

EX-ANTE EVALUATION OF THE SECTORAL OPERATIONAL PROGRAMME  
ON TRANSPORT WITHIN THE BULGARIAN NATIONAL DEVELOPMENT  
PLAN 2007-2013

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**STRATEGIC ENVIRONMENTAL ASSESSMENT**

**ENVIRONMENTAL REPORT**

Draft Report

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## **NON-TECHNICAL SUMMARY**

In the light of the anticipated accession of Bulgaria to the EU in 2007, considerable effort has been made to facilitate the country's convergence with the member states in all sectors.

A large part of the transport infrastructure in Bulgaria, especially road infrastructure, requires significant interventions to reach satisfactory levels. The shortcomings of the transport system on the one hand raise business costs and on the other they act as an obstacle to foreign investment, in an otherwise attractive region. Therefore, a considerable amount of investment is needed to create a transport system that is in accordance with the standards and requirements of the EU.

The Sectoral Operational Programme on Transport (SOPT) is coordinated by the Coordination of Programmes and Projects Directorate in the Ministry of Transport and Communications. SOPT is a part of the National Strategic Reference Framework, which, on the basis of coordinated sequence of priorities, defines the strategy development of the transport sector for the period 2007 – 2013, with the aim to achieve the EU Convergence objective.

This report undertakes the Strategic Environmental Assessment (SEA) of the Sectoral Operational Programme on Transport (SOPT) within the Bulgarian National Development Plan 2007 – 2013 in accordance with Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive).

The purpose of the SEA Directive is to “provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development”. It does this by requiring Member States to identify and assess the potential environmental effects of plans and programmes during their preparation stage and before they are adopted.

The Directive requires that environmental authorities and the public must be consulted as part of the SEA process. The draft programme and the Environmental Report must be made available to the environmental authorities and to the public. The environmental authorities and the public likely to be affected or with a particular interest in the environmental effects of implementing the programme must be given an early opportunity to express their opinions.

The consultation period for the SOPT SEA Environmental Report starts on 15<sup>th</sup> September 2006 and runs until 6<sup>th</sup> October 2006. After this period responses to the SOPT SEA consultation will be reviewed. In light of these comments, the

Environmental Report will be amended with the final versions being published 12 October 2006.

The nature of the SOPT is such that it is not possible to predict the exact location, nature and impact of the actions. Therefore the SEA does not assess the exact environmental impacts of the programme, rather it provides an indication of that impact and suggests ways that negative impacts can be mitigated.

The purpose of this report has been to document the strategic environmental assessment of the policies and strategies that are outlined in the SOPT and to document the how the SEA process has been integrated into its development. It therefore provides the start of an 'environmental protection thread' through the SOPT and is intended to act as a vehicle for continuing the SEA process.

To ensure that each action and initiative implemented within the SOPT is sustainable and delivers the desired environmental benefits, the SEA has identified potential environmental impacts which could result from the implementation of specific actions and suggested various mitigation strategies and measures which could be used to minimise or negate the impacts of these actions.

The SEA has recommended that specific environmental monitoring be undertaken during the implementation of the SOPT, in order to monitor the effectiveness of the actions within SOPT at meeting the environmental objectives, a series of indicators must be developed.

Finally, it is also strongly recommended that a number of additional Technical Assistance measures are included, aimed specifically at answering to the main needs of support for environmental monitoring of the programme.

## GLOSSARY OF ABBREVIATIONS

Abbreviation	Description
CEA	Competent Environmental Authority
CEE	Central and Eastern Europe
CF	Cohesion Fund
CPED	Cohesion Policy for Environment Directorate
CR	Council Regulation
EC	European Council
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ER	Environmental Report
ERDF	European Regional Development Fund
EU	European Union
FB	Final Beneficiary
FYROM	Former Yugoslav Republic of Macedonia
GHG	Greenhouse gases
GSM-R	Groupe Spécial Mobile – Railway
MA	Managing Authority
MC	Monitoring Committee
MOEW	Ministry of Environment and Water
NDP	National Development Plan
NGO	Non Governmental Organization
NSEAP	National Strategy on Environment and Action Plan
NSRF	National Strategic Reference Framework
REEC	Regional Environmental Expert Council
RIEW	Regional Inspectorate of Environment and Water
RIS	River Information System
SEA	Strategic Environmental Assessment
SEEC	Supreme Environmental Expert Council
SOP	Sectoral Operational Programme
SOPT	Sectoral Operational Programme on Transport
PAD	Preventative Activity Directorate
SWOT	Strengths, Weaknesses, Opportunities and Threads Analysis
SEA	Strategic Environmental Assessment
VTMIS	Vessel Traffic Management and Information System
WFD	Water Framework Directive
WG	Working Group

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## 1. INTRODUCTION

### 1.1. Preamble

This report undertakes the Strategic Environmental Assessment (SEA) of the Sectoral Operational Programme on Transport (SOPT) within the Bulgarian National Development Plan 2007 – 2013 in accordance with Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive).

The purpose of the SEA Directive is to “provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development”. It does this by requiring Member States to identify and assess the potential environmental effects of plans and programmes during their preparation stage and before they are adopted.

It is the responsibility of Member States to decide how best to meet the requirements of the SEA Directive in relation to the Operational Programmes co-financed by the Structural and Cohesion Funds. Established procedures for SEA can be used or the Member State can decide to incorporate the SEA into the ex-ante evaluation process. The Ministry of Transport of the Republic of Bulgaria has decided<sup>1</sup> that the Strategic Environmental Assessment of the Sectoral Operational Programme on Transport should be incorporated within the ex-ante evaluation of the SOPT.

This Environmental Report was compiled by Dr Alexander Zacharof, the environmental expert of the ex-ante evaluation team. Dr Zacharof underwent the procedure of registration as an Expert in the Bulgarian Ministry of Environment and Water (MOEW) in order to fully comply with the requirements of the Bulgarian national legislation.

### 1.2. Ex-Ante Evaluation and the 2007 – 2013 Programming Period

The Latin expression “**ex-ante**” literally means “*from before*”, “*beforehand*”, “*before the event*”. This is in contrast to the term “**ex post**” which means “*after the event*”. Consequently, the evaluation of a programme before and after its implementation is called **ex-ante** and **ex-post** evaluation respectively.

The aim of the ex-ante evaluation is to optimise the allocation of budgetary resources under operational programmes and improve programming quality. The responsibility of carrying out an ex-ante evaluation rests with the authority responsible for the preparation of the programming documents.

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<sup>1</sup> Decision No EA 3/2006, For the assessment of the necessity for execution of Environmental Assessment

Planning the timetable for the ex-ante evaluation is parallel with planning for the preparation of the operational programme. The interactive nature of the ex-ante evaluation means that the evaluator undertakes his work in stages, depending on when elements of the programme are available. The evaluator, though retaining his independence, works closely with authorities responsible for the preparation of programmes. As different elements of the evaluation are completed, they may cause programme planners to re-visit earlier stages. As the recommendations of the experts are taken into account by the planners in subsequent drafts of programmes, the final ex-ante evaluation report draws together the work undertaken and is forwarded to the Commission together with the programme.

The new general Community Support Fund Regulations<sup>2</sup> proposes a more strategic approach to the programming of Funds and their expenditure with a greater focus on performance and results. For the 2007-2013 programming period programmes also become more strategic, focused more strongly on the priority level.

For the ex-ante evaluation, the main concerns are: **relevance** (of the strategy to needs identified), **effectiveness** (whether the objectives of the programme are likely to be achieved) and **utility** (judging the likely impacts against wider social, environmental and economic needs). Throughout the development of the programme and the process of the ex-ante evaluation, there should be a concern to maximise Community added value.

### **1.3. Legal and Institutional Framework and Sources of Information**

The main legislative driver behind the Strategic Environmental Assessment (SEA) of the Sectoral Operational Programme on Transport (SOPT) is the SEA Directive and its transposition in the Bulgarian legislation. The Ministry of Transport of the Republic of Bulgaria has decided that the Strategic Environmental Assessment of the Sectoral Operational Programme on Transport should be incorporated within the ex-ante evaluation of the SOPT.

This report was prepared according to the following EU and Bulgarian national legislation.

#### **EU Legislation**

- Directive 2001/42/EC of the European Parliament and of the Council on the Assessment of the Effects of Certain Plans and Programmes on the Environment., 27 June 2001 (**The SEA Directive**)

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<sup>2</sup> Council Regulation (EC) No 1083/2006, 11 July 2006

- Directive 79/409/EEC on the Conservation of Wild Birds, 2 April 1979 (**The Birds Directive**)
- Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, 21 May 1992 (**The Habitats Directive**)

#### **Bulgarian National Legislation:**

- Environmental Protection Act, State Gazette No. 91/25.09.2002, corrected, SG No. 98/18.10.2002, amended, SG 86/30.09.2003, supplemented, SG No. 70/10.08.2004, effective 1.01.2005, SG No. 74/13.09.2005, effective 1.01.2006, amended and supplemented, SG No. 77/27.09.2005, amended, SG No. 88/4.11.2005, SG No. 95/29.11.2005, effective 1.03.2006, amended and supplemented, SG No. 105/29.12.2005, effective 1.01.2006, amended, SG No. 30/11.04.2006 (effective 12.07.2006)
- Regulation on the Conditions, Procedure and Methods for Environmental Assessment of Plans and Programs, SG, number 57/ 2.07.2004, enforced as of 1.07.2004
- Ordinance on the terms and procedure for making environmental impact assessment of investment proposals for construction, activities and technologies, SG 25/2003 amended SG No 3/2006

#### **Sources of Information**

Carrying out the SEA involves obtaining and reviewing a large amount of existing information in the form of EU and Bulgarian legislative and guidance documents, Bulgarian National plans, studies etc. These are classified in categories and outlined below:

#### **Guidance Documents and Studies**

“The SEA Manual – a sourcebook on strategic environmental assessment of transport infrastructure plans and programmes” – BEACON project Transport SEA Manual, European Commission, DG TREN, October 2005.

