το ίδιο το κονσόρτσιουμ πιο γρήγορα να πουλήσει αέριο στον αγωγό. Αυτό λοιπόν που λέμε εμείς ως εταίροι στο κονσόρτσιουμ ΔΕΠΑ – Εντισον και Μπότας είναι ότι ο δικός μας αγωγός είναι το πιο ώριμο. Εδώ έρχεται να συνδεθεί αυτό το οποίο ρώτησαν κάποιοι συνάδελφοι: «Ποιος διαπραγματεύεται;» Σας απαντώ ότι διαπραγματεύεται ταυτόχρονα και το κονσόρτσιουμ του ITGI και η κάθε εταιρεία χωριστά και η κάθε κυβέρνηση Ελλάδας και Ιταλίας χωριστά. Είμαστε όλοι στρατευμένοι στον ίδιο σκοπό. Ο

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Έλληνας Πρωθυπουργός έχει θέσει το θέμα του ITGI σε Συνόδους Κορυφής, ο Πρωθυπουργός Μπερλουσκόνι έχει αποστείλει επιστολές στον Μπαρόζο, εμείς έχουμε συναντηθεί αρκετές φορές με τον Αζέρο πρέσβη, έναν εξαιρετικό άνθρωπο και πολύ φιλέλληνα. Το αντίστοιχο γίνεται και σε επίπεδο Ιταλίας, το ίδιο γίνεται και σε επίπεδο εταιρειών.

Πόση χωρητικότητα έχει ο ITGI και ποια η σχέση του με τον HTP Ο IGI ο ελληνοϊταλικός έχει 9 bcm που μπορούν να φτάσουν τα 12 bcm, καλή χωρητικότητα, επαρκής χωρητικότητα. Ο HTP που θα είναι ένας αγωγός που θα μπορεί στηρίξει και σε φυσιολογικές εποχές αλλά και σε εποχές κρίσης τη Βουλγαρία και όχι μόνο ξεκινάει με 3 bcm (δισεκατομμύρια κυβικά μέτρα) που μπορούν να επεκταθούν στα 5 bcm. Και πρέπει να σας πω ότι για την πορεία εξέλιξης του έργου υπάρχουν ήδη και μελέτες που γίνονται και ανατίθενται, αλλά προχωρά και ο διαγωνισμός για την προμήθεια των σωλήνων του αγωγού. Άρα είναι σαφές ότι είμαστε πολύ καλύτερα από τα άλλα δύο προγράμματα. Και αυτό είναι το μεγάλο μας πλεονέκτημα.

Για το LNG στην Καβάλα πρέπει να σας πω ότι έχω κάνει τουλάχιστον δύο συναντήσεις με τους συναδέλφους της Καβάλας και θέλω να είμαι σαφής. Και οι τέσσερις συνάδελφοι της Καβάλας μου έχουν πει ότι είναι μη επιθυμητή στην Καβάλα η δημιουργία χερσαίου σταθμού LNG. Αυτό που μπορώ να σας πω, όμως, είναι ότι βρισκόμαστε σε προχωρημένο στάδιο για να αξιοποιήσουμε τον υπόγειο χώρο αποθήκευσης στον Πρίνο, που μπορεί να κάνει μια δουλειά πολύ καλύτερη από τον LNG, γιατί έχει σημαντική χωρητικότητα, Άρα και σε αυτό το ζήτημα της τροφοδότησης του κομματιού των δικτύων της Νοτιοανατολικής Ευρώπης με ποσότητες αερίου που η τιμή τους και η ποσότητά τους να μην εξαρτάται από εποχές κρίσης πάει σχετικά καλά.

Σχετικά με αυτό που ρώτησε κάποιος συνάδελφος, για το πόσοι γνωμοδότησαν για το χερσαίο κομμάτι. Εγώ μέτρησα 42 με 43 φορές. Θα καταθέσω για τα πρακτικά τις δύο περιβαλλοντικές αδειοδοτήσεις. Θα δείτε ότι είναι τουλάχιστον 40 φορές, εφορίες αρχαιοτήτων, νομαρχιακές αυτοδιοικήσεις, πάρα πολλοί φορείς. Άρα θεωρώ ότι έχει μια πάρα πολύ καλή εικόνα το χερσαίο κομμάτι.

Ποια είναι η πολιτική μας για τον άλλο αγωγό, τον Σάουθτριμ και αν έχει εγκαταλειφθεί. Σας λέω με μεγάλη χαρά ότι πριν 4 – 5 μήνες υπεγράφη στην Αθήνα το

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καταστατικό της συγκρότησης της ελληνορωσικής εταιρείας, που θα κατασκευάσει τον Σάουθτριμ. Επίσης, πρέπει να σας πω ότι έχει δεσμευθεί η ελληνική στη ρώσικη κυβέρνηση και όχι μόνο, ότι σε συντονισμό με τα κράτη-μέλη από τα οποία διέρχεται ο βόρειος κυρίως κλάδος του αγωγού, θα προωθήσουμε στο διευρωπαϊκό δίκτυο αγωγών φυσικού αερίου την ένταξη και του Σάουθτριμ. Το πρώτο βήμα έχει ήδη γίνει διότι ο Σάουθτριμ με πρωτοβουλία και της Ελλάδας έχει ήδη ενταχθεί στο δεκαετές πρόγραμμα ανάπτυξης του ευρωπαϊκού δικτύου των διαχειριστών των αγωγών φυσικού αερίου. Άρα είμαστε αρκετά καλά, πιο καλά από πολλές άλλες χώρες από τις οποίες διέρχεται ο Σάουθτριμ.

Για τον Μπουργκάς – Αλεξανδρούπολη. Πρέπει να σας πω ότι χθες συζητήθηκε στην ΚΕΝΕ η τελική διατύπωση του νομοσχεδίου, η αλήθεια είναι ότι έχει καθυστερήσει. Τουλάχιστον 5 με 6 μήνες καθυστερήσαμε επειδή υπήρχε πρόβλημα μη σύμφωνης γνώμης της τοπικής κοινωνίας. Κάναμε συναντήσεις με τους συναδέλφους βουλευτές και το νομάρχη και τους δημάρχους του Έβρου και τελικά έχουμε ουσιαστικά ομόφωνη γνώμη και της τοπικής κοινωνίας. Και γι' αυτό υπήρξε αυτή η καθυστέρηση.

Εάν οι Αζέροι είναι δεσμευμένοι. Υπήρξε ίσως μια παρανόηση και θέλω να είμαι σαφής. Κανένας δεν έχει δεσμευθεί σε κανέναν για τίποτα. Ο αγώνας είναι ποιος θα υπογράψει το κοντράτο με ποιον. Άρα το δικό μας κονσόρτσιουμ λέει ότι είναι έτοιμο και καλεί τους Αζέρους αύριο να υπογράψουν. Βέβαια δεν είναι μόνο το θέμα της ωριμότητας της προώθησης του αγωγού είναι και πολλά άλλα, η τιμή, τα τέλη διέλευσης κ.α. Όμως, δεν έχουν δεσμευθεί οι Αζέροι απέναντί μας ότι θα μας δώσουν το αέριο. Οι συνομιλίες βέβαια έχουν γίνει σε ένα πολύ καλό κλίμα και είμαι αισιόδοξος. Αυτό όμως δεν λέει τίποτα εάν δεν πέσουν οι υπογραφές. Και με προβλημάτισε το ενδιαφέρον του Προέδρου της Ευρωπαϊκής Επιτροπής του κ. Μπαρόζο και η επίσκεψή του. Χάρηκα βέβαια όταν διάβασα στην κοινή δήλωση που υπέγραψαν με τον Αζέρο Πρόεδρο ότι δεν μίλησαν για πρότζεκτ αλλά μίλησαν γενικά για το νότιο διάδρομο. Άρα είμαι βέβαιος ότι ο Πρόεδρος Μπαρόζο στις συνομιλίες του ενέταξε και τον ITGI.

Αυτό που έχει σημασία είναι να είμαστε ελκυστικοί εμπορικά. Γιατί όταν κανείς ξέρει ότι μπορεί να πουλήσει σύντομα το αέριο του και έχει διασφαλισμένη αγορά είναι το μεγαλύτερο πλεονέκτημα.

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ΓΕΩΡΓΙΟΣ – ΕΡΝΕΣΤΟΣ ΧΑΡΑΛΑΜΠΟΠΟΥΛΟΣ: Να μας απαντήσετε για τους τούρκους και το Ναμπούκο, γιατί κατάλαβα ότι ο δικός μας θα περάσει από το Ναμπούκο.

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Ο Nabucco με τον ITGI έχει μια μεγάλη διαφορά. Ο Nabucco περνώντας μέσα από την Τουρκία, απαιτεί να φτιαχτεί δικό του δίκτυο. Δε χωρά να περάσει από το τούρκικο δίκτυο και αυτό είναι ένα από τα μειονεκτήματά του και χρειάζεται ξεχωριστά χρήματα. Αντιθέτως ο ITGI και ο..... μπορούν να διέλθουν με μια αναβάθμιση του δικτύου της Τουρκίας. Έλληνες, Ιταλοί είμαστε συνεργάτες σε αυτό το θέμα.

Όσον αφορά το αν θα απορροφηθεί χρηματοδότηση από το ..... Η απάντηση είναι θετική. Δεν υπάρχει καθυστέρηση ούτε από την ελληνική ούτε από την ιταλική πλευρά.

Οι σχέσεις Τουρκίας - Αζερμπαϊτζάν γενικά είναι καλές το τελευταίο διάστημα. Βρήκαν μόνοι τους.....και έχουν ξεπεράσει αρκετά προβλήματα από αυτά που υπήρχαν στο παρελθόν.

Όσον αφορά το διευθύνοντα σύμβουλο της Edison και τη σχέση ITGI και Nabucco, θα σας πω κάτι, για το οποίο έχουμε συμφωνήσει σε επιχειρηματικό και πολιτικό επίπεδο με την ιταλική πλευρά. Το λέμε στα συμβούλια υπουργών ενέργειας, καθώς και η ΔΕΠΑ με την Edison στις επιχειρηματικές συναντήσεις τους. Λέμε ότι ο ITGI μπορεί να θεωρηθεί η πρώτη φάση του Nabucco. Πρέπει πρώτα να βρούμε αέριο και χρηματοδότηση από τις τράπεζες. Όμως, μέχρι να φτιαχτεί αυτό το πολύ χρήσιμο έργο για την ενεργειακή ασφάλεια της Ευρώπης, ας δούμε ως πρώτη φάση τον ITGI που είναι έτοιμος και μετά θα δούμε τα υπόλοιπα. Συμφωνούμε απόλυτα σε αυτό.

Η κυρία Σακοράφα ρώτησε για τις αδειοδοτήσεις. Στην Ελλάδα ξεχνάμε ότι έχουμε μια 20ετή εμπειρία στους αγωγούς και στα δίκτυα. Δεν ανακαλύπτουμε τώρα τι σημαίνει δίκτυο φυσικού αερίου. Έχουμε νομοθεσία και ο νόμος 95 προβλέπει πως θα γίνουν απαλλοτριώσεις και πως θα σχεδιαστούν.

ΣΟΦΙΑ ΣΑΚΟΡΑΦΑ: Ρώτησα αν έχουν γίνει αυτά.

ΙΩΑΝΝΗΣ ΜΑΝΙΑΤΗΣ(Υπουργός Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής): Όχι, διότι αυτά θα γίνουν, αφού πρώτα προχωρήσουν οι περιβαλλοντικές αδειοδοτήσεις και προσδιοριστεί επακριβώς η χάραξη και θα προχωρήσουν οι

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απαλλοτριώσεις κ.λπ.. Προηγείται η περιβαλλοντική αδειοδότηση υποχρεωτικά και μετά ακολουθεί ο ακριβής σχεδιασμός και η εκτέλεση του έργου.

Υπήρξε ερώτηση για την απεξάρτηση της χώρας. Για πρώτη φορά μετά από 15 χρόνια απόλυτης αδράνειας και ανυπαρξίας, η πατρίδα μας θα φτιάξει φορέα έρευνας υδρογονανθράκων, πετρελαίου και φυσικού αερίου όπως ανακοίνωσε ο Πρωθυπουργός. Ευελπιστούμε και εμείς ως χώρα σε ένα εύλογο χρονικό διάστημα 3, 4, 5 χρόνων, θα απεαρτηθούμε αρκετά από εξωτερικές εξαρτήσεις.

Για το ζήτημα του Λεβιάθαν και των άλλων κοιτασμάτων, δεν υπάρχει άλλη χώρα στον κόσμο που να μη δέχεται ευχαρίστως οποιονδήποτε αγωγό θέλει να περάσει από το έδαφός της, υπό κάποιες προϋποθέσεις. Η πρώτη προϋπόθεση είναι ποιος πληρώνει το κόστος. Η δεύτερη προϋπόθεση είναι αν υπάρχουν πελάτες. Η τρίτη προϋπόθεση είναι τι σημαίνει αυτό για την ευρύτερη γεωπολιτική ισορροπία. Γνωρίζετε πολύ καλά τις πάγιες θέσεις της ελληνικής εξωτερικής πολιτικής σε σχέση με τις φιλίες της στην περιοχή.

Δε θα γίνει σταθμός LMG στην Πέρδικα. Δεν υπάρχει κανένας απολύτως σχεδιασμός και δεν έχουμε καμία απολύτως ανάγκη να φτιάξουμε σταθμό στην Πέρδικα. Δεν υπήρξε ποτέ λόγος ούτε πρόκειται να υπάρξει.

Σε σχέση με την έλευση του φυσικού αερίου στην Ήπειρο, αυτή τη στιγμή δεν υπάρχει κανένας σχεδιασμός. Αυτό που υπάρχει ως σχεδιασμός και θα περάσει στο νομοσχέδιο για το Μπουργκάς που ελπίζω την επόμενη εβδομάδα να το φέρω στην Ολομέλεια.....

ΕΥΑΓΓΕΛΟΣ ΑΡΓΥΡΗΣ: Δεν υπήρχε ποτέ σχεδιασμός για την Ήπειρο; Γιατί άλλα μας έλεγε πριν ο.....

ΙΩΑΝΝΗΣ ΜΑΝΙΑΤΗΣ(Υπουργός Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής): Θα σας πω κάτι που ήταν πάντα στα σχέδια. Στο νομοσχέδιο του Μπουργκάς φέρνουμε μια τροπολογία που επιτρέπει στη ΔΕΠΑ, με βάση τους καινούργιους κανονισμούς φυσικού αερίου, να προκηρύξει τις τρεις ΕΠΑ για τις οποίες έχουμε δεσμευτεί πολιτικά όλοι μας, δηλαδή ΕΠΑ Ανατολικής Μακεδονίας και Θράκης, ΕΠΑ Κεντρικής Μακεδονίας πλην Θεσσαλονίκης που έχει δική της ΕΠΑ και ΕΠΑ Στερεάς Ελλάδας και Εύβοιας, διότι υπάρχει από εκεί αγωγός που περνάει. Υπάρχει η βάνα αποδοχής, άρα

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προκηρύσσεται διαγωνισμός, ζητείται επενδυτής για να επεκταθεί το δίκτυο στις βιομηχανίες και τα νοικοκυριά της ευρύτερης περιοχής.

Για την Ήπειρο θεωρείστε απολύτως βέβαιο για τον αγωγό που θα φύγει από Κόρινθο και θα πάει Μεγαλόπολη. Αυτό έχει σχεδιαστεί και γίνεται τώρα. Μέχρι να υλοποιηθεί ο αγωγός, να υπάρξει αέριο, να σταθεροποιηθεί η αγορά και να ξέρουμε τι διαθέσιμα έχουμε, θεωρώ προφανές ότι η επόμενη δουλειά θα είναι να προκηρυχθεί η ΕΠΑ Ηπείρου, διότι δείχνει ότι έχει και εμπορικό ενδιαφέρον. Όμως αυτό μη το εκλάβετε ως δέσμευση. Όλα αυτά έχουν μέσα τους το κριτήριο της εμπορικότητας, διότι κάποιος πρέπει να πληρώσει τα δίκτυα κ.λ.π. Θεωρώ ότι με την εικόνα που έχουμε, ότι είναι προφανές πως θα υπάρξει επενδυτικό ενδιαφέρον και για την Ήπειρο.

Ζούμε σε δύσκολη εποχή, που το πολιτικό σύστημα γενικά υφίσταται μια πίεση και ο καθένας από εμας ως εκπρόσωπος του ελληνικού λαού. Σήμερα, που συζητήσαμε ένα πολύ σοβαρό θέμα, αισθάνθηκα πολύ υπερήφανος που όλοι οι συνάδελφοι με μεγάλη υπευθυνότητα τοποθετήθηκαν απέναντι σε ένα θέμα που σχετίζεται με την ενεργειακή ασφάλεια της χώρας. Αυτή η συζήτηση είναι η απόδειξη για το πόσο σοβαρή δουλειά μπορεί να γίνει σε τέτοιου είδους θέματα.

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ(Πρόεδρος της Επιτροπής): Και εσείς όταν επιζητείτε αυτό που κάνατε σήμερα, δηλαδή τον διάλογο, τη συναίνεση και την ενημέρωση της Επιτροπής, θα προκύπτουν πολύ θετικά και σωστά αποτελέσματα. Αυτά που υπάρχουν και δε μπορούμε να δικαιολογήσουμε στις τοπικές κοινωνίες, είναι οι αιφνιδιασμοί. Δώσατε σήμερα ένα πολύ καλό παράδειγμα για το πώς πρέπει να λειτουργούμε γενικότερα.

Το λόγο έχει ο κ. Καλαφάτης.

ΣΤΑΥΡΟΣ ΚΑΛΑΦΑΤΗΣ: Είναι περιπίπτον το θέμα, αλλά δόθηκε η ευκαιρία και μέσα από την αναφορά του κ. Υπουργού έγινε μια διόρθωση. Δεν ξέρω αν είχατε πει, εν τη ρύμη του λόγου σας, ότι φορέας για τους υδρογονάνθρακες τα τελευταία τρία χρόνια δεν έχει γίνει ποτέ.

Π/φος	Δ/φος	Ημερομηνία	Όνομα αρχείου
<b>ΤΖΩΡΤΖΗ</b>	<b>ΤΖΩΡΤΖΗ</b>	<b>01.02.2011</b>	<b>BQFA0201.MT2</b>

ΣΤΑΥΡΟΣ ΚΑΛΑΦΑΤΗΣ: Θα ήθελα να κάνω μια παρατήρηση μόνο. Δόθηκε η ευκαιρία μέσα από την αναφορά του κ. Υπουργού, έγινε και μια διόρθωση που καλώς έγινε, δεν ξέρω εάν είχατε πει η εν την ρύμη του λόγου ότι φορέας για τους υδρογονάνθρακες τα τελευταία τρία χρόνια δεν έχει γίνει ποτέ. Σήμερα, μιλήσατε και είπατε ότι ποτέ δεν είχαμε έναν τέτοιο φορέα, αντίστοιχο, για διερεύνηση, ενώ παλιότερα είχατε πει ότι δεν υπήρχε τα τελευταία τρία χρόνια.

ΙΩΑΝΝΗΣ ΜΑΝΙΑΤΗΣ (Υφυπουργός Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής): Ίσως έγινε κάποια παρανόηση. Η Ελλάδα αμέσως μετά τη μεταπολίτευση την ΔΕΠ.

ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ(Πρόεδρος της Επιτροπής): Εάν ειπώθηκε δεν είχε σκοπιμότητα να κατηγορήσει καμία κυβέρνηση. Ολοκληρώθηκε η συνεδρίαση της σημερινής επιτροπής. Ευχαριστώ.

Στο σημείο αυτό έγινε η γ' ανάγνωση του καταλόγου.

Παρόντες ήταν οι Βουλευτές κ.κ.:

Τέλος και περί ώρας 19.35'λύθηκε η συνεδρίαση.

**Ο ΠΡΟΕΔΡΟΣ Ο ΕΠΙΤΡΟΠΗΣ**

**Ο ΓΡΑΜΜΑΤΕΑΣ**

**ΙΩΑΝΝΗΣ ΔΡΙΒΕΛΕΓΚΑΣ**

**ΑΘΑΝΑΣΙΟΣ ΟΙΚΟΝΟΜΟΥ**

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## **ANNEX K:**

### **CONTACT WITH AUTHORITIES**

- K.1 ESIA Correspondence**
- K.2 Supplementary PEIA Correspondence**
- K.3 ESIA Correspondence**



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ  
& ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ  
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ  
ΕΥΠΕ  
(ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
ΤΜΗΜΑ Α'

Ταχ. Δ/ση : Λ. Αλεξάνδρας 11  
Τ. Κ. : 114 73  
Πληροφορίες : Κ. Γιαβής  
Τηλέφωνο : 210 641 7962  
F.A.X. : 210 643 0637

Αθήνα, 17 Σεπτεμβρίου 2010

Α.Π. οικ. 130221

ΠΡΟΣ: ΠΙΝΑΚΑ ΑΠΟΔΕΚΤΩΝ

Θέμα :

Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση του Έργου  
«ΕΛΛΗΝΟΙΤΑΛΙΚΟ ΣΥΛΛΟΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ»  
ΕΛΛΗΝΙΚΟ ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

Έχοντας υπόψη:

1. Το Ν. 1650/86 (ΦΕΚ 160/Α) «Για την προστασία του Περιβάλλοντος» όπως τροποποιήθηκε με το Ν.3010/02 (ΦΕΚ 91/Α/25.04.2002)
2. Την Κοινή Υπουργική Απόφαση Η.Π.15393/2332/5.8.02 (ΦΕΚ 1022/Β/5.8.2002) «Κατάταξη δημόσιων και ιδιωτικών έργων και δραστηριοτήτων σε κατηγορίες, σύμφωνα με το άρθρο 3 του Ν.1650/86 (Α'160) όπως αντικαταστάθηκε με το άρθρο 1 του Ν. 3010/02 "Εναρμόνιση του Ν. 1650/86 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ κ.α. (Α' 91)"», όπως τροποποιήθηκε και ισχύει.
3. Την Κοινή Υπουργική Απόφαση Η.Π. 11014/703/Φ104/14.3.03 (ΦΕΚ 332/Β/20.3.2003) «Διαδικασία Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης (Π.Π.Ε.Α.) και Έγκρισης Περιβαλλοντικών Όρων (Ε.Π.Ο.), σύμφωνα με τα άρθρο 4 του Ν.1650/86 (Α'160) όπως αντικαταστάθηκε με το άρθρο 2 του Ν. 3010/02 "Εναρμόνιση του Ν. 1650/86 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ... και άλλες διατάξεις (Α' 91)"».
4. Τα με α.π. 257/10.11.09 και 293/11.12.09 έγγραφα της ΙΓΙ Ροσείδον με τα οποία κατατέθηκε επικαιροποιημένος φάκελος Προμελέτης Περιβαλλοντικών Επιπτώσεων του αναφερομένου στο θέμα έργου και συμπληρωματικά στοιχεία αντίστοιχα (α.π. ΕΥΠΕ 146147/10.11.09, 148451/14.12.09).
5. Το με α.π. οικ. 148674/16.12.09 έγγραφο της ΕΥΠΕ/ΥΠΕΚΑ με το οποίο αντίγραφο της ΠΠΕ διαβιβάστηκαν στις συναρμόδιες Υπηρεσίες για απόψεις.
6. Το υπ. αρ. Φ4/5/226/19.01.10 έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων με το οποίο ζητούνται συμπληρωματικά στοιχεία (α.π. ΕΥΠΕ 121112/28.01.10)
7. Το με αρ. πρ. 1088/21.01.10 έγγραφο της Δ/σης Χωροταξίας του ΥΠΕΚΑ χωρίς αντίρρηση για το έργο του θέματος (α.π. ΕΥΠΕ 120967/26.01.10, 121064/26.01.10)
8. Το με α. π. Φ542/292/10 Σ6137/29.03.10 έγγραφο του Γενικού Επιτελείου Ναυτικού χωρίς αντίρρηση-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ ΕΜΠ 3/09.04.10).

9. Τα υπ. αρ. 366/22.04.10 και 368/23.04.10 έγγραφα της IGI Poselidon με διευκρινήσεις και συμπληρωματικά στοιχεία για το έργο του θέματος (α.π. ΕΥΠΕ 124602/23.04.10, 124614/23.04.10)
10. Το με α.π. Δ3/Α/376/07.05.10 έγγραφο της Δ/σης Εγκαταστάσεων Πετρελαιοειδών του ΥΠΕΚΑ με το οποίο δεν εκφράζεται αντίρρηση για το έργο (α. π. ΕΥΠΕ 125311/11.05.10)
11. Τα υπ. αρ. 55/19.01.10 και 1504/03.05.10 έγγραφα της ΑΒ' Εφορείας Προϊστορικών & Κλασικών Αρχαιοτήτων του ΥΠΠΟΤ στα οποία δεν εκφράζεται αντίρρηση για το προτεινόμενο έργο-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ 121201/29.01.10, 125366/12.05.10).
12. Το με αρ. πρ. 8221.Α17/05/05.05.10 έγγραφο της Δ/σης Λιμενικών Υποδομών του Υπ. Οικονομίας, Ανταγωνιστικότητας & Ναυτιλίας, όπου δεν εκφράζεται αντίρρηση για το έργο-υπό όρους γνωμοδότηση (Α.Π. ΕΥΠΕ 125111/06.05.10).
13. Το υπ. αρ. Φ4/5/2120/26.04.10 έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων με το οποίο δεν εκφράζονται αντιρρήσεις-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ 125038/03.05.10)
14. Το με α. π. Φ100.1/149386/Σ4868/28.05.10 έγγραφο της Δ/σης Υποδομής του ΓΕΕΘΑ χωρίς αντίρρηση-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ 126095/31.05.10, 126294/03.06.10)
15. Το από 26.05.10 έγγραφο της Γενικής Γραμματείας της Περιφέρειας Ηπείρου με συνημμένο ψήφισμα και υπόμνημα των κατοίκων Πέρδικας Θεσπρωτίας, σύμφωνα με το οποίο αντιδρούν στην υλοποίηση του προτεινόμενου έργου.
16. Το με α.π. Β1/Φ33/24269/1319/12.05.10 έγγραφο της Δ/σης Βυζαντινών & Μεταβυζαντινών Αρχαιοτήτων του ΥΠΠΟΤ με το οποίο δεν εκφράζονται αντιρρήσεις-γνωμοδότηση υπό όρους (α.π. ΕΥΠΕ 125630/18.05.10)
17. Το υπ. αρ. 385/01.06.10 έγγραφο της IGI Poselidon με συμπληρωματικά στοιχεία για το έργο του θέματος (α.π. ΕΥΠΕ 126278/02.06.10)
18. Το υπ. αρ. 690345/18.08.10 έγγραφο της ΔΕΠΑ Α.Ε. με το οποίο αιτείται την έκδοση θετικής γνωμοδότησης για ΠΠΕΑ για την εναλλακτική θέση ΟΜΠΕΛΑ 2-ΒΑΡΙΚΟ (α.π. ΕΥΠΕ 129271/18.08.10)
19. Το με α.π. οικ. 129273/18.08.10 έγγραφο της ΕΥΠΕ/ΥΠΕΚΑ με το οποίο αντίγραφα της ΠΠΕ διαβιβάστηκαν στη ΛΓ' ΕΠΚΑ, στη 18<sup>η</sup> ΕΒΑ και στην Δ/ση Αγροτικής Ανάπτυξης Πρέβεζας για απόψεις
20. Τα με α. π. 2136/30.08.10 έγγραφο της 18ης Εφορείας Βυζαντινών Αρχαιοτήτων του ΥΠΠΟΤ στο οποίο δεν εκφράζεται αντίρρηση για το έργο του θέματος (α.π. ΕΥΠΕ 129577/01.09.10)
21. Το γεγονός ότι το προτεινόμενο έργο είναι έργο εθνικής σημασίας για την ενεργειακή διασφάλιση της χώρας καθώς και για την ενεργειακή διασύνδεση της Κεντρικής Ασίας με την Κεντρική Ευρώπη μέσω Ιταλίας.

