



# FORTH ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2011

Period covered 01.01.2011-31.12.2011

Environment Department OLYMPIA ODOS S.A.





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# Introduction

Based on the Concession Agreement (article 11.2.2& 16.2), OLYMPIA ODOS S.A. is obliged, throughout the entire Concession Period to deliver to the Service, an annual environmental report. This is the fourth annual Environmental Management Report and covers the period 01.01.2011 to 31.12.2011.

The annual report incorporates the data of the two semester environmental management reports and is submitted to EYPE/MEPPW until January 31st of each year and throughout the entire Concession Period.

The above mentioned six-month and annual reports shall be publicized on the internet site [www.olympiaodos.gr](http://www.olympiaodos.gr) created and maintained by the Concessionaire, in accordance with the Concession Agreement.

During the motorway's construction and operation, both the constructor as well as the operator comply with all pertinent provisions, as they are recorded in the Greek Legislation, ensuring the same for their contractors and subcontractors.

Within this framework and as a part of its Environmental Management System, the constructor, Joint Venture APION KLEOS has developed the "Environmental Legislation Monitoring Procedure", incorporating all existing pertinent legislation and updated in case the latter is amended or updated. This procedure is communicated to all parties who are obliged to then communicated to all cooperating sub-contractors.

Note: all appendices of the present report have been submitted to the Special Environment Service of the Ministry of Environment, Energy and Climate Change, responsible for the environmental supervision of the OLYMPIA ODOS project and are available upon request.

# Appendices

- APPENDIX 1** SECTION: ELEFSINA - KORINTHOS (EXCLUDING KAKIA SKALA)
- APPENDIX 2** SECTION: ANCIENT KORINTHOS I/C – K1 PATRA BY-PASS I/C
- APPENDIX 3** SECTION : MIDIOGLI I/C - AMALIADA
- APPENDIX 4** SECTION: AMALIADA – PYRGOS - TSAKONA
- APPENDIX 5** ARCHAEOLOGICAL INVESTIGATIONS FOR KORINTHOS – PATRAS – PYRGOS - TSAKONA
- APPENDIX 6** QUANTITY DATA PERTINENT TO THE ENVIRONMENTAL PROTECTION MEASURES DURING CONSTRUCTION AND OPERATION
- APPENDIX 7** ENVIRONMENTAL EXPENDITURE RELATED TO THE DESIGN-CONSTRUCTION OF THE PROJECT



# Progress of the environmental agenda

# General

Appendix A of Annex 2 of the Concession Agreement states the Common Ministerial Decisions (CMD) and the Law comprising the Project's environmental licensing and forming the main framework for the monitoring of the progress of the Project's environmental issues.

More specifically:

1	Law 2338/1995 <b>Thiva I/C – Elefsina Toll Plaza</b>
2	CMD 126393/16.02.2007 <b>Elefsina – Korinthos (excluding Kakia Skala section)</b>
3	CMD 108569/18.10.2006 <b>Kakia Skala</b>
4	CMD 92073/16.05.1994 <b>Isthmos – Ancient Korinthos I/C</b>
5	CMD 104892/16.06.2006 <b>Ancient Korinthos I/C – Patra By-Pass K1 I/C</b>
6	CMD 106321/28.07.2006 <b>Patra By-Pass K1 I/C – Mydilogli Semi-I/C</b>
7	CMD 102696/30.05.2006 <b>Mydilogli I/C - Amaliada</b>
8	CMD 100163/30.05.2006 <b>Amaliada – Tsakona</b>

In the construction as well as in the operation phase, the procedures and directives for the works' environmental management are implemented by the Constructor, aiming at the in compliance with the terms and constraints of the above decisions.

APION KLEOS submits to OLYMPIA ODOS S.A. monthly reports regarding the progress of the construction related works.

Within the framework of the contractual obligations, the Constructor has developed an Environmental Management Plan (EMP) for the Project in accordance with ISO 14001:2004.

The EMP includes the organizational structure, planning actions, duties allocation, technical methods, procedures as well as processes for the development, implementation, achievement, revision and support of the Constructor's

environmental policy as well as the compliance with the Project's environmental terms.