Handbook on SEA for Cohesion Policy 2007 – 2013, February 2006, Greening Regional Development Programmes Network, <http://www.grdp.org>

“Study to Improve Navigation on the Danube in Bulgaria and Romania”, Final Report, December 1999, Frederick R. Harris B.V. The Netherlands.

“The Relationship between the EIA and SEA Directives – Final Report to the European Commission, Imperial College London Consultants, August 2005.

## National Plans

“National Development Plan of the Republic of Bulgaria over the 2007-2013 period”. Agency for Economic Analysis & Forecasting, December 2005.

“National Strategy for the Environment and Action Plan 200-2006”. Republic of Bulgaria, Council of Ministers, Sofia 2001.

“Organization Development Strategy. Coordination of Programmes and Projects Directorate. Managing Authority of the Sectoral Operational Programme on Transport 2007-2013”. October 2005.

Draft Version of Sectoral Operational Programme on Transport, August 2006

“Strategy for development of the National Transport System of the Republic of Bulgaria until 2015”. April 2005.

“National ISPA Strategy – Transport”. Ministry of Transport & Communications, August 2003.

“Project for the metro extension”-Techno-economical study, Sofia Municipality 2006

### 1.4. Report Structure

The Draft Environmental Report is made up of eight Chapters and three Annexes.

The report is structured in the following manner. Following this **Introduction** outlining the general principles of the SEA and the background of the present work, **Chapter 2** describes the assessment methodology used. An overview of SOPT is laid out in **Chapter 3**, while **Chapter 4** provides an analysis of the present state of the environment in Bulgaria. **Chapter 5** introduces the objectives of the SEA, and the potential environmental impacts of SOPT are presented in **Chapter 6**. In **Chapter 7** an overview of Bulgarian EIA procedures is given along with monitoring requirements and potential indicators for the implementation of SOPT. A discussion on the conclusions drawn from this work is presented in **Chapter 8**.

Three appendices are also included. **Appendix I**, outlining details of the consultations on the contents of the Environmental Report. **Appendix II** providing detailed maps and figures used in the Environmental Report. In **Appendix III**, the “Ordinance on the terms and procedure for making environmental impact assessment of investment proposals for construction, activities and technologies” is presented giving the detailed legislative process for EIA permitting

## **2. ASSESSMENT METHODOLOGY**

### **2.1. Introduction**

The Strategic Environmental Assessment was adopted in July 2001 and has had to be applied in the Member States since 21 July 2004. It requires a wide range of plans and programmes to undergo an environmental assessment before they are adopted.

For more in-depth information on the Directive, [the Commission's Guidance on the 'Implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment'](#) can be consulted<sup>3</sup>.

A Strategic Environmental Assessment is automatically mandatory for plans and programmes which set the framework for projects listed in Annexes I and II to the "Environmental Impact Assessment" (EIA) Directive (85/337/EEC); or which, in view of the likely effect on natural sites, have been determined to require an assessment pursuant to Article 6 or 7 of the "Habitats" Directive (92/43/EEC).

If programmes are not covered by the circumstances quoted above, environmental authorities in Member States must screen them to determine if they are likely to have significant environmental effects. In reality, it is likely that most operational programmes co-financed by the European Regional Development Fund will require a SEA.

### **2.2. Applying the SEA Directive to programmes under the Structural and Cohesion Fund Regulations**

Plans and programmes co-financed by the European Community are treated under the SEA Directive in the same way as other plans and programmes.

SEA is automatically mandatory for the following two types of plans and programmes:

a) which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent for projects listed in Annexes I and II to Directive 85/337/EEC (the "Environmental Impact Assessment (EIA) Directive"); or

b) which, in view of the likely effect on sites, have been determined to require an assessment pursuant to Article 6 or 7 of Directive 92/43/EEC (Habitats Directive).

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<sup>3</sup> <http://www.europa.eu.int/comm/environment/eia/home.htm>.

If programmes are not covered by the two categories quoted above, environmental authorities in Member States must screen them to determine if they are likely to have significant environmental effects. In reality, it is likely that most Operational Programmes co-financed by the European Regional Development and Cohesion Funds will require a Strategic Environmental Assessment. It is also likely that most Operational Programmes co-financed by the European Social Fund will not, but they will still need to be screened by the relevant environmental authorities to clarify this point.

### **2.3. An Overview of the SEA Methodology**

The methodology followed during the preparation of the Environmental Report follows the Strategic Environmental Assessment methodology an overview of which is outlined in the paragraphs below.

The main steps in environmental assessment, outlined below, are the responsibility of the authority preparing the Operational Programme. Depending on the approach taken in the Member State, ex-ante evaluators for Operational Programmes may be asked to prepare the environmental report, facilitate consultations or make recommendations on how the results of the report and/or consultations should be reflected in the Programme.

This is the case in the present report, where the Ministry of Transport of the Republic of Bulgaria has decided that the Strategic Environmental Assessment of the Sectoral Operational Programme on Transport should be incorporated within the ex-ante evaluation of the SOPT.

#### **2.3.1. Scoping of the environmental report**

Before drafting the report, environmental authorities must be consulted to determine the scope and level of detail of the information to be included in the report.

#### **2.3.2. The preparation of the environmental report**

The content of the Report is described in Annex I of the Directive. Member States usually find it helpful to develop the environmental report and Operational Programmes in parallel. This helps avoiding subsequent delays and helps to produce a better plan or programme in which the environment is better integrated. Member States must ensure that environmental reports are of sufficient quality to meet the requirements of the Directive (Article 12(2)).

### 2.3.3. Consultations

The Directive requires that environmental authorities and the public must be consulted as part of the SEA process. Detailed arrangements for consultation are normally regulated by national legislation. Consultation is required in the following circumstances:

In identifying programmes which require a SEA, the designated authorities with environmental responsibilities must be consulted. They must also be consulted when deciding on the scope and level of detail to be included in the Environmental Report.

The draft programme and the Environmental Report must be made available to the environmental authorities and to the public. The environmental authorities and the public likely to be affected or with a particular interest in the environmental effects of implementing the programme must be given an early opportunity to express their opinions.

Provision is also made for trans-boundary consultations with other EU Member States if their environment is likely to be significantly affected by the plan or programme. This issue is relevant for the new Territorial Co-operation Objective of the Structural Funds.

### 2.3.4. Taking account of the environmental report and the results of the consultations

The environmental report and the opinions received during the consultation process must be taken into account by the responsible authority during the preparation of the programme. Although the authority is not bound by the results of the environmental assessment, it may find it necessary to introduce amendments to the draft programme.

### 2.3.5. Monitoring

Article 10 of the Directive requires that the significant environmental effects of the implementation of the programme should be monitored in order to identify unforeseen adverse effects, and to be able to undertake appropriate remedial actions. This will usually include the selection of appropriate indicators.

## 2.4. Detailed Overview of the Consultation Process

The SEA Directive establishes consultation as an instrumental part of the process and creates the following requirements for consultation:

- Authorities which, because of their environmental responsibilities, are likely to be concerned by the effects of implementing the plan or programme,

must also be consulted on screening determinations on whether SEA is needed for plans or programmes under Article 3(5), i.e. those which may be excluded if they are not likely to have significant environmental effects. These authorities are designated in the SEA Regulations as the Consultation Bodies.

- If the decision is made that an SEA is required, Consultation Bodies must be consulted on the scope and level of detail of the information to be included in the SEA Environmental Report
- The public and the Consultation Bodies must be consulted on the draft plan or programme and the Environmental Report, and must be given an early and effective opportunity within appropriate time frames to express their opinions.
- Other EU Member States must be consulted if the plan or programme is likely to have significant effects on the environment in their territories.

The Directive requires responses to consultation to be taken into account during the preparation of the plan or programme and before its adoption or submission to a legislative procedure.

The Directive refers only to consultation with the Consultation Bodies and with the public. Responsible Authorities will however normally consult a range of other bodies in the course of preparing their plans and programmes (e.g. Local Authorities, Regional Development Agencies, NGOs etc) and information from these may be useful in SEA.

An overview of the consultation requirements is shown in the Table 1 below:

<b>Overview of Consultation Requirements under the SEA Directive</b>		
<b>Steps in the SEA</b>	<b>Consultation requirements in Domestic situations</b>	<b>Additional requirements in Trans-boundary situations</b>
Scope of the assessment	Consult Consultation Bodies.	
Environmental report and draft plan or programme.	Consult Consultation Bodies and the public.	Consultation of Environmental Authorities and public
During preparation of plan or programme.	Take account of Environmental Report and opinions expressed	Trans-boundary consultation.
Programme adopted, monitoring measures	Information available to Consultation Bodies and public.	Information made available to the consulted Member State.

**Table 1: Overview of the SEA Consultation Requirements**

## **2.5. Practical aspects of consultation**

Enough time for consultation must be allowed when preparing for a plan or programme and the Environmental Report. Therefore, the decision was made to allow three weeks instead of the two weeks foreseen by the legislation, thus providing ample time to the consultees to make their comments.

It was also deemed helpful to produce this present outline of how consultation is to be conducted, making clear how the Directive's requirements will be met. This indicates the objectives of the consultation process, what consultation activities will be conducted, what information and documents will be made available, how they can be obtained, and how consultation responses will be considered, hence facilitating the consultation process.

As effective consultation needs appropriate skills, knowledge and experience, the form of consultation and the participation of individuals and organisations will vary. It is for example often difficult for local representative groups to take a regional perspective, when their work and interests are focused on a particular locality. Similarly, bodies represented at the regional level may not always be familiar with local issues. It is therefore important to ensure that participants are involved at appropriate levels.

Some consultees will want to become active participants, while others may only wish to be kept informed, or to be involved through participatory events or written consultation. Much depends on their interest and involvement. It is important to be aware that consultees are not a homogenous group and to allow them to indicate how they wish to be involved. Lists of consultees will typically expand and change as the SEA progresses and issues emerge or cease to be relevant.