### Γνωμοδοτούμε

Θετικά - ύστερα από τη διαδικασία της Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης - ως προς την κατασκευή και λειτουργία του έργου:

ΕΛΛΗΝΟΪΤΑΛΙΚΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ - ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ, όπως εμφανίζεται στην οριζοντιογραφία 8089-000-00-AU-01, κλίμακας 1:50.000 της Προμελέτης Περιβαλλοντικών Επιπτώσεων (ΠΠΕ), που συνοδεύει την παρούσα γνωμοδότηση.

Το έργο αφορά στην εγκατάσταση αγωγού φυσικού αερίου (ΑΦΑ) υψηλής πίεσης που θα αποτελείται από: α) χερσαίο τμήμα, μήκους 10 χλμ. περίπου, στα όρια των Ν. Θεσπρωτίας και Πρέβεζας και β) υποθαλάσσιο τμήμα, μήκους 144 χλμ. περίπου, με σημείο προσαυγιάλωσης τη θέση ΟΜΠΡΕΛΑ 2 και το οποίο θα διέρχεται νότια της Νήσου Κέρκυρας και βόρεια των Παξών μέχρι το μέσο του θαλάσσιου στενού μεταξύ Ελλάδας και Ιταλίας ανατολικά του Οτράντο της Νότιας Ιταλίας. Στο χερσαίο τμήμα του αγωγού, στη θέση ΒΑΡΙΚΟ, θα χωροθετηθούν εγκαταστάσεις μέτρησης και συμπίεσης, καθώς και βοηθητικές/υποστηρικτικές εγκαταστάσεις.

Κατά την παρούσα γνωμοδότηση λήφθηκαν κατ' αρχήν υπόψη τα ακόλουθα:

1. Οι γενικές και ειδικές κατευθύνσεις της χωροταξικής πολιτικής, που προκύπτουν από εγκεκριμένα χωροταξικά, ρυθμιστικά και πολεοδομικά σχέδια ή άλλα σχέδια χρήσεων γης. Σύμφωνα με τα Περιφερειακά Πλαίσια Χωροταξικού Σχεδιασμού και Αειφόρου Ανάπτυξης των Περιφερειών της χώρας, η μεταφορά και η διανομή Φυσικού Αερίου θεωρείται σημαντικός παράγοντας ανάπτυξης για όλη τη χώρα, καθιστώντας την ενεργειακό κέντρο των Βαλκανίων και της Δυτικής Ευρώπης.
2. Η περιβαλλοντική ευαισθησία της περιοχής που ενδέχεται να θιγεί από το έργο. Οι περιοχές ανάπτυξης τόσο του χερσαίου τμήματος του έργου, όσο και του υποθαλάσσιου τμήματος, δεν βρίσκονται εντός θεσμοθετημένης ζώνης προστασίας ή εντός ζώνης αρχαιολογικού ενδιαφέροντος. Από την εγκατάσταση και λειτουργία του προτεινόμενου έργου δεν πρόκειται να υπάρξουν σημαντικές επιπτώσεις στο ευρύτερο φυσικό και ανθρωπογενές περιβάλλον.
3. Τα χαρακτηριστικά των ενδεχόμενων σημαντικών περιβαλλοντικών επιπτώσεων όπως το μέγεθος, η πολυπλοκότητα, η ένταση και η έκτασή τους, η διάρκεια, η συχνότητα και η αναστρεψιμότητά τους. Από την εγκατάσταση του προτεινόμενου έργου αναμένεται να υπάρξουν μικρές επιπτώσεις στο φυσικό περιβάλλον κατά μήκος του αγωγού, οι οποίες είναι αναστρέψιμες με τα κατάλληλα μέτρα αποκατάστασης.
4. Τα οφέλη για την εθνική οικονομία, την εθνική ασφάλεια, τη δημόσια υγεία και η εξυπηρέτηση άλλων λόγων δημοσίου συμφέροντος. Το εν λόγω έργο αποτελεί τμήμα του κεντρικού αγωγού που θα συνδέσει το Ελληνικό Σύστημα Φυσικού Αερίου με το αντίστοιχο Ιταλικό προκειμένου να γίνει δυνατή η μεταφορά Φυσικού Αερίου από την περιοχή της Κασπίας και την Κεντρική Ασία προς την Ιταλία και την Κεντρική Ευρώπη.
5. Οι θετικές επιπτώσεις στο φυσικό και ανθρωπογενές περιβάλλον σε μία ευρύτερη περιοχή από εκείνη που επηρεάζεται άμεσα από το έργο. Από τη λειτουργία του έργου αναμένονται θετικές επιδράσεις σε μια ευρύτερη περιοχή από εκείνη που επηρεάζεται από το έργο λόγω της χρήσης φυσικού αερίου στη χώρα και θεωρείται καύσιμο φιλικό προς το περιβάλλον (με την δυνατότητα που έχει ο αγωγός να εξασφαλίσει φυσικό αέριο από Ιταλία και Β. Αφρική σε περίπτωση ανάγκης εφοδιασμού της χώρας)

Επίσης η θετική γνωμοδότηση δίδεται με τους ακόλουθους όρους και προϋποθέσεις:

- α. ότι δεν έρχεται σε αντίθεση με περιορισμούς, που έχουν τεθεί στην περιοχή με ειδικές διατάξεις και που ενδεχομένως δεν επιτρέπουν την κατασκευή του υπόψη έργου
- β. ότι θα ληφθούν υπόψη οι παρατηρήσεις και υποδείξεις των αρμοδίων Αρχαιολογικών Υπηρεσιών του ΥΠΠΟΤ.

Ο φορέας οφείλει στο στάδιο της έγκρισης των περιβαλλοντικών όρων να υποβάλει στην Ειδική Υπηρεσία Περιβάλλοντος (ΕΥΠΕ) του ΥΠΕΚΑ Μελέτη Περιβαλλοντικών Επιπτώσεων (ΜΠΕ), τύπου Ι, η οποία θα πρέπει να περιλαμβάνει τουλάχιστον τα εξής:

1. Περιγραφή του έργου συμπεριλαμβανομένων των εναλλακτικών λύσεων
2. Περιγραφή της υφιστάμενης κατάστασης του περιβάλλοντος με τα απαραίτητα στοιχεία και τεκμηριώσεις προκειμένου να γίνει αξιολόγηση και εκτίμηση των κυριοτέρων άμεσων και έμμεσων περιβαλλοντικών επιπτώσεων του έργου:
  - στον άνθρωπο, στην πανίδα και στην χλωρίδα

- στο έδαφος, στα νερά, στον αέρα, στο κλίμα και στο τοπίο
  - στα υλικά αγαθά και στην πολιτιστική κληρονομιά
  - στην αλληλεπίδραση μεταξύ των παραγόντων που αναφέρονται στις προηγούμενες περιπτώσεις
3. Περιγραφή των μέτρων που προβλέπονται να ληφθούν προκειμένου να αποφευχθούν, να μειωθούν και εφόσον είναι δυνατόν να επανορθωθούν σημαντικές δυσμενείς επιπτώσεις στο περιβάλλον.
  4. Να περιγράφονται οι τρόποι αποκατάστασης των χώρων επέμβασης (εκσκαφές θεμελιώσεων, τυχόν διάνοιξη οδών προσπέλασης κ.λ.π.).
  5. Να εξευρεθούν και να αναφέρονται οι χώροι απόθεσης πλεοναζόντων υλικών και παραπροϊόντων εκσκαφής, για τους οποίους θα έχουν εξασφαλιστεί οι απαραίτητες άδειες.
  6. Συνοπτική περιγραφή των κύριων εναλλακτικών λύσεων που μελετά ο κύριος του έργου και υπόδειξη των κύριων λόγων της επιλογής του, λαμβανομένων υπόψη των επιπτώσεων τους στο περιβάλλον.
  7. Απλή (μη τεχνική) περίληψη των πληροφοριών που αναφέρονται στις προηγούμενες παραγράφους.

Επίσης ο φάκελος της ΜΠΕ θα πρέπει να συνοδεύεται από την παρούσα θετική γνωμοδότηση (ΠΠΕΑ) της Γενικής Δ/ντριας Περι/ντος του ΥΠΕΚΑ μαζί με αντίγραφο των θεωρημένων από την ΕΥΠΕ του ΥΠΕΚΑ τοπογραφικών σχεδίων από όπου θα φαίνεται η προεπιλεγείσα όδευση του έργου.

Όλα τα αντίγραφα της ΜΠΕ θα πρέπει να είναι υπογεγραμμένα και σφραγισμένα από τον μελετητή και τον φορέα του έργου. Επίσης πρέπει να συνοδεύονται από υπεύθυνη δήλωση του μελετητή που θα αναφέρει ότι είναι κάτοχος Μελετητικού Πτυχίου της κατηγορίας 27, με ημερομηνία κτήσης και διάρκεια ισχύος.

Τα κείμενα και οι χάρτες της ΜΠΕ υποβάλλονται και σε ηλεκτρονική μορφή.

Η παρούσα αποτελεί Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση της προγραμματιζόμενης δραστηριότητας και συνίσταται σε γνωμοδότηση ως προς τη θέση, το μέγεθος, το είδος, την εφαρμοζόμενη τεχνολογία, τα γενικά τεχνικά χαρακτηριστικά, τη χρήση των φυσικών πόρων, τη συσσωρευτική δράση με άλλα έργα, την παραγωγή αποβλήτων, τη ρύπανση και τις οχλήσεις, καθώς και τον κίνδυνο ατυχημάτων ιδίως από τη χρήση ουσιών και τεχνολογίας και δεν υποκαθιστά πιθανές απαιτούμενες άδειες και εγκρίσεις από άλλους φορείς (Υπ. Αγροτικής Ανάπτυξης & Τροφίμων, Αρχαιολογική Υπηρεσία, κλπ).

Η οριστική και δεσμευτική άποψη της Διοίκησης, επί των προαναφερόμενων και συναφών θεμάτων, θα δοθεί με την αξιολόγηση της ΜΠΕ και την Απόφαση Έγκρισης Περιβαλλοντικών Όρων με την οποία μπορεί να επιβάλλει προϋποθέσεις, όρους, περιορισμούς και διαφοροποιήσεις για την πραγματοποίηση του έργου ή της δραστηριότητας ή και να αποφασίσει τη μη υλοποίησή του, σύμφωνα με τις εκάστοτε ισχύουσες διατάξεις.

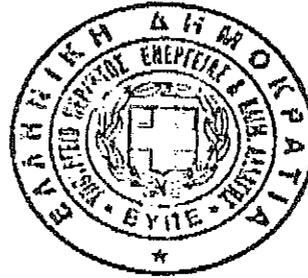
Η διάρκεια ισχύος της παρούσας είναι πέντε (5) χρόνια, χρονικό διάστημα μέσα στο οποίο πρέπει να υποβληθεί η Μελέτη Περιβαλλοντικών Επιπτώσεων του έργου.

Μετά την παρέλευση των πέντε χρόνων χωρίς να έχει υποβληθεί η ΜΠΕ, απαιτείται είτε να τηρηθεί εκ νέου η διαδικασία της Περιβαλλοντικής Εκτίμησης και Αξιολόγησης του έργου.

Η παρούσα Γνωμοδότηση κοινοποιείται στα Νομαρχιακά Συμβούλια των Ν.Α. Θεσπρωτίας και Πρέβεζας, συνοδευόμενη από ένα αντίγραφο Π.Π.Ε. προκειμένου να δημοσιοποιηθεί σύμφωνα με τα αναφερόμενα στην παράγραφο 3 του άρθρου 5 του Ν. 1650/86 όπως τροποποιήθηκε με το άρθρο 3 του Ν. 3010/02.

Η δαπάνη δημοσιοποίησης βαρύνει το φορέα του έργου.

Η ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΤΡΙΑ  
ΠΕΡΙΒΑΛΛΟΝΤΟΣ ΥΠΕΚΑ  
Π. ΚΑΡΑΜΠΙΝΗ-ΣΑΒΒΙΔΟΥ



ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ

Ε. ΑΛΕΥΡΑ

#### ΠΙΝΑΚΑΣ ΑΠΟΔΕΚΤΩΝ

1. ΔΕΠΑ Α.Ε.-ΙΓΙ POSEIDON  
Μαρίνου Αντύπα 92, 141 21 Αθήνα  
(συν. 1 αντ. ΠΠΕ)
2. ΥΠΕΚΑ
  - α) Δ/ση Χωροταξίας  
Αμαλιάδος 17, 115 23 Αθήνα
  - β) Δ/ση Αισθητικών Δασών, Δρυμών & Θήρας  
Χαλκοκονδύλη 31, 10164 Αθήνα
  - γ) Δ/ση Εγκαταστάσεων Πετρελαιοειδών  
Μεσογείων 119, 101 92 Αθήνα
3. Υπ. Αγροτικής Ανάπτυξης & Τροφίμων  
Δ/ση Χωροταξίας & Προστ. Περ/ντος  
Πατησίων 207 & Σκαλιστήρη 19, 10164 Αθήνα
4. Υπ. Πολιτισμού & Τουρισμού
  - α) Δ/ση Προϊστ.& Κλασ. Αρχαιοτήτων
  - β) Δ/ση Βυζ/νων και Μεταβυζ/νων Αρχαιοτήτων  
Μπουμπουλίνας 20, 10682 Αθήνα
  - γ) ΛΒ' ΕΠΚΑ, Κύπρου 68, 46100 Ηγουμενίτσα
  - δ) 8η ΕΒΑ, Βυζαντινό Μουσείο, 452 21 Ιωάννινα
  - ε) ΛΓ' ΕΠΚΑ, ΕΘ. Αντίστασης 108-110, 481 00 Πρέβεζα
  - στ) 18η ΕΒΑ, Αράχθου & Μανωλιάσσης, 471 00 Άρτα
  - ζ) Εφορεία Εναλίων Αρχαιοτήτων, Καλλιστήρη 30, 117 42 Αθήνα
5. Υπ. Αγροτικής Ανάπτυξης & Τροφίμων  
Δ/ση Χωροταξίας & Προστ. Περ/ντος  
Πατησίων 207 & Σκαλιστήρη 19, 10164 Αθήνα
6. ΓΕΕΘΑ/ΔΥΠΟ/ΤΕΥ  
Μεσογείων 227-231, 154 51 Αθήνα

7. Νομαρχιακό Συμβούλιο  
Ν.Α. Θεσπρωτίας  
Π. Τσαλδάρη 18, 46100 Ηγουμενίτσα  
(συν. 1 αντ. ΠΠΕ)
8. Νομαρχιακό Συμβούλιο  
Ν.Α. Πρέβεζας  
Σπηλιάδου 8, 481 00 Πρέβεζα  
(συν. 1 αντ. ΠΠΕ)
9. Δ/ση Αγροτικής Ανάπτυξης (ΝΕΧΩΠ)  
Ν.Α. Πρέβεζας
10. Δ/ση Αγροτικής Ανάπτυξης (ΝΕΧΩΠ)  
Ν.Α. Θεσπρωτίας,  
Διοικητήριο, 461 00 Ηγουμενίτσα

**ΕΣΩΤ. ΔΙΑΝΟΜΗ**

1. ΕΥΠΕ (συν. 1 αντ. ΠΠΕ)
2. Χρον. Αρχείο
3. Τμήμα Α'
4. Κ. Γιαβής

βδδς: \ΥΡΕΗΟΔΕ\Χοροτακ\ΠΠΕΑ ΑΦΑ-Ι61.doc

2  
027.01.10



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ  
ΕΝΕΡΓΕΙΑΣ ΚΑΙ  
ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ  
ΓΕΝ. Δ/ΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

Αθήνα, 21 / 1 / 2010  
Αρ. Πρωτ : 1088

ΠΡΟΣ: Την Ε.Υ.ΠΕ.  
Λ. Αλεξάνδρας 11  
ΑΘΗΝΑ 114 73

Δ/ση : Χωροταξίας  
Τμήμα : Γ'

ΚΟΙΝ :

Ταχ. Δ/ση : Αμαλιάδος 17  
Ταχ. Κώδικας : 11523  
TELEFAX: 210- 64 58 690

ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ,  
ΕΝΕΡΓΕΙΑΣ ΚΑΙ ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ  
ΕΙΔΙΚΗ ΓΡΑΦΕΙΑ ΓΕΝ. ΠΡΟΫΠΟΛΟΓΙΣΜΟΥ  
12096F  
26-1-10

2/1  
4 Γραφείο

Πληροφορίες : Ι. Ράμμος  
Τηλέφωνο : 213-1515-107

ΘΕΜΑ: ΠΠΕΑ του έργου: «Ελληνοϊταλικός Αγωγός Φυσικού αερίου υψηλής πίεσης, - Ελληνικό Υποθαλάσσιο τμήμα» 26.01.10

ΣΧΕΤ: α) Το υπ'αρ. 148674/16.12.09 έγγραφο σας (α.π.χωρ. 1088/13.1.10)

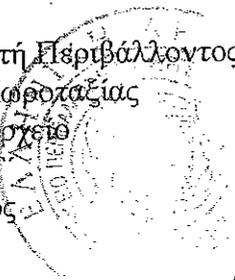
Σε απάντηση του (α) σχετικού και σε ότι αφορά τις αρμοδιότητές μας, σας γνωρίζουμε ότι :

1) Σύμφωνα με τα Περιφερειακά Πλαίσια Χωροταξικού Σχεδιασμού και Αειφόρου Ανάπτυξης των Περιφερειών της Χώρας, η συμπαραγωγή και διανομή φυσικού αερίου θεωρείται σημαντικός παράγοντας ανάπτυξης για όλη τη χώρα, καθιστώντας την ενεργειακό κέντρο των Βαλκανίων και της Δυτικής Ευρώπης. Ειδικότερα το Χωροταξικό Πλαίσιο της Περιφέρειας Ηπείρου, (όπου θα ξεκινάει η όδευση του υποθαλάσσιου αγωγού), θεωρεί σημαντική για την ανάπτυξη της Περιφέρειας την σύνδεση της με το δίκτυο φυσικού αερίου της χώρας, (σύνδεση με Ανατολική Ελλάδα, η μέσω της διασύνδεσης των δικτύων Φυσικού Αερίου ΕΛΛΑΔΑΣ-ΙΤΑΛΙΑΣ)

2) Τα παραπάνω πλαίσια δεν παρέχουν κατευθύνσεις αναφορικά με την θέση εγκατάστασης σταθμών συμπίεσης, ούτε και με την όδευση των αγωγών μεταφοράς του.

Συνημμένα : 2 Φάκελοι.

- Ε.Δ.:
- 1. Γεν. Δ/ντή Περιβάλλοντος
  - 2. Δ/ση Χωροταξίας
  - 3. Χρον. Αρχείο
  - 4. Τμήμα Γ
  - 5. Ι. Ράμμος



ΠΟΛΥΞΕΝΗ ΖΕΙΚΟΥ

Η ΔΙΕΥΘΥΝΤΡΙΑ  
ΠΟΛΥΞΕΝΗ ΖΕΙΚΟΥ



**ΠΙΝΑΚΑΣ ΑΠΟΔΕΚΤΩΝ**

1. Δ/ση Αγροτικής Ανάπτυξης  
Ν.Α. Πρέβεζας  
Λ. Ειρήνης 89, 481 00 Πρέβεζα  
(1 αντ. ΠΠΕ)
2. ΛΓ΄ Εφορεία Προϊστορικών & Κλασικών Αρχαιοτήτων  
Εθνικής Αντίστασης 108-110  
481 00 Πρέβεζα  
(1 αντ. ΠΠΕ)
3. 18<sup>η</sup> Εφορεία Βυζαντινών Αρχαιοτήτων  
Αράχθου & Μανωλιάσσης  
471 00 Άρτα  
(συν. 1 αντ. ΠΠΕ)

**ΚΟΙΝΟΠΟΙΗΣΗ**

1. ΥΠΠΟ  
Δ/ση Προϊστορ. & Κλασ. Αρχαιοτήτων  
Μπουμπουλίνας 20, 10682 Αθήνα
  2. IGI Poseidon- ΔΕΠΑ  
Μαρ. Αντύπα 92  
141 21 Αθήνα
- 

**ΕΣΩΤΕΡΙΚΗ ΔΙΑΝΟΜΗ**

1. ΕΥΠΕ
2. Χρον. Αρχείο
3. Τμήμα Α΄
4. Κ. Γιαβής



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ  
18<sup>η</sup> ΕΦΟΡΕΙΑ ΒΥΖΑΝΤΙΝΩΝ  
ΑΡΧΑΙΟΤΗΤΩΝ

ΑΡΤΑΣ - ΠΡΕΒΕΖΑΣ

Ταχ. Δ/ση: ΑΡΑΧΘΟΥ & ΜΑΝΩΛΙΑΣΣΗΣ

Ταχ. Κώδ.: 471 00, Άρτα

Πληρ/ρίες: Νικολάου Βασιλική

Τηλέφωνα: 26810/76365, 24637, 24636

Fax: 26810/79821

Άρτα, 30-08-2010

Αριθμ. Πρωτ.: 2136

ΠΡΟΣ:

Υπουργείο Περιβάλλοντος, Ενέργειας  
& Κλιματικής Αλλαγής  
Γενική Διεύθυνση Περιβάλλοντος ΕΥΠΕ  
Λ. Αλεξάνδρας 11  
114 73 Αθήνα

ΚΟΙΝ.:

ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ & ΤΟΥΡΙΣΜΟΥ  
Μπουμπουλίνας 20-22, 106 82 Αθήνα  
1. Γενική Διεύθυνση Αρχαιοτήτων &  
Πολιτιστικής Κληρονομιάς  
2. Διεύθυνση Βυζαντινών & Μεταβυζαντινών  
Αρχαιοτήτων  
3. ΔΓ' ΕΠΚΑ

ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ
ΕΙΣΑΓΓΗ ΥΠΟΥΡΓΕΙΑ ΠΕΡΙΒΛΛΟΝΤΟΣ
ΑΡΙΘΜ. ΠΡΩΤΟΚΟΛΛΟΥ: 128577
ΗΜΕΡΟΜΗΝΙΑ: 19/10

ΤΡΑ  
Γιαβι

02 09 40

**ΘΕΜΑ:** «Π.Π.Ε Ελληνοϊταλικού αγωγού φυσικού αερίου υψηλής πίεσης - Ελληνικό υποθαλάσσιο τμήμα».

Έχοντας υπόψη:

1. Το Ν.3028/28.06.2002 «Για την Προστασία των Αρχαιοτήτων και εν γένει της Πολιτιστικής Κληρονομιάς».
2. Το Π.Δ. 191 «Περί Οργανισμού του Υπουργείου Πολιτισμού» (ΦΕΚ 146/Α/13.06.2003).
3. Την Υ.Α. ΥΠ.ΠΟ./ΔΟΕΠΥ/ΤΟΠΥΝΣ/15/3696/20.01.2004 «Περί μεταβιβάσεως αρμοδιοτήτων του Υπουργού Πολιτισμού στις περιφερειακές και ειδικές υπηρεσίες του ΥΠ.ΠΟ».
4. Την από 04.05.2006 έναρξη λειτουργίας της 18<sup>ης</sup> Εφορείας Βυζαντινών Αρχαιοτήτων Άρτας- Πρέβεζας.

Σχετ. το με αριθμ. Πρωτ. : οικ. 129273/18-08-2010 έγγραφό σας.

Απαντώντας στο ανωτέρω σχετικό, σας γνωστοποιούμε ότι στα πλαίσια των αρμοδιοτήτων μας και σύμφωνα με την ισχύουσα αρχαιολογική νομοθεσία δεν έχουμε αντίρρηση για την όδευση ΑΦΑ-2 (ΟΜΠΡΕΛΑ 2) και θέση χερσαίων εγκαταστάσεων ΒΑΡΙΚΟ, σύμφωνα με τις διατάξεις του άρθρου 3 και της ΚΥΑ 11014/703/Φ104/14.3.03 (ΦΕΚ 332Β/20.3.03) ΚΑΙ ΤΟΥ Ν. 3010/2002 (ΦΕΚ 911/25.04.02) και την υποβληθείσα μελέτη Π.Π.Ε.

210 2250249



ΕΠΙΧΕΙΡΗΣΙΑΚΗ ΔΙΕΥΘΥΝΣΗ ΤΗΣ ΕΦΟΡΕΙΑΣ

Γεωργία Γ. Μουτζάλη  
Αρχαιολόγος



# IGI Poseidon

Προς  
Υπουργείο Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής  
Γενική Διεύθυνση Περιβάλλοντος  
ΕΥΠΕ (ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
Λεωφ. Αλεξάνδρας 11  
Τ.Κ. 11 473 - ΑΘΗΝΑ  
Τηλ.: 210 64 17 729

Αθήνα, 10 Νοεμβρίου 2009  
Αρ. Πρωτ.: 257

**Υπόψη: Διευθυντή κ. Ε. Τολέρη**

**ΕΡΓΟ:** ΥΠΟΘΑΛΑΣΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΕΛΛΑΔΑΣ ΙΤΑΛΙΑΣ – ΠΟΣΕΙΔΩΝ  
**ΘΕΜΑ:** Νέα Αίτηση για την Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση (Π.Π.Ε.Α.) για το Ελληνικό Τμήμα του Διασυνδεδημένου Υποθαλάσσιου Αγωγού Φυσικού Αερίου Ελλάδος-Ιταλίας (από τη Θεσπρωτία, νότια της Ν. Κέρκυρας, προς το Οτράντο Ιταλίας) και των υποστηρικτικών Χερσαίων Εγκαταστάσεών του

Σχετ.: 1. Η υπ' αριθμ. πρωτ. 656400 / 20.06.2007 επιστολή της ΔΕΓΠΑ  
2. Η υπ' αριθμ. πρωτ. 667692 / 20.07.2008 επιστολή της ΔΕΓΠΑ

Κύριοι,

Με την (1) σχετική επιστολή, τον Ιούνιο του 2007 σας είχε υποβληθεί η Προμελέτη Περιβαλλοντικών Επιπτώσεων (ΠΠΕ) για το Ελληνικό Τμήμα του Έργου:

«Ελληνοϊταλικός Διασυνδεδημένος Υποθαλάσσιος Αγωγός Φυσικού Αερίου Υψηλής Πίεσης»,

προκειμένου να γίνει από τις Υπηρεσίες του ΥΠΕΧΩΔΕ η από τον νόμο προβλεπόμενη Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση (ΠΠΕΑ).

Κατά το χρονικό διάστημα που μεσολάβησε από την ανωτέρω υποβολή, πραγματοποιήθηκε εκτεταμένη διερεύνηση στην ευρύτερη περιοχή της παράκτιας ζώνης των νομών Θεσπρωτίας και Πρέβεζας (βορείως και νοτίως των αρχικά προτεινόμενων περιοχών του Σταυρολιμένα και του Σοφά της Κοινότητας Πέρδικας Θεσπρωτίας), προκειμένου να αναζητηθούν και να μελετηθούν εναλλακτικές θέσεις προσαιγιάλωσης του υποθαλάσσιου αγωγού, εναλλακτικές θέσεις χωροθέτησης των εγκαταστάσεων Μέτρησης και Συμπίεσης και εναλλακτικές χαράξεις από τις θέσεις προσαιγιάλωσης μέχρι τις εγκαταστάσεις Μέτρησης και Συμπίεσης

Με την παρούσα επιστολή σας υποβάλλουμε συνημμένα σε δύο αντίγραφα και ένα ηλεκτρονικό αντίγραφο (CD) την αναθεωρημένη Προμελέτη Περιβαλλοντικών Επιπτώσεων (ΠΠΕ).