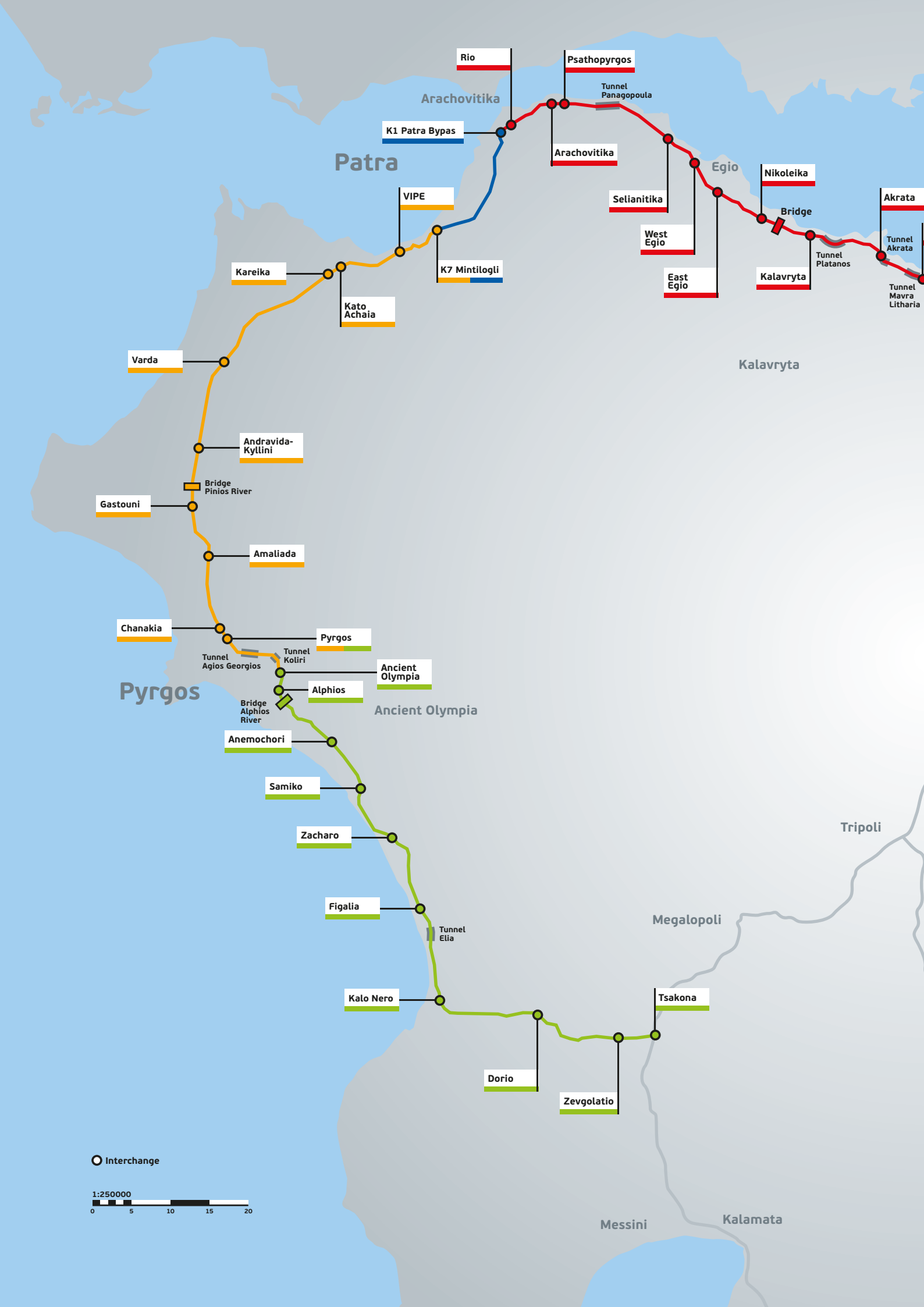
The EMP constitutes the basic and overall framework for the management of environmental issues, whereas the procedures and directives area tool for the rational handling/ management of each environmental issue, taking into account the pertinent legislation and the decisions applicable to each case.

The EMP as well as the environmental management procedures/ directives are at the disposal of the competent authorities involved in the Project.