## **2.6. Trans-boundary consultation with EU Member States**

Where a plan or programme is likely to have significant effects on the environment in another Member State of the European Union, the Directive provides for trans-boundary consultation. Where trans-boundary consultation is required, the time needed for contact to be established between the government bodies concerned, identification of and consultation with the public and environmental authorities in the affected Member State, and consideration of the resulting comments must be taken into account.

In the case of the SEA process of the Sectoral Operational Programme on Transport in the Republic of Bulgaria trans-boundary consultation was not required.

## 2.7. Consultation on the SOPT Environmental Report

During the preparation of the Environmental Report consultations were held with the relevant environmental authorities and the public, in relation to both the scope and the contents of the environmental report.

### 2.7.1. Consultations on the Contents of the Environmental Report

The ex-ante evaluation team met with the relevant consultation bodies in order to prepare a detailed proposal for the content of the SEA Environmental Report and submit this to the Ministry of Transport. The Ministry of Transport then submitted the proposed content of the Environmental Report to the Preventative Activities Directorate for their comments.

The proposed consultation bodies were:

- Coordination of Programmes and Projects Directorate, Ministry of Transport and Communications.
- The Preventative Activities Directorate, Ministry of Environment and Water.
- The Cohesion Policy on Environment Directorate, Ministry of Environment and Water.
- National Nature Protection Service, Ministry of Environment and Water.
- Water Protection Department, Ministry of Environment and Water.
- Executive Agency for the Exploration and Maintenance of the Danube River
- Water Basin Directorate Danube Region
- Bulgarian Biodiversity Foundation

Details of specific meetings are provided in Appendix I.

### 2.7.2. Public Consultation

The Directive defines “the public” as “one or more natural or legal persons and, in accordance with national legislation or practice, their associations, organisations or groups” (Article 2(d)). The public to be consulted includes, but is not limited to, “the public affected or likely to be affected by, or having an interest in [a plan or programme] including relevant non-governmental organisations” (Article 6(4)).

The consultations with the public will be conducted within both the working group for the preparation of the Sectoral Operational Programme on Transport (SOPT) and the general public.

The working group for the SOPT consists of all the relevant stakeholders, namely representatives from central administration, district and municipal authorities, the business and scientific sectors, as well as NGOs. Therefore, the members of the working group are familiar with the SOPT and are well placed to offer their comments on the draft Environmental Report.

Once the draft Environmental Report and the SOPT are translated in Bulgarian these will be published on the website of the Ministry of Transport while copies will be provided at the Ministry of Transport Information Centre.

Both the general public and the working group members will have three weeks (21 days) to express their comments on the Environmental Report. These can be sent via electronic (e.g. e-mail) or traditional means (letter, fax etc).

Similarly, the draft Environmental Report will be submitted to the Preventative Activities Directorate in the Ministry of Environment for their comments.

### **3. THE SECTORAL OPERATIONAL PROGRAMME ON TRANSPORT AND ITS CONTEXT**

#### **3.1. Background and current status**

In the light of the anticipated accession of Bulgaria to the EU in 2007, considerable effort has been made to facilitate the country's convergence with the member states in all sectors.

A large part of the transport infrastructure, especially road infrastructure, requires significant interventions to reach satisfactory levels. The shortcomings of the transport system on the one hand raise business costs and on the other they act as an obstacle to foreign investment, in an otherwise attractive region. Another problem related to the transport network is its relatively weak binding to the transport systems of the neighbouring countries. Therefore, a considerable amount of investment is needed to create a transport system that is in accordance with the standards and requirements of the EU.

The Sectoral Operational Programme on Transport is coordinated by the Coordination of Programmes and Projects Directorate in the Ministry of Transport and Communications. SOPT is a part of the National Strategic Reference Framework, which, on the basis of coordinated sequence of priorities, defines the strategy development of the transport sector for the period 2007 – 2013, with the aim to achieve the EU Convergence objective.

The preparation of SOPT started in October 2004, implementing the partnership principle between the key ministries, non-governmental organizations, employer's organizations, socio-economic partners, academic circles, regional and local authorities, whose representatives are members of the Working Group, established with an Order of the Minister of Transport.

At this stage the available version of SOPT is dated August 21<sup>st</sup> 2006 and the ex-ante evaluation and SEA are both performed based on that.

#### **3.2. Overview of the Trans-European Transport Corridors**

From a geo-strategic point of view, Bulgaria's favourable geological location provides excellent conditions for bridging West and Central Europe with the Near East, West and Central Asia, as well as the north and the south of Europe. On the other hand, improving transport connectivity with neighbouring countries will lead to a considerable amount of new opportunities for additional routes and changes to old routes, which should lead to an optimization of the transit transport traffic.

The European transport policy, as presented in the EU Transport Policy White Paper<sup>4</sup>, focuses on the mutual dependency and equality between the different types of transport and on finding the right balance aimed at reaching a higher level of efficiency, competitiveness, and more consideration towards the current environmental requirements.

The favourable geographic location of Bulgaria can be seen clearly in the passage of five Trans-European Transport Corridors through the territory of Bulgaria. This, although favourable it also represents a major challenge and liability as it calls for a large annual amount of investment.

The **five Trans-European Transport Corridors** that pass through the territory of Bulgaria are:

**Trans-European Transport Corridor IV**

Dresden / Nierenberg – Prague – Vienna / Bratislava – Budapest – Arad – Bucharest – Constanza / Craiova – Sofia – Thessaloniki / Plovdiv – Istanbul

**Trans-European Transport Corridor VII**

The Danube River

**Trans-European Transport Corridor VIII**

Bari / Brindisi – Durres / Vlora – Tirana – Kafasan – Skopje – Sofia – Plovdiv – Burgas / Varna  
+ Ormenio – Svilengrad – Burgas  
+ Byala / Gorna Oryahovitza – Pleven – Sofia  
+ Kafasan – Kapstiche / Kristalopigi

**Trans-European transport corridor IX**

Helsinki – Saint Petersburg – Moscow / Pskov – Kiev – Ljubasevka – Chisinau – Bucharest – Dimitrovgrad – Alexandroupolis  
Branch A: Odessa - Ljubasevka / Razdelna  
Branch B: Kiev – Minsk – Vilnius – Claipeda / Kaliningrad

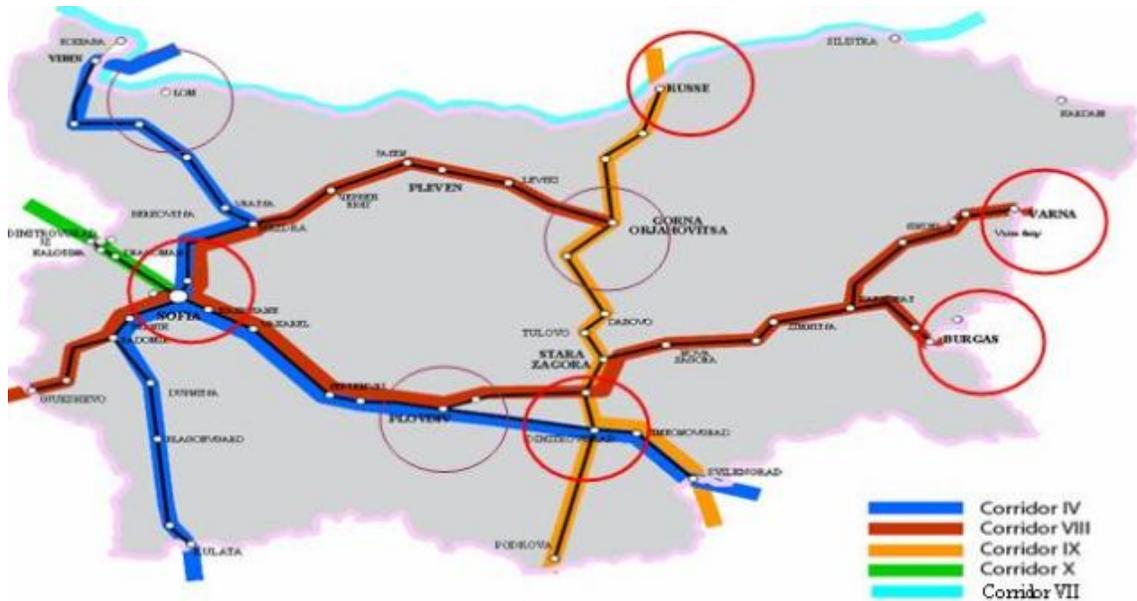
**Trans-European transport corridor X**

Salzburg – Ljubljana – Zagreb – Belgrade – Nis – Skopje – Veles – Thessaloniki  
Branch A: Gratz – Maribor – Zagreb  
Branch B: Budapest – Novi Sad - Belgrade  
Branch C: Nis - Sofia (Dimitrovgrad – Istanbul through corridor IV)  
Branch D: Veles – Prilep – Bitolja – Florina – Via Egnatia - Igoumenitsa

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<sup>4</sup> White Paper European transport policy for 2010: time to decide, COM(2001) 370 final, 12.9.2001

The Trans-European Transport Corridors passing through Bulgaria can be seen in Figure 1, Figure 2 and Figure 3, below.



**Figure 1: European Transport Corridors**

The European transport policy puts significant emphasis on the development of intra-Community maritime transport and inland waterway transport, two two key components of inter-modality which must provide a means of coping with the growing congestion of road and rail infrastructure and of tackling air pollution. Danube River is the only domestic inland waterway. The transport functions of the Danube River are of great importance for the development of the adjacent river regions.

After the accession of Republic of Bulgaria to the European Union the country will become an external border of the union and link with Central Asia, the Near East, the Middle East, the Far East and the countries of the Black Sea Region. The biggest share of the trade between the member-states and the countries outside the Union is performed through maritime transport.