Οι εναλλακτικές θέσεις προσαιγιάλωσης που εξετάζονται στην Προμελέτη είναι οι εξής:

- α) Σταμπόνι
- β) Σοφάς
- γ) Ομπρέλα 2



# IGI Poseidon

δ) Σταυρολιμένας

ε) Ομπρέλα 1

Οι αντίστοιχες περιοχές χωροθέτησης των χερσαίων εγκαταστάσεων Μέτρησης και Συμπύεσης ,είναι οι ακόλουθες :

α) Περιοχή Καλύβια, του Δήμου Συβότων Θεσπρωτίας,

για τις θέσεις προσαιγιάλωσης Σταμπόνι και Σοφάς

β) Περιοχή Βαρικό, της Κοινότητας Πέρδικας Θεσπρωτίας,

για τις θέσεις προσαιγιάλωσης Ομπρέλα 2, Σταυρολιμένας και Ομπρέλα 1

γ) Περιοχή Γουρί, του Δήμου Πάργας Πρεβέζης,

για τις θέσεις προσαιγιάλωσης Ομπρέλα 2 και Ομπρέλα 1

Τέλος, οι επτά χαράξεις που εξετάστηκαν και αντιστοιχούν στις πιο πάνω εναλλακτικές θέσεις και περιοχές, κατά την σειρά αξιολόγησής τους στην Π.Π.Ε., είναι οι εξής:

Προτεινόμενη (Κύρια) Χάραξη:

Σταμπόνι (σημείο προσαιγιάλωσης) -Καλύβια (θέση χωροθέτησης των χερσαίων εγκαταστάσεων)

Πρώτη Εναλλακτική Χάραξη :

Σοφάς (σημείο προσαιγιάλωσης) - Καλύβια (θέση χωροθέτησης των χερσαίων εγκαταστάσεων)

Δεύτερη Εναλλακτική Χάραξη

Ομπρέλα 2 (σημείο προσαιγιάλωσης) - Βαρικό (θέση χωροθέτησης των χερσαίων εγκαταστάσεων)

Παραλλαγή της Δεύτερης Εναλλακτικής Χάραξης

Ομπρέλα 2 (σημείο προσαιγιάλωσης) - Γουρί (θέση χωροθέτησης των χερσαίων εγκαταστάσεων)

Τρίτη Εναλλακτική Χάραξη

Σταυρολιμένας (σημείο προσαιγιάλωσης) - Βαρικό (θέση χωροθέτησης των χερσαίων εγκαταστάσεων)

Τέταρτη Εναλλακτική Χάραξη

Ομπρέλα 1 (σημείο προσαιγιάλωσης) - Γουρί (θέση χωροθέτησης των χερσαίων εγκαταστάσεων)

Παραλλαγή της Τέταρτης Εναλλακτικής Χάραξης

Ομπρέλα 1 (σημείο προσαιγιάλωσης) - Βαρικό (θέση χωροθέτησης των χερσαίων εγκαταστάσεων)

Διευκρινίζονται τα εξής :



# IGI Poseidon

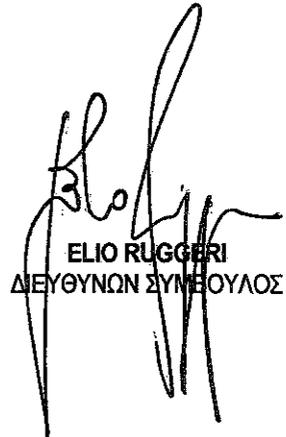
1. Η παρούσα αναθεωρημένη ΠΠΕ υποκαθιστά και αντικαθιστά πλήρως και στο σύνολό της την ΠΠΕ που είχε υποβληθεί με την ανωτέρω αναφερόμενη σχετική (1) επιστολή. Η ΠΠΕ που σας είχε υποβληθεί με την σχετική επιστολή καταργείται.
2. Μεταξύ των συνολικά 5 θέσεων που εξετάζονται στην νέα ΠΠΕ, περιλαμβάνονται οι δύο θέσεις προσαιγιάλωσης (Σταυρολιμένας και Σοφάς) που είχαν εξετασθεί στην αρχική μελέτη. Οι αρχικά προταθείσες περιοχές χωροθέτησης των χερσαίων εγκαταστάσεων Μέτρησης και Συμπίεσης έχουν αντικατασταθεί από άλλες, σε σημαντικά μεγαλύτερη απόσταση από τις ακτές.
3. Η προτεινόμενη θέση προσαιγιάλωσης βρίσκεται στην περιοχή Σταμπόνι, σε ένα βραχύως τμήμα της ακτής, βορείως της παραλίας του Σοφά.
4. Και οι τρεις προαναφερόμενες θέσεις χωροθέτησης των χερσαίων εγκαταστάσεων (Καλύβια, Βαρικό, Γουρί) ευρίσκονται σε περιοχές απομακρυσμένες από την ακτή (σε αποστάσεις από 3,5 km μέχρι 5,6 km) και δεν δημιουργούν καμία ενόχληση σε περιοχές υπό τουριστική ανάπτυξη.

Είμαστε στη διάθεσή σας για την παροχή τυχόν διευκρινίσεων, καθώς επίσης και για την αποστολή του συγκεκριμένου αριθμού αντιγράφων της Προμελέτης Περιβαλλοντικών Επιπτώσεων (ΠΠΕ) που θα μας υποδείξετε.

Παρακαλούμε για τις ενέργειές σας.

Για την  
Υ.Α.Φ.Α. ΠΟΣΕΙΔΩΝ Α.Ε.

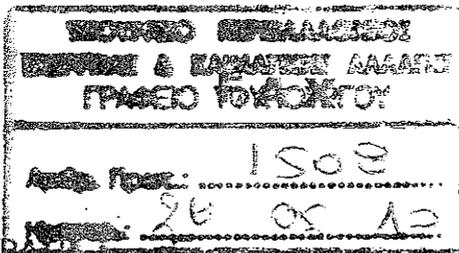
  
ΑΝΤΩΝΗΣ ΝΑΤΣΙΚΑΣ  
ΤΕΧΝΙΚΟΣ ΔΙΕΥΘΥΝΤΗΣ

  
ELIO RUGGERI  
ΔΙΕΥΘΥΝΩΝ ΣΥΜΒΟΥΛΟΣ

Συνημμένα: Π.Π.Ε. του Έργου από την Εταιρεία ΑΣΠΡΟΦΟΣ  
Σε δύο (2) αντίγραφα και ένα (1) CD



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
HELLENIC REPUBLIC  
ΠΕΡΙΦΕΡΕΙΑ ΗΠΕΙΡΟΥ  
REGION OF EPIRUS



Ημερομηνία / Date : 26-5-2010  
Αρ. Πρωτ. / Reference Number :  
Αρ. σελίδων / Number of pages : 1 + 8

Από / From :  
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ  
ΠΕΡΙΦΕΡΕΙΑΣ ΗΠΕΙΡΟΥ  
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κ. Μανιάτη  
Τηλέφωνο / Phone number :  
Αριθμός Φαξ / Fax number : 2106969501

Επείγον  Για ενημέρωση  Για σχολιασμό  Για απάντηση  Για καταστροφή

ΨΗΦΙΣΜΑ κ' ΥΠΟΜΝΗΜΑ ΚΑΤΟΙΚΩΝ ΠΕΡΙΔΙΚΑΣ

~~Α~~  
α. Γιαννιέρης  
260510

## ΨΗΦΙΣΜΑ

Γίνουμε 26/5 /2010

Εμείς οι κάτοικοι της Κοινότητας Πέρδικας και του Δήμου Συβότων του διαδηλώνουμε σήμερα 26 Μαΐου 2010 ομόφωνα ζητάμε:

1. Να σταματήσει άμεσα κάθε ενέργεια εγκατάστασης εργοστασίου συμπίεσης και διέλευσης αγωγού φυσικού αερίου από την περιοχή μας.
2. Η Κυβέρνηση να υλοποιήσει άμεσα την δέσμευση της και να υποχρεώσει την ΔΕΠΑ να αναζητήσει άλλη περιοχή στο Νομό που δεν θα δημιουργεί προβλήματα σε κανέναν.
3. Κάθε ενέργεια, που θα αναστέλλει την τουριστική ανάπτυξη της περιοχής, θα την αντιπαλέψουμε με κάθε μέσο και τρόπο.
4. Δεν θα επιτρέψουμε τη μετατροπή του τόπου μας σε βιομηχανική ζώνη .
5. Η περιβαλλοντική υποβάθμιση της περιοχής, θα μας βρίσκει καθολικά αντίθετους.
6. Πάνω από τα στενά οικονομικά συμφέροντα της ΔΕΠΑ είναι οι 6000 άνθρωποι της περιοχής και οι δέκα χιλιάδες θέσεις εργασίας στην τουριστική οικονομία της περιοχής.
7. Ζητάμε από την κ. Περιφερειάρχη να παρέμβει ώστε να βρεθούν άλλες λύσεις στο πρόβλημα της ΔΕΠΑ συμβατές με τις βιομηχανικές δραστηριότητες που προγραμματίζει.

**Ο ΑΓΩΝΑΣ ΣΥΝΕΧΙΖΕΤΑΙ!**

**ΟΧΙ ΣΤΗΝ ΥΠΟΒΑΘΜΙΣΗ ΤΟΥ ΤΟΠΟΥ ΜΑΣ!**

**ΟΧΙ ΣΤΗΝ ΑΝΑΣΤΟΛΗ ΤΗΣ ΤΟΥΡΙΣΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ!**

**ΣΥΝΤΟΝΙΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΑΓΩΝΑ ΟΛΩΝ ΤΩΝ ΦΟΡΕΩΝ**

Προς

Το Υπουργείο Περιβάλλοντος, Ενέργειας & Κλιματικής Αλλαγής / Γενική  
Διεύθυνση Περιβάλλοντος / Ειδική Υπηρεσία Περιβάλλοντος  
ΥΠΟΜΝΗΜΑ

1. Κοινότητας Πέρδικας, νόμιμα εκπροσωπούμενης
2. Δήμου Συβότων, νόμιμα εκπροσωπούμενου
3. Κίνησης Πολιτών Συβότων – Πέρδικας, νόμιμα εκπροσωπούμενης
4. Μορφωτικού – Εκπολιτιστικού Συλλόγου Πέρδικας, νόμιμα  
εκπροσωπούμενου
5. Εμπορικού Συλλόγου Πέρδικας, νόμιμα εκπροσωπούμενου
6. Συλλόγου Γονέων & Κηδεμόνων Πέρδικας, νόμιμα  
εκπροσωπούμενου
7. Σωματίου Εθελοντών Πέρδικας, νόμιμα εκπροσωπούμενου
8. Αγροτικού Συνεταιρισμού Πέρδικας, νόμιμα εκπροσωπούμενου
9. Τοπικό Συμβούλιο Νέων Πέρδικας, νόμιμα εκπροσωπούμενου
10. Αθλητικού σωματίου «Αετοί Πέρδικας», νόμιμα εκπροσωπούμενου

κοινοποιούμενο παράλληλα προς

1. Πίνακα Αποδεκτών του υπ' αρ. πρωτ. 148674/16-12-2009 εγγράφου  
της Ειδικής Υπηρεσίας Περιβάλλοντος του ΥΠΕΚΑ
2. συλλογικούς φορείς νομού Θεσπρωτίας

επί

της επικαιροποιημένης Προμελέτης Περιβαλλοντικών Επιπτώσεων του  
έργου «ΕΛΛΗΝΟΪΤΑΛΙΚΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ  
- ΕΛΛΗΝΙΚΟ ΘΑΛΑΣΣΙΟ ΤΜΗΜΑ»

Με το υπ' αρ. πρωτ. 148674/16-12-2009 έγγραφό σας διαιζιβάσατε σε  
διάφορες Υπηρεσίες, οι οποίες συμπεριλαμβάνονται σε Πίνακα Αποδεκτών,  
προκειμένου να γνωμοδοτήσουν επί αυτής, την επικαιροποιημένη Προμελέτη  
Περιβαλλοντικών Επιπτώσεων (Π.Π.Ε.) του έργου «ΕΛΛΗΝΟΪΤΑΛΙΚΟΣ  
ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ - ΕΛΛΗΝΙΚΟ ΘΑΛΑΣΣΙΟ  
ΤΜΗΜΑ», την οποία συνέταξε η τεχνική εταιρία «ΑΣΠΡΟΦΟΣ Α.Ι.Ε.», η οποία  
ανήκει στον ευρύτερο Δημόσιο Τομέα, για λογαριασμό της εταιρίας Υ.Α.Φ.Α.

ΠΟΣΕΙΔΩΝ Α.Ε., στην οποία συμμετέχουν εξ ημισείας η ελληνική ύημόσια εταιρία Δ.Ε.Π.Α. και η ιταλική ιδιωτική εταιρία EDISON S.A.. Το έργο αυτό, τμήμα του συνολικού Υποθαλάσσιου Αγωγού Φυσικού Αερίου Ελλάδος – Ιταλίας», περιλαμβάνει α) το υποθαλάσσιο τμήμα του αγωγού από το σημείο προσαιγιάλωσης στις ακτές του ν. Θεσπρωτίας μέχρι τη μέση του θαλασσιού στενού Ελλάδας και Ιταλίας, ανατολικά του Οτράντο, συνολικού μήκους 144 χιλιομέτρων β) τις εγκαταστάσεις συμπίεσης του φυσικού αερίου κοντά στις ακτές προκειμένου να διέλθει από το υποθαλάσσιο τμήμα και γ) το χερσαίο τμήμα του αγωγού μεταξύ σταθμού συμπίεσης και σημείου προσαιγιάλωσης.

Η Π.Π.Ε. περιορίζει την εξέταση λύσεων για τη διέλευση και προσαιγιάλωση του αγωγού και την κατασκευή του σταθμού συμπίεσης σε μια ζώνη λίγων χιλιομέτρων στο νότιο τμήμα του νομού Θεσπρωτίας και, σε μία από τις εναλλακτικές λύσεις, στην ίδια πάντοτε ζώνη αλλά εν ός των διοικητικών ορίων του νομού Πρέβεζας. Στη συνέχεια δε τοποθετεί τη διαδρομή του αγωγού νοτίως της Κέρκυρας.

Επί της συγκεκριμένης Π.Π.Ε. οι συλλογικοί φορείς της Πέρδ και των Συβότων, οι οποίοι συνυπογράφουμε, καταθέτουμε το παρόν υπόμνημα, εκφράζοντας την έντονη αντίθεσή μας για τον ελλιπή, μονομερή και μεροληπτικό χαρακτήρα της και ζητώντας την άμεση απόσυρση και συμπλήρωσή της.

Ειδικότερα :

1. Η Π.Π.Ε. προτείνει την απόρριψη της μηδενικής λύσης, της αποφυγής δηλαδή της κατασκευής του αγωγού, με το επιχείρημα ότι χάνονται τα οφέλη από την χρήση φυσικού αερίου στον πρωτογενή τομέα και στην παραγωγή ενέργειας για την Ελλάδα και για την Ευρώπη ενώ χένεται η ευκαιρία να αναδειχθεί η Ελλάδα σε ενεργειακό κόμβο και να τροφοδοτηθεί η Ήπειρος με Φυσικό Αέριο.

Επί του σημείου αυτού επικαλούμαστε την από 5-2-2008 γνωμοδότηση του Επιμελητηρίου Περιβάλλοντος και Βιωσιμότητας, σύμφωνα με τη / οποία τα διεθνή ενεργειακά συστήματα, όπως ο παρών αγωγός, πρέπει να εξετάζονται με κριτήριο τη συμφωνία τους με την Αρχή της Βιώσιμης Ανάπτυξης, η οποία κατοχυρώνεται στο άρθρο 24 του Συντάγματος. Η ανωτέρω γνωμοδότηση, εξετάζουσα τον συγκεκριμένο αγωγό και ειδικότερα την από τον Ιούνιο του 2007 προηγούμενη Προμελέτη Περιβαλλοντικών

Επιπτώσεων, διαπιστώνει την ασυμβατότητα του με τις αρχές της ασφάλειας (αυτάρκειας), της εξοικονόμησης ενέργειας και της ιεράρχησης και ελέγχου των ενεργειακών αναγκών και επισημαίνει την ασυμβατότητά του με το φυσικό περιβάλλον, την εγγενή επικινδυνότητα των υποθαλασσιών αγωγών φυσικού αερίου και την επαύξηση του κινδύνου στις σεισμογενείς περιοχές. Για τους λόγους αυτούς διαπιστώνει την πλήρη ασυμβατότητα του αγωγού με την Αρχή της Βιώσιμης Ανάπτυξης και προτείνει την εγκατάλειψή του. Τα βασικά σημεία της γνωμοδότησης αυτής ασφαλώς ισχύουν και στη/ παρούσα περίπτωση.

Συμπληρωματικά στο ζήτημα της σεισμικότητας επικημαινουμε κραυγαλέες αντιφάσεις μεταξύ προηγούμενης Προμελέτης Περιβαλλοντικών Επιπτώσεων του έργου (που είχε συνταχθεί τον Ιούνιο του 2007) και της παρούσας. Ενώ λ.χ. η προηγούμενη ανέφερε ότι «δεν έχει συμβεί μέχρι σήμερα σεισμός μεγαλύτερος των 5,6 Ρίχτερ στο νομό Θεσπρωτίας» αλλά παράλληλα πληροφορούσε ότι «σε αποστάσεις μεγαλύτερες των 10 χλμ. εκ των σημείων προσαιγιαλώσεως έχουν συμβεί κατά την τελευταία 20ετία 5 ισχυροί σεισμοί μεγαλύτεροι των 5 Ρίχτερ», η παρούσα ναι μεν αναγνωρίζει ότι «στη χερσαία περιοχή του έργου έχει συμβεί σεισμός 7 Ρίχτερ» (σελ. 48 Π.Π.Ε.) αποφεύγει όμως να δώσει την παραμικρή πληροφορία για τη συχνότητα του φαινομένου. Αντίθετα παραπέμπει σε μελλοντική (!) εκτέλεση μελετών σεισμικής επικινδυνότητας της προτεινόμενης χάραξης, καθορισμού των ενεργών σεισμικών ρηγμάτων και ειδικού σεισμικού σχεδιασμού του αγωγού (σελ. 48-49). Άλλες γεωλογικές και γεωτεχνικές μελέτες, οι οποίες απουσιάζουν, περιλαμβάνονται στη σελ. 195 της Π.Π.Ε..

Στο ζήτημα τέλος της τροφοδότησης της Ηπείρου, επισημαίνουμε ότι η Διεθνής Σύμβαση μεταξύ Ελλάδας και Ιταλίας για την ανάπτυξη του έργου διασύνδεσης με την κατασκευή του αγωγού, η οποία κυρώθηκε από την Ελληνική Βουλή με το ν. 3441/2006, δεν προβλέπει τη δέσμευση ποσοτήτων φυσικού αερίου για τη διάθεσή τους στην ελληνική αγορά. Επομένως ο ισχυρισμός για δήθεν ανάπτυξη δικτύου φυσικού αερίου στην Ήπειρο παράμενει αναπόδεικτος, αμφίβολος και σε κάθε περίπτωση, στα πλαίσια της συγκεκριμένης Προμελέτης, παραπλανητικός.

2. Η επίμαχη, παρούσα Π.Π.Ε. περιορίζει την εμπειριστατωμένη εξέταση λύσεων για τη χάραξη και προσαιγιαλώση του αγωγού και για την

κατασκευή του σταθμού συμπίεσης σε ένα μικρό μόνο μέρος των ακτών στο νότιο τμήμα του νομού Θεσπρωτίας, στα διοικητικά όρια της Κοινότητας Πέρδικας, ενώ σε μία από τις εναλλακτικές περιπτώσεις επεκτείνεται στο νομό Πρέβεζας, στην ίδια πάντοτε ευρύτερη περιοχή. Με αυτόν όμως τον περιορισμό οι μελετώμενες λύσεις (κύρια και εναλλακτικές) διέρχονται από την καρδιά της ζώνης τουριστικής ανάπτυξης της Θεσπρωτίας, την περιοχή Πέρδικας και Συβότων.

Επ' αυτού η Π.Π.Ε., παρά το γεγονός ότι αναγνωρίζει πως το 45 % του πληθυσμού του νομού Θεσπρωτίας απασχολείται στον τουρισμό (σελ. 112), αποφεύγει πολύ χαρακτηριστικά να διακρίνει τη ζώνη της τουριστικής αιχμής και να την ταυτίσει με την περιοχή της μελέτης της. Το πιο εξοργιστικό όμως είναι ότι αξιολογεί τα πιθανά σημεία προσαυγιάλωσης αφενός μεν υποβαθμίζοντας την σημερινή τους εικόνα αφετέρου δε αγνοώντας τελείως τον αναπτυξιακό δυναμισμό της περιοχής. Οι συντάκτες της Π.Π.Ε. αντιλαμβάνονται ως «επιπτώσεις στον τουρισμό» τις συνέπειες μόνο για τις υπάρχουσες ξενοδοχειακές μονάδες και τις λοιπές εγκαταστάσεις τις οποίες και αυτές υποτιμούν, αλλά πάντως σε καμμία περίπτωση τις επιπτώσεις στη συνολική εικόνα, τις προοπτικές και το όνομα της περιοχής, πολύ περισσότερο που η τουριστική βιομηχανία στηρίζεται κατά βάση στην προσδοκία, εξαρτώμενη απόλυτα από αστάθμητους παράγοντες. Είναι χαρακτηριστικό ότι και μόνη η αναγγελία του αγωγού έχει τροκαλέσει αναβολές σε επενδυτικά σχέδια στην περιοχή.

Έτσι η Π.Π.Ε. αξιολογεί τα πιθανά σημεία προσαυγιάλωσης, τα οποία σημειωτέον βρίσκονται σε πανέμορφες παραλίες με μεγάλες μελλοντικές δυνατότητες, ως «αδιάφορα για την τουριστική ανάπτυξη» (σελ. 116-117) και ως «μη προσβάλλοντα τουριστικές εγκαταστάσεις» (σελ. 153), με μόνη εξαίρεση αυτή της εναλλακτικής λύσης Σοφά, όπου εντοπίζει υφιστάμενη τουριστική ανάπτυξη και πιθανότητα μελλοντικής (σελ. 156).

Οι συντάκτες της Π.Π.Ε. φέρονται να αγνοούν το εγκεκριμένο και ισχύον Περιφερειακό Πλαίσιο Χωροταξικού Σχεδιασμού και Αειφόρου Ανάπτυξης Περιφέρειας Ηπείρου (ΥΑ 25301/25-6-2003 ΦΕΚ Β 1451/6-10-2003), το οποίο είναι χαρακτηριστικό ότι ούτε καν μνημονεύουν στις εκατοντάδες σελίδες της προμελέτης. Όμως ο συγκεκριμένος Χωροταξικός Σχεδιασμός, για την κατάρτιση του οποίου εργάστηκαν επί ολόκληρα χρόνια

ειδικευμένες και πολυθεματικές μελετητικές ομάδες και συζήτησαν διεξοδικά συλλογικά σώματα όπως το Περιφερειακό Συμβούλιο Ηπείρου, αφενός αποτυπώνει τη χωροταξική φυσιογνωμία της περιοχής και αφετέρου διαγράφει τις κατευθύνσεις της μελλοντικής της ανάπτυξης. Ειδικότερα για την περιοχή το Χωροταξικό Σχέδιο Ηπείρου προβλέπει την ανάπτυξη τουριστικών χρήσεων στην περιοχή της Πέρδικας, των Συβότων και της Πλαταρκίς πάνω στον παράκτιο άξονα τουριστικής ανάπτυξης ενώ κάνει ειδική μνεία στην ανάπτυξη παραθεριστικής κατοικίας στις παράκτιες περιοχές της Κοινότητας Πέρδικας και του Δήμου Συβότων, όπως θα οριοθετηθούν από τα αντίστοιχα ΣΧΟΟΑΠ.

Είναι φανερό ότι αυτή τη συγκεκριμένη δυναμική διάσταση στην εξέλιξη και τουριστική φυσιογνωμία της περιοχής απέφυγαν να αξιολογήσουν – λόγω ασύγγνωστης μεροληψίας ή εξίσου ασύγγνωστης άγνοιας – οι μελετητές.

3. Υποτίθεται ότι η Π.Π.Ε. αναφέρεται και στις υπόλοιπες εναλλακτικές θαλάσσιες χαραζεις, πέραν της ζώνης Πέρδικας - Συβότων, και ειδικότερα στην χάραξη, η οποία αρχίζει από τον όρμο Φτελιάς στο Βόρειο άκρο του ν. Θεσπρωτίας, κοντά στα Ελληνο-αλβανικά σύνορα, και στη συνέχεια διέρχεται από το Βόρειο θαλάσσιο στενό μεταξύ Κέρκυρας και Αλβανίας (σελ. 150). Όμως ο ελάχιστος χώρος των 7 αράδων (!) που αφιερώνει, και κυρίως το είδος της επιχειρηματολογίας, που χρησιμοποιεί για να την απορρίψει, πείθουν και τον πλέον καλόπιστο για τα περιθώρια αμεροληψίας και αξιοπιστίας των συντακτών της. Η προμελέτη χαρακτηρίζει την χάραξη ως τεχνικά μη εφικτή (εν έτει 2010 !!!), «*δεδομένου του μικρού πλάτους του θαλάσσιου στενού, της ανώμαλης μορφολογίας του πυθμένα, των υπαρχόντων καλωδίων και της πυκνής κυκλοφορίας πλοίων*» και επιπλέον «*με ιδιαίτερα επιβαρυντικές επιπτώσεις στο θαλάσσιο περιβάλλον*» (αλλά μόνο με τη συγκεκριμένη χάραξη!).

Ειλικρινά μας δημιουργεί μεγάλα ερωτήματα η απουσία της παραμικρής αναφοράς στα τεράστια πλεονεκτήματα της συγκεκριμένης λύσης. Δεν πρόκειται μόνο για τα προφανέστατα οικονομικά, κιθώς η διαδρομή Ελλάδας – Ιταλίας συντομεύεται κατά πολλά χιλιόμετρα (55 χλμ. από τα 144 συνολικά του υποθαλάσσιου τμήματος του αγωγού, στα οποία πρέπει ασφαλώς να προστεθεί και το όφελος από τη συντόμειση της χερσαίας διαδρομής του αγωγού στο έδαφος της Ηπείρου) και επομένως

επιτυγχάνεται οικονομία κλίμακας εκατοντάδων εκατομμυρίων ευρώ, ιδιαίτερα σημαντική στις παρούσες συνθήκες της οικονομικής κρίσης. Εξίσου προφανή είναι τα περιβαλλοντικά πλεονεκτήματα, καθώς οι αναστόφευκτες βλάβες και επιπτώσεις της διέλευσης θα πραγματοποιηθούν σε πολύ μικρότερο μήκος και ιδιαίτερα σε πολύ μικρότερο μήκος στον ελληνικό θαλάσσιο (και χερσαίο) χώρο. Ακόμη και εάν η διαδρομή στο βόρειο στενό απαιτούσε κάποιες επιπλέον τεχνικές προβλέψεις, η οικονομία κλίμακας αφενός και τα περιβαλλοντικά οφέλη αφετέρου είναι τόσο μεγάλα, ώστε στοιχειώδης ορθολογισμός θα επέβαλε την επιλογή αυτή.