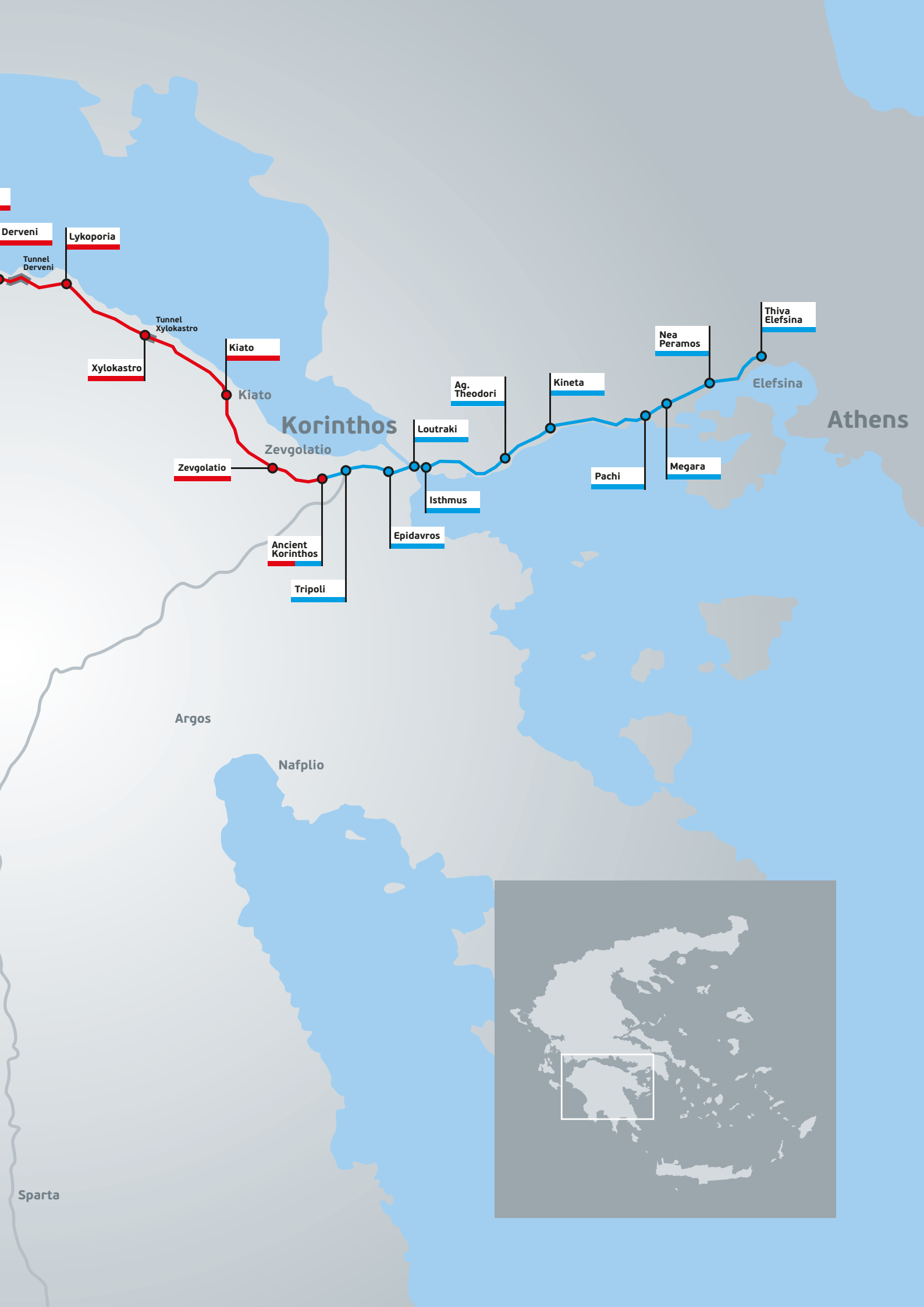
The Operator in order to comply with the Project's environmental terms and the implementation of an Environmental Policy has developed an **Environmental Management Plan** for:

- controlling, monitoring and dealing with the environment impact of the project
- optimum management of liquid and solid waste of the Project
- promotion of best practices to reduce energy and resources consumption

The environmental expenditure related to the design - construction of the project for the year 2011 is presented in Annex 7 of this report.