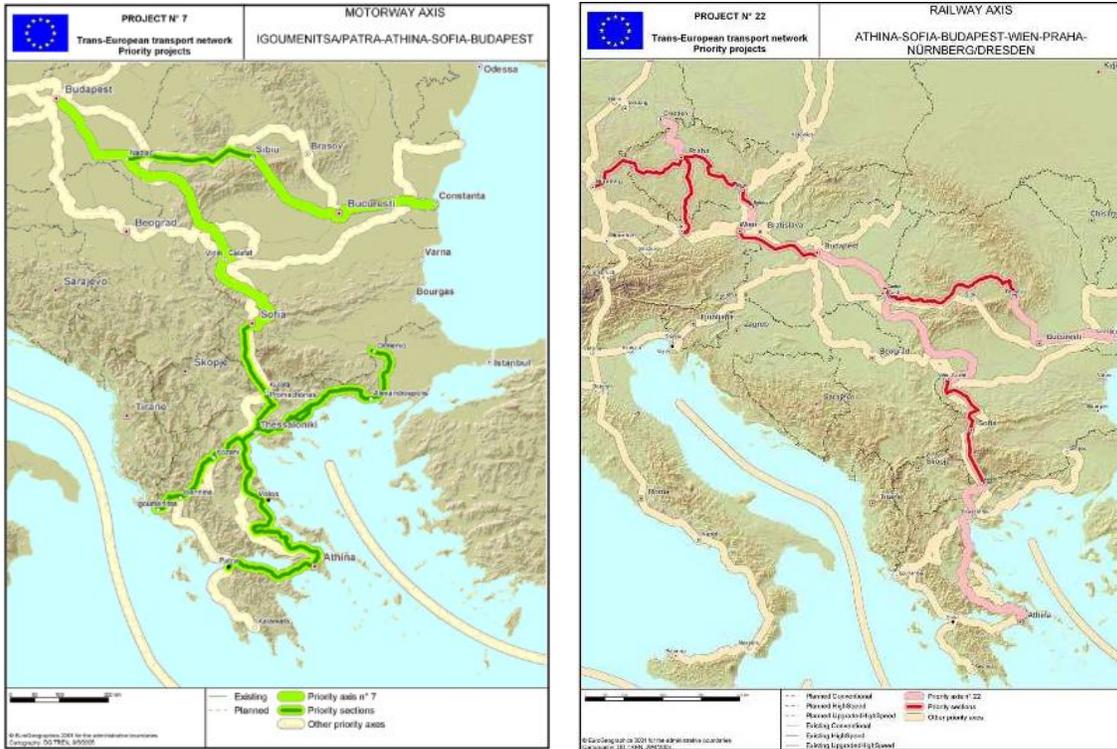


Figure 2: European Motorway and Railway Axes



Figure 3: European Waterway Axis

### **3.3. SOPT Outline**

The strategy for transport infrastructure development in Bulgaria builds on the country's favourable position as a transport bridge. The five Trans-European Transport Corridors that cross the Bulgarian territory enforce additional requirements to the quality of the Bulgarian transport network in order to make the most of the country's location and facilitate the traffic of people and goods and access to the other countries and markets.

The Sectoral Operational Programme on Transport aims to facilitate transport infrastructure development, by providing the following priority axes:

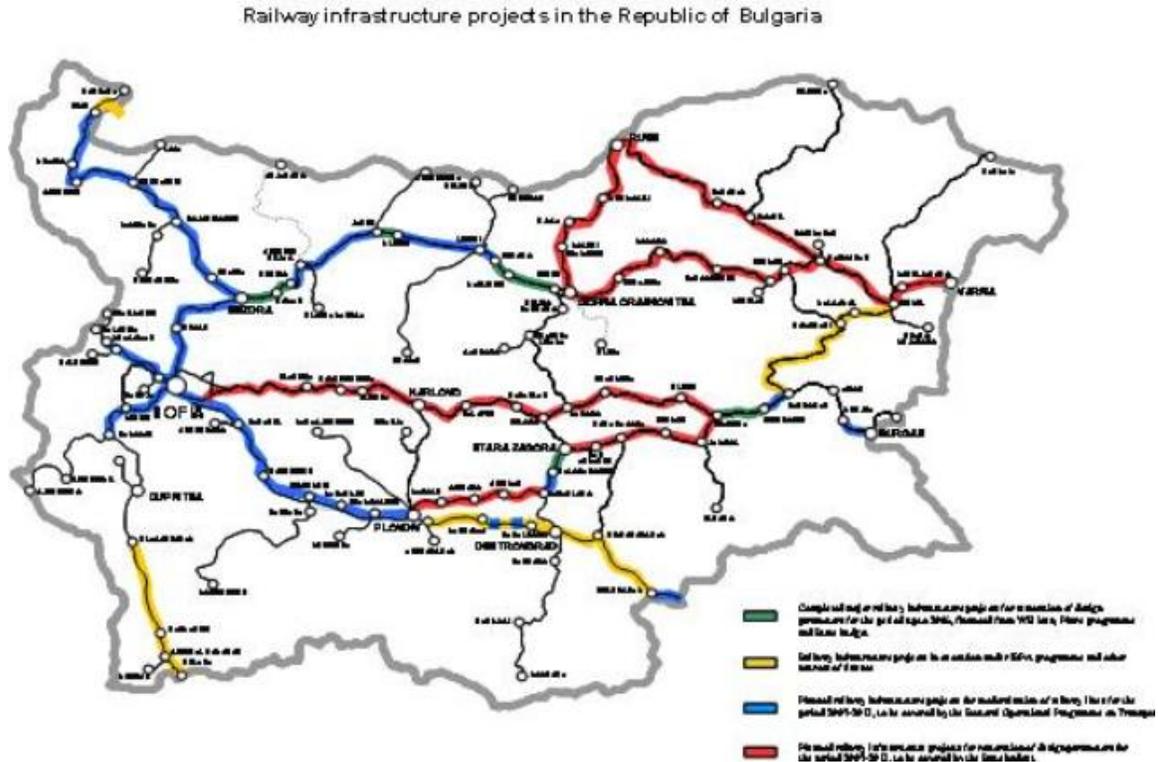
- Priority Axis 1 – Development of railway infrastructure along the major national and Trans-European transport axes
- Priority Axis 2 – Development of road infrastructure along the major national and Trans-European transport axes
- Priority Axis 3 – Improvement of inter-modality for passengers and freights
- Priority Axis 4 – Improvement of the maritime and inland-waterway navigation
- Priority Axis 5 – Technical assistance

### **3.4. Priority Axis 1 – Railway Transport**

The objective of this priority is to establish and develop the main railway infrastructure and improve the interoperability on major rail routes. All operations are closely linked with the intention to develop a modernized and consistent railway network.

Analysis of trade data between Bulgaria and other countries demonstrate a clear interest in enhancing border connections in order support the growing movement of goods transiting through Bulgarian borders. Hence infrastructure connections with Greece, Turkey, FYROM and Romania must be strengthened. It is worth pointing out that natural economic partnership with Romania remains underexploited due to the natural barrier of Danube and the lack of infrastructure between the two countries.

An overview of the Bulgarian Railway network along with planned infrastructure programmes is provided in Figure 4, below.



**Figure 4: The Railway Infrastructure Development Plan in Bulgaria**

Therefore, the investments planned in the railway infrastructure are directed towards improving cross-border connections and focus on this missing links with neighbouring countries located along the Trans-European Transport Corridors.

Indicative priorities include:

- Second Danube bridge construction between Bulgaria and Romania along IV Trans-European Corridor.
- The construction of the railway link at Gjueshevo station (FYROM border) along VIII Trans-European Corridor along with new border crossing in order to reduce stopping times at existing ones.
- Electrification and Reconstruction of Svilengrad –Turkish border railway line aimed at facilitating the increase of commercial relationships between the two countries.
- Enhancing domestic railways in order to integrate internal transport capacity into the regional transport capacity.

Indicative projects include:

- Modernization of Vidin-Sofia railway line (along Trans-European transport corridor IV)
- Electrification and Reconstruction of Svilengrad – Turkish border railway line.
- Modernization of Sofia-Plovdiv railway line (along Trans-European transport corridors IV and VIII)
- Renewal of railway sections along Plovdiv-Burgas railway line
- Modernization of Sofia-Pernik-Radomir railway line (part of modernization of Sofia-Kulata railway line – along Trans-European transport corridor IV)
- Modernization of Sofia-Dragoman railway line (along Trans-European transport corridor X)
- Renewal of railway sections along Mezdra-Gorna Oryahovitza railway line
- Doubling and electrification of Parvomai – Iabalkovo railway line

Modernisation of railway infrastructure includes track substructure and superstructure, telecommunications (installing GSM-R systems) and signalling systems.

### **3.5. Priority Axis 2 – Road Transport**

The objective of this priority is to establish and develop the main road infrastructure of the nation-wide, cross-border and EU importance and to improve the interoperability on major road routes.