Εξίσου προφανή είναι τα πλεονεκτήματα της Φτελιάς λόγω της απουσίας σημαντικού οικονομικού και κοινωνικού κόστους, καθώς πρόκειται για ερημική περιοχή κοντά στα σύνορα, αρκετά μακριά από την Σαγιάια και χωρίς προοπτικές τουριστικής ανάπτυξης. Αυτά τα στοιχεία θα έπρεπε να αξιολογηθούν συγκριτικά με την πάνδημη αντίθεση της Πέρδικας και των Συβότων.

Αδυνατούμε επίσης να αντιληφθούμε για ποιο λόγο τα υπάρχοντα δίκτυα είναι αξεπέραστο πρόβλημα στην περίπτωση της Φτελιάς ενώ στην περίπτωση της Πέρδικας και της νότιας χάραξης απλώς «παρουσιάζουν ιδιαίτερο τεχνικό ενδιαφέρον ... στις περιπτώσεις αυτές ο αγωγός τοποθετείται κάτω από τα παρεμβαλλόμενα εμπόδια (καλώδια, οχετοί κλπ.) και σε ελάχιστη απόσταση 0,30 μ.» (σελ. 207 Π.Π.Ε.). Εάν αρκεί μια απόσταση 0,30 μ., μπορεί κανείς να επικαλεσθεί τεχνική αδυναμία ;

Η αναφορά της Π.Π.Ε. στην κυκλοφορία των διερχόμενων πλοίων, τη στιγμή που πρόκειται για ένα Στενό πλάτους 2 χιλιομέτρων, είτε είναι 100 % δημαγωγική είτε υποκρύπτει προθέσεις ανάπτυξης όχι απλού αγωγού αλλά και λιμανιού κοντά στις εγκαταστάσεις συμπίεσης, οπότε το σχεδιαζόμενο έργο είναι άλλο και η περιγραφή και μελέτη του εμφανώς παραπλανητική και ψευδής.

Τέλος επισημαίνουμε ότι αγνοήθηκε η πολύ σημαντική παρατήρηση στο συνημμένο στην Π.Π.Ε. έγγραφο του Γενικού Επιτελείου Ναυτικού με αριθμό Φ.542/1210/1-8-2007 ότι «στη θαλάσσια περιοχή νοτίως της λήσου Κέρκυρας απ' όπου διέρχεται η όδευση του υποθαλάσσιου αγωγού και μέχρι του σημείου προσαιγιαλώσεώς του, ενδεχομένως επί ή υπό τον βυθόν ευρίσκονται υπολείμματα εκρηκτικών μηχανισμών (ναρκών) τς υ Β'

Παγκοσμίου Πολέμου». Αντίθετα η χρήση του καθαρισμένου από νάρκες Βόρειου Στενού δεν εγκυμονεί τέτοιους κινδύνους.

Είναι τόσο πολλά και οφθαλμοφανή τα πλεονεκτήματα της βόρειας χάραξης – για τα οικονομικά δεδομένα του έργου και για το ύψος της επιβάρυνσης του ελληνικού λαού, για την ελαχιστοποίηση των κοινωνικών και οικονομικών συνεπειών ειδικά στη Θεσπρωτία, για την έκταση των περιβαλλοντικών συνεπειών, για τα δεδομένα ασφαλούς κατασκευής και λειτουργίας κλπ. – που η απουσία συγκριτικής αξιολόγησής τους από την εταιρία «Άστροφος Α.Ε.» καταντά σκανδαλώδης και παίρνει τα χαρακτηριστικά διατεταγμένης υπηρεσίας.

Η ίδια μονομέρεια χαρακτηρίζει και τις συνοδευτικές μελέτες, τόσο τη μελέτη μορφολογίας των ακτών του Ελληνικού Κέντρου Θαλάσσιων Ερευνών όσο και τη μελέτη εντοπισμού ενεργών ρηγμάτων του Ινστιτούτου Γεωλογικών και Μεταλλευτικών Ερευνών. Και οι δύο μελέτες περιορίζουν το αντικείμενό τους στην περιοχή της Πέρδικας - Συβότων. Έτσι όμως δεν είναι δυνατή η συγκριτική αξιολόγηση, της μορφολογίας λ.χ. των ακτών στην περίπτωση της Φτελιάς και της βόρειας χάραξης αφενός και των εναλλακτικών λύσεων της νότιας χάραξης αφετέρου.

ΣΥΜΠΕΡΑΣΜΑΤΙΚΑ η συνταχθείσα Προμελέτη Περιβαλλοντικών Επιπτώσεων δεν ανταποκρίνεται ούτε στις προβλέψεις του Νόμου ούτε στο «νομολογιακό κεκτημένο» του Συμβουλίου της Επικρατείας σχετικά με την πληρότητά της ως μέσου πληροφόρησης για τη συγκεκριμένη δραστηριότητα και τις συνέπειές της και εξέτασης εναλλακτικών λύσεων και αντιπαράθεσης των πλεονεκτημάτων και μειονεκτημάτων της καθιερώσεως και τεκμηρίωσης με περιβαλλοντικά κριτήρια των λόγων επιλογής. Γι' αυτό και είναι αναγκαία η απόσυρση και ανασύνταξη της από ανεξάρτητη μελετητική ομάδα και όχι από εταιρία του ευρύτερου Δημόσιου Τομέα.

Δεν επιθυμούμε στη φάση αυτή να αναφερθούμε σε κάθε ετιμέρους έλλειψη της (προ)μελέτης. Πολύ περισσότερο που σκοπεύουμε να καλύψουμε εμείς τη μονομέρεια και τις ανεπάρκειές της και να αναθέσουμε σε μελετητική ομάδα με τα παραπάνω χαρακτηριστικά τη συγκριτική αξιολόγηση της Φτελιάς ή και άλλων τοποθεσιών με τις προτεινόμενες από τη μελέτη.

Θέλουμε όμως να διατρανώσουμε την ομόθυμη διάθεση του λαού και των φορέων της Πέρδικας και των Συβότων ενάντια σε προειλημμένες

αποφάσεις και στη δημιουργία τετελεσμένων. Το «όχι στη διέλευση του αγωγού φυσικού αερίου» εκφράζει όχι μόνο το σύνολο της Πέρδικας, όπως προκύπτει από την απόφαση του Κοινοτικού Συμβουλίου αλλά και από τα αποτελέσματα του τοπικού δημοψηφίσματος, που συνοδεύουν και την Π.Π.Ε., καθώς και των Συβότων αλλά και το Νομαρχιακό Συμβούλιο της Θεσσαλίας και θα μας βρει όλους ενωμένους.

Διερωτώμαστε μάλιστα, εάν αυτό το «κόστος» το έχει πληροφορηθεί η συμμετέχουσα στην εταιρία Ποσειδών Α.Ε. Ιταλική εταιρία EDISON από τα αρμόδια όργανα της Δ.Ε.Π.Α. και δηλώνουμε ότι θα το διερευνήσουμε και θα την ενημερώσουμε εμείς.

Ζητούμε την άμεση απόσυρση και ανασύνταξη της συγκριμένης προμελέτης και καλούμε το Υπουργείο Περιβάλλοντος και Κλιματικής Αλλαγής να αναλάβει τις ευθύνες του.

Πέρδικα, 25 Μαΐου 2010

Για τους συλλογικούς φορείς της Πέρδικας & των Συβότων

1. Για την Κοινότητα Πέρδικας

2. Για τον Δήμο Συβότων



# IGI Poseidon

ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ,  
ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜ. ΑΛΛΑΓΗΣ  
ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ  
ΑΡΙΘΜ. ΠΡΩΤ. : 148451  
ΗΜΕΡΟΜΗΝΙΑ : 14-12-2009

Προς  
Υπουργείο Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής  
Γενική Διεύθυνση Περιβάλλοντος  
ΕΥΠΕ (ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
Λεωφ. Αλεξάνδρας 11  
Τ.Κ. 11 473 - ΑΘΗΝΑ  
Τηλ.: 210 64 17 729

Αθήνα, 11 Δεκεμβρίου 2009  
Αρ. Πρωτ.: 293

Υπόψη: Διευθυντή κ. Ε. Τολέρη

ΕΡΓΟ: ΥΠΟΘΑΛΑΣΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΕΛΛΑΔΑΣ ΙΤΑΛΙΑΣ - ΠΟΣΕΙΔΩΝ  
ΘΕΜΑ: Αποστολή αντιγράφων της Προμελέτης Περιβαλλοντικών Επιπτώσεων (Π.Π.Ε.) για το Ελληνικό Τμήμα του Διασυνδεδημένου Υποθαλάσσιου Αγωγού Φυσικού Αερίου Ελλάδος-Ιταλίας (από τη Θεσπρωτία, νότια της Ν. Κέρκυρας, προς το Οτράντο Ιταλίας) και των υποστηρικτικών Χερσαίων Εγκαταστάσεών του

Σχετ.: 1. Η υπ' αριθμ. πρωτ. 257 / 10.11.2009 επιστολή μας

Κύριοι,

Σε συνέχεια της ως άνω σχετικής επιστολής, σας διαβιβάζουμε (όπως μας ζητήθηκε) οκτώ (8) αντίγραφα της Προμελέτης Περιβαλλοντικών Επιπτώσεων (ΠΠΕ) για το Ελληνικό Τμήμα του Έργου:

«Ελληνοϊταλικός Διασυνδεδημένος Υποθαλάσσιος Αγωγός Φυσικού Αερίου Υψηλής Πίεσης».

προκειμένου να προωθηθούν στις κατά τόπους Υπηρεσίες, στα πλαίσια της από τον νόμο προβλεπόμενης διαδικασίας Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης (ΠΠΕΑ).

Είμαστε στη διάθεσή σας για την παροχή τυχόν διευκρινίσεων.

Παρακαλούμε για τις ενέργειές σας.

Για την  
Υ.Α.Φ.Α. ΠΟΣΕΙΔΩΝ Α.Ε.

  
ΑΝΤΩΝΗΣ ΝΑΤΣΙΚΑΣ  
ΤΕΧΝΙΚΟΣ ΔΙΕΥΘΥΝΤΗΣ

Συμπληρωματικά: Οκτώ (8) αντίγραφα της Π.Π.Ε. και Έργου



# IGI Poseidon

Προς  
ΥΠΕΚΑ

Γενική Διεύθυνση Περιβάλλοντος  
ΕΥΠΕ (ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
Λεωφ. Αλεξάνδρας 11  
Τ.Κ. 11 473, Αθήνα  
Τηλ. : 210 6417729

Αθήνα, 22 Απριλίου 2010  
Αρ. Πρωτ. : 366

**Υπόψη :** κ. Ε. Τολέρη, Διευθύντ.

**Κοιν. : 1. Εφορεία Εναλίων Αρχαιοτήτων.**

Καλισπέρη 30, Τ.Κ. 11142 Αθήνα

**Υπόψη :** Κας Α. Σίμωνι, Προϊσταμένης Εφορείας.  
Κου Δ. Κουρκουμέλη, Αρχαιολόγου.

**2. ΛΒ' Εφορία Προϊστορικών και Κλασσικών Αρχαιοτήτων.**

Κύπρου 68, Ηγουμενίτσα

**Υπόψη :** Κου Γ. Ρήγινου, Προϊσταμένου της Εφορείας.  
Κας Κ. Λάζαρη, Αρχαιολόγου.

**3. ΑΣΠΡΟΦΟΣ**

Ελ. Βενιζέλου 284, Τ.Κ. 17675 Καλλιθέα.

**Υπόψη :** Κου Α. Ζάμπα, Αναπληρωτή Διευθυντή Διεύθυνσης Έργων.

**Έργο :** Ελληνο-ιταλικός Υποθαλάσσιος Αγωγός Φυσικού Αερίου (ΥΑΦΑ-ΠΟΣΕΙΔΩΝ).

**Θέμα :** Διευκρινήσεις και συμπληρωματικά στοιχεία σχετικά με την αναθεωρημένη Προμελέτη Περιβαλλοντικών Επιπτώσεων (ΠΠΕ) του Ελληνικού Τμήματος του Έργου.

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**Σχετ. :** α. Το υπ' αριθμ. ΑΠ 123556/24-03-2010 έγγραφο της ΕΥΠΕ.  
β. Το υπ' αριθμ. Φ4/5/226/19-01-2010 έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων (ΕΕΑ).  
γ. Το υπ' αριθμ. ΑΠ 55/19-01-2010 έγγραφο της ΛΒ' ΕΠΚΑ Θεσπρωτίας.  
δ. Το υπ' αριθμ. 257/10-11-2009 έγγραφο-διαβιβαστικό της ΥΑΦΑ-ΠΟΣΕΙΔΩΝ.

Σε απάντηση της ως άνω (α) σχετικής επιστολής σας, με την οποία μας διαβιβάσατε τα σχόλια της Εφορείας Εναλίων Αρχαιοτήτων (ΕΕΑ) και της ΛΒ' Εφορείας Προϊστορικών & Κλασσικών Αρχαιοτήτων Θεσπρωτίας (ΛΒ' ΕΠΚΑ), σχετικά με την Προμελέτη Περιβαλλοντικών Επιπτώσεων (ΠΠΕ), σας υποβάλλουμε δύο ξεχωριστά Ενημερωτικά Σημειώματα (Α) και (Β) (ένα για κάθε μία Εφορεία

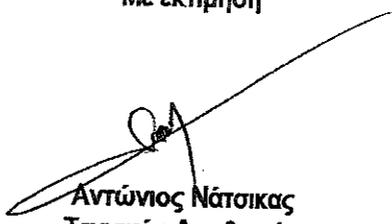


# IGI Poseidon

Αρχαιοτήτων) με διευκρινιστικά στοιχεία και συμπληρωματικά έγγραφα, τα οποία εκ παραδρομής δεν είχαν συμπεριληφθεί μέσα στο σώμα της Αναθεωρημένης Προμελέτης Περιβαλλοντικών Επιπτώσεων.

Παρακαλούμε να θεωρήσετε ότι τα Σημειώματα αυτά και τα συνημμένα σε αυτά συμπληρωματικά έγγραφα αποτελούν στοιχεία και έγγραφα της υποβληθείσας με το (δ) σχετικό ΠΠΕ.

Με εκτίμηση

  
Αντώνιος Νάτσικας  
Τεχνικός Διευθυντής

## Συνημμένα

- i) Ενημερωτικό Σημείωμα (Α), με τα συνημμένα του.
- ii) Ενημερωτικό Σημείωμα (Β).

## **ΕΝΗΜΕΡΩΤΙΚΟ ΣΗΜΕΙΩΜΑ (Α)**

(Συνημμένο στο Έγγραφο με ΑΠ 366/22-04-2010 της ΥΑΦΑ-ΠΟΣΕΙΔΩΝ)

**Προς**  
**Εφορεία Εναλίων Αρχαιοτήτων (ΕΕΑ)**  
Καλλισπέρη 30, Τ.Κ. 11142 Αθήνα

**Υπόψιν :** κας Α. Σίμωσι, Προϊσταμένης της Εφορείας  
κ. Δ. Κουρκουμέλη, Αρχαιολόγου.

**Θέμα :** Διευκρινιστικά στοιχεία και συμπληρωματικά Έγγραφα σχετικά με την αναθεωρημένη Προμελέτη Περιβαλλοντικών Επιπτώσεων (ΠΠΕ).

Στο παρόν Ενημερωτικό Σημείωμα, επισυνάπτονται τα πιο κάτω συμπληρωματικά ή σχετικά έγγραφα, τα οποία εκ παραδρομής δεν είχαν συμπεριληφθεί μέσα στο σώμα της Προμελέτης Περιβαλλοντικών Επιπτώσεων, η οποία υποβλήθηκε στην Γενική Διεύθυνση Περιβάλλοντος (ΕΥΠΕ) με το υπ' αριθμόν 257/10-11-2009 έγγραφο της Εταιρείας ΥΑΦΑ-ΠΟΣΕΙΔΩΝ.

- i. Το υπ' αριθμόν Φ4/5/6599/12-12-2008 Έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων (ΕΕΑ) προς την Εταιρεία ΑΣΠΡΟΦΟΣ (η οποία συντάξε την ΠΠΕ).
- ii. Το υπ' αριθμόν ΕΠ/29/30-07-2007 Έγγραφο της ΕΕΑ προς την ΔΕΠΑ.
- iii. Το υπ' αριθμόν Φ4/5/4031/29-08-2007 Έγγραφο της ΕΕΑ προς το Υπουργείο Πολιτισμού.
- iv. Το υπ' αριθμόν Φ4/5/692/08-02-2008 Έγγραφο της ΕΕΑ προς την ΔΕΠΑ.
- v. Το υπ' αριθμόν 66459/17-03-2008 Έγγραφο της ΔΕΠΑ προς την ΕΕΑ.
- vi. Το υπ' αριθμόν ΕΠ 9/21-04-2008 Έγγραφο της ΕΕΑ προς την ΔΕΠΑ.
- vii. Το υπ' αριθμόν 666635/30-05-2008 Έγγραφο της ΔΕΠΑ προς την ΕΕΑ.

Σε σχέση και αναφορικά με την ανωτέρω επισυναπτόμενη σχετική αλληλογραφία, διευκρινίζονται τα ακόλουθα :

1. Με το ως άνω (ii) ΕΠ/29/30-07-2007 Έγγραφο της ΕΕΑ είχε δοθεί η έγκριση για την διενέργεια της Αναγνωριστικής Θαλάσσιας Έρευνας (Reconnaissance Marine Survey : RMS), υπό την προϋπόθεση της αυστηρής τήρησης των όρων (1), (2), (3) και (4), που αναφέρονταν στο εν λόγω έγγραφο.

Σημειώνεται ότι η ανωτέρω έγκριση αφορούσε την έρευνα RMS και όχι την αρχική ΠΠΕ, η οποία είχε υποβληθεί στο ΥΠΕΧΩΔΕ με το 656400/20-06-2007 και η οποία δεν είχε ακόμη διαβιβασθεί από το ΥΠΕΧΩΔΕ προς την ΕΕΑ (και άλλες αρμόδιες Υπηρεσίες) για την διατύπωση γνώμης ή παρατηρήσεων.

2. Με το ως άνω (v) έγγραφο της ΔΕΠΑ προς την ΕΕΑ, υποβλήθηκε ένα πλήρες αντίγραφο της Τεχνικής Έκθεσης της Μελέτης RMS και όλοι οι χάρτες της θαλάσσιας περιοχής, που είχε διερευνηθεί (στα πλαίσια της μελέτης RMS), ικανοποιώντας έτσι τον υπ' αριθμόν (3) όρο που είχε τεθεί από την ΕΕΑ.

Η ΕΕΑ με το ως άνω (vi) έγγραφο προς την ΔΕΠΑ, ζήτησε των υποβολή των χαρτών της θαλάσσιας περιοχής σε ψηφιακή μορφή και η ΔΕΠΑ απάντησε με το (vii) έγγραφο, ενημερώνοντας ότι λόγω του εμπιστευτικού χαρακτήρα των στοιχείων, δεν έχει την δυνατότητα παροχής αντιγράφου σε ψηφιακή μορφή και πρότεινε όπως, εκπρόσωπος της ΕΕΑ, εξετάσει επί τόπου (στα γραφεία της ΔΕΠΑ) τα σχετικά ψηφιακά στοιχεία.

3. Ο υπ' αριθμόν (4) όρος που περιλαμβανόταν στο ως άνω έγγραφο της ΕΕΑ ανέφερε ότι :

*"4. Μετά το πέρας της προκαταρκτικής αυτής έρευνας και για τον προγραμματισμό της αναγκαίας για την τελική εκπόνηση της μελέτης όδευσης του αγωγού, μελέτης λεπτομερειακής αποτύπωσης του πυθμένα (DMS), θα πρέπει, από το φορέα του έργου, να προβλεφθεί προϋπολογισμός για τη διενέργεια λεπτομερούς αρχαιολογικού ελέγχου της συγκεκριμένης περιοχής, σύμφωνα με τις διατάξεις του Ν. 3028/02. Από τα αποτελέσματα του ελέγχου, θα εξαρτηθεί και η τελική χάραξη της πορείας του αγωγού. Για το λόγο αυτό ο φορέας του έργου θα πρέπει να έρθει σε συνεννόηση με την Εφορεία Εναλίων Αρχαιοτήτων, ώστε να προγραμματισθεί και να προϋπολογισθεί εν λόγω έρευνα".*

Ο όρος αυτός θα ικανοποιηθεί πριν από την έναρξη της λεπτομερούς θαλάσσιας έρευνας (Detail Marine Survey : DMS), η οποία προβλέπεται να αρχίσει τον προσεχή Σεπτέμβριο ή Οκτώβριο.

Ο λεπτομερής αρχαιολογικός έλεγχος της θαλάσσιας περιοχής που θα διερευνηθεί για την χάραξη του αγωγού, θα γίνει με δαπάνες της Εταιρείας ΥΑΦΑ-ΠΟΣΕΙΔΩΝ, σύμφωνα με τα στοιχεία και τις οδηγίες που θα δοθούν από την ΕΕΑ και σε συνεργασία με την εταιρεία που θα αναλάβει την λεπτομερή έρευνα.

Σημειώνεται επίσης ότι πριν από την έναρξη της μελέτης DMS θα ζητηθεί ειδική άδεια από την ΕΧΑΕΘ (Υπουργείο Εξωτερικών) και θα έχουν γίνει όλες οι συνεννοήσεις και με την ΕΕΑ (συμμετοχή αρχαιολόγων, δυτών ,κλπ.).

4. Με το υπ' αριθμόν Φ4/5/4031/29-08-2007 έγγραφο η ΕΕΑ διατύπωσε θετική γνώμη σχετικά με την αρχική ΠΠΕ, που είχε υποβληθεί από την ΔΕΠΑ στο ΥΠΕΧΩΔΕ στις 20-06-2007 και στη συνέχεια από το ΥΠΕΧΩΔΕ προς την ΕΕΑ με το υπ' αριθμόν ΑΠ 131683/03-08-2007 έγγραφο.

Στο έγγραφο αυτό αναφερόταν ότι :

*«Κατόπιν των ανωτέρω και τη διενέργεια αυτοψίας στην περιοχή του όρμου Σταυρολιμένα, η ΕΕΑ από την πλευρά των αρμοδιοτήτων της, θεωρεί ότι μπορεί να εγκριθεί η συγκεκριμένη μελέτη με την προϋπόθεση ότι πριν την εκπόνηση της ΜΠΕ ο φορέας του έργου θα αναλάβει, σύμφωνα με τις κείμενες διατάξεις του Ν. 3028/02, το σύνολο της δαπάνης διεξαγωγής αρχαιολογικού ελέγχου σε όλο το μήκος της όδευσης του αγωγού, όπως αυτή θα προκύψει μετά την αρχική βυθομετρική μελέτη που εγκρίθηκε με το (β) σχετικό έγγραφο μας και με την προϋπόθεση της τήρησης των όρων που τέθηκαν σε αυτό. Για το λόγο αυτό και επειδή ο συγκεκριμένος έλεγχος πρέπει να προηγηθεί της εκπόνησης της ΜΠΕ, ώστε να μην παρουσιασθούν εμπλοκές και προβλήματα στην συνέχεια, ο φορέας του έργου οφείλει να έρθει σε επικοινωνία με την ΕΕΑ για την οργάνωσή της, από τα αποτελέσματα της οποίας θα κριθεί και η τελική χάραξη του υποθαλάσσιου τμήματος του αγωγού».*

Σημειώνεται και τονίζεται ότι η Μελέτη Περιβαλλοντικών Επιπτώσεων (ΜΠΕ), που αναφέρεται πιο πάνω, δεν έχει αρχίσει να συντάσσεται ακόμη, δεδομένου ότι για να γίνει αυτό προαπαιτούμενα είναι :

**α)** Να έχει εκδοθεί η Υπουργική Απόφαση για την έγκριση της ΠΠΕ.  
(Προέγκριση χωροθέτησης).

**β)** Να έχει δοθεί η έγκριση από την ΕΧΑΕΘ για την διενέργεια της μελέτης DMS.

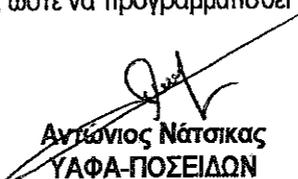
γ) Να έχει ενημερωθεί έγκαιρα η ΕΕΑ και να έχει υπογραφεί σχετικό μνημόνιο, στο οποίο να συμφωνούνται όλες οι λεπτομέρειες για την αρχαιολογική έρευνα και την ανάληψη της σχετικής δαπάνης από την Εταιρεία ΥΑΦΑ-ΠΟΣΕΙΔΩΝ.

5. Η ΕΕΑ, με το υπ' αριθμόν Φ4/5/6599/12-12-2009 προς την ΑΣΠΡΟΦΟΣ, κατέθεσε τα σχόλιά της για την αναθεωρημένη ΠΠΕ (στην οποία προβλέπονται 5 εναλλακτικές θαλάσσιες χαραζείς), σημειώνοντας και υπενθυμίζοντας τους όρους και τις προϋποθέσεις που είχε θέσει με την προηγηθείσα αλληλογραφία κατά το έτος 2007 (ως ανωτέρω).

Διευκρινίζεται στο σημείο αυτό ότι η Εταιρεία ΑΣΠΡΟΦΟΣ είχε ζητήσει την γνώμη της ΕΕΑ, στα πλαίσια της διερεύνησης της νέας αναθεωρημένης ΠΠΕ και όχι για την έγκριση διενέργειας της μελέτης DMS η οποία δεν έχει αρχίσει ακόμη, όπως αναφέρεται και ανωτέρω στην παράγραφο (3).

Τέλος σημειώνεται και τονίζεται ότι η Εταιρεία ΥΑΦΑ-ΠΟΣΕΙΔΩΝ (θυγατρική της ΔΕΠΑ) θα τηρήσει όλους τους όρους και τις προϋποθέσεις που έχουν τεθεί ή που θα τεθούν από την ΕΕΑ και όλες τις υπόλοιπες αρμόδιες Δημόσιες Αρχές, πιο συγκεκριμένα :

- 1) Τις διατάξεις του Ν. 3028/02 "Για την προστασία των Αρχαιοτήτων και της Πολιτιστικής Κληρονομιάς" (ΦΕΚ 153/28-06-2002).
  - 2) Την μη φωτογράφιση, ή βιντεοσκόπηση ή ανέλκυση αρχαίων που ενδεχομένως θα εντοπισθούν κατά την διενέργεια της έρευνας DMS και την άμεση ειδοποίηση της Εφορείας Εναλίων Αρχαιοτήτων.
  - 3) Την παράδοση προς την ΕΕΑ αντιγράφων όλων των στοιχείων που θα προκύψουν από την έρευνα DMS (βαθυμετρικές αποτυπώσεις, μορφολογικές αποτυπώσεις, αποτυπώσεις της υποδομής του πυθμένα, κλπ.), χωρίς αυτά να έχουν υποστεί οποιαδήποτε επεξεργασία και περιλαμβάνοντας όλα τα παράπλευρα στοιχεία (συντεταγμένες, ημερομηνίες, βάθη, κλπ.).
  - 4) Την πρόβλεψη προϋπολογισμού για την διενέργεια λεπτομερούς αρχαιολογικού ελέγχου της συγκεκριμένης περιοχής, σύμφωνα με τις διατάξεις του Ν. 3028/02. Από τα αποτελέσματα του ελέγχου, θα εξαρτηθεί και η τελική χάραξη της πορείας του αγωγού.
- Η Εταιρεία ΥΑΦΑ-ΠΟΣΕΙΔΩΝ (Φορέας του Έργου) θα έλθει, για το σκοπό αυτό, σε συνεννόηση με την Εφορεία Εναλίων Αρχαιοτήτων, ώστε να προγραμματισθεί και να προϋπολογισθεί η έρευνα.