Derveni

Lykoporia

Tunnel Derveni

Tunnel Xylokastro

Xylokastro

Kiato

Kiato

Zevgolatio

Zevgolatio

Ancient Korinthos

Tripoli

Argos

Nafplio

Sparta

Korinthos

Loutraki

Isthmus

Epidavros

Ag. Theodori

Kineta

Pachi

Megara

Nea Peramos

Elefsina

Thiva Elefsina

Athens





# Permits - designs related to construction

In the framework of complying with the Concession Agreement environmental requirements, the approved environmental terms and the required environmental permits:

- a** requests are submitted, when required, in order for forest and archaeology related permits and official opinions to be issued.
  - b** Special Technical Implementation Designs (STID) and when required, Technical Exploitation Designs for related works are compiled and submitted to EYPE/MEECC in order to obtain approval and permit. In the herein 1, 2, 3 & 4 Appendices are presented in detail all the submitted/ approved studies in 2011.
  - c** Cooperation is in progress with the Public Utility Organisations in order to relocate various networks located within the Project.
  - d** In the cases where new roads opening was considered necessary in order to provide access for the drilling equipment at the test boring areas, so as to verify the stratum quality in the tunnelling areas, the consent and the supervision of the local Fire Service and Forest Inspection has been asked. For this purpose, "Forest Road Designs" were developed (NERCO - N. Chlykas & Co), and submitted to the local Forest Services for approval.
  - e** Hydro geological Design (AQUATERRA – Ch. Kapopoulos - E. Psarropoulou & Co) has been submitted to the competent Public Service. The above pertains to the excavation of eleven (11) new water collection works, so as to cover the irrigation, fire fighting and other needs that shall arise in the Project's short-term parking areas.
  - f** Hydraulic Designs have been elaborated (D. Sotiropoulos & Co, Hydro-Rationalising "L.S. Lazaridis & Co") with the aim to ensure the uninterrupted flow of surface water (e.g. rivers, streams etc) by constructing all necessary structures and taking into account a flood recurrence interval of at least 50 years.
- These earthen roads shall be up to four meters (4m) wide and designed in such way, so as to be utilized in the future as fire protection areas.
- Construction Joint Venture by enforcement of article 5 law 3010/2002 and in accordance with the provisions of article 11.2.1 of the Project's Concession Agreement proceeded with the development of stream delineation designs (D. Sotiropoulos & Co & L.S. Lazaridis & Co) regarding the stream's section extended along the Projects construction zone or abutted to it and along Korinthos - Patras section for five hundred meters downstream. The designs are being submitted to the Technical Services of the local Regional Units Administrations for approval and any other administrative act necessary in order to be rendered fully effective.
- The respective process for Patra – Pyrgos section is also temporarily suspended.
- Already in this direction, the modification of project sections, as they are described in the EIS, is conducted according to the necessary process foreseen by article 13 of CMD No 11014/703/ F104/14.3.2003 (Gov. Gaz. 332/B), pursuant to the approved environmental terms.

# Environmental management, waste management, hazardous and non hazardous materials

During the motorway's construction and operation, both the constructor and the operator as well as the cooperating contractors and sub-contractors comply with all pertinent provisions, according to the Greek Legislation.

Joint Venture APION KLEOS in the frame of its Environmental Management Plan has developed procedures for the management of waste.

The respective "Hazardous Materials Selection and Procurement Procedure" has been prepared describing all the constructor's actions contributing to the prevention of the uncontrollable use of hazardous materials during the Project's construction period.

During the construction and the operation of the project, waste of any nature is managed based on the pertinent legislation and the constraints/ requirements imposed by the approved environmental terms, both for the Project's existing and new sections. The respective "Waste Management Procedure" has been prepared for the management of waste, documenting the existing legislative framework and the means/ directives for their management.

The respective "Water Resources Management Procedure" has been prepared for the management of water resources, presenting in detail all the constructor's actions contributing to the minimization of the adverse impact the construction has on the adjacent water resources.



Nea Peramos OMC



Nea Peramos OMC



Kiato TB



Akrata TB

The results of the Project's environmental performance, such as material recycling, mineral oil, batteries, vehicle tyres, hazardous materials, polluting substances, area restoration, excavation and demolition products etc management are presented in Appendix 6 of this Report.