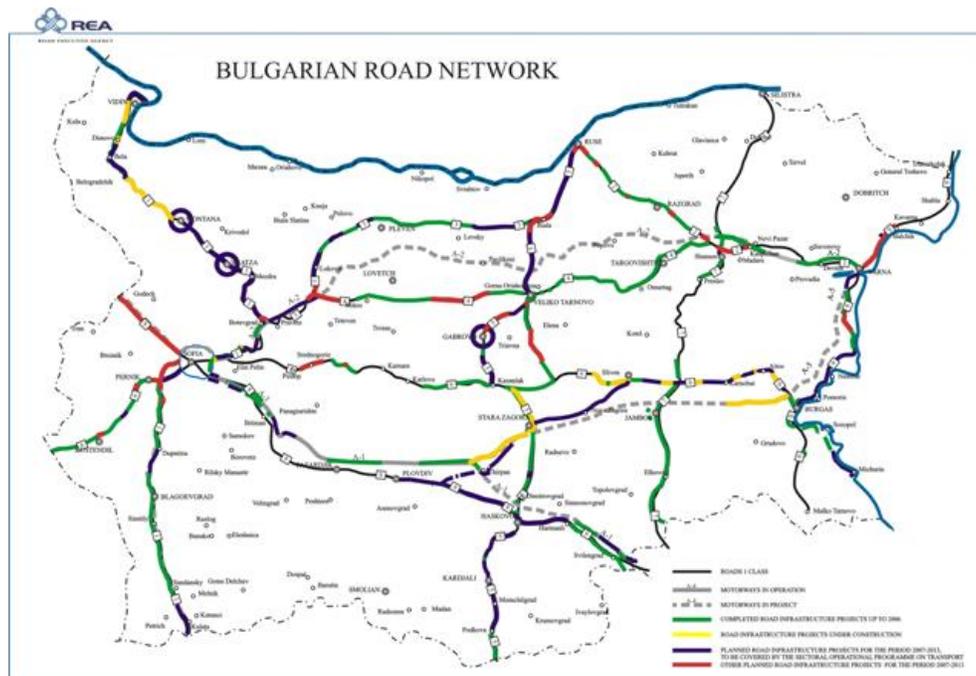
The most important operations under this priority axis are outlined below:

- Construction of new and rehabilitation and modernization of the existing motorways of nation-wide and EU importance
- Construction of new and modernization and rehabilitation of the existing I class roads of nation-wide and EU importance
- Construction of new and modernization and rehabilitation of the existing II class roads along the TEN-T of nation-wide and EU importance
- Construction, modernization and rehabilitation of road sections connecting the main road network of RB with the main road networks of the neighbouring countries.

Indicative projects include:

- (E 79) Vidin – Montana
- Reaching the technical and operational parameters of the road infrastructure in accordance with the European standards along Corridors IV and VIII and IX with L= 880 km
- Project Rehabilitation of transit roads IV-phase II
- Kardjali – Podkova
- I-1 (E 79) Vratza-Botevgrad
- Construction of bypasses along TEN-T network, Phase I
- Reaching the technical and operational parameters of road I – 3 (E83) Botevgrad-Pleven-Byala I-5 (E 85) Russe-Veliko Tarnovo
- Lot 1 I-5 (E 85) Ruse-Bqla
- Lot 2 I-5 (E 85) Bqla-Veliko Tarnovo
- HEMUS Motorway – temporary link Jablanica-Koritna interchange
- MARITZA Motorway – from km 5 to km 72

While the SOPT is concentrating on the transport infrastructure of nationwide, cross-border and EU importance, the Regional Operational Programme is focusing on improvement of the road infrastructure of regional and local importance. An overview of the Bulgarian Road network along with planned infrastructure programmes is provided in Figure 5, below.



**Figure 5: Road Transport Infrastructure Development Plan in Bulgaria**

### 3.6. Priority Axis 3 – Waterborne Transport

The objective of this priority is to improve the navigation on the Danube River and maritime spaces.

The operations under this priority include:

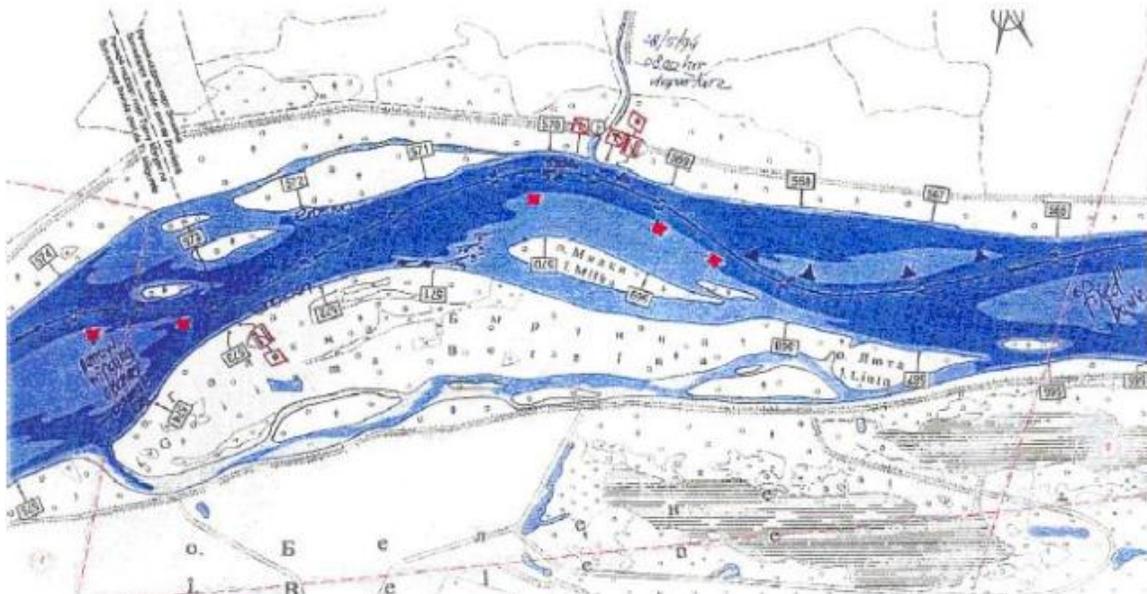
- Improvement of the navigation on the Danube
- Setting up and modernization of aids to navigation (RIS and VTMIS)

#### 3.6.1. Operation 1: Improvement of the navigation on the Danube

The Danube River is a major transport corridor connecting EU member states with countries in Central and Eastern Europe (CEE), including those who await membership in the EU.

The main goal is to improve navigation in the two critical sections of the Danube River, thus securing international navigation and ensuring the transit passing of vessels throughout the year.

The project provides for implementation of improvement of the river bed and banks, including islands which will control the river flow in a way that will secure free navigation in two of the most critical bottlenecks in the joint Bulgarian-Romanian section of the Danube River, namely the Batin island and Belene island sections, between river kilometres 530 and 522 and 576 and km 560 respectively.



**Figure 6: The section of the Danube at Belene Island**

Indicative interventions provided by the project include:

- River groynes for control of the flow direction;
- Bank-strengthening equipment that will contribute to directing water flow and prevent erosion.
- Bottom sills limiting the water flow in river branches, aiming at achieving higher speed and self-washing of the bed.
- Dredging works for deepening of the bed and widening of the fairway.

### 3.6.2. Operation 2: Setting up and modernization of aids to navigation

This objective includes implementing the third phase of the Vessel Traffic Management and Information Service (VTMIS) along Bulgarian coastlines and installing a River Information Service (RIS) system in the Bulgarian part of Danube River.

The establishment of such information exchange system is closely related to the Directive 2002/59/EC which establishes a Community vessel traffic monitoring and information system (VTMIS) for maritime spaces. Similarly, Directive 2005/44/EC establishes the provision of harmonized River Information Services (RIS) on inland waterways in the Community.

The VTMIS information exchange between the ships and the coast based operators leads to a higher level of maritime safety in the Bulgarian territorial waters; increased pollution response capacity; creation of instrument for effective traffic management and informational services; support of the SAR operation implementation, overall facilitation of the maritime transport. The implementation of the project would further develop the established infrastructure, improve the effectiveness of the system, extend coverage to the Bulgarian Black Sea region and increase the scope of shipping services

Estimates suggest that the increase in use of inland waterways for the period 1998 – 2010 is likely to be over 30 %. One of the components that should make the waterborne transport more reliable, efficient and accessible is installing highly efficient navigational aids and communication systems on the inland waterway networks.

River Information Services facilitate the tasks of the competent authorities, in particular traffic management and the monitoring of hazardous goods. Through the provision of data to skippers, it improves the basis for immediate navigational decisions. Safety and environmental protection will be enhanced through better information and reduced reaction times in emergencies.

### **3.7. Priority Axis 4 – Inter-modal Transport**

The aim of this priority is to make travelling conditions easier and facilitate modal transfers of passengers and freights to more environment friendly transport modes.

The following two interventions are planned under this priority axis:

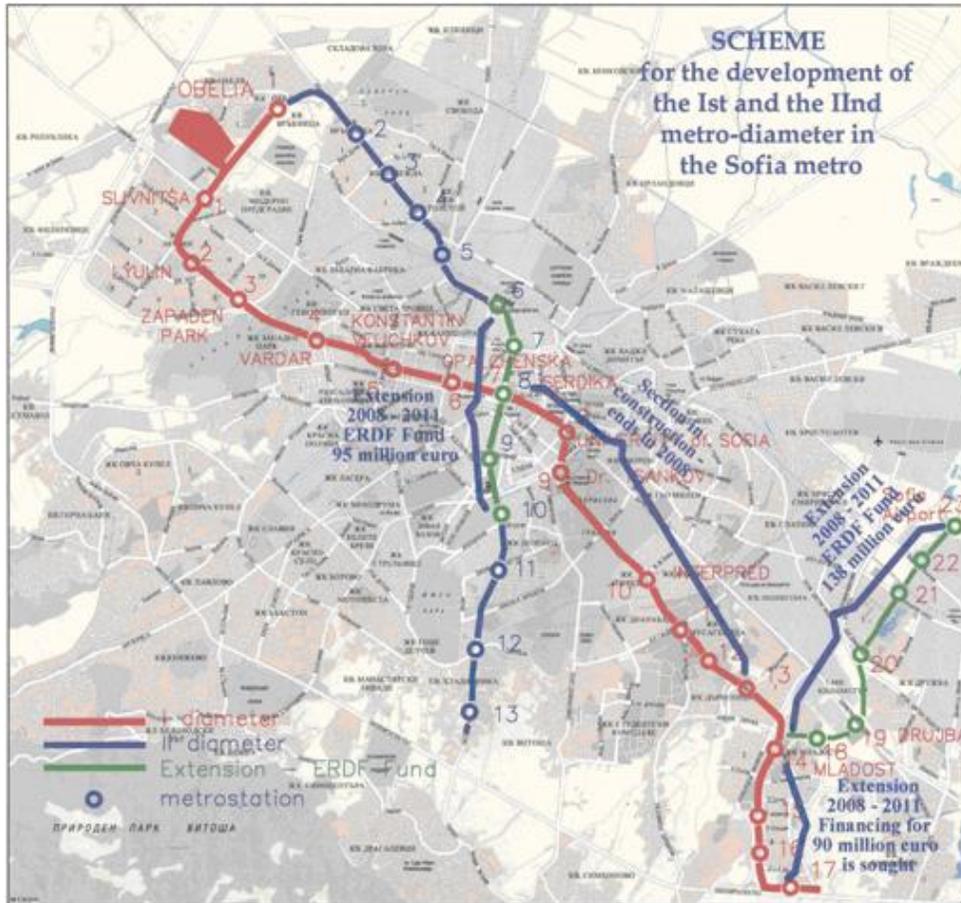
1. Development of inter-modal freight transport, including
  - the construction of new inter-modal terminals and the improvement of the technical, technological and operational parameters of the existing terminals
  - the construction of freight villages in the related areas

An indicative project is the creation or the improvement of terminal connection and facilities in the Sofia area. The capital of Bulgaria, being the city with the biggest consumption and biggest contribution to the GNP of the country, generates sufficient transport traffic volumes. Sofia is the crossing point of three trans-European Transport Corridors and is situated in the centre of the Balkan Peninsula, which makes it appropriate for a transport logistic centre of the region.