  
Αγγέλιος Νάσικας  
ΥΑΦΑ-ΠΟΣΕΙΔΩΝ  
Τεχνικός Διευθυντής

#### Συνημμένα

- i. Το υπ' αριθμόν Φ4/5/6599/12-12-2008 Έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων (ΕΕΑ) προς την Εταιρεία ΑΣΠΡΟΦΟΣ (η οποία συνέταξε την ΠΠΕ).
- ii. Το υπ' αριθμόν ΕΠ/29/30-07-2007 Έγγραφο της ΕΕΑ προς την ΔΕΠΑ.
- iii. Το υπ' αριθμόν Φ4/5/4031/29-08-2007 Έγγραφο της ΕΕΑ προς το Υπουργείο Πολιτισμού.
- iv. Το υπ' αριθμόν Φ4/5/692/08-02-2008 Έγγραφο της ΕΕΑ προς την ΔΕΠΑ.
- v. Το υπ' αριθμόν 66459/17-03-2008 Έγγραφο της ΔΕΠΑ προς την ΕΕΑ.
- vi. Το υπ' αριθμόν ΕΠ 9/21-04-2008 Έγγραφο της ΕΕΑ προς την ΔΕΠΑ.
- vii. Το υπ' αριθμόν 666635/30-05-2008 Έγγραφο της ΔΕΠΑ προς την ΕΕΑ.

## **ΕΝΗΜΕΡΩΤΙΚΟ ΣΗΜΕΙΩΜΑ (B)**

(Συνημμένο στο Έγγραφο με ΑΠ 366/22-04-2010 της ΥΑΦΑ-ΠΟΣΕΙΔΩΝ)

Προς

**ΛΒ' Εφορεία Προϊστορικών και Κλασικών Αρχαιοτήτων Θεσπρωτίας (ΛΒ ΕΠΚΑ)**

Κύπρου 68, Τ.Κ.46100, Ηγουμενίτσα

Υπόψιν : κ. Γ. Ρήγινου, Προϊσταμένου της Εφορείας,  
κας Κ. Λάζαρη, Αρχαιολόγου.

**Θέμα:** Διευκρινιστικά και συμπληρωματικά στοιχεία σχετικά με την αναθεωρημένη Προμελέτη Περιβαλλοντικών Επιπτώσεων (ΠΠΕ).

Στο παρόν Ενημερωτικό Σημείωμα προς την Εφορεία Προϊστορικών και Κλασικών Αρχαιοτήτων Θεσπρωτίας (ΛΒ ΕΠΚΑ), δίδονται διευκρινιστικά και συμπληρωματικά στοιχεία, σχετικά με τα σχόλια της ΛΒ ΕΠΚΑ, σε ότι αφορά την Προμελέτη Περιβαλλοντικών Επιπτώσεων (ΠΠΕ).

Συγκεκριμένα, σημειώνουμε τα ακόλουθα :

1. Οι όροι και οι προϋποθέσεις που αναφέρονται στην σχετική επιστολή της ΛΒ ΕΠΚΑ, και θα τεθούν σε ισχύ εφόσον ολοκληρωθούν οι διαδικασίες χωροθέτησης του αγωγού και πριν από την έναρξη οποιωνδήποτε εργασιών για την κατασκευή του, θα τηρηθούν, όπως και γενικότερα όσα προβλέπονται από την ισχύουσα νομοθεσία

Μεταξύ των όρων αυτών, τους οποίους η ΥΑΦΑ Ποσειδών (Φορέας εκτέλεσης του Έργου) θα ακολουθήσει, περιλαμβάνονται οι εξής:

- Το σύνολο των εκσκαφικών εργασιών που θα εκτελεστούν για τις ανάγκες του έργου εντός των ορίων του Νομού Θεσπρωτίας θα πραγματοποιηθούν παρουσία αρμοδίου υπαλλήλου της ΛΒ ΕΠΚΑ, η οποία για τον σκοπό αυτό θα ενημερωθεί εγκαίρως με την υποβολή σχετικής αίτησης. Στις εν λόγω εργασίες συμπεριλαμβάνονται επίσης η απομάκρυνση των φυτικών, οι διαμορφώσεις και διαπλατύνσεις δρόμων πρόσβασης, κλπ.
- Θα προβλεφθεί πίστωση από την ΥΑΦΑ Ποσειδών για την πρόσληψη επί συμβάσει υπαλλήλου, ο οποίος, υπό την εποπτεία της ΛΒ ΕΠΚΑ, θα παρακολουθήσει το σύνολο των εκσκαφικών εργασιών.
- Σε περίπτωση που κατά την διάρκεια των εν λόγω εργασιών βρεθούν αρχαιότητες, οι εργασίες θα διακοπούν προσωρινά στο τμήμα εκείνο, το οποίο θα κρίνει απαραίτητο η Εφορεία για την προστασία των αρχαιοτήτων και θα ακολουθήσει, σύμφωνα με την ισχύουσα νομοθεσία, η σύνταξη και υπογραφή Μνημονίου Συνεργασίας για την πραγματοποίηση σωστικής ανασκαφικής έρευνας μεταξύ της ΥΑΦΑ Ποσειδών και της ΛΒ ΕΠΚΑ.
- Μετά την υπογραφή του Μνημονίου, θα ακολουθήσει ανασκαφική έρευνα από ειδικό συνεργείο, αμειβόμενο από τις πιστώσεις του Έργου, σύμφωνα με την ισχύουσα νομοθεσία.
- Εφόσον κριθεί απαραίτητο, η ανασκαφική αυτή έρευνα είναι δυνατό να επεκταθεί και πέραν των ορίων του εκτελούμενου Έργου. Μετά την ολοκλήρωσή τους η Εφορεία θα γνωματεύσει, όσον αφορά στην πορεία των εργασιών στο συγκεκριμένο τμήμα του Έργου.
- Εφόσον, σύμφωνα με τις προβλέψεις της ισχύουσας νομοθεσίας (Ν.3028/2002, Εγκύκλιος 6418/27.05.2003 του ΥΠ.ΠΟ.) απαιτείται η σύνταξη τεχνικού δελτίου ανεξάρτητου υποέργου για την διεξαγωγή σωστικών αρχαιολογικών ερευνών στο συγκεκριμένο Έργο, η

συμπλήρωση του εν λόγω Δελτίου και η υλοποίηση του συγκεκριμένου υποέργου θα γίνει σύμφωνα με την επιστολή της ΛΒ ΕΠΚΑ και βάσει της ισχύουσας νομοθεσίας. Εξυπακούεται ότι τα ανωτέρω θα ισχύσουν κατ' αναλογία και σε περίπτωση εκσκαφικών εργασιών εντός άλλου Νομού, σε συνεννόηση της ΥΑΦΑ Ποσειδών με την αντίστοιχη αρμόδια Εφορεία.

2. Σε ότι αφορά το απόσπασμα της επιστολής, το οποίο αναφέρεται στην μη καταλληλότητα των χαράξεων (2) και (2<sup>α</sup>) και συγκεκριμένα ότι:

*«... θα πρέπει να αποκλειστούν εντελώς οι χαράξεις (2) και (2<sup>α</sup>), οι οποίες βρίσκονται πολύ κοντά στο όριο του αρχαιολογικού χώρου και προβλέπουν την κατασκευή συμπίεστή σε άμεση οπτική επαφή με αυτόν.»*

θα θέλαμε να σημειώσουμε ότι με βάση όσα αναφέρονται στην ΠΠΕ, τόσο ο αγωγός όσο και οι εγκαταστάσεις του Σταθμού Συμπίεσης εκτιμάται ότι δεν προκαλούν κάποιο πρόβλημα στον αρχαιολογικό χώρο του Δημοκάστρου, για τους εξής λόγους:

- Οι χαράξεις διέρχονται έξω από τα όρια του αρχαιολογικού χώρου του Δημοκάστρου και σε απόσταση 50 περίπου μέτρων από αυτόν. Από τεχνικής δε πλευράς είναι εφικτή μία προσαρμογή της όδευσης, κατά την φάση του λεπτομερούς σχεδιασμού, με αύξηση της απόστασης μέχρι τα 100 μέτρα, εφόσον αυτό ζητηθεί από την αρμόδια Εφορεία ΛΒ ΕΠΚΑ.
  - Σε όλο το μήκος της χερσαίας όδευσης, καθώς και στο υποθαλάσσιο τμήμα, μέχρι το βάθος θαλάσσης των 25 περίπου μέτρων, ο αγωγός θα τοποθετηθεί σε τάφρο, η οποία, μετά την τοποθέτηση του αγωγού, θα επιχωθεί και θα αποκατασταθεί.
  - Οι θέσεις του Σταθμού Συμπίεσης που προτείνονται στην ΠΠΕ για τις χαράξεις 2 και 2<sup>α</sup>, (αντίστοιχα οι θέσεις «Βαρικό» και «Γουρί»), είναι απομακρυσμένες από την περιοχή του Δημοκάστρου (συγκεκριμένα βρίσκονται, σε ευθεία απόσταση, περίπου 3,5 και 5 χιλιόμετρα αντίστοιχα από τον συγκεκριμένο αρχαιολογικό χώρο).
  - Λόγω της γεωμορφολογίας της περιοχής, οι προαναφερόμενες θέσεις του Σταθμού Συμπίεσης δεν έχουν οπτική επαφή με τον αρχαιολογικό χώρο του Δημοκάστρου.
- Δεδομένου ότι στα πλαίσια της ΠΠΕ εξετάστηκαν ορισμένες θέσεις του Σταθμού Συμπίεσης, οι οποίες όντως βρίσκονται κοντά και σε άμεση οπτική επαφή με τον αρχαιολογικό χώρο, είναι πιθανό η αναφορά που γίνεται στην συγκεκριμένη επιστολή να αφορά κάποιες από αυτές. Πρέπει ωστόσο να σημειώσουμε ότι οι θέσεις αυτές έχουν ήδη αποκλειστεί κατά τη σχετική αξιολόγηση (βλέπε Κεφάλαιο 5.4.5) της ΠΠΕ.

Λαμβάνοντας υπόψη τα ανωτέρω, θεωρούμε ότι, πέραν της προτεινόμενης Κύριας Χάραξης, καθώς και των εναλλακτικών χαράξεων με αφετηρία τα σημεία Σοφάς και Ομπρέλα 1, για τις οποίες η ΛΒ ΕΠΚΑ αναφέρει στην επιστολή της ότι δεν έχει αντίρρηση, και οι χαράξεις με αφετηρία το Σημείο Ομπρέλα 2 (χαράξεις 2 και 2<sup>α</sup>) κατά την γνώμη μας και με βάση τα στοιχεία που διαθέτουμε, δεν φαίνονται να παρουσιάζουν κάποιο ιδιαίτερο πρόβλημα, σε σχέση με τα θέματα αρχαιολογικού ενδιαφέροντος.

Για τον λόγο αυτό, και εφόσον κριθεί σκόπιμο και από την Γενική Διεύθυνση Περιβάλλοντος / ΕΥΠΕ, ενδέχεται να ζητηθεί από την αρμόδια Εφορεία ΛΒ ΕΠΚΑ να διατυπώσει συμπληρωματική άποψη.

  
Αντώνιος Νάτσικας  
ΥΑΦΑ-ΠΟΣΕΙΔΩΝ  
Τεχνικός Διευθυντής



# IGI Poseidon

Προς  
ΥΠΕΚΑ  
Γενική Διεύθυνση Περιβάλλοντος  
ΕΥΠΕ (ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
Λεωφ. Αλεξάνδρας 11  
Τ.Κ. 11 473, Αθήνα  
Τηλ. : 210 6417729

Αθήνα, 23 Απριλίου 2010  
Αρ. Πρωτ. : 368

Υπόψη : κ. Ε. Τολέρη, Διευθυντή.

Θέμα : Υποθαλάσσιος Διασυνδεδετήριος Αγωγός Φυσικός Αερίου Ελλάδας Ιταλίας (ΥΑΦΑ-ΠΟΣΕΙΔΩΝ).  
Πρόσδος στην διαδικασία έγκρισης της ΠΠΕ.

Σχετ. : α. Το ΑΠ 257/10-11-2009 Έγγραφο της ΥΑΦΑ-Ποσειδών.  
β. Το ΑΠ 148674/16-12-2009 Έγγραφο της ΕΥΠΕ.  
γ. Το ΑΠ 123556/24-03-2010 Έγγραφο της ΕΥΠΕ.

Σε συνέχεια των ανωτέρω σχετικών, παρακαλούμε να μας ενημερώσετε για την μέχρι σήμερα πρόοδο της διαδικασίας γνωμοδότησης από τις αρμόδιες Υπηρεσίες, στις οποίες είχε διαβιβασθεί η ΠΠΕ για το έργο.

Λαμβάνοντας υπόψη τον χρόνο που έχει παρέλθει από την αποστολή εκ μέρους σας των σχετικών αντιγράφων της ΠΠΕ, καθώς και τα χρονικά όρια που προβλέπονται σχετικά, παρακαλούμε για την επιτάχυνση της σχετικής διαδικασίας.

Σχετικά με την γνωμοδότηση της ΛΒ' Εφορείας Προϊστορικών & Κλασσικών Αρχαιοτήτων, την οποία μας κοινοποιήσατε (σχετικό γ) και πιο συγκεκριμένα όσον αφορά την παράγραφο της 2<sup>ης</sup> σελίδας, η οποία αναφέρει :

*"Επειδή, ωστόσο, οι εν λόγω χαράξεις βρίσκονται κατά το μεγαλύτερο μέρος τους εντός των ορίων του Νομού Πρέβεζας, είναι απαραίτητη η γνωμοδότηση και των αρμοδίων για την περιοχή ΛΓ' ΕΠΚΑ και 18<sup>ης</sup> ΕΒΑ."*

επιθυμούμε να διευκρινίσουμε ότι οι χαράξεις αυτές αντιστοιχούν στο σημείο προσαιγιάλωσης ΟΜΠΡΕΛΑ 1 και έχουν σειρά αξιολόγησης πολύ χαμηλή σε σχέση με την Κύρια χάραξη και την πρώτη εναλλακτική.

Λαμβάνοντας υπόψη τα ανωτέρω παρακαλούμε να μας ενημερώσετε σχετικά με το ενδεχόμενο να αποστείλετε αντίγραφα της ΠΠΕ και προς την ΛΓ' ΕΠΚΑ και την 18<sup>η</sup> ΕΒΑ, για την διατύπωση γνώμης.

Με εκτίμηση

  
Αντώνιος Νάσικας  
Τεχνικός Διευθυντής



# IGI Poseidon

Προς  
ΥΠΕΚΑ  
Γενική Διεύθυνση Περιβάλλοντος  
ΕΥΠΕ (ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
Λεωφ. Αλεξάνδρας 11  
Τ.Κ. 11 473, Αθήνα  
Τηλ. : 210 6417729

Αθήνα, 01 Ιουνίου 2010  
Αρ. Πρωτ. : 385

*Υπόψη : κ. Ε. Τολέρη, Διευθυντή.*

**Έργο :** Ελληνο-ιταλικός Υποθαλάσσιος Αγωγός Φυσικού Αερίου (ΥΑΦΑ-ΠΟΣΕΙΔΩΝ).

**Θέμα :** Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση (Π.Π.Ε.Α.) για το Ελληνικό Τμήμα του Διασυνδεδετήριου Υποθαλάσσιου Αγωγού Φυσικού Αερίου Ελλάδος-Ιταλίας και των υποστηρικτικών Χερσαίων Εγκαταστάσεών του

*Σχετ. :*

1. Η υπ' αριθμ. 257/10.11.2009 επιστολή της ΥΑΦΑ-ΠΟΣΕΙΔΩΝ.
2. Το υπ' αριθμ. 148674/16.12.2009 έγγραφο του ΥΠΕΚΑ της Γενικής Διεύθυνσης Περιβάλλοντος ΕΥΠΕ.
3. Η υπ' αριθμ. 257/10.11.2009 επιστολή της ΥΑΦΑ-ΠΟΣΕΙΔΩΝ με τα δύο ενημερωτικά σημειώματα (Α και Β) προς ΕΕΑ και ΛΒ' ΕΠΚΑ αντίστοιχα.

Μετά την κατάθεση της Αναθεωρημένης Προμελέτης Περιβαλλοντικών Επιπτώσεων του έργου ΥΑΦΑ – ΠΟΣΕΙΔΩΝ (Σχετ. 1) καθώς και την ανταλλαγείσα αλληλογραφία και τις διευκρινήσεις που δόθηκαν προς την Εφορεία Εναλίων Αρχαιοτήτων (ΕΕΑ) και την ΛΒ' Εφορεία Προϊστορικών & Κλασικών Αρχαιοτήτων Θεσπρωτίας (ΛΒ' ΕΠΚΑ) (Σχετ. 3), παρακαλούμε να μας ενημερώσετε σχετικά με την ολοκλήρωση της αποστολής και της παραλαβής από την Υπηρεσία σας των προβλεπόμενων από την νομοθεσία γνωμοδοτήσεων, από το σύνολο των φορέων, στους οποίους είχε σταλεί η εν λόγω μελέτη.

Λαμβάνοντας υπόψη ότι (όπως προβλέπεται από την ισχύουσα νομοθεσία) οι αρμόδιοι φορείς οφείλουν να διαβιβάσουν τη γνώμη τους στην αρμόδια υπηρεσία του ΥΠΕΚΑ εντός 15 ημερών, καθώς και ότι, κατά τη γνώμη μας, έχει παρέλθει χρονικό διάστημα κατά πολύ μεγαλύτερο από αυτό που παρέχεται από το νόμο, παρακαλούμε να προχωρήσετε στην έκδοση της προβλεπόμενης από το νόμο θετικής γνωμοδότησης σύμφωνα με την διαδικασία της ΠΠΕΑ.

Θεωρούμε χρήσιμο και απαραίτητο να τονίσουμε ότι το έργο του ΥΑΦΑ – ΠΟΣΕΙΔΩΝ είναι εθνικής σημασίας, έχει χαρακτηριστεί από την Ευρωπαϊκή Ένωση ως έργο υψίστης σπουδαιότητας (με την



# IGI Poseidon

υπ' αριθμ. 1364/2006 απόφασή της) και ως εκ τούτου είναι απαραίτητο να ολοκληρωθούν οι προβλεπόμενες από το νόμο διαδικασίες.

Παρακαλούμε για τις άμεσες ενέργειές σας.

Με εκτίμηση



Αντώνιος Νάτσικας  
Τεχνικός Διευθυντής



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ  
ΚΑΙ ΤΟΥΡΙΣΜΟΥ  
ΑΒ' ΕΦΟΡΕΙΑ ΠΡΟΪΣΤΟΡΙΚΩΝ  
& ΚΛΑΣΙΚΩΝ ΑΡΧΑΙΟΤΗΤΩΝ  
ΘΕΣΠΡΩΤΙΑΣ

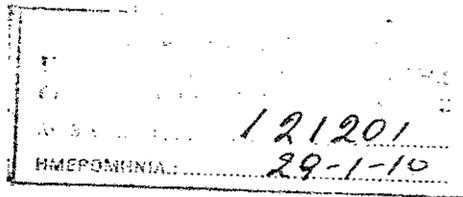
Ταχ. Δ/ση: Κύπρου 68 - Ηγουμενίτσα  
Ταχ. Κώδ.: 461 00  
Πληρ/ρίες: Κασ. Λάζαρη  
Τηλέφωνα: 26650.29177 / 8  
FAX: 26650.25133

Ηγουμενίτσα, 19.01.2010  
Αριθ. Πρωτ. 55

1.2.2010

✓ ΠΡΟΣ: Υπουργείο Περιβάλλοντος, Ενέργειας  
και Κλιματικής Αλλαγής  
Γενική Διεύθυνση Περιβάλλοντος  
ΕΥΠΕ / Τμήμα Α'  
Λεωφ. Αλεξάνδρας 11 - 114 73 Αθήνα

- ΚΟΙΝ.: 1. Υπουργείο Πολιτισμού και Τουρισμού  
ΓΔΑΠΚ / ΔΗΠΚΑ /  
Τμήμα Αρχαιολογικών Χώρων, Μνημείων  
και Αρχαιογνωστικής Έρευνας  
Μπουμπουλίνας 20 - 106 82 Αθήνα  
2. ΔΓ' Ε.Π.Κ.Α.  
Εθνικής Αντίστασης 108 - 110  
481 00 Πρέβεζα  
3. 8<sup>η</sup> Εφορεία Βυζαντινών Αρχαιοτήτων  
Κάστρο Ιωαννίνων - 452 21 Ιωάννινα  
4. 18<sup>η</sup> Εφορεία Βυζαντινών Αρχαιοτήτων  
Αράχθου και Μανωλιάσσης - 471 00 Άρτα  
5. Εφορεία Εναλίων Αρχαιοτήτων  
Καλλισπέρη 30 - 117 42 Αθήνα



2/Α  
Τιαβυ  
29.01.10

ΘΕΜΑ: «Γνωμοδότηση για την Προμελέτη Περιβαλλοντικών Επιπτώσεων του έργου  
Ελληνοϊταλικός Αγωγός Φυσικού Αερίου Υψηλής Πίεσης - Ελληνικό Υποθαλάσσιο  
Τμήμα».

ΣΧΕΤ.: (α) Το με αρ. πρωτ. 4986/02.12.2008 έγγραφό μας.  
(β) Το με αρ. πρωτ. 148674/16.12.2009 έγγραφό σας.

Σε συνέχεια του (α) και σε απάντηση του (β) σχετικού, με το οποίο διαβιβάστηκε η  
Προμελέτη Περιβαλλοντικών Επιπτώσεων με τις πέντε (5) εναλλακτικές χαράξεις  
προσאיγιάλωσης του ελληνικού υποθαλάσσιου τμήματος του Ελληνοϊταλικού Αγωγού  
Φυσικού Αερίου Υψηλής Πίεσης, σας γνωρίζουμε τα εξής:

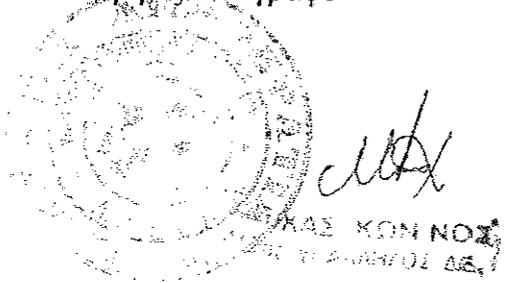
- Η προσאיγιάλωση του υπό κατασκευή αγωγού, πρόκειται σύμφωνα με την υποβληθείσα μελέτη να πραγματοποιηθεί στις νότιες ακτές του Νομού Θεσπρωτίας ή στα όρια των Νομών Θεσπρωτίας και Πρέβεζας.
- Στην περιοχή αυτή εντοπίζεται ο κηρυγμένος με τη με αρ. ΥΠΠΟ/ΓΔΑΠΚ/ΑΡΧ/Α1/Φ43/401/17/11.04.2008 Υπουργική Απόφαση αρχαιολογικός χώρος του Δυμοκάστρου, η θέση και τα όρια του οποίου αναφέρονται στην εκπονηθείσα μελέτη, καθώς και ο επίσης κηρυγμένος με την ίδια Απόφαση λόφος της Γκριμάλας, στο κέντρο της μικρής πεδιάδας που σχηματίζεται πίσω από τον όρμο Καραβοστάσι.

- Στον αρχαιολογικό χώρο του Δυμοκάστρου, έναν οχυρωμένο οικισμό των ύστερων κλασικών και ελληνιστικών χρόνων, ολοκληρώθηκαν τον Ιούνιο του 2009, με χρηματοδότηση από το Π.Ε.Π. Ηπείρου του Γ' Κ.Π.Σ., εργασίες ανάδειξης και, ως εκ τούτου, κρίνεται απολύτως απαραίτητη η κατά το δυνατό μεγαλύτερη απομάκρυνση του υπό κατασκευή αγωγού -και ειδικά των συμπιεστών που αποτελούν αναπόσπαστο τμήμα του- από αυτόν.
  - Ως εκ τούτου, η Υπηρεσία μας δεν έχει αντίρρηση για την προτεινόμενη κύρια χάραξη -πράσινου χρώματος- με θέση προσαιγιάλωσης το βόρειο άκρο της παραλίας του Σοφά στην Κοινότητα Πέρδικας, που είναι η πλέον απομακρυσμένη από τον αρχαιολογικό χώρο. Σας ενημερώνουμε, ωστόσο, ότι στην εν λόγω θαλάσσια περιοχή συλλέχθηκε το καλοκαίρι του 2008 αρχαίο σιδερένιο αντικείμενο και, συνεπώς, για την πραγματοποίηση οποιωνδήποτε εργασιών είναι απαραίτητη η γνωμοδότηση και της αρμόδιας Εφορείας Εναλίων Αρχαιοτήτων.
  - Το ίδιο ισχύει και για την εναλλακτική χάραξη (1) -μωβ χρώματος- στο νότιο άκρο της ίδιας παραλίας.
  - Όσον αφορά στις υπόλοιπες εναλλακτικές χαράξεις, σας ενημερώνουμε ότι θα πρέπει να αποκλειστούν εντελώς οι χαράξεις (2) και (2<sup>α</sup>) -κόκκινου και πορτοκαλί χρώματος αντίστοιχα- οι οποίες βρίσκονται πολύ κοντά στο όριο του αρχαιολογικού χώρου και προβλέπουν την κατασκευή συμπιεστή σε άμεση οπτική επαφή με αυτόν.
  - Η εναλλακτική χάραξη (3) -γαλάζιου χρώματος- με θέση προσαιγιάλωσης τον όρμο Σταυρολιμένα, αν και βρίσκεται σε απόσταση 2 ~ 2,5 χλμ. από τον αρχαιολογικό χώρο και δεν έχει οπτική επαφή με αυτόν, θεωρούμε ότι θα ήταν σκόπιμο να αποφευχθεί, ώστε να μη διαταραχθεί το ευρύτερο περιβάλλον του χώρου και η διαδρομή προσέγγισης σε αυτόν μέσω του ελαιώνα της Πέρδικας.
  - Προσφορότερες όλων για την πορεία του υπό κατασκευή αγωγού θεωρούνται, από πλευράς της ΔΒ' Ε.Π.Κ.Α., οι προτεινόμενες εναλλακτικές χαράξεις (1) και (1<sup>α</sup>) -ρόδινου χρώματος- με θέση προσαιγιάλωσης το νότιο άκρο του όρμου Ομπρέλα, στα όρια των νομών Πρέβεζας και Θεσπρωτίας, λόγω της απόστασής τους από τον κηρυγμένο αρχαιολογικό χώρο και του φυσικού αναγλύφου του εδάφους, που εμποδίζει οποιαδήποτε οπτική επαφή με αυτόν. Ταυτόχρονα, οι προτεινόμενες αυτές χαράξεις βρίσκονται μακριά από κατοικημένες περιοχές και το προστατευόμενο πάρκο αναψυχής στην περιοχή του Αγίου Αθανασίου Πέρδικας, καθώς και από τις τουριστικά αναπτυγμένες παραλίες της περιοχής.
  - Επειδή, ωστόσο, οι εν λόγω χαράξεις βρίσκονται κατά το μεγαλύτερο μέρος της εντός των ορίων του Νομού Πρέβεζας είναι απαραίτητη η γνωμοδότηση και των αρμόδιων για την περιοχή ΔΓ' Ε.Π.Κ.Α. και 18<sup>ης</sup> Ε.Β.Α.
- Λαμβάνοντας υπόψη όλα τα παραπάνω, εφόσον ολοκληρωθούν οι διαδικασίες χωροθέτησης του αγωγού και πριν την έναρξη οποιωνδήποτε εργασιών για την κατασκευή του, σας γνωρίζουμε ότι θα πρέπει να τηρηθούν οι παρακάτω όροι και προϋποθέσεις, όπως άλλωστε αναφέρεται και στη σελίδα 255 της εκπονηθείσας μελέτης:
- Το σύνολο των εκσκαφικών εργασιών που θα εκτελεστούν για τις ανάγκες του έργου εντός των ορίων του Νομού Θεσπρωτίας θα πραγματοποιηθούν παρουσία αρμοδίου υπαλλήλου της ΔΒ' Ε.Π.Κ.Α., η οποία για το σκοπό αυτό πρέπει να ενημερωθεί εγκαίρως, με την υποβολή σχετικής αίτησης. Στις εν λόγω εργασίες συμπεριλαμβάνονται η απομάκρυνση των φυτικών, οι διαμορφώσεις και διαπλατύνσεις δρόμων πρόσβασης κλπ.
  - Λόγω της μεγάλης έκτασης του έργου και για την αποφυγή καθυστερήσεων, θα πρέπει να προβλεφθεί πίστωση από τον φορέα εκτέλεσης του έργου για την πρόσληψη επί

συμβάσει υπαλλήλου, ο οποίος υπό την εποπτεία της ΛΒ' Ε.Π.Κ.Α. θα παρακολουθήσει το σύνολο των εκσκαφικών εργασιών.