Patra TB





# Environmental parameters, monitoring programme

(noise monitoring, traffic load vibrations,  
air quality, water)

Air quality management as well as noise obstruction minimization due to the motorway's construction are amongst the main objectives of the Project's Constructor and its Operator.

The Constructor, based on the relevant study, designs, elaborates and implements a programme for the Project's environmental monitoring and audit (ΣΣΕ & Περιβάλλον Α.Ε.), in order to ensure compliance with the Project's environmental requirements.

For that purpose, the Constructor develops a programme for the Project's monitoring and audit during construction.

## Existing Sections

The Project's monitoring and control programme carried out during construction at the existing sections of "Elefsina - Korinthos" and "K1 Patra By-Pass I/C - Midilogli Semi-I/C" has already begun.

In these sections and in the framework of "Special Acoustic Design for sound barriers installation" was carried out a Complete Recording Programme of the daily hourly variation rate of the appropriate Road Traffic Noise rates. Moreover, a 24-hour acoustic measurement assessment of the exceeded rates was carried out in selected rates, located in proximity to the existing road sections, which are in a distance equivalent or smaller than 200m from the nearest edge



Installation of sound barriers, in the Project's existing sections (Zoodochos Pigi Abbey, Patra By-Pass)

of the approved land-use plan. The above distance is calculated taking pavement's or structure's edge as starting point.

Besides the above, extra rates, which are considered acoustically sensitive, were explored, even though no complete monitoring record is held for the current acoustical environment conditions, as the those rates were not included in an approved urban design of a city or settlement. Special self-propelled, appropriate modulated, noise stations, equipped with

special static noise analysers and all-weather microphone were developed in order to satisfy the requirements of the relevant European directive regarding the environmental noise (measurement high of 4 m).

Hourly rate analysis of traffic noise to the overall acoustical measurements, in combination with the geometric and town planning features of the area, which is in direct proximity to the motorway, and traffic features were the calculation basis for the final detailed structural design

pertaining to length - height - sort - density and materials for the sound barriers.

Measurements have been conducted along these sections within the framework of the "Noise-Barriers Implementation Special Acoustic Design" elaboration which has been approved via document No 122052/8.3.2010 by EYPE/MEECC where – among others – the noise-barrier type is determined.

The construction/installation of the noise-barriers commenced and shall be completed according to the approved works time-schedule.

Moreover, an "Additional Special Acoustic Design for sound barriers installation & Noise-Barriers Implementation Special Acoustic Design" for "Elefsina –Korinthos section" has been submitted, pertaining to the protection of "Gefyra Isthmou" settlement in the Mun. of Loutraki-Perachora, in Korinthia Regional Unit. It has to be stressed that even though in the frameworks of the approved Acoustic Design the above residential area had been controlled regarding the RTN, it wasn't included in the immediate area of sound protection implementation, since it was included in the Project's related EIS and the Service of Korinthia Regional Unit was not informed thereof during the Designer's research for establishing the city's and settlements' limits.

Additionally, during the motorway's operation test sound measurements shall be conducted while at the same time monitoring the traffic load per six months or less.



Pollutants monitoring motor station

#### **Air-pollution & basic meteorological data monitoring**

It is provided to install self-propelled air pollution stations and basic meteorological data measurement stations, in locations, which shall be approved both by EYPE/MEECC and by the Project's Independent Engineer, in accordance with provisions of the Concession Agreement and the approved environmental terms.

Technical Design (TT & Environment S.A.) describing the technical requirements and the position of the required monitoring stations at the Project's existing sections has been approved by EYPE/MEECC. The positioning of the stations, which has been approved by the

Project's Independent Engineer as well, was carried out by taking into account the results of the "Measurements Programme for vibrations and suspended particles assessment design" which was elaborated for the sections in issue.