2. Development of multimodal mobility for passenger in Sofia

This operation will favour the development of public rail transport for passengers in the capital by the extension of the metropolitan network, enabling new railway connections with key transport centre of national importance (airports, central railway stations, central bus stations, ports etc.) and other public transport modes.

The main objective is to extend the Sofia Metro from “Mladost 1” to “Mladost 4”, “Drujba” and the new terminal at the Sofia Airport.



**Figure 7: The Extension of the Sofia Metro**

The project of extension of Metro can be used as the backbone to develop several inter-modal nodes in Sofia's public transport system. Some of them, such as the Central Railways Station or the Sofia Terminal Airport Station, will have a strategic importance in the development of the public transport.

Incentives for limiting car use and provide parking areas for cars are planning and will accompany the development of the metro network. For example, at the Tsarigradsko Shousse Boulevard metro station, a buffer parking area of 2,000 spaces is foreseen. The intended aim of this intervention is to provide people with the alternative option of parking their cars and using public transport instead of driving into the centre.

Forecasts suggest that the Metropolitan should absorb mostly the passengers for bus services and individual users.

As a whole, the predominant impact of this operation on the modal share of urban transport should be a substantial increase of the passenger flows from 75,000 passengers/day to 580,000 passengers/day at completion of the sections and of the suggested metro extensions.

### **3.8. Priority Axis 5 – Technical Assistance**

The sound management and implementation of the SOPT requires particular contents for technical assistance measures in order to answer to the main needs of support for programme coordination and to strengthen the capacity building of administrative structures involved in its implementation. The main objective of this Priority Axis is to achieve efficient and effective management and implementation of the SOPT.

The Technical Assistance priority axis aims at strengthening the effectiveness and efficiency of the SOPT.

Specific actions of the Technical Assistance priority axis include:

- The establishment of a General Transport Master Plan
- Preparation, Evaluation, Monitoring and Control of the SOPT
- Technical Administration
- Information and Publicity

## **4. ENVIRONMENTAL BASELINE INFORMATION AND TRENDS**

### **4.1. Country Profile and Climate Overview**

The area of Bulgaria is 110,993.6 km<sup>2</sup> and the total length of the boundaries is 2,245 km. Of these 52.6%, 30.6% and 16.8% are land, river and sea boundaries. The country is divided into 28 regions and 262 municipalities.

The population of Bulgaria is 8,149,500 residents (December 31, 2000 census), 69% of which live in the cities. Nine cities have a population above 100,000 residents. The capital city Sofia has over one million of residents, followed by Plovdiv, Varna, Bourgas, Rousse, Stara Zagora, Pleven, Sliven and Dobrich. The average density of the population is 74.2 persons/km<sup>2</sup> and the occupation by sector is: Industry 26.4%, Agriculture 25.7%, Services 47.9%.

The terrain of Bulgaria is diverse; the mountains are high with low, rocky and folded deep valleys, shallow rivers and large plains. Soil quality is varied and generally of good quality. Bulgaria does not have large inland rivers, but has a relatively large number of unevenly distributed smaller rivers that spring from mountains and flow to the Danube, the Black Sea and the Aegean Sea. There are few natural lakes and a number of artificial reservoirs have been built. Bulgaria is one of the richest in mineral water resorts in Europe.

Bulgaria has a temperate climate with cold damp winters and hot dry summers. The Rhodope Mountains form a barrier to the moderating influence of the Aegean, while the Danube plain is open to the extremes of Central Europe. The Black sea moderates temperatures in the east of the country, rainfall is highest in the mountains and in the winter life in Bulgaria is sometimes disrupted by heavy snowfalls. Average annual temperature: 10.5 °C.

### **4.2. Biodiversity, Flora and Fauna, Designated Areas and Habitats**

Bulgaria is one of Europe's richest countries in terms of its unique flora and fauna with a wide range of habitats, extensive forests and other biologically important resources. This rich natural heritage includes forests covering one-third of Bulgaria's territory, fishing areas in the Black Sea, freshwater rivers, fertile agricultural land and wild fauna and flora of economic importance, such as medicinal plants gathered for the local industry and for export. These resources are however susceptible to damage and a number of indigenous species have either recently become extinct or are vulnerable, endangered or critically endangered at the present time.

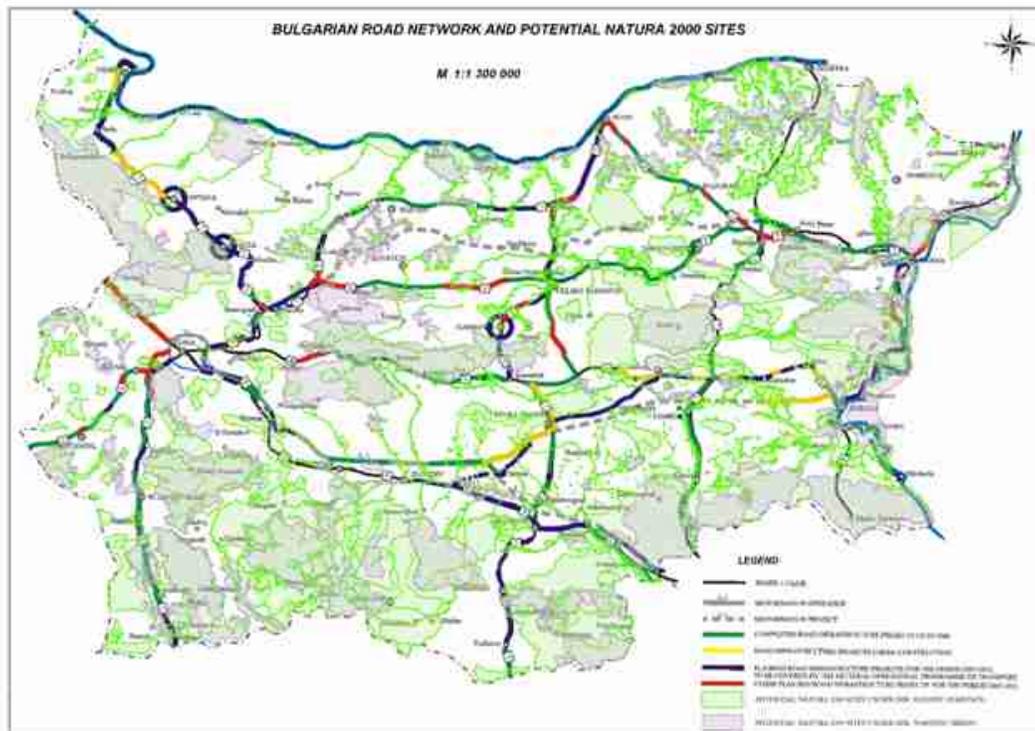
In line with the 2002 Johannesburg Conference on Sustainable Development the Bulgarian Government's National Strategy on the Environment has set itself the aim of ceasing biodiversity loss by 2010. Towards that end, Bulgaria has taken many important steps to protect biodiversity. In 1998 it has outlined its National

Biodiversity Conservation Strategy and in 2002 a law on Biodiversity was adopted.

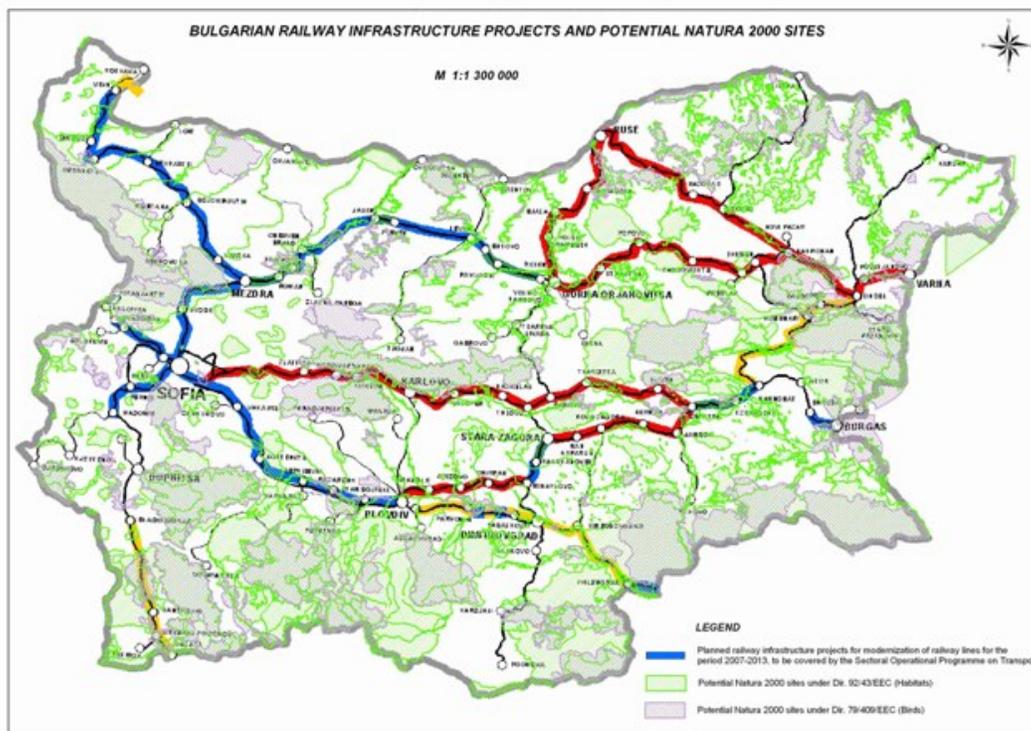
Bulgaria takes protection of its Biodiversity very seriously with a dedicated directorate in the Ministry of Environment and Water, The Biodiversity Directorate, headed by Dr Hristo Bojinov. At the end of 2002 almost 5% of country territory was under some form of protection, and over 2% was under strict protection.