- Σε περίπτωση που κατά τη διάρκεια των εν λόγω εργασιών βρεθούν αρχαιότητες, οι εργασίες θα διακοπούν προσωρινά στο τμήμα εκείνο, το οποίο θα κρίνει απαραίτητο η Εφορεία για την προστασία των αρχαιοτήτων και θα ακολουθήσει, σύμφωνα με την ισχύουσα νομοθεσία, η σύνταξη και υπογραφή Μνημονίου Συνεργασίας για την πραγματοποίηση σωστικής ανασκαφικής έρευνας μεταξύ του φορέα εκτέλεσης του έργου και της Υπηρεσίας μας.
- Μετά την υπογραφή του Μνημονίου, θα ακολουθήσει ανασκαφική έρευνα από ειδικό συνεργείο, αμειβόμενο κατά τον ίδιο τρόπο από τις πιστώσεις του έργου, σύμφωνα με την ισχύουσα νομοθεσία.
- Εφόσον κριθεί απαραίτητο, η ανασκαφική αυτή έρευνα είναι δυνατό να επεκταθεί και πέραν των ορίων του εκτελούμενου έργου, ενώ μόνο μετά την ολοκλήρωσή της δύναται η Υπηρεσία μας να γνωματεύσει, όσον αφορά στην πορεία των εργασιών στο συγκεκριμένο τμήμα του έργου.
- Σε περίπτωση που το έργο συγχρηματοδοτείται από Κοινοτικούς Πόρους, είναι απαραίτητη, σύμφωνα με την ισχύουσα νομοθεσία (Ν. 3028/2002, Εγκύκλιος 6418/27.05.2003 του ΥΠ.Π.Ο.), η σύνταξη τεχνικού δελτίου ανεξάρτητου υποέργου για τη διεξαγωγή σωστικών αρχαιολογικών ερευνών με προϋπολογισμό έως και το 10% του προϋπολογισμού της κύριας δαπάνης. Το εν λόγω Δελτίο θα συμπληρωθεί από την Υπηρεσία μας, η οποία ως φορέας υλοποίησης του συγκεκριμένου υποέργου θα έχει και την αποκλειστική ευθύνη για την υλοποίησή του.
- Η παρούσα έγκριση δεν αντικαθιστά τυχόν απαιτούμενη άδεια άλλων (συν)αρμόδιων Υπηρεσιών, ενώ για τυχόν μετατροπές, απαιτείται η έγκαιρη ενημέρωση της ΛΒ' Ε.Π.Κ.Α., ώστε να γνωμοδοτήσει σχετικά.

Ακριβές Αντίγραφο



Ο Προϊστάμενος της Εφορείας  
κ.α.α.

Γεώργιος Ρήγιнос  
Αρχαιολόγος



# ΔΗΜΟΣΙΑ ΕΠΙΧΕΙΡΗΣΗ ΑΕΡΙΟΥ ΑΕ

Προς  
ΥΠΕΚΑ  
Γενική Διεύθυνση Περιβάλλοντος  
ΕΥΠΕ (ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
Λεωφ. Αλεξάνδρας 11  
Τ.Κ. 11 473, Αθήνα  
Τηλ. : 210 6417729

Αθήνα, 18 Αυγούστου 2010  
Αρ. Πρωτ. 690345

Υπόψη : κ. Ε. Τολέρη, Διευθυντή.

Έργο : Ελληνο-ιταλικός Υποθαλάσσιος Αγωγός Φυσικού Αερίου (ΥΑΦΑ-ΠΟΣΕΙΔΩΝ).

**Θέμα : Προκαταρκτική Περιβαλλοντική Εκτίμηση και Αξιολόγηση (Π.Π.Ε.Α.) για το Ελληνικό Τμήμα του Διασυνδεδετήριου Υποθαλάσσιου Αγωγού Φυσικού Αερίου Ελλάδος-Ιταλίας και των υποστηρικτικών Χερσαίων Εγκαταστάσεών του**

Ύστερα από συναντήσεις με τοπικούς φορείς και τις επανειλημμένες συσκέψεις στο ΥΠΕΚΑ, θα θέλαμε να σας ενημερώσουμε ότι, παρά τις τεχνικές δυσκολίες και τις οικονομικές επιπτώσεις, μπορείτε να θεωρήσετε ότι, εκτός από την ήδη προταθείσα από τη ΔΕΠΑ θέση Σταμπόνη - Καλύβια, και η προταθείσα εναλλακτική λύση χωροθέτησης και χάραξης του Ελληνο-ιταλικού υποθαλάσσιου αγωγού ΥΑΦΑ ΠΟΣΕΙΔΩΝ, με σημείο προσαιγιάλωσης τη θέση Ομπρέλα 2 και χωροθέτησης του Σταθμού Μέτρησης και Συμπύεσης το Βαρικό (που βρίσκονται στα διοικητικά όρια του Νομού Θεσπρωτίας) είναι αποδεκτή από τη ΔΕΠΑ και την Εταιρεία ΥΦΑ-ΠΟΣΕΙΔΩΝ

Ως εκ τούτου, και προκειμένου να ελαχιστοποιηθούν καθυστερήσεις στην υλοποίηση του Έργου, παρακαλούμε για την άμεση έκδοση της από τον Νόμο προβλεπόμενης θετικής γνωμοδότησης επί της προκαταρκτικής περιβαλλοντικής εκτίμησης του Έργου στη θέση Ομπρέλα 2 - Βαρικό.

Με εκτίμηση

ε.α

Αντώνης Νάσικας  
Τεχνικός Διευθυντής  
ΥΑΦΑ ΠΟΣΕΙΔΩΝ  
&  
Αναπληρωτής Διευθυντής  
Διεθνών Δραστηριοτήτων

ΠΡΟΕΔΡΟΣ &	
Δ/ΝΟΝ ΣΥΜΒ.	✓
ΑΝΤΙΓΡ. & ΑΝ.	✓
Δ/ΝΟΝ ΣΥΜΒ.	
Ν.Υ.	
Ε.Ε.	
Ε.Υ.&ΕΠ.	
ΣΤΡ. & Ε.Α.	
ΔΙΕΘΝ. ΔΡ.	
ΤΕΧΝ. ΔΡ.	
ΠΡΟΜΗΘ. ΑΕΡ.	
Δ.Κ.Χ. & Ε.Σ.	
ΕΜΠ. ΑΕΡ.	
ΔΙΑΝ. ΑΕΡ.	
ΟΙΚ. ΔΡ.	
Ε.Δ. & ΠΛ.	
ΑΝΘΡ. ΔΥΝ.	
Ε. ΜΕΛΕΤΗΤΗΣ	✓







ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΡΟΣΤΑΣΙΑΣ ΤΟΥ ΠΟΛΙΤΗ  
ΛΙΜΕΝΙΚΟ ΣΩΜΑ  
ΚΕΝΤΡΙΚΟ ΛΙΜΕΝΑΡΧΕΙΟ ΗΓΟΥΜΕΝΙΤΣΑΣ

Ηγουμενίτσα 08-04-2010  
Αριθ. Πρωτ. 3414.3.1/04/07/16-10-2007

Ταχ.Δ/ση: Ηγουμενίτσα  
Ταχ.Κωδικ.: 46 100  
TELEX: 0338114 LIGM GR  
TELEFAX: 26650 - 99420  
Πληροφορίες: Υποπ/ρχος Α.Σ. ΣΟΥΡΒΙΝΟΣ Στέφανος  
Τηλέφωνο: 26650 - 99400

ΠΡΟΣ: ΥΠΟΙΟΙΑΝ ΛΤΝΠ/ΑΛΥ - β'  
Ακτή Βασιλειάδη, Πύλη Β1  
1ος όροφος  
Τ.Κ. 185 10 - ΠΕΙΡΑΙΑΣ  
(ΜΕ ΑΠΟΔΕΙΞΗ)

16-4-10 / 3846

ΘΕΜΑ : «Διατύπωση απόψεων επί της Προμελέτης Περιβαλλοντικών Επιπτώσεων έργου :  
«ΕΛΛΗΝΟΙΤΑΛΙΚΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ -  
ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ»».

ΣΧΕΤ: α) Η αριθ. πρωτ. 8221.Λ17/01/10/15-01-2010 Δ/γή σας.  
β) Η αριθ. πρωτ. 3414.3.1/04/07/16-10-2007 αναφορά μας.

1.- Σε εκτέλεση ανωτέρω (α) σχετικής και ύστερα από επιτόπιο έλεγχο ανδρών της Υπηρεσίας μας συνοδευόμενο από φωτογραφικό υλικό το οποίο και σας υποβάλλεται στις προτεινόμενες θέσεις εκτέλεσης του έργου «Ελληνοϊταλικός αγωγός φυσικού αερίου υψηλής πίεσης - ελληνικό υποθαλάσσιο τμήμα» και στα τμήματα αυτού που αφορά την περιοχή αρμοδιότητας μας επιμένουμε στην αιχμική μας θέση με (β) σχετική όσο αφορά τις επιπτώσεις που θα επηρεάσει η εκτέλεση του έργου κάτωθι :

α) στην θέση προσγειώσεως που ορίζεται στο τοπογραφικό σχέδιο ως «PLF-1» (θέση «ΣΟΦΑΣ» Ν. Θεσπρωτίας), η περιοχή αποτελείται από βραχώδη ακτή που δεν χρησιμοποιείται από λουόμενους για λήψη θαλάσσιου λουτρού ενώ η πρόσβαση από γειτονικό ασφαλτοστρωμένο δρόμο στην εν λόγω περιοχή είναι αδύνατη. Η συγκεκριμένη περιοχή ουσίως γειτνιάζει βόρεια και νότια με αμμώδεις παραλίες οι οποίες κατά τους θερινούς μήνες προσελκύουν μεγάλο αριθμό λουομένων για λήψη θαλάσσιου λουτρού και στην περίπτωση εκτέλεσης του έργου θα επηρεάσει αρνητικά την τουριστική ανάπτυξη της περιοχής.

β) στην θέση προσγειώσεως που ορίζεται στο τοπογραφικό σχέδιο ως «PLF-1» (θέση «ΣΟΦΑΣ» Ν. Θεσπρωτίας), η περιοχή διαθέτει μια αμμώδη παραλία που χρησιμοποιείται τόσο από λουόμενους που διαμένουν εντός της κατασκήνωσης (camping) τους θερινούς μήνες για λήψη θαλάσσιου λουτρού όσο και από λουόμενους ενώ η πρόσβαση από γειτονικό ασφαλτοστρωμένο δρόμο στην εν λόγω παραλία είναι σχετικά εύκολη. Παρ' όλο που η περιοχή δεν παρουσιάζει οικιστικό ενδιαφέρον, εκτιμάται ότι η τουριστική αξιοποίηση της περιοχής θα επηρεαστεί αρνητικά από την τυχόν εκτέλεση του έργου.

γ) στην θέση προσγειώσεως που ορίζεται στο τοπογραφικό σχέδιο ως «SLF» (θέση «ΣΤΑΥΡΟΣ ΛΙΜΕΝΑΣ» Ν. Θεσπρωτίας), οι σχετικές υπηρεσιακές απόψεις Υπηρεσίας μας έχουν διατυπωθεί με (β) σχετική μας [παραγ. 1 γ)].

δ) στην θέση προσγειώσεως που ορίζεται στο τοπογραφικό σχέδιο ως «OLF-2» (θέση «ΟΜΠΡΕΛΛΑ 2» Ν. Θεσπρωτίας), η περιοχή αποτελείται ως επί το πλείστον από βραχώδη ακτή αλλά οι μεμονωμένες ενδιάμεσες αμμώδεις παραλίες που την απαρτίζουν δέχονται αρκετούς

λουόμενους κατά τους θερινούς μήνες (η πρόσβαση πραγματοποιείται μόνο από την θάλασσα. Λόγω της μορφολογίας της ακτής, εκτιμάται ότι θα επηρεαστεί το φυσικό περιβάλλον της περιοχής και συγκεκριμένα του αιγιαλού. Η περιοχή δεν διαθέτει οικιστικό ενδιαφέρον όμως θορυβική χερσαία χώρα γειτνιάζει με χώρο αρχαιολογικού ενδιαφέροντος και στον θαλάσσιο χώρο προσελκύει αλιείς επαγγελματίες και ερασιτέχνες λόγω της πλούσιας πανίδας που φιλοξενεί.

ε) στην θέση προσγειώσεως που ορίζεται στο τοπογραφικό σχέδιο ως «ΟΛΠ-1» (θέση "ΟΜΗΡΕΛΑ 1" Ν. Θεσπρωτίας), η περιοχή αποτελείται ως επί το πλείστον από βραχώδη ακτή αλλά οι μειονομένες αμμώδεις παραλίες που την απαρτίζουν δέχονται αρκετούς λουόμενους κατά τους θερινούς μήνες και η πρόσβαση πραγματοποιείται μόνο από την θάλασσα. Λόγω της μορφολογίας της ακτής, εκτιμάται ότι θα επηρεαστεί το φυσικό περιβάλλον της περιοχής και συγκεκριμένα του αιγιαλού. Η περιοχή δεν παρουσιάζει οικιστικό ενδιαφέρον όμως στον θαλάσσιο χώρο προσελκύει αλιείς επαγγελματίες και ερασιτέχνες λόγω της πλούσιας πανίδας που φιλοξενεί στον βυθό της.

3.- Από τον έλεγχο που διενεργήθηκε από προσωπικό της Υπηρεσίας μας και στις πέντε (05) θέσεις προσαγιαλώσεως δεν διαπιστώθηκαν παράνομα έργα στον αιγιαλό.

4.- Η ακτολογική κίνηση είναι πολύ δραστήρια καθόσον ημερησίως : α) Ε/Γ-Ο/Γ πλοία διεθνών πλόων περιπλέουν την συγκεκριμένη θαλάσσια περιοχή κατευθυνόμενα από και προς την Ιταλία, β) Ε/Γ-Ο/Γ πλοία εσωτερικού εκτελούν δρομολόγια μεταξύ Ηγουμενίτσας - Παξών σε συνάρτηση με την δραστηριότητα εμπορικών πλοίων (Δεξαμενόπλοια - Φ/Γ μεταφορές τσιμέντου) που εξυπηρετούν χερσαίες εγκαταστάσεις διακίνησης πετρελαιοειδών και τσιμέντου περιοχής αρμοδιότητάς μας. Επιπλέον στις συγκεκριμένες θαλάσσιες περιοχές δραστηριοποιούνται κατά διάφορες χρονικές περιόδους : μεγάλα και μικρά επαγγελματικά αλιευτικά σκάφη, επαγγελματικά τουριστικά, ~~αλιευτικά-ερασιτεχνικά αλιευτικά σκάφη και ιδιωτικά αλιευτικά σκάφη~~. Περαιτέρω αναφέρουμε : ότι με την διάνοξη πρόσφατος της Ελληνικής Οδού από την περιοχή των συγκεκριμένων περιοχών παρουσιάζουν αυξημένο τουριστικό και οικιστικό ενδιαφέρον, γεγονός που αυξάνει την ημεμερινή κίνηση.

5.- Αντιδράσεις / σχόλια τοπικών φορέων, επιμεριδίων κοινότητας έχουν καταγραφεί και η Υπηρεσία μας εξακολουθούν να υφίστανται.

6.- Παρακαλούμε για την ενημέρωσή σας και τις δικές σας ενέργειες.

**Ο Κεντρικός Λιμενάρχης α.α.**

Αντιπλοίαρχος Λ.Σ. ΒΑΡΕΛΛΑΣ Αναστάσιος

- Επισυνάπτεται:
- Φωτογραφίες (25)
- Δυο φακέλοι Π.Π.Ε.

ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ  
 Ο ΠΡΟΪΣΤΑΜΕΝΟΣ ΓΡΑΜΜΑΤΕΙΑΣ  
 Κ.Λ. ΗΓΟΥΜΕΝΙΤΣΑΣ



ΓΣΑΛΛΟΥ Χαρίκλεια  
 Κελευστής Λ.Σ.

Υπόψη σας Τελεία



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΕΜΠΟΡΙΚΗΣ ΝΑΥΤΙΑΙΑΣ  
ΑΙΓΑΙΟΥ & ΝΑΥΤΙΑΙΑΚΗΣ ΠΟΛΙΤΙΚΗΣ  
ΚΕΝΤΡΙΚΟ ΛΙΜΕΝΑΡΧΕΙΟ ΗΓΟΥΜΕΝΙΤΣΑΣ

Ηγουμενίτσα 16-10-2007  
Αριθ. Πρωτ. 3414.3.1/04/07

Ταχ. Δ/ση: Ηγουμενίτσα  
Ταχ. Κωδικ: 46 100  
TELEX: 0338114 LIGM GR  
TELEFAX: 26650 - 99420  
Πληροφορίες: Ανθ/ρχος Λ.Σ. ΣΟΥΡΒΙΝΟΣ Στέφανος  
Τηλέφωνο: 26650 - 99400

ΠΡΟΣ: ΥΕΝ/ΓΤΑΛΠ/ΔΔΥ - Β'  
Ακτή Κονδύλη 26-28 & Αιτωλικού

ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΥΕΝ	
Αριθμ. Πρωτ.:	
Ημερομηνία:	23 ΟΚΤ. 2007
Εισαγωγή:	

ΘΕΜΑ: «Διατύπωση απόψεων επί της Προμελέτης Περιβαλλοντικών Επιπτώσεων έργου: "ΕΛΛΗΝΟΙΤΑΛΙΚΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ"»

ΣΧΕΤ: Η αριθ. πρωτ. 8221.Λ17/25/07/23-08-2007/Δ/γή σας.

1. Σε εκτέλεση ανωτέρω σχετικής και υπερασπιστικής από επιτόκιο έλεγχου ανδρών της Υπηρεσίας μας στη προτεινόμενη θέση εκτέλεσης του έργου "Ελληνοιταλικός αγωγός φυσικού αερίου υψηλής πίεσης - ελληνικό υποθαλάσσιο τμήμα" και στο τμήμα αυτού που αφορά την περιοχή αρμοδιότητας μας που στο τοπογραφικό σχέδιο ορίζεται ως γραμμή «Α» (όρμος Σταυρολιμένα νοτιοδυτ κά της Κοινότητας Πέρδικας Ν. Θεσπρωτίας), σας αναφέρουμε τα κάτωθι:

α) Στην εν λόγω περιοχή έχουν καθορισθεί τα όρια του αιγιαλού-παραλίας σύμφωνα με την από 19-04-07 έκθεση της αρμόδιας Επιτροπής, ωστόσο παραμένει σε εκκρεμότητα η διαδικασία εκδόσεως επικυρωτικής αποφάσεως και δημοσιεύσεως σε Φ.Ε.Κ.

β) Η ευρύτερη περιοχή χρησιμοποιείται από ελάχιστους λουόμενους για λήψη θαλάσσιου λουτρού ενώ η πρόσβαση από γειτονικό ασφαλτοστρωμένο δρόμο στην εν λόγω παραλία είναι δύσκολη.

γ) Από την εκτέλεση του έργου, εκτιμούμε ότι δεν θα υπάρξουν σοβαρές επιπτώσεις στο φυσικό και οικιακό περιβάλλον ωστόσο θα επηρεασθεί αρνητικά η τουριστική αξιοποίηση της εν λόγω περιοχής, δεδομένου ότι σε μικρή απόσταση (400μ. περίπου νότια του όρμου Σταυρολιμένα) λειτουργεί μεγάλη ξενοδοχειακή μονάδα.

δ) Επίπρόσθετα αναφέρουμε ότι υπάρχουν συνεχείς διαμαρτυρίες των κατοίκων της εν λόγω περιοχής και δημοσιεύσεις σε τοπικές εφημερίδες κατά του σχεδιαζόμενου έργου μία εκ των οποίων και σας επισυνάπτουμε.

ε) Τέλος αναφέρουμε ότι από την τυχόν εκτέλεση του έργου ο κοινόχρηστος χαρακτήρας του αιγιαλού - παραλίας θα περιοριστεί ανεπιφύλακτος.

2 - Παρακαλούμε για την ενημέρωσή σας και τις δικές σας ενέργειες.



Κεντρικός Λιμενάρχης

Αντιπρόεδρος Λ.Σ. ΤΣΟΓΚΙΑΝΗΣ Σπυρίδων

Επισυνάπτονται:  
-Φωτογραφίες (04)  
- Τοπική εφημερίδα.

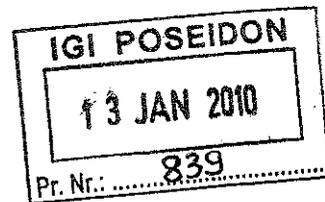


**ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ**  
**ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ**  
**& ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ**  
**ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ**  
**ΕΥΠΕ**  
(ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)  
**ΤΜΗΜΑ Α'**

Ταχ. Δ/ση : Λ. Αλεξάνδρας 11  
Τ.Κ. : 114 73  
Πληροφορίες : Κ. Γιαβής  
Τηλέφωνο : 210 6417962  
F.A.X. : 210 6451914

Αθήνα, 16 Δεκεμβρίου 2009

Α.Π. οικ. 148674



**ΠΡΟΣ: ΠΙΝΑΚΑΣ ΑΠΟΔΕΚΤΩΝ**

**Θέμα :** Διαβίβαση Προμελέτης Περιβαλλοντικών Επιπτώσεων του έργου: «**ΕΛΛΗΝΟΪΤΑΛΙΚΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ- ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ**»

- Σχετ. :** α) Τα με α.π. 257/10.11.09 και 293/11.12.09 έγγραφα της IGI Poseidon με τα οποία διαβιβάστηκε επικαιροποιημένος φάκελος Προμελέτης Περιβαλλοντικών Επιπτώσεων του αναφερομένου στο θέμα έργου και συμπληρωματικά στοιχεία αντίστοιχα (α.π. ΕΥΠΕ 146147/10.11.09, 148451/14.12.09)
- β) Ο Ν. 1650/86 (ΦΕΚ 160/Α) «Για την προστασία του Περιβάλλοντος», όπως τροποποιήθηκε με το Ν. 3010 (ΦΕΚ 91/Α/25.4.02).
- γ) Η ΚΥΑ με αρ. Η.Π 15393/2332 (ΦΕΚ 1022Β/5.8.2002), «Κατάταξη δημόσιων και ιδιωτικών έργων και δραστηριοτήτων σε κατηγορίες σύμφωνα με το άρθρο 3 του Ν. 1650/1986 όπως αντικαταστάθηκε με το άρθρο 1 του Ν.3010/2002 ΦΕΚ 91 Α/25.4.2002».
- δ) Η ΚΥΑ Η.Π. 11014/703/Φ104/14.3.03 (ΦΕΚ 332/Β/20.3.03) «Διαδικασία Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης (Π.Π.Ε.Α) και Έγκρισης Περιβαλλοντικών Όρων (Ε.Π.Ο) σύμφωνα με το άρθρο 4 του Ν.1650/86 (160/Α) όπως αντικαταστάθηκε με το άρθρο 2 του Ν.3010/02 (ΦΕΚ91/Α)».

Σχετικά με το παραπάνω θέμα, σας διαβιβάζουμε ένα (1) τεύχος της επικαιροποιημένης Προμελέτης Περιβαλλοντικών Επιπτώσεων του σχεδιαζόμενου έργου και παρακαλούμε για τις απόψεις σας στα πλαίσια των αρμοδιοτήτων σας, σύμφωνα με τις διατάξεις του άρθρου 3 της ΚΥΑ 11014/703/Φ104/14.3.03 (ΦΕΚ 332Β/20.3.03) και του Ν.3010/2002 (ΦΕΚ 91 Α/25.04.02).