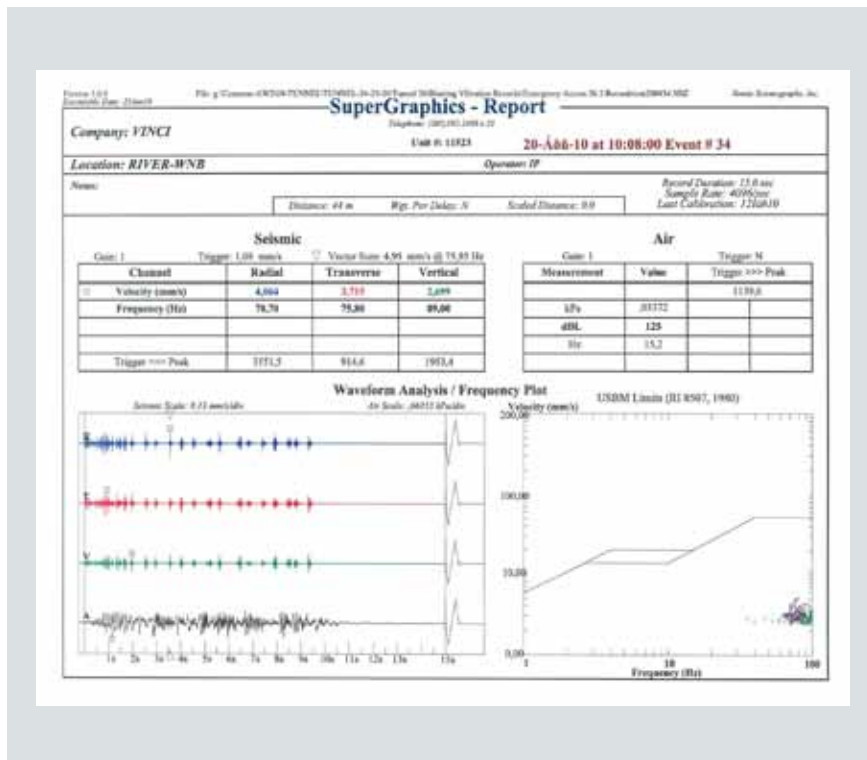
The collection and assessment procedure for the technical and financial tenders, related to the supply/installation of the self-propelled air pollution station and meteorological data measurement station is provided to be concluded within 2012.

#### **New Sections**

Along the Motorway's new sections and within the framework of the "Special Final noise protection Design & Special Design for sound barrier application" were elaborated acoustical measurements in order to register the current traffic noise conditions (TT & Environment S.A.) for "Ancient Korinthos I/C - K1 Patra By-Pass I/C", "Midiligli I/C - Kato Achaia" and Rion - Antirion bridge access roads.

Measurements Programme for vibrations and suspended particles AS 2,5 & 10 is assigned (TT & Environment S.A.) not only for the motorways sections, which presented exceeded T.N.R. (during the recent acoustical measurements programme), but also for the locations of operative working sites.





Vibration monitoring report

During Project's construction measures are taken in order to minimize vibrations produced by construction activities in buildings and in sensitive areas within the Project's zone of influence. For this purpose, apposite systems (EXORIXI S.A. or working sites privately owned equipment) were installed in critical locations, in order to measure and monitor all important variants of the phenomenon. A complete record of the collected data is kept in the local working sites.

In parallel, the Operator carries out traffic counts at the Project's toll plazas. More specifically, each month the company drafts an operation report, including precise traffic data, i.e. number of vehicles passing through all toll plazas and the traffic composition; said report is duly submitted to the competent supervising Services of the Ministry of Infrastructures, Transport and Networks. The company has at its disposal both the primary and the processed traffic data.

## Water resources management

Water resources are being managed according to the pertinent legislation and the restrictions/ limitations imposed by the approved environmental terms both for the Project's existing and the new sections. In order to facilitate the efficient management of both surface and underground water resources, the respective "Water Resources Management Procedure" has been developed, documenting the existing legislative framework and the means/ instructions of their management.

The Construction Joint Venture by the enforcement of article 5 law 3010/2002 and in accordance with the provisions of article 11.2.1 of the Project's Concession Agreement proceeded in the elaboration of stream delineation designs (D. Sotiropoulos & Co & L.S. Lazaridis & Co) for the stream's section extended along the Projects construction zone or abutted to it and along Korinthos - Patras section for five hundred meters downstream. The designs are being submitted to the Technical Services of the local Regional Unit Administrations for approval and any other administrative act necessary in order to be rendered fully effective.

The respective process for Patra – Pyrgos section is also temporarily suspended.







# Environmental impact response measures during construction

## a Geomorphology - Soil

In order to protect the soil from fuel leaks etc special areas with sealed floor and graded collection drain that ends in a sedimentation basin are provided in order to swill the machinery in each of the construction sites.