Currently, the process of characterising protected areas under Directive 79/409/EEC on the Conservation of Wild Birds (**The Birds Directive**) is almost complete, while the same process under the Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (**The Habitats Directive**) is advancing at a steady pace and is expected to be fully completed when Bulgaria enters the EU in 2007. At present potential Natura 2000 sites set out in a list of potential sites cover over 35% of Bulgaria's national territory.

Figure 8 and Figure 9 below show the road and railway transport interventions in relation to existing protected areas and potential Natura 2000 sites. Detailed maps are included in Appendix II of this report.



**Figure 8: The Bulgarian Road Network and Potential Natura 2000 Sites**



**Figure 9: The Bulgarian Rail Network and Potential Natura 2000 Sites**

### 4.3. Air Quality

Ambient air pollution is an environmental problem of particular importance due to its proven impact on human health. Current analysis of the existing monitoring information indicate steady tendency towards improvement of the ambient air parameters. However, problems with the high levels of particulate pollution remain, owing mainly to widespread use of solid fuel (wood and coal) for household heating. There are also regional problems, the so-called “hot spots”, i.e. country regions, mainly large industrial centres, where the concentration of air pollutants is higher.

The preliminary ambient air quality assessment has been performed for 1999-2002 period for SO<sub>2</sub>, NO<sub>x</sub>, particulate matter, lead, ozone, CO and cadmium. In addition, some settlement-specific parameters like phenol, ammonia, hydrogen sulphide, chlorine, and heavy metals have been also assessed.

Studies linking illnesses with air pollution in Bulgarian towns that have been implemented by the Ministry of Health indicate that, compared to the country average, the medical cases increase in towns with high pollution from chemical, petrochemical and metallurgical enterprises and in areas with intensive road traffic. High concentrations of lead, arsenic, cadmium and other heavy metals are registered in some “hot spots” while high levels of sulphur dioxide (SO<sub>2</sub>) are seen elsewhere. The threat for health is additionally augmented when the high levels

of SO<sub>2</sub> and heavy metals combine with increased concentrations of particulate matter.

The staged introduction of the EU requirements for large industrial installations will also contribute to controlling the emission of specific pollutants. Specific actions are also included in the fourth strategic objective of the National Strategy for the Environment and Action Plan 2005-2014.

#### **4.4. Noise Pollution**

Noise levels measured in towns are significant. For example, in 2002, only 15% of all monitoring points registered average noise pollution below 58dB. According to information from the Regional Inspectorates of Environment and Water, most complaints about excessive noise are submitted in big towns where more businesses are located and larger parts of the population live.

Noise from automobile transport is the main factor for excessive noise pollution in towns, and it represents 80-85% of the total noise pollution. Recent increases in background noise from transport are mainly due to the increased use of motor vehicles combined with the poor condition of many automobiles, road pavements and tram rails as well as insufficient measures for noise reduction, combined with the lack of adequate control of vehicles for noise level reduction.

Over the last years, considerable work has been done to set in place a framework for establishing effective control over environmental noise. Future tasks include establishing institutional capacity for implementation of the new legislation in the noise area, complying with the European requirements for the system of noise monitoring and measuring methods and achieving compliance with the EU requirements and standards in settlements.

#### **4.5. Sustainable Transport**

The majority of concern relating to air quality relates to air quality in urbanised areas where transport usage and industrial processes, two of the main causes of poor air quality, are more concentrated. The transport sector has a considerable impact on the environment through air, noise pollution, waste generation and by impacting on landscape and land use through the implementation of large transport infrastructure projects.

Since a large share of automobile traffic passes through settlements, there is a significant effect on ambient air quality. The regions with deteriorated ambient air quality are in most cases large settlements with intensive transport – Sofia, Bourgas, Plovdiv, Varna, Pernik, etc. Transport, including automobile and other forms of transport, is the main source of nitrogen dioxide and one of the major sources of carbon oxide in Bulgaria.

As the transport sector in general is essential to the development of the economy, steps being taken to alleviate its environmental impact. Therefore, the National Strategy for the Environment and Action Plan 2005-2014 set out the following observations and objectives:

- The transport sector's share in the pollution of the environment is increasing, especially in large cities (air and noise).
- Relatively high air pollution with lead, sulphur, benzene and other harmful substances as a result of the use of low quality fuels.
- There is no national system for type approval of engines, including emitted dangerous gases.
- A National program on phasing out the use of leaded petrol by the end of 2003 was adopted.
- Motor fleet in Bulgaria is extremely old and will have an impact on the environment in the years to come.
- End-of-life cars represent a serious problem for the large cities and for the protection of the environment.

Development of transport infrastructure is currently concentrated on building the trans-national road and rail network. A major part of the EU pre-accession funds are devoted to transport infrastructure, with the priority projects linked to the EU program on developing a Trans-European Transport Network connecting the national transportation network to trans-national transportation corridors.

The Ministry of Transport and Communications undertakes a number of large-scale investment projects, including building of motorways, reconstruction and modernization of harbours, reconstruction and expansion of Sofia Airport, as well as projects to further develop rail transport and combined rail-road transport. Naturally, the Sectoral Operational Programme on Transport is part of the Ministry's efforts to improve Bulgaria's infrastructure.

#### **4.6. Energy Production and Consumption**

The Bulgarian economy is high energy-intensive, consumption being higher than that of all EU member-states. Eurostat data on relative energy consumption, defined as primary energy use per unit of GDP (tons of oil equivalent per 1000 euros), indicate that Bulgaria's industrial sector energy consumption is two times higher than that of EU-25. Bulgaria does not rely on resources of its own, so it imports more than 70% of the required primary energy resources, on which some 20% of GDP is spent.

No domestic oil resources exist in Bulgaria. The imports of oil are around 6 Mt. Bulgaria has an important refinery with a production capacity of 300,000 bl/day, located on the Black Sea coast at Burgas. Bulgaria has natural gas reserves, but

at present, these remain underexploited and most natural gas consumed in the country is imported from Russia. Substantial reserves of lignite exist, but with high sulphur content and a fairly low calorific value. Modest reserves of sub-bituminous coal, do exist, the largest deposit being the Maritsa coal field in southern Bulgaria.

Bulgaria has modest hydroelectric resources. Water accumulates in approximately 50 large reservoirs, with capacities ranging from 424 thousand to 60.4 thousand m<sup>3</sup>. The total installed capacity of larger commercial HPPs is about 1.937 MWe. Finally, there is a large potential to utilise biomass as an energy source, as wastes generated from agricultural and farming activities are produced in large quantities.

Bulgaria operates the Kozloduy Nuclear Power Plant which provides around 42% of the country's electricity. Spent fuel from the power reactors is stored at Kozloduy. Existing waste treatment and disposal facilities are being upgraded and new ones are planned.

Bulgaria's energy balance is shown in Table 2 below:

<b>Electricity balance - 2003</b>	<b>TWh</b>	<b>%</b>
Thermal Power:	21.31	51.13
Nuclear Power	17.65	42.35
Hydro-power	2.71	6.50
Biomass	0.01	0.02
<b>GROSS PRODUCTION</b>	<b>41.68</b>	<b>100 %</b>

**Table 2: Electricity production balance in 2003**

#### **4.7. Water Environment**

Bulgaria's surface and ground water are generally in good status. The impact of the transition to market economy on the industry and agriculture and the production fall-off have resulted in a reduction of the discharge of pollutants into water, including a decrease in loads of the main nutrients (nitrogen and phosphorus). Thus, some 75% of the river length in the country complies with the standard parameters for good surface water quality. Measurements performed suggest that groundwater and coastal sea water resources are also of good quality.

Despite the favourable situation, there are still a considerable number of critical areas where standard values of the water quality indicators have been largely exceeded. The main reason is that about 31% of the wastewater is currently discharged into water bodies without prior treatment. For certain rivers like Osam, Kamchia, and Mesta, the percentage of non-treated discharged

wastewater reaches 80%. As a result, some rivers, water reservoirs and coastal sea areas are at risk from eutrophication, because of high levels of nutrients from urban wastewater discharges and agricultural runoff.

Therefore, as Bulgaria is facing a lack of efficient water supply and sewage systems as well as wastewater treatment infrastructure, some of the challenges in this field are related to water quality protection. Bulgaria invests and will have to invest a lot of funds in new and reconstruction of existing systems for supply of safe drinking water and for collection and treatment of urban wastewater before it is discharged back into nature. The Sectoral Operational Programme Environment is designed to tackle exactly these weaknesses.

The introduction of integrated river basin management in accordance with the requirements of the EU Water Framework Directive 2000/60/EC (WFD) will be an essential element of Bulgaria's efforts to ensure good quality of water in future.

#### **4.8. Flooding**

Incidents of flooding are predicted to increase as a result of climate change, although other factors, such as increasing construction on flood plains, also play an important role. There is a view that changes in land use, such as wide scale deforestation can result in increased run off from rural catchments resulting in increased peak flows reaching urban areas and finally resulting in flooding in these areas. There is an increasing trend to consider the implications of land use changes in a catchment level, and a move towards more sustainable flood management.