**Ο ΠΡΟΪΣΤΑΜΕΝΟΣ ΤΟΥ Α' ΤΜΗΜΑΤΟΣ**  
**Β. ΓΙΑΝΝΑΚΟΠΟΥΛΟΣ**

**ΠΙΝΑΚΑΣ ΑΠΟΔΕΚΤΩΝ**

**1. ΥΠΕΚΑ**

- α) Δ/ση Χωροταξίας  
Αμαλιάδος 17, 11523 Αθήνα  
(1 αντ. ΠΠΕ)
- β) Δ/ση Πετρελαιοειδών  
Μεσογειών 119, 101 92 Αθήνα  
(1 αντ. ΠΠΕ)



**ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ**

**Σ. ΡΑΥΤΟΠΟΥΛΟΥ,**

2. ΓΕΕΘΑ/ΔΥΠΟ/ΤΕΥ  
Μεσογείων 227-231, 154 51 Αθήνα  
(1 αντ. ΠΠΕ)
3. Γενικό Επιτελείο Ναυτικού  
Δ/νση Γ2/III, Χολαργός  
(1 αντ. ΠΠΕ)
4. Δ/νση Αγροτικής Ανάπτυξης  
Ν.Α. Θεσπρωτίας, Ηγουμενίτσα  
Διοικητήριο, 461 00 Ηγουμενίτσα  
(1 αντ. ΠΠΕ)
5. ΛΒ' ΕΠΚΑ  
Κύπρου 68, 46100 Ηγουμενίτσα  
(1 αντ. ΠΠΕ)
6. 8<sup>η</sup> Εφορεία Βυζαντινών Αρχαιοτήτων  
Βυζαντινό Μουσείο, 452 21 Ιωάννινα  
(συν. 1 αντ. ΠΠΕ)
7. Εφορεία Εναλίων Αρχαιοτήτων  
Καλλισπέρη 30, 117 42 Αθήνα  
(1 αντ. ΠΠΕ)
8. Υπ. Οικονομίας, Ανταγωνιστικότητας & Ναυτιλίας  
Δ/νση Λιμενικών Υποδομών  
Ακτή Βασιλειάδη, 185 10 Πειραιάς  
(1 αντ. ΠΠΕ)

#### **ΚΟΙΝΟΠΟΙΗΣΗ**

1. Υπ. Αγροτικής Ανάπτυξης & Τροφίμων  
Δ/νση Χωροταξίας & Προστασίας Περ/ντος  
Πατησίων 207 & Σκαλιστήρη 19, 10164 Αθήνα
2. Υπ. Πολιτισμού & Τουρισμού  
Δ/νση Προϊστορ.& Κλασ. Αρχαιοτήτων  
Μπουμπουλίνας 20, 10682 Αθήνα
3. IGI Poseidon  
Μαρ. Αντύπα 92, 141 21 Αθήνα

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#### **ΕΣΩΤΕΡΙΚΗ ΔΙΑΝΟΜΗ**

1. ΕΥΠΕ
2. Χρον. Αρχείο
3. Τμήμα Α'
4. Κ. Γιαβής



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ & ΤΟΥΡΙΣΜΟΥ

ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΑΡΧΑΙΟΤΗΤΩΝ  
ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ  
ΔΙΕΥΘΥΝΣΗ: ΒΥΖΑΝΤΙΝΩΝ & ΜΕΤΑΒΥΖΑΝΤΙΝΩΝ ΑΡΧΑΙΟΤΗΤΩΝ  
ΤΜΗΜΑ: ΑΡΧΑΙΟΛΟΓΙΚΩΝ ΧΩΡΩΝ, ΜΝΗΜΕΙΩΝ  
ΚΑΙ ΑΡΧΑΙΟΓΝΩΣΤΙΚΗΣ ΕΡΕΥΝΑΣ

Ταχ. Δ/ση: Μπουμπουλίνας 20-22  
Ταχ. Κώδικας: 10682  
TELEFAX: 210 -8201186  
Πληροφορίες: Α. Ποϊλα – Μ. Χουσιάδα  
Τηλέφωνο: 210-8201204, 8201275  
E-mail: dbmm@culture.gr

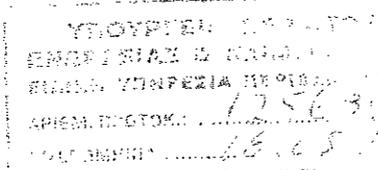
**ΘΕΜΑ:** Προμελέτη Περιβαλλοντικών Επιπτώσεων  
(Π.Π.Ε.) του έργου: «Ελληνοϊταλικός αγωγός φυσικού  
αερίου υψηλής πίεσης – Ελληνικό υποθαλάσσιο  
τμήμα»

**Σχετ:**

1. Το με αρ. πρωτ. 148674/16-12-2009 έγγραφο της ΕΥΠΕ του ΥΠΕΚΑ, με το οποίο διαβιβάστηκε στις αρμόδιες Υπηρεσίες του ΥΠΠΟΤ η επικαιροποιημένη ΠΠΕ του εν θέματι έργου
2. Η με αρ. πρωτ. ΥΠΠΟ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ40/25691/1495/30.3.2004 εγκύκλιος της ΓΔΑΠΚ του ΥΠΠΟ για τη διαδικασία έγκρισης των μελετών ΠΠΕΑ και ΜΠΕ
3. Το με αρ. πρωτ 55/19-1-2010 έγγραφο της ΛΒ' ΕΠΚΑ
4. Το με αρ. πρωτ. 165/2-3-2010 έγγραφο της 8<sup>ης</sup> ΕΒΑ
5. Το με αρ. πρωτ. Φ4/5/2120/26-4-2010/26-4-2010 έγγραφο της ΕΕΑ
6. Το με αρ. πρωτ 1504/3-5-2010 έγγραφο της ΛΒ' ΕΠΚΑ

Σε απάντηση του ανωτέρω υπ' αρ. 1 σχετικού εγγράφου σας, που αφορά στην επικαιροποιημένη Προμελέτη Περιβαλλοντικών Επιπτώσεων (Π.Π.Ε.) του αναφερόμενου στο θέμα έργου, και έχοντας υπόψη τα ανωτέρω υπ' αρ. 3, 4, 5 και 6 σχετικά έγγραφα, σας γνωρίζουμε τα ακόλουθα:

Σύμφωνα με την υποβληθείσα μελέτη, η προσαιγιάλωση του υπό κατασκευή αγωγού πρόκειται να πραγματοποιηθεί στις νότιες ακτές του Νομού Θεσπρωτίας ή στα όρια των Νομών Θεσπρωτίας και Πρέβεζας. Στην περιοχή αυτή εντοπίζεται ο κηρυγμένος αρχαιολογικός χώρος του Δυμοκάστρου (Υ.Α. ΥΠΠΟ/ΓΔΑΠΚ/ΑΡΧ/Α1/Φ43/401/17/11-4-2008), η θέση και τα όρια του οποίου αναφέρονται στην υποβληθείσα μελέτη, καθώς επίσης και ο κηρυγμένος με την ίδια Απόφαση λόφος της Γκριμάλας, στο κέντρο πεδιάδας που σχηματίζεται πίσω από τον όρμο Καραβοστάσι. Επίσης, στην ευρύτερη περιοχή εντοπίζεται ο οθωμανικός οικισμός του Βραχωνά, κηρυγμένος ως ιστορικό διατηρητέο μνημείο (ΦΕΚ 752/Β/27-9-1993), ο οποίος ωστόσο βρίσκεται σε ικανή απόσταση και δεν επηρεάζεται από το έργο.



Ε.Ε. ΕΠΕΙΓΟΝ-ΠΡΟΘΕΣΜΙΑ

Αθήνα, 12-5-2010

Αρ.Πρωτ.:ΥΠΠΟΤ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/24269/1319

✓ Προς: Υ.Π.Ε.Κ.Α.

Γενική Δ/ση Περιβάλλοντος  
ΕΥΠΕ – ΤΜΗΜΑ Α'  
Λ. Αλεξάνδρας 11  
114 73 – Αθήνα

Κοιν.: 1. ΛΒ' ΕΠΚΑ

Κύπρου 68  
461 00 – Ηγουμενίτσα

2. Εφορεία Εναλίων Αρχαιοτήτων  
Καλλισπέρη 30  
117 42 – Αθήνα

3. 8<sup>η</sup> Ε.Β.Α.  
Βυζαντινό Μουσείο  
Κάστρο Ιωαννίνων  
452 21 – Ιωάννινα

4. ΛΓ' Ε.Π.Κ.Α.  
Εθνικής Αντίστασης 108-110  
481 00 – Πρέβεζα

5. 18<sup>η</sup> Ε.Β.Α.  
Αράχθου & Μανωλιάσσης  
471 00 – Άρτα

Λαμβάνοντας υπόψη τα ανωτέρω, σας κάνουμε γνωστό ότι δεν υπάρχει καταρχάς αντίρρηση, από πλευράς αρχαιολογικής νομοθεσίας και δικής μας αρμοδιότητας, για την έγκριση της προτεινόμενης κύριας χάραξης (Κ.Χ.) –πράσινου χρώματος- με θέση προσαιγιάλωσης το βόρειο άκρο της παραλίας του Σοφά στην Κοινότητα Πέρδικας, θέση «Σταμπόνη», που είναι η πλέον απομακρυσμένη από τον αρχαιολογικό χώρο του Δυμοκάστρου.

Το ίδιο ισχύει και για την εναλλακτική χάραξη (Ε.Χ.1) –μωβ χρώματος- στο νότιο άκρο της ίδιας παραλίας, «θέση Σοφάς».

Αναφορικά με τις υπόλοιπες εναλλακτικές χαράξεις επισημαίνουμε τα εξής:

- Οι εναλλακτικές χαράξεις (Ε.Χ.2) και (Ε.Χ.2Α) θέση «Ομπρέλα 2» -κόκκινου και πορτοκαλί χρώματος αντίστοιχα- βρίσκονται πολύ κοντά (50μ. περίπου) από τα όρια του αρχαιολογικού χώρου του Δυμοκάστρου και βάσει της υποβληθείσας Π.Π.Ε. προέβλεπαν την κατασκευή εγκαταστάσεων μέτρησης και συμπίεσης σε άμεση οπτική επαφή με αυτόν (Ε.Χ. 2-Α). Η εν λόγω θέση των εγκαταστάσεων μέτρησης και συμπίεσης κρίνεται απορριπτέα στην Π.Π.Ε. (Κεφάλαιο 5.4.5, σελ. 178) και προτείνονται οι θέσεις «Βαρικό» και «Γουρί» (C/S-M/S Βαρικό και C/S-M/S Γουρί, αντίστοιχα), οι οποίες βρίσκονται σε μεγάλη απόσταση από τον αρχαιολογικό χώρο. Ως εκ τούτου, και εφόσον για τη θέση των εγκαταστάσεων μέτρησης και συμπίεσης δεν επιλεγεί η λύση Ε.Χ. 2-Α, δεν υπάρχει αντίρρηση για τις χαράξεις (Ε.Χ.2) και (Ε.Χ.2Α) του αγωγού, δεδομένου ότι στο υπόλοιπο τμήμα του ο αγωγός είναι τοποθετημένος σε τάφρο, η οποία θα καταχωθεί και αποκατασταθεί.
- Η εναλλακτική χάραξη (Ε.Χ.3) θέση «Σταυρολιμένας» -γαλάζιου χρώματος- με θέση προσαιγιάλωσης τον όρμο Σταυρολιμένα, αν και βρίσκεται 2-2,5 χλμ. από τον αρχαιολογικό χώρο και δεν έχει οπτική επαφή με αυτόν, θεωρούμε ότι θα ήταν σκόπιμο να αποφευχθεί, ώστε να μην διαταραχθεί το ευρύτερο περιβάλλον του χώρου και η διαδρομή προσέγγισης σε αυτόν μέσω του ελαιώνα της Πέρδικας.
- Προσφορότερες όλων για την πορεία του υπό κατασκευή αγωγού θεωρούνται οι προτεινόμενες εναλλακτικές χαράξεις (Ε.Χ.4) και (Ε.Χ.4Α) θέση «Ομπρέλα 1» -ρόδινου χρώματος- με θέση προσαιγιάλωσης το νότιο άκρο του όρμου Ομπρέλα, στα όρια των Νομών Πρέβεζας και Θεσπρωτίας, λόγω της απόστασής τους από τον κηρυγμένο αρχαιολογικό χώρο και του φυτικού αναγλύφου του εδάφους, που εμποδίζει οποιαδήποτε οπτική επαφή με αυτόν. Ταυτόχρονα, οι προτεινόμενες αυτές χαράξεις βρίσκονται μακριά από κατοικημένες περιοχές και το προστατευόμενο πάρκο αναψυχής στην περιοχή του Αγίου Αθανασίου Πέρδικας, καθώς και από τις τουριστικά αναπτυσσόμενες παραλίες της περιοχής. Ωστόσο, επειδή οι προαναφερόμενες χαράξεις (Ε.Χ.4) και (Ε.Χ.4Α) βρίσκονται κατά το μεγαλύτερο τμήμα τους εντός των ορίων του Νομού Πρέβεζας, σε περίπτωση που επιλεγούν, είναι απαραίτητη η διατύπωση απόψεων και των αρμοδίων για την περιοχή ΛΓ' Ε.Π.Κ.Α. και 18<sup>ης</sup> Ε.Β.Α.

Η παρούσα έγκριση δίδεται με την προϋπόθεση ότι θα τηρηθούν απαρέγκλιτα οι ακόλουθοι όροι:

1. Πριν από την προβλεπόμενη λεπτομερή θαλάσσια έρευνα, η οποία προγραμματίζεται για το Σεπτέμβριο ή Οκτώβριο 2010, ο φορέας του έργου θα πρέπει να έρθει σε επικοινωνία με την Εφορεία Εναλίων Αρχαιοτήτων (Ε.Ε.Α.), ώστε να διευκρινισθούν λεπτομέρειες ως προς τη διένεργεια της αρχαιολογικής έρευνας (χρονική διάρκεια, τρόπος διεξαγωγής, τεχνικά και τεχνολογικά μέσα που θα χρησιμοποιηθούν, σύμφωνα με τις προδιαγραφές που θα θέσει η Ε.Ε.Α.).
2. Για την αρχαιολογική έρευνα θα συνταχθεί και υπογραφεί μνημόνιο, στο οποίο θα συμφωνηθούν όλες οι λεπτομέρειες για τη διεξαγωγή της. Τη συνολική δαπάνη της έρευνας θα αναλάβει εξ ολοκλήρου ο φορέας του έργου, σύμφωνα με τα προβλεπόμενα στο Ν. 3028/2002 (ΦΕΚ 153/Α/28.6.2002) «Για την προστασία των Αρχαιοτήτων και εν γένει της Πολιτιστικής Κληρονομιάς». Η αρχαιολογική έρευνα θα διεξαχθεί από το επιλεγμένο σημείο προσαιγιάλωσης του αγωγού έως το όριο της Αποκλειστικής Οικονομικής Ζώνης της

Ελλάδος. Η τελική όδευση του αγωγού θα εξαρτηθεί από τα αποτελέσματα της αρχαιολογικής έρευνας κατά μήκος της χάραξης.

3. Οι υπεύθυνοι του έργου υποχρεούνται να ειδοποιήσουν εγκαίρως (τουλάχιστον 15 ημέρες νωρίτερα) και εγγράφως τις συναρμόδιες για την περιοχή Εφορείες Αρχαιοτήτων (ΛΒ' Ε.Π.Κ.Α., 8<sup>η</sup> Ε.Β.Α. και Ε.Ε.Α.) για την επικείμενη έναρξη των εργασιών.
4. Όλες οι εργασίες που απαιτούνται για την εκτέλεση του έργου στο χερσαίο τμήμα, συμπεριλαμβανομένων και των εργασιών απομάκρυνσης των φυτικών, διαμορφώσεων και διαπλατυνσεων δρόμων πρόσβασης κ.λ.π., θα πραγματοποιηθούν με την άμεση επίβλεψη αρχαιολόγου, ο οποίος θα προσληφθεί από τον ανάδοχο του έργου -καθ' υπόδειξη των συναρμοδίων Εφορειών Αρχαιοτήτων-, και η αμοιβή του οποίου θα βαρύνει τον προϋπολογισμό του έργου. Η πρόσληψη αρχαιολόγου κρίνεται απαραίτητη, καθώς πρόκειται για έργο μεγάλης κλίμακας, το οποίο θα πραγματοποιηθεί σε έκταση που αφενός δεν έχει διερευνηθεί συστηματικά, αφετέρου η πυκνή άγρια βλάστηση δυσχεραίνει την επιφανειακή έρευνα.
5. Ουδεμία ανασκαφική εργασία, κάλυψη ορυγμάτων ή διαμόρφωση χώρου θα πραγματοποιείται χωρίς προηγούμενη συνεννόηση και έγκριση από τις συναρμόδιες Εφορείες Αρχαιοτήτων.
6. Σε περίπτωση που κατά τη διάρκεια των εργασιών εντοπισθούν ή αποκαλυφθούν αρχαιότητες, οι εργασίες θα διακοπούν προσωρινά στο τμήμα εκείνο, το οποίο θα κρίνουν απαραίτητο οι αρμόδιες Υπηρεσίες του ΥΠΠΟΤ για την προστασία των αρχαιοτήτων και θα ακολουθήσει, σύμφωνα με την ισχύουσα νομοθεσία, η σύνταξη και υπογραφή Μνημονίου Συνεργασίας για την πραγματοποίηση σωστικής ανασκαφικής έρευνας μεταξύ του φορέα εκτέλεσης του έργου και της αρμόδιας κατά περίπτωση Εφορείας Αρχαιοτήτων. Από τα αποτελέσματα της ανασκαφικής έρευνας θα εξαρτηθεί η περαιτέρω πορεία του έργου, μετά από γνωμοδότηση των αρμοδίων οργάνων του Υπουργείου Πολιτισμού.
7. Η συνολική δαπάνη της ανασκαφής – συμπεριλαμβανομένης και της αμοιβής του απαραίτητου επιστημονικού και εργατοτεχνικού προσωπικού, -το οποίο θα προσληφθεί καθ' υπόδειξη των συναρμοδίων Εφορειών Αρχαιοτήτων-, καθώς και το κόστος συντήρησης, μελέτης και δημοσίευσης των ευρημάτων θα βαρύνουν τον προϋπολογισμό του έργου βάσει των διατάξεων του άρθρου 37 του Ν. 3028/2002 (ΦΕΚ 153/Α/28.6.2002) «Για την προστασία των Αρχαιοτήτων και εν γένει της Πολιτιστικής Κληρονομιάς».
8. Η παρούσα έγκριση εκδίδεται από πλευράς Αρχαιολογικού Νόμου και δεν αντικαθιστά άλλη συναρμόδιας Αρχής, ενώ για τυχόν μετατροπές στην υποβληθείσα μελέτη, απαιτείται η έγκαιρη ενημέρωση των συναρμοδίων για την περιοχή Εφορειών Αρχαιοτήτων, με την υποβολή συμπληρωματικής αίτησης με όλα τα απαραίτητα δικαιολογητικά, προκειμένου να διατυπώσουν εκ νέου τις απόψεις τους.

Εσωτερική Διανομή: Δ.Β.Μ.Α. – Β1  
Δ.Π.Κ.Α. – Α1

Η Προϊσταμένη της Γενικής Δ/σης Αρχαιοτήτων  
και Πολιτιστικής Κληρονομιάς

κ.α.α.

Μαρία Ανδρεαδάκη-Βλαζάκη





ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ,  
ΕΝΕΡΓΕΙΑΣ ΚΑΙ ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ  
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΕΝΕΡΓΕΙΑΣ  
ΚΑΙ ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ

ΓΕΝΙΚΗ Δ/ΝΣΗ ΕΝΕΡΓΕΙΑΣ  
Δ/ΝΣΗ ΕΓΚΑΤΑΣΤΑΣΕΩΝ ΠΕΤΡΕΛΑΙΟΕΙΔΩΝ  
Τμήμα Α'

Ταχ. Δ/ση : Μεσογείων 119  
Ταχ. Κώδικας : 101 92  
Πληροφορίες : Γ. Σουρής  
Τηλ. : 210-6969440  
Fax : 210-6969402  
E-mail : egatpetrel@ypan.gr

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ  
ΚΑΙ ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ  
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΕΝΕΡΓΕΙΑΣ  
ΚΑΙ ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ  
Αθήνα, 7 Μαΐου 2010  
Αρ. Πρωτ.: Δ3/Α/376

α.β.ε.β.  
12/5/10

Αθήνα, 7 Μαΐου 2010  
Αρ. Πρωτ.: Δ3/Α/376

ΠΡΟΣ: Υ.Π.Ε.Κ.Α.  
Γεν. Δ/ση Περιβάλλοντος  
Ε.Υ.Π.Ε.  
Τμήμα Α'  
Λ. Αλεξάνδρας 11  
114 73 ΑΘΗΝΑ

**ΘΕΜΑ:** Απόψεις για την Προμελέτη Περιβαλλοντικών Επιπτώσεων του έργου:  
«Ελληνοϊταλικός Αγωγός Φυσικού Αερίου Υψηλής Πίεσης – Ελληνικό  
Υποθαλάσσιο Τμήμα».

Σχετ.: Το 148674/16-12-2009 έγγραφό σας

Σε απάντηση του ανωτέρου σχετικού εγγράφου σας, στα πλαίσια των αρμοδιοτήτων μας και σύμφωνα με τις διατάξεις του άρθρου 3 της ΚΥΑ 11014/703/Φ.104/14-03-2003 (ΦΕΚ 332/Β/20-03-2003) και του ν. 3010/2002 (ΦΕΚ 91/Α/25-04-2002), όσον αφορά στην εν θέματι προμελέτη, σας γνωστοποιούμε ότι δεν έχουμε αντίρρηση για την προώθηση της διαδικασίας έγκρισης της προμελέτης περιβαλλοντικών επιπτώσεων του εν θέματι έργου, υπό την προϋπόθεση ότι θα τηρηθούν οι νόμιμες διαδικασίες και θα εκδοθούν οι απαραίτητες εγκρίσεις για την κατασκευή του.

Η Προϊσταμένη της Δ/σης

Λουίζα Λοΐζου

Εσωτερική Διανομή:

1. Γραφείο Υπουργού
2. Γραφείο Υφυπουργού
3. Γραφείο Γεν. Γραμματέα Ενέργειας και Κλιματικής Αλλαγής
4. Γενική Διεύθυνση Ενέργειας  
(σχετ. Α.Π. Γ.Δ.Ε. ΥΠΕΚΑ 212/14-01-2010)
5. Δ3/Α (3)



ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ  
ΓΕΝ. ΓΡΑΜΜΑΤΕΙΑΣ ΕΝΕΡΓΕΙΑΣ ΚΑΙ ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ

Ν. ΚΩΝΣΤΟΡΑΝΤΩΝΑΚ

ΠΡΟΣ : ΥΠΟΥΡΓΕΙΟ Π.Ε. & Κ.Α.  
ΓΕΝ ΔΝΣΗ ΠΕΡΙΒΑΛ./ΕΥΠΕ/ΤΜ. Α'  
Λ. ΑΛΕΞΑΝΔΡΑΣ 11  
ΑΘΗΝΑ - Τ.Κ. 11473

ΓΕΝ.ΕΠΙΤ.ΕΘΝ.ΑΜΥΝΑΣ  
ΚΛΑΔΟΣ ΠΟΡΩΝ/ΔΥΠΟ  
ΤΜ. ΕΘΝ. ΥΠΟΔΟΜΗΣ  
Τηλεφ: 210 6575035  
FAX : 210 657 4169

ΚΟΙΝ : ΓΕΕΘΑ/ΔΔΣΠ/Δνση Ασφ. Αντ.  
ΓΕΕΘΑ/ΔΥΠΟ-ΓΕΣ/ΔΙΠΑ/2β  
ΓΕΑ/Γ5/4-ΓΕΝ/Α2/ΜΙ- 1<sup>η</sup> ΣΤΡ/ΔΙΠΑ -  
Α'ΣΣ/ΔΙΠΑ - VIII ΜΠ/2<sup>ο</sup> ΕΓ

Η/Δ: www.geetha.mil.gr - ΟΡΓΑΝΩΣΗ -  
ΔΝΣΗ ΥΠΟΔΟΜΗΣ - ΔΙΚΑΙΟΛΟΓΗΤΙΚΑ  
Φ.100.1/149386  
Σ. 4868  
Αθήνα, 28 Μαί. 2010

**ΘΕΜΑ: ΠΠΕ ΑΦΑ Υψ. Πίεσης ΕΛΛΗΝΟΪΤΑΛΙΚΟΥ ΑΓΩΓΟΥ  
- ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ**

ΣΧΕΤ : α. Η από 16 Δεκ. 2009 Αίτηση με Α.Π. 148674 του ΥΠΕ&ΚΑ  
β. Φ.114.1/783/299667/Σ.845/10 Μαρ. 2010/ΓΕΣ/ΔΙΠΑ/2β  
γ. Φ.542/389/10/Σ.6193/28 Απρ Φεβ. 2010/ΓΕΝ/Α2/ΜΙ  
δ. Φ.542/389/10/Σ.6193/28 Απρ.2010/ΓΕΝ/Α2/ΜΙ  
ε. Φ.542/292/10/Σ.6137/29 Μαρ. 2010/ΓΕΝ/Α2/ΜΙ  
στ. Φ.550/689614/Σ1047/19 Μαί 2010/ΓΕΑ/Γ5/4

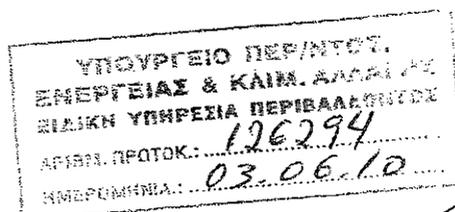
1. Σε απάντηση στο (α) σχετικό, σας γνωρίζουμε ότι το ΓΕΕΘΑ δεν έχει αντίρρηση από πλευράς στρατιωτικής ασφάλειας, εφόσον ληφθούν οι προβλεπόμενες από τις κείμενες διατάξεις άδειες και εγκρίσεις για την εγκατάσταση του έργου «ΕΛΛΗΝΟΪΤΑΛΙΚΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ - ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ» από τη «ΥΑΦΑ ΠΟΣΕΙΔΩΝ ΑΕ» με τις προϋποθέσεις:

α. Κάθε διάνοιξη ή διαπλάτυνση δρομολογίου ή επέκταση των καθοριζομένων εκμεταλλεύσεως θα υπόκεινται στην έγκριση των αρμόδιων στρατιωτικών αρχών (VIII ΜΠ).

β. Να τηρηθούν οι απόψεις του ΓΕΝ , όπως αυτές εκφράσθηκαν με το (ε) σχετικό και σας έχουν κοινοποιηθεί.

2. Η παρούσα έγκριση δεν υποκαθιστά αναγκαίες πράξεις άλλων αρμοδίων Υπηρεσιών.

Σμχος (Μ) Εμ. Στρατάκος  
(Για τον απουσιάζοντα Δντή ΔΥΠΟ)



α. Γ. Λοβ - 4-6-10  
04.06.10

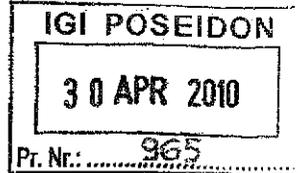


ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ ΚΑΙ ΤΟΥΡΙΣΜΟΥ

**ΕΦΟΡΕΙΑ ΕΝΑΛΙΩΝ ΑΡΧΑΙΟΤΗΤΩΝ**  
Τμήμα Εναλίων Αρχαιολογικών Χώρων  
Μνημείων και Ερευνών  
ΑΘΗΝΑ

TAX. Δ/ΝΣΗ: Καλλισπέρη 30, 11742, Αθήνα  
ΤΗΛ.: 210-9239038 / 9235105 / 9247249  
FAX: 210-9235707  
E-MAIL: [ena@culture.gr](mailto:ena@culture.gr)  
ΠΛΗΡΟΦΟΡΙΕΣ: Δ. Κουρκουμέλης

Βαθμός Ασφαλείας  
Βαθμός Προτεραιότητας



Αθήνα, 26 Απριλίου 2010

Αριθ. πρωτ. Φ4/5/2120

ΠΡΟΣ: Υπουργείο Πολιτισμού και Τουρισμού  
ΓΔΑΠΚ  
α) ΔΙΓΚΑ / TAXM & AE  
β) ΔΒΝΜ / TAXM & AE  
Μπουμπουλίνας 20-22, 106 82 Αθήνα

ΚΟΙΝ: Ως π.α.