In the machinery maintenance or in other suitable and safe area, used oils from black oils change are temporarily stored. The management of the used oils is in accordance with the provisions of PD 82/2-3-2004. By the PD is given priority to collect and dispose used oils for regeneration treatment.

All necessary measures are taken in order to avoid erosion or filtration at the slopes during the tunnel construction and the water and clay supply to the final acceptor. The sediment before being disposed is being treated in apposite sedimentation tanks.

## b Geology

Special attention is paid during construction of sections passing by geologically sensitive zones, as in those areas stability problems might emerge at the formations. In those sections shall the least possible interventions are made.

## c Ecosystems - Vegetation

In the areas where the technical structures are constructed, and mostly in the areas where bridges are constructed, all the necessary precaution are taken in order to avoid any impact on the riverside ecosystems. All possible efforts are made in order to use the fewer possible quantity of concrete. Where possible the use of gabions is preferred and the proper application/use of additives (e.g. bentonite), which are used in order to add improved features to the boring effluents during the borings.

Especially during the dry period, in the construction phase, all the necessary measures are taken in order to avoid dust emissions (infusion of earth materials, trucks' load covered with nets). In some case the cleared vegetation originated materials are cut and temporarily stored in mounds in order to create organic fertilizer for future use in planting technical activities. After clearance, excavation, collection and temporary disposal of the superficial fertile soil layer follows.

## Vegetation, planting and road cleaning

The vegetation and planting pertain to the environmental integration and protection of the areas adjacent to the project.

### Existing Sections

In order to facilitate the fulfillment of the above obligations, a Final Planting Design (S. Voutsinos & Co) for the surrounding areas, the related I/Cs, slopes and median strips was developed for Elefsina – Korinthos section. This design was approved by the project's Independent Engineer.

The planting of Patra By-Pass is in very good shape due to its "recent" construction and maintenance for the last period of time.



View of Elefsina-Korinthos section

### New Sections

In order to facilitate the fulfilment of the above mentioned obligations Construction Joint Venture conducted a relevant tender in order to find the suitable designer (agronomist, landscape architect) for the development of Planting-Technical Design for Korinthos – Patra section.

The designer (Klea Volovini) undertook the project ,the relevant agreement was made and the data collection commenced towards the development of the Planting-Technical Design for the surrounding area, the respective I/Cs, embankment/cut slopes as well as the sections of the existing national road which will not be included in the motorway. The process is temporarily suspended.

The OLYMPIA ODOS OPERATION S.A. (Operator) personnel and the competent subcontractors carried out regular trimming, weeding and cleaning works for the most part of the project, and specifically of 97 km of central reserve, 402 km of shoulders and of the 28 interchanges and their branches, as well as of the 45 parking areas.

For green maintenance works the Operator has entered into contract with the following subcontractors:

- TOMI (District 1)
- J&P AVAX (District 2)

### Cleaning

During 2011, the Operator's personnel in collaboration with external subcontractors carried out and still does regular cleaning works along the entire project (202 km), in the 28 interchanges, the toll stations (lanes, booths, pavement, surrounding area, buildings), in the tunnels and in the 45 parking areas (washing, sweeping, waste removal from bins and surrounding areas). It is noted that cleaning pertains to the entire cross section until the expropriation limits.







# Management of extraordinary incidents, environmental accident, green areas fire

During the operation of the working sites, all fire prevention measures are taken in order to prevent fire coming potentially from working machinery, working teams, transportation of explosives and to minimize the danger of fire being expanded to adjacent areas. The way according which the fire belt is organised, was controlled and approved by the competent Fire Service before the beginning of the works.

More specifically, fire management measures are taken in order to protect forest areas on both sides of the road.

Within the framework of elaborating the fire hoses designs along the EKPPT motorway, maps were prepared depicting the forest land for "Elefsina – Korinthos", "Ancient Korinthos I/C – Patra By-Pass K1 I/C" and "Patra By-Pass K1 I/C – Midilogli Semi-I/C" sections.