**ΘΕΜΑ:** «Επικαιροποιημένη ΠΠΕ του έργου «Ελληνοϊταλικός Αγωγός Φυσικού Αερίου Υψηλής Πίεσης – Ελληνικό Υποθαλάσσιο Τμήμα»

Σχετ.:

- α) το με αριθ. πρωτ. ΕΠ 29/30-7-2007 έγγραφό μας
- β) το με αριθ. πρωτ. Φ4/5/4031/29-8-2007 έγγραφό μας.
- γ) το με αριθ. πρωτ. ΥΠΠΟ/ΓΔΑΠΚ/ΑΡΧ/Α1/Φ32/76994/3785/26-9-2007 έγγραφο του ΥΠΠΟΤ/ΓΔΑΠΚ/ΔΙΓΚΑ/Τμήμα Αρχαιολογικών Χώρων, Μνημείων και Αρχαιογνωστικής Έρευνας.
- δ) το με αριθ. πρωτ. ΥΠΠΟ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/88234/4676/24-10-2007 έγγραφο του ΥΠΠΟΤ/ΓΔΑΠΚ/ΔΒΜΑ/Τμήμα Αρχαιολογικών Χώρων, Μνημείων και Αρχαιογνωστικής Έρευνας.
- ε) το με αριθ. πρωτ. Φ4/5/6599/12-12-2008 έγγραφό μας.
- στ) το με αριθ. πρωτ. 148674/16-12-2009 έγγραφό σας.
- ζ) το με αριθ. πρωτ. Φ4/5/226/19-1-2010 έγγραφό μας.
- η) το με αριθ. πρωτ. 366/22-4-2010 έγγραφο της IGI Poseidon

Σε συνέχεια των ανωτέρω σχετικών (α έως στ) που αφορούν στο θέμα της χάραξης του υποθαλασσίου τμήματος του Ελληνοϊταλικού Αγωγού Φυσικού Αερίου Υψηλής Πίεσης και του σχετικού (ζ) εγγράφου μας που αφορά στην επικαιροποιημένη ΠΠΕ του έργου και με το οποίο είχαν ζητηθεί διορθώσεις και συμπληρώσεις στην εν λόγω ΠΠΕ, και του (η) σχετικού, με το οποίο δόθηκαν τα στοιχεία που ζητήθηκαν και αντίγραφο του οποίου σας επισυνάπτουμε, θα θέλαμε να σας ενημερώσουμε για τα ακόλουθα:

1. Η ΕΕΑ με το (α) σχετικό έγγραφό της είχε αρχικά εγκρίνει την απαραίτητη για την εκπόνηση των μελετών όδευσης, αρχική αναγνωριστική θαλάσσια έρευνα (Reconnaissance Marine Survey: RMS), θέτοντας όρους και συγκεκριμένα: «...Μετά το πέρας της προκαταρκτικής αυτής έρευνας και για τον προγραμματισμό της αναγκαίας για την τελική εκπόνηση της μελέτης όδευσης του αγωγού, μελέτης λεπτομερειακής αποτύπωσης του πυθμένα (DMS), θα πρέπει, από το φορέα του έργου, να προβλεφθεί προϋπολογισμός για τη διενέργεια υποβρύχιου αρχαιολογικού ελέγχου της συγκεκριμένης περιοχής, σύμφωνα με τις διατάξεις του Ν. 3028/02, από τα αποτελέσματα του οποίου, θα εξαρτηθεί και η τελική χάραξη της πορείας του αγωγού. Για το λόγο αυτό ο φορέας του έργου θα πρέπει να έρθει σε συνεννόηση με την Εφορεία Εναλίων Αρχαιοτήτων, ώστε να προγραμματισθεί και να προϋπολογισθεί η εν λόγω έρευνα.».
2. Η επικαιροποιημένη ΠΠΕ προτείνει πέντε διαφορετικές λύσεις για την προσαιγιάλωση και την αρχική όδευση του αγωγού, ο οποίος από το βάθος περίπου των 50 μ. ακολουθεί κοινή χάραξη προς το Ιόνιο Πέλαγος περνώντας ανάμεσα από την Νότια Κέρκυρα και βόρεια της νήσου Πιαζοί.



## ΠΙΝΑΚΑΣ ΑΠΟΔΕΚΤΩΝ

1. ΛΒ' ΕΠΚΑ, Δαγκλή 6, 461 00 Ηγουμενίτσα
2. 8<sup>η</sup> ΕΒΑ, Κάστρο Ιωαννίνων, 452 21 Ιωάννινα
3. Υπουργείο Εξωτερικών  
Δ/ση Δ1 Ηνωμένων Εθνών και  
Διεθνών Οργανισμών και Διασκέψεων  
Επιτροπή ΕΧΑΕΘ  
Ακαδημίας 3, 100 27 Αθήνα
4. Υπουργείο Εθνικής Άμυνας  
Γ.Ε.Ν. Δ/ση Α2, Τμήμα Ιε  
155 61 Χολαργός
5. Υπουργείο Οικονομίας, Ανταγωνιστικότητας και Ναυτιλίας  
Διεύθυνση Λιμενικών Υποδομών  
Ακτή Βασιλειάδη, Πύλη Ε, 185 10 Πειραιάς
6. Υπουργείο Π.Ε.&Κ.Α.  
ΕΥΠΕ/Τμήμα Α  
Λεωφ. Αλεξάνδρας 11, 114 73 Αθήνα
- ✓ 7. IGI Poseidon S.A.  
Μαρίνου Αντύπα 92, 141 21 Ηράκλειο Αττικής



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ ΚΑΙ ΤΟΥΡΙΣΜΟΥ

**ΕΦΟΡΕΙΑ ΕΝΑΛΙΩΝ ΑΡΧΑΙΟΤΗΤΩΝ**  
Τμήμα Εναλίων Αρχαιολογικών Χώρων  
Μνημείων και Ερευνών  
ΑΘΗΝΑ

TAX. Δ/ΝΣΗ: Καλλισπέρη 30, 11742, Αθήνα  
ΤΗΛ.: 210-9239038 / 9235105 / 9247249  
FAX: 210-9235707  
E-MAIL: [eeea@culture.gr](mailto:eeea@culture.gr)  
ΠΛΗΡΟΦΟΡΙΕΣ: Δ. Κουρκουμέλης

Βαθμός Ασφαλείας

29.1.2010

Αθήνα, 19 Ιανουαρίου 2010

Αριθ. πρωτ. Φ4/5/226 Βαθμός Προτεραιότητας

ΠΡΟΣ: Υπουργείο Περιβάλλοντος,  
Ενέργειας & Κλιματικής Αλλαγής  
Γενική Δ/ση Περιβάλλοντος  
ΕΥΠΕ/Τμήμα Α'  
Λ. Αλεξάνδρας 11  
114 73 Αθήνα

ΚΟΙΝ: Ως π.α.

12/11/2  
28-1-10

ΘΕΜΑ: «Επικαιροποιημένη ΠΠΕ του έργου «Ελληνοϊταλικός Αγωγός Φυσικού Αερίου  
Υψηλής Πίεσης – Ελληνικό Υποθαλάσσιο Τμήμα»

ΣΧΕΤ.:

- α) το με αριθ. πρωτ. 148674/16-12-2009 έγγραφό σας.
- β) το με αριθ. πρωτ. Φ4/5/4031/29-8-2007 έγγραφό μας.
- γ) το με αριθ. πρωτ. ΥΠΠΟ/ΓΔΑΠΚ/ΑΡΧ/Α1/Φ32/76994/3785/26-9-2007 έγγραφο του ΥΠΠΟΤ/ΓΔΑΠΚ/ΔΙΠΚΑ/Τμήμα Αρχαιολογικών Χώρων, Μνημείων και Αρχαιογνωστικής Έρευνας.
- δ) το με αριθ. πρωτ. ΥΠΠΟ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/88234/4676/246-10-2007 έγγραφο του ΥΠΠΟΤ/ΓΔΑΠΚ/ΔΒΜΑ/Τμήμα Αρχαιολογικών Χώρων, Μνημείων και Αρχαιογνωστικής Έρευνας.
- ε) το με αριθ. πρωτ. Φ4/5/6599/12-12-2008 έγγραφό μας.

Υ.Α.  
Για  
28.01.

Σε συνέχεια του (α) σχετικού εγγράφου σας, με το οποίο μας διαβιβάσατε την επικαιροποιημένη ΠΠΕ του έργου, θα θέλαμε να σας ενημερώσουμε για τα ακόλουθα:

Η ΕΕΑ με το (β) σχετικό έγγραφο της είχε εισηγηθεί επί της αρχικής ΠΠΕ του έργου, θέτοντας όρους για την έγκριση της οριστικής χάραξης όδευσης του αγωγού. Οι απόψεις της ΕΕΑ συμπεριληφθήκαν στο (γ, παρ. 6) σχετικό έγγραφο της ΔΙΠΚΑ αναφορικά με την ΠΠΕ του έργου και στο (δ, παρ. 6) σχετικό έγγραφο της ΔΒΜΑ αναφορικά με την ΠΠΕ του έργου. Επίσης η ΕΕΑ με το (ε) σχετικό έγγραφο της, κατόπιν αιτήματος της εταιρείας Ασπροφος α.ε., είχε ενημερώσει για το όρο ότι: «...θα πρέπει, από το φορέα του έργου, να προβλεφθεί προϋπολογισμός για τη διενέργεια λεπτομερούς αρχαιολογικού ελέγχου της συγκεκριμένης περιοχής, σύμφωνα με τις διατάξεις του Ν. 3028/02. Από τα αποτελέσματα του ελέγχου, θα εξαρτηθεί και η τελική χάραξη της πορείας του αγωγού. Για το λόγο αυτό ο φορέας του έργου θα πρέπει να έρθει σε συνεννόηση με την Εφορεία Εναλίων Αρχαιοτήτων, ώστε να προγραμματισθεί και να προϋπολογισθεί η εν λόγω έρευνα...». Όρος, ο οποίος είχε τέθει και για την ΠΠΕ του έργου (σχετ. β).

Από την επικαιροποιημένη ΠΠΕ της εταιρείας IGI Poseidon που μας υποβλήθηκε, διαπιστώθηκε ότι σε κανένα σημείο της μελέτης δεν αναφέρονται τα παραπάνω έγγραφα ούτε συμπεριλαμβάνονται στο παράρτημα Δ: «Γνώμοδοτήσεις από τις Αρχές». Και κυρίως δεν αναφέρεται ο όρος 6 του σχετ. (γ) εγγράφου, που είχε τεθεί από την ΔΙΠΚΑ και του αναλόγου εδαφίου 6 του εγγράφου της ΔΒΜΑ και ούτε γίνεται αναφορά στο σχετ. (ε) έγγραφο της ΕΕΑ προς την Ασπροφος α.ε.

Ως εκ τούτου, και εφόσον δεν έχουν συμπεριληφθεί οι όροι της ΕΕΑ ως καθ' ύλην αρμόδιας Υπηρεσίας του ΥΠΠΟΤ, οι οποίοι εκ προοιμίου είχαν τεθεί στα σχετ. (β και ε) έγγραφά μας, παρακαλούμε όπως ενημερωθεί η εταιρεία, που εκπόνησε τη μελέτη, ώστε να υπάρξουν οι απαραίτητες διορθώσεις και συμπληρώσεις ώστε να περιληφθούν οι όροι της ΕΕΑ και του ΥΠΠΟΤ γενικότερα. Κατόπιν τούτου η ΕΕΑ θα εισηγηθεί επί της συγκεκριμένης μελέτης.

Συνημμένα:

1. τα σχετικά β έως ε φύλλα πέντε (5).

Η Προϊσταμένη της Εφορείας  
κ.α.α.

Αγγελική Γ. Σίμωνι  
ΠΕ Αρχαιολόγων με Βαθμό Α'



Ακριβές Αντίγραφο

Χρυσούλα Πλευρά  
ΤΕ Δ/κού Λογ/σκού με Βαθμό Γ'

#### ΠΙΝΑΚΑΣ ΑΠΟΔΕΚΤΩΝ

1. ΥΠΠΟ  
ΓΔΑΠΚ  
α) ΔΙΠΚΑ/ΤΑΧΜ & ΑΕ  
β) ΔΒΜΑ/ ΤΑΧΜ & ΑΕ  
Μπουμπουλίνας 20-22, 106 82 Αθήνα
2. Η' ΕΠΚΑ, Βράιλα Αρμένη 1, 491 00 Κέρκυρα
3. ΛΒ' ΕΠΚΑ, Δαγκλή 6, 461 00 Ηγουμενίτσα
4. 8<sup>η</sup> ΕΒΑ, Κάστρο Ιωαννίνων, 452 21 Ιωάννινα
5. 21<sup>η</sup> ΕΒΑ, Παλαιό Φρούριο, 491 00 Κέρκυρα
6. Υπουργείο Εθνικής Άμυνας  
Γ.Ε.Ν. Δ/ση Α2, Τμήμα Ιε  
155 61 Χολαργός
7. Υπουργείο Οικονομίας, Ανταγωνιστικότητας και Ναυτιλίας  
Διεύθυνση Λιμενικών Υποδομών  
Ακτή Βασιλειάδη, Πύλη Ε, 185 10 Πειραιάς



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ,  
ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ  
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ  
ΕΥΠΕ

(ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ)

ΤΜΗΜΑ Α'

Ταχ. Δ/ση: Λ. Αλεξάνδρας 11

Τ.Κ.: 114 73

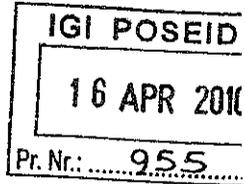
Πληροφορίες: Κ. Γιαβής

Τηλέφωνο: 210 641 7962

Fax: 210 643 0637

Αθήνα, 24 Μαρτίου 2010

Α.Π. οικ. 123556



ΠΡΟΣ: IGI Poseidon  
Μαρίνου Αντύπα 92, 141 21 Αθήνα  
(συν: α], β] σχετ.)

Θέμα: Διαβίβαση Απόψεων για το Έργο: ΕΛΛΗΝΟΪΤΑΛΙΚΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ ΥΨΗΛΗΣ ΠΙΕΣΗΣ- ΕΛΛΗΝΙΚΟ ΥΠΟΘΑΛΑΣΣΙΟ ΤΜΗΜΑ.

Σχετ.: α) Το με α.π. 55/19.01.10 έγγραφο της ΛΒ' ΕΠΚΑ (α.π. ΕΥΠΕ 121201/29.01.10).  
β) Το με α.π. Φ4/5/226/19.01.10 έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων (α.π. ΕΥΠΕ 121112/28.01.10).

Στα πλαίσια της διαδικασίας Προκαταρκτικής Περιβαλλοντικής Εκτίμησης & Αξιολόγησης του έργου του θέματος, σας διαβιβάζουμε αντίγραφα των γνωμοδοτήσεων της ΛΒ' Εφορείας Προϊστορικών & Κλασικών Αρχαιοτήτων και της Εφορείας Εναλίων Αρχαιοτήτων (α], β] σχετ.) και παρακαλούμε για τις απόψεις σας.

Ο ΠΡΟΪΣΤΑΜΕΝΟΣ ΤΟΥ Α' ΤΜΗΜΑΤΟΣ  
Β. ΓΙΑΝΝΑΚΟΠΟΥΛΟΣ

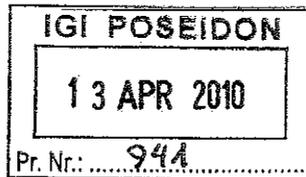
ΕΣΩΤ. ΔΙΑΝΟΜΗ

1. ΕΥΠΕ
2. Χρον. Αρχείο
3. Τμήμα Α'
4. Κ. Γιαβής



ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ

Α. ΨΑΪΛΑ



ε. Παραγοννίσο  
ε. Κλαυδίου  
ε. Τσοκράδης  
ε. Σαββίτου

**ΕΜΠΙΣΤΕΥΤΙΚΟ**

- ΠΡΟΣ :** ΥΠ. ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ/ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ/ΕΥΠΕ/ ΤΜΗΜΑ Α' Λ.Αλεξάνδρας 11 Αθήνα 11473
- ΚΟΙΝ. :**
- ΥΠ. ΥΠΟΔΟΜΩΝ ΜΕΤΑΦΟΡΩΝ ΚΑΙ ΔΙΚΤΥΩΝ/Γ.Γ.Δ.Ε./ ΔΙΕΥΘΥΝΣΗ ΛΙΜΕΝΙΚΩΝ ΕΡΓΩΝ ΚΑΙ ΕΡΓΩΝ ΑΕΡΟΔΡΟΜΙΩΝ (Δ4) Σεβαστουπόλεως 1, Αθήνα 11526
  - ΥΠΟΥΡΓΕΙΟ ΟΙΚΟΝΟΜΙΚΩΝ/ ΔΙΕΥΘΥΝΣΗ ΔΗΜΟΣΙΑΣ ΠΕΡΙΟΥΣΙΑΣ Καρ. Σερβίας 10. Αθήνα 10184
  - ΥΠ. ΟΙΚΟΝΟΜΙΑΣ ΑΝΤΑΓΩΝΙΣΤΙΚΟΤΗΤΑΣ & ΝΑΥΤΙΛΙΑΣ/ ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΝΑΥΤΙΛΙΑΚΗΣ ΠΟΛΙΤΙΚΗΣ/ΔΙΕΥΘΥΝΣΗ ΛΙΜΕΝΙΚΩΝ ΥΠΟΔΟΜΩΝ Ακτή Βασιλειάδη - Πύλη Ε1 Πειραιάς 18510
  - ΥΠ. ΠΟΛΙΤΙΣΜΟΥ ΚΑΙ ΤΟΥΡΙΣΜΟΥ/ ΕΦΟΡΕΙΑ ΕΝΑΛΙΩΝ ΑΡΧΑΙΟΤΗΤΩΝ Καλλισπέρη 30, Αθήνα 11742
  - ΕΟΤ Τσόχα 7. Αθήνα 11521
  - ΠΕΡΙΦΕΡΕΙΑ ΙΟΝΙΩΝ ΝΗΣΩΝ/ ΔΙΕΥΘΥΝΣΗ ΠΕ.ΧΩ. Αλυκές Ποταμού, Κέρκυρα 49100
  - ΠΕΡΙΦΕΡΕΙΑ ΗΠΕΙΡΟΥ/ ΔΙΕΥΘΥΝΣΗ ΠΕ.ΧΩ. Κτίριο Ορφέα, Κεντρ. Πλατεία Ιωάννινα 45221
  - ΥΥ - ΥΦ
  - Κ.Λ. ΚΕΡΚΥΡΑΣ 49100
  - Κ.Λ. ΗΓΟΥΜΕΝΙΤΣΑΣ 46100
  - ΥΠ. ΟΙΚΟΝΟΜΙΑΣ ΚΑΙ ΟΙΚΟΝΟΜΙΚΩΝ/ ΚΤΗΜΑΤΙΚΗ ΥΠΗΡΕΣΙΑ Ν. ΚΕΡΚΥΡΑΣ Λεωφ. Αλεξάνδρας 38 Β, Κέρκυρα 49100
  - ΥΠ. ΟΙΚΟΝΟΜΙΑΣ ΚΑΙ ΟΙΚΟΝΟΜΙΚΩΝ/ ΚΤΗΜΑΤΙΚΗ ΥΠΗΡΕΣΙΑ Ν. Θεσπρωτίας Π. Τσαλδάρη 51, Ηγουμενίτσα 46100
  - ΔΕΣΦΑ Α.Ε. Μεσογείων 207, Αθήνα 11525
  - «ΑΣΠΡΟΦΟΣ Α.Ε.» Ελ. Βενιζέλου 284 Καλλιθέα, Αθήνα 17675

**ΕΠΕΙΓΟΝ**

ΓΕΝΙΚΟ ΕΠΙΤΕΛΕΙΟ ΝΑΥΤΙΚΟΥ  
ΔΙΕΥΘΥΝΣΗ Α2  
ΤΜΗΜΑ VI  
Τηλεφ. 2106551276  
Φ. 542/ 292 /10  
Σ. 6137  
Αθήνα, 29 Μαρ. 10  
Συνημμένα: Φωτοαντίγραφα των σχετικών (β), (γ), (δ) και (ε)

NO Proj: 1067

NO	1067
Date	09.04.2010
File	118089
Distribution	info
AP	
LZ	✓
MV	
PS	
Προφθογή	✓

ΑΣΠΡΟΦΟΣ

Α2 ΠΡΟΔΩΚ	118089
298	8-4-2010
L. Ζαφωρα	

**ΘΕΜΑ:** Τεχνικά Έργα Λιμένων (Προμελέτη Περιβαλλοντικών Επιπτώσεων (ΠΠΕ) του έργου: «Ελληνοϊταλικός Αγωγός Φυσικού Αερίου Υψηλής Πίεσης – Ελληνικό Υποθαλάσσιο Τμήμα./ Υπ. 52/10).

**ΣΧΕΤ.:** α) ΥΠ. ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ/ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ/ΕΥΠΕ/ ΤΜΗΜΑ Α'/148674/16-12-2009.  
β) ΓΕΝ/Α2-VI/542/207/09/16-2-2009.  
γ) ΓΕΝ/Α2-Ιε/542/1210/07/1-8-2007.  
δ) ΓΕΝ/Α2-Ιε/542/1445/07/20-9-2007.  
ε) ΓΕΝ/Α2-Ιε/542/1464/08/30-9-2008.

1. Απαντώντας στο σχετικό (α), σας γνωρίζουμε ότι, οι απόψεις του ΓΕΝ για την κατασκευή του έργου του θέματος, όπως αυτές εκφράσθηκαν με το σχετικό (β), εξακολουθούν ισχύουσες.
2. Συνημμένα διαβιβάζονται φωτοαντίγραφα των σχετικών (β), (γ), (δ) και (ε).
3. Το παρόν χωρίς το συνημμένο του φωτοαντίγραφο του σχετικού (γ) μεταπίπτει σε αδιαβάθητο.



Ακριβές Αντίγραφο  
Πλοίαρχος (Ο) Α. Λάρδας ΠΝ  
ΔΓ/ΓΕΝ

Πλοίαρχος Ν. Λεμονής ΠΝ  
Διευθυντής Α2

ΕΜΠΙΣΤΕΥΤΙΚΟ

ΕΞ. ΕΠΕΙΓΟΝ

ΠΡΟΣ : «ΑΣΠΡΟΦΟΣ Α.Ε.»  
Ελ. Βενιζέλου 284  
Καλλιθέα, Αθήνα 17675

ΓΕΝΙΚΟ ΕΠΙΤΕΛΕΙΟ ΝΑΥΤΙΚΟΥ  
ΔΙΕΥΘΥΝΣΗ Α2  
ΤΜΗΜΑ Ιε  
Τηλεφ. 2106551276  
Φ. 542/ 207 /09  
Σ. 6597  
Αθήνα, 16 Φεβ 09  
Συνημμένα: α) Φωτοαντίγραφα  
των σχετικών (β),  
(γ) και (δ)  
β) Εννέα (9)  
διαγράμματα

- ΚΟΙΝ. : - ΥΠΕΧΩΔΕ/ ΓΓΔΕ/ ΔΙΕΥΘΥΝΣΗ  
ΛΙΜΕΝΙΚΩΝ ΕΡΓΩΝ ΚΑΙ ΕΡΓΩΝ  
ΑΕΡΟΔΡΟΜΙΩΝ (Δ4)  
Σεβαστουπόλεως 1, Αθήνα 11526  
- ΥΠΕΧΩΔΕ/ ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ  
ΠΕΡΙΒΑΛΛΟΝΤΟΣ/ΕΥΠΕ/ ΤΜΗΜΑ Α'  
Λ. Αλεξάνδρας 11, Αθήνα 11473  
- ΥΠ. ΟΙΚΟΝΟΜΙΑΣ ΚΑΙ ΟΙΚΟΝΟΜΙΚΩΝ /  
ΔΙΕΥΘΥΝΣΗ ΔΗΜΟΣΙΑΣ ΠΕΡΙΟΥΣΙΑΣ  
Καρ. Σερβίας 10, Αθήνα 10184  
- ΥΕΝΑΝΠ/ ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ  
ΛΙΜΕΝΩΝ ΚΑΙ ΛΙΜΕΝΙΚΗΣ ΠΟΛΙΤΙΚΗΣ  
Ακτή Κονδύλη 26-28 και Αιτωλικού  
Πειραιάς 18545  
- ΥΠ. ΠΟΛΙΤΙΣΜΟΥ / ΕΦΟΡΕΙΑ ΕΝΑΛΙΩΝ  
ΑΡΧΑΙΟΤΗΤΩΝ  
Καλλισπέρη 30, Αθήνα 11742  
- ΕΟΤ  
Τσόχα 7. Αθήνα 11521  
- ΠΕΡΙΦΕΡΕΙΑ ΙΟΝΙΩΝ ΝΗΣΩΝ/  
ΔΙΕΥΘΥΝΣΗ ΠΕ.ΧΩ.  
Αλυκές Ποταμού, Κέρκυρα 49100  
- ΠΕΡΙΦΕΡΕΙΑ ΗΠΕΙΡΟΥ/ ΔΙΕΥΘΥΝΣΗ  
ΠΕ.ΧΩ.  
Κτίριο Ορφέα, Κεντρ. Πλατεία  
Ιωάννινα 45221  
- ΥΥ - ΥΦ  
- Κ.Λ. ΚΕΡΚΥΡΑΣ 49100  
- Κ.Λ. ΗΓΟΥΜΕΝΙΤΣΑΣ 46100  
- ΥΠ. ΟΙΚΟΝΟΜΙΑΣ ΚΑΙ ΟΙΚΟΝΟΜΙΚΩΝ/  
ΚΤΗΜΑΤΙΚΗ ΥΠΗΡΕΣΙΑ Ν. ΚΕΡΚΥΡΑΣ  
Λεωφ. Αλεξάνδρας 38 Β, Κέρκυρα 49100  
- ΥΠ. ΟΙΚΟΝΟΜΙΑΣ ΚΑΙ ΟΙΚΟΝΟΜΙΚΩΝ/  
ΚΤΗΜΑΤΙΚΗ ΥΠΗΡΕΣΙΑ Ν. Θεσπρωτίας  
Π. Τσαλδάρη 51, Ηγουμενίτσα 46100  
- ΔΕΣΦΑ Α.Ε.  
Μεσογείων 207, Αθήνα 11525

13/03/1400

ΑΣΠΡΟΦΟΣ	
ΑΡ. ΠΡΩΤΟΚ.	ΗΜ. ΑΦΗΡΟΣ
537	13/3/09
Λ. ΖΑΝΝΑΣ	

HC Project		
NO	228	
Date	13.03.09	
File	118089	
Distribution	Info	Ac.
AP	✓	
LG	✓	
NV		

ΘΕΜΑ: Τεχνικά Έργα Λιμένων (Εκπόνηση Προμελέτης Περιβαλλοντικών  
Επιπτώσεων (ΠΠΕ) του Υποθαλάσσιου Αγωγού Φυσικού Αερίου Ελλάδας -  
Ιταλίας / Υπ. 173/08).

25  
Προβλεπόμενη (ΜΕ) ✓

ΣΧΕΤ.: α) ΑΣΠΡΟΦΟΣ Α.Ε./3660/Ε.Π./Σ.Κ./12-11-2008.  
β) ΓΕΝ/Α2-Ιε/542/1210/07/1-8-2007.  
γ) ΓΕΝ/Α2-Ιε/542/1445/07/20-9-2007.  
δ) ΓΕΝ/Α2-Ιε/542/1464/08/30-9-2008.

1. Απαντώντας στο σχετικό (α), σας γνωρίζουμε ότι, το ΓΕΝ από πλευράς αρμοδιοτήτων του δεν έχει αντίρρηση για την κατασκευή του αγωγού του θέματος σε οιαδήποτε από τις πέντε (5) προτεινόμενες εναλλακτικές χαράξεις, με την προϋπόθεση ότι θα τηρηθούν οι τεθέντες με την παράγραφο 1 του σχετικού (β) όροι και προϋποθέσεις και θα ληφθούν ιδιαίτερος υπόψη οι επισημάνσεις παραγράφου 2 αυτού.

2. Τα σχετικά (β), (γ) και (δ), φωτοαντίγραφα των οποίων διαβιβάζονται συνημμένα για ενημέρωσή σας, εξακολουθούν ισχύοντα ως έχουν.

3. Συνημμένα επιστρέφεται η υποβληθείσα με το σχετικό (α) ασπρόμαυρη σειρά διαγραμμάτων, θεωρημένη από τη Διεύθυνση Γ2 του ΓΕΝ.

4. Το παρόν χωρίς το συνημμένο του φωτοαντίγραφο του σχετικού (β) μεταπίπτει σε αδιαβάθμητο.



Ακριβές Αντίγραφο

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ΔΙ/ΓΕΝ

Υποναύαρχος Ν. Βαζαίος Π.Ν.  
Υπαρχηγός ΓΕΝ

# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## ANNEX L: SUPPLEMENTARY PEIA DRAWINGS



# GREEK OFFSHORE SECTION OF THE NATURAL GAS INTERCONNECTOR GREECE - ITALY

## ANNEX M: PEIA DRAWINGS