In the framework of road safety, the Operator has Patrollers and Intervention Teams patrolling the Project with specially marked vehicles dealing with incidents (immobilized vehicles, accidents, traffic problems etc.) by implementing temporary signage to safely arrange traffic and assist the emergency services (Police, Fire Brigade and Paramedics). In this framework, during 2011:

- 4.272.278 (about 11.705 per day) kilometers of Patrols and Interventions were covered to supervise the road network

- 26.131 incidents were handled with the Company's assistance, such as: 15.049 immobilized vehicles (mechanical failure, flat tire, lack of fuel, abandonment), 7.853 obstacles on the pavement, 1.331 road accidents (58 with injured and 1.273 with material damage), 1.199 user problems (pedestrians, vehicles moving in the opposite direction, non authorized users, dangerous traffic violations), 183 traffic congestions and 516 other emergency incidents (fire, adverse weather conditions, etc.) out of which:
  - 15.187 were handled immediately by the Company, since they were detected (located) by its own vehicles, or by its subcontractors' vehicles
  - 10.944 incidents were handled within 11' in average by the Company, since they were otherwise detected (phone, cameras etc.), while regarding the response of the subcontractors respectively: 16' for light vehicles and 30' for heavy vehicles

## Patrol vehicles

The Operator's competent personnel (Intervention Teams) implement on a daily basis temporary signage for incidents and for the safe execution of works carried out on the road either by the Operation Company or the Construction Joint Venture. Regarding Korinthos-Patra NNR special attention is paid due to its features (no central reserve) and the sections with steep turns and limited visibility.

The Operator has action plans related to the protection of the environment either within routine maintenance or emergency and abnormal situations.

- B.1** Congestion
- B.2** Road Accident
- B.3** Immobilized vehicle
- B.4** Problem on the pavement
- B.5** Problem on infrastructure or equipment
- B.6** Problem with user
- B.7** Other emergency incidents
- B.8** Adverse weather conditions
- B.9** Large scale incident in tunnel
- B.10** Incident on Korinthos-Patra NNR

The Constructor shall work and cooperate closely with the Environmental Service and other departments of OLYMPIA ODOS S.A. in the application of the procedures – directives for the management of such issues.



## Antiquities

Under the principle that cultural heritage and antiquities along the motorway shall be protected, a principle that constitutes prerequisite for the construction of the road, the Constructor has direct contact and collaboration with the competent archaeological services. According to the Concession Agreement and the Design – Construction Contract, Construction Joint Venture is responsible for the execution of archaeological investigations pursuing a recommendation by the pertinent archaeological service.

Works in the positions indicated in the Concession Agreement (article 13.1) and where there is a great potential of Antiquities being revealed have commenced.

Antiquities detailed data/activities are reported in the herein Appendix 5.



SIKYONA (MOULKI) K.P. 17+100 KO-PA section  
Architectonical ruins excavation

## Project modernisation, improvement, extension or modification

The modification of project sections, as they are described in the EIS, is conducted according to the necessary process foreseen by article 13 of CMD No 11014/703/F104/14.3.2003 (H.G.G.332/B), pursuant to the approved environmental terms.

# Training – awareness raising

Environmental training aims to reinforce knowledge and raise awareness about the environment, to develop the necessary skills, to form the right behaviour, to activate and make informed decisions and responsible actions.

The Construction Joint Venture is organizing training and briefing seminars whereas all internal inspections are accompanied by the training and briefing of all competent persons at working sites regarding issues and developments pertaining to the environment.

Each working site's environmental engineers are regularly organising meetings with all parties involved in the Project's construction, providing them with the suitable training and briefing.

The Construction Joint Venture's Environmental Department in cooperation with the project engineers conduct regular inspections, give the necessary instructions or directions pursuant to the Project's EMP regarding any arising environmental issue. To fulfill that goal, special reports are elaborated documenting the test results, proposing measures to deal with any environmental issues identified and accompanied by a complete photographic survey.

Environmental training during the Project's construction is divided in 2 categories. The first one pertains to the specialized environmental training of the staff related to the Project's environmental management (environment engineers, foremen in sensitive areas) and the second one to the general environmental training of the whole staff. Table 9 describes the whole number of hours (persons x time) for environmental training during 01/01/2011 – 31/12/2011.

Table 9:

TRAINING TYPE	TIME (HRS)
SPECIALISED TRAINING	90
GENERAL TRAINING	40





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