One of the objectives of the Water Framework Directive is to contribute to mitigating the effects of floods and droughts. Under the provisions of this legislation, responsible authorities, including all local authorities, are required to have regard to the Water Framework Directive in the course of carrying out normal duties including promoting sustainable flood management.

#### **4.9. Soil pollution and desertification**

Soil is a non-renewable resource and essential for supporting agriculture, forestry and ecosystems. There is an inter-relation between soil quality, the water environment and climate change and operations in agriculture and forestry are major contributors to this cycle. Deteriorations in soil quality as a result of erosion could be influenced by large infrastructure projects. Options which result in changes to forestry and agricultural operations to improve the water environment and soil quality and reduce the emissions of greenhouse gases will themselves, in the long term, if not in the short term, improve agricultural and forestry productivity.

In Bulgaria, large amounts of land have been damaged following the extraction of coal, ore extraction and primary processing of non-metal mineral resources as well as extraction of construction materials. The total quantity of damaged terrain in 2003 amounts to over 25,000 hectares although almost 9,000 hectares have been reclaimed and re-cultivated. Supervision and observations are carried out annually on damaged and re-cultivated terrains. These include technical and biological re-cultivation, and treatment of contaminated waters, re-cultivation and environmental monitoring on the terrains affected by the mining and ore-processing industries.

Further from soil degradation, the issue of desertification is also present. Desertification is the degradation of land because of human activities (over-exploitation, deforestation, overgrazing, bad irrigation practices) and climatic changes. Combating desertification is essential to ensuring the long-term productivity of land but unfortunately this problem continues to worsen around the world. The 1992 United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992, recognised desertification as a major global concern, and called for a new, integrated approach. In 2001, Bulgaria became the 173-rd country to ratify the Convention and thereby to take on its obligations.

#### **4.10. Waste**

The generation of waste by households and construction activities remains to be a problem in Bulgaria, which threatens the quality of the urban environment and presents important risks for human health, the main disposal route is either controlled or uncontrolled landfilling.

Households generate annually over 3 million tons waste, approximately 500 kg per capita. Although these figures have not increased significantly during the last five years, the current levels of waste production are already high and the introduction of a new model for urban waste management is required in order to ensure the reduction the environmental impact of waste generation use.

The main objectives of the Bulgarian National Waste Management Program are set out below:

- Build effective system of facilities and installations for treatment of infectious and other hazardous waste from medical institutions
- Develop the necessary infrastructure for treatment of household, hospital and construction waste till 2009
- Clean-up all illegal dumpsites on the country territory up to 2010 and ensure conditions to terminate the emergence of new ones
- Expand the organized system for collection and transportation of household and construction waste

- Staged inclusion of the settlements in the system for separate collection, reuse and recycling of common wastes within the quantities set in the normative basis

Separate collection of household wastes is organized only in some municipalities, while the collection of hazardous waste for recycling is limited to lead batteries and spent oils. However, Bulgaria has undertaken a commitment before the EU to recycle not less than 25% of packaging waste before its accession date.

#### **4.11. Landscape, Cultural Heritage and Historic Environment**

There are currently vast topographical and regional differences in Bulgaria's landscape such as coastal areas, mountainous areas and lowland areas. Man's activities have had and will continue to have impacts on the historic landscape of Bulgaria and there is a need for these to be considered in proposals for changes to land use management in Rural Bulgaria in the future. Bulgaria's landscape plays an important part in tourism. This is an area on which transport projects make an impact as increased access can result in impacts on the water environment and soil erosion and can have landscape implications creating a visible effect on the landscape.

In Bulgaria, there are a wide range of differing sites designated for their cultural heritage, or historic interest. Changes in agriculture and forestry as well as other activities including recreation can have a significant impact on the historic environment in Bulgaria affecting not only the integrity of the site and or the structure but also affecting its setting. Therefore, the impact of the policies and actions in the SOPT must be assessed against both the direct impacts on the structural integrity of the site and also on the impacts on the setting of the designated site or structure.

#### **4.12. Land Use and Agriculture**

The main impacts of activities in Bulgaria are point pollution, abstraction and flow regulation with lesser impacts being attributable to diffuse pollution. In Bulgaria agriculture, forestry and urban drainage are the three key sources of diffuse pollution and given that a significant percentage of land in Bulgaria is given over to agriculture or is used for forestry, these two areas have a significant potential to impact on the environment.

Agriculture and, to a lesser extent, forestry, contribute significantly to nutrient pollution, with agriculture having been identified as being the main contributor of nutrients to freshwater and groundwater. Increased nutrients can affect the biological diversity of freshwaters and this as well as chemical water quality will be examined when assessing water quality under the provisions of the Water Framework Directive.

#### **4.13. Greenhouse Gasses and Climate Change**

Scientific evidence increasingly suggests that climate change is a reality and significant changes in weather patterns can be expected, such as increased droughts, floods, cold spells and severe storms.

To address the growing problem of climate change, the global community adopted the UN Framework Convention on Climate Change in 1992 and the Kyoto Protocol in 1997. Bulgaria has also made a commitment to combat global climate change by implementing the UN Convention on Climate Change and the Kyoto Protocol.

Bulgaria can also participate in the international flexibility mechanisms provided by the Kyoto Protocol called “joint implementation projects” and “international emissions trading”. These mechanisms could allow the country to attract foreign investments into its greenhouse gas intensive industries. In order to participate in the flexible mechanisms our country needs to establish the necessary institutional and legal framework. Bulgaria will be able to participate in the EU greenhouse gas emissions trading once it joins the EU.

#### **4.14. Likely evolution of the environment without the implementation of the SOPT**

The SEA Regulations require that the Environmental Report considers how Bulgaria’s environment would evolve if the SOPT was not implemented at all. This is a theoretical issue as the development and implementation of the SOPT 2007 – 2013 is in such an advanced stage of planning, it is clearly a matter of when rather than if.

There are two main ways in which the evolution of the environment without the implementation of the SOPT can be analysed. This first assumes there is funding for infrastructure development in Bulgaria through existing funding mechanisms. The second assumes that there is no funding available to support activities in Bulgaria.

In existing funding mechanisms which support infrastructure development activities in Bulgaria, a lack of coordination between funding mechanisms can occasionally be seen. Therefore, it can be said that without the introduction of the new SOPT, it is likely that infrastructure development in Bulgaria would occasionally be slow and fragmented. This, on the one hand would lead to less impact on the environment due to reduced activity, but on the other cause the country to miss the opportunity of institutionalising environmental protection through the implementation of a major coordinated sectoral programme such as the SOPT.

This is supplemented by the fact that in the first scenario, there is the potential that the focus of funding would be on directly funding activities which are likely to be economically advantageous and profitable and that there would be little consideration given to the funding of those activities which offer social and/or environmental benefits unless economic benefits were also evident. Although there are many opportunities for the implementation of activities in Bulgaria which could result in increased environmental and/or social benefits as well as economic benefits these are not perhaps immediately obvious and therefore are perhaps less likely to be implemented.

In the second scenario, there could be economic, social and environmental impacts as a result of the lack of funding for infrastructure development activities. Improved access is essential to ensuring the viability of businesses and communities and without this, communities would struggle to survive and negative environmental impacts could result. The failure of rural businesses could result in the breakdown of local communities as people move to find work. Finally, as most of the scope of the SOPT is actually targeted towards improving infrastructure, optimizing its functioning and rendering it safer, the absence of SOPT would remove these benefits.

However, there are potential environmental benefits which could result if funding for certain activities were to cease. Less infrastructure development and less access could result in less disruption to local wildlife and less pressure on existing resources and natural heritage sites.

## **5. STRATEGIC ENVIRONMENTAL ASSESSMENT OBJECTIVES AND CONTEXT**

### **5.1. Introduction**

This section details the process undertaken to determine the proposed objectives against which the SOPT should be assessed during the SEA. The first step in the process was to identify those policies and plans considered to be of relevance to the SOPT and to determine their potential impact(s) on the SOPT and/or the SOPT's impact on these policies and plans. Using this information and the baseline environmental data collated in Chapter 4, key environmental issues were determined and the environmental objectives of the SOPT were identified.

### **5.2. Key environmental issues**

In the baseline environmental data collated and displayed in Chapter 4, the following key environmental issues facing Bulgaria with regard to the SOPT have been identified:

- Protecting Biodiversity, Flora and Fauna, Designated Areas and Habitats
- Improving Air Quality, Reducing Noise Pollution and Promoting Sustainable Transport
- Protecting the Water Environment, Avoiding Flooding and Improving Waste Management Practices

This information was used to identify the key SEA objectives and targets which are discussed below.

### **5.3. Policy Priorities**

In line with the EU Transport and Environmental Policy as well as the Bulgarian National Legislation, the policy priorities that have been set out are to:

- Eliminate pollution by persistent oils and prohibit illegal discharges
- Reduce consumption of fossil energy by transport
- Preserve biodiversity and ensure connectivity between nature areas
- Minimise land take per transport unit
- Preserve biodiversity and protect designated nature areas
- Reduce number of people exposed to traffic noise levels above specified limits
- Meet EU air quality standards set for protection of human health

- Meet EU and/or international emission reduction targets for 2010
- Meet the EU target under the Kyoto Protocol
- Reduction of Accident Fatalities
- Ensure balanced accessibility of regions and markets by different modes of transport
- Ensure access to basic services by environment-friendly modes
- Optimise the use of existing infrastructure capacity and revitalise rail and inland waterways
- Switch to cleaner and renewable fuels

#### **5.4. Appraising strategic alternatives**

The Directive requires the assessment of “reasonable alternatives taking into account current knowledge and methods of assessment” [Article 5(1)]. It should anyway be normal practice when developing a plan or programme to propose different ways of fulfilling its objectives. Positive as well as negative effects should be considered, and uncertainties about the nature and significance of effects should be noted. This will often be an iterative process, with the alternatives being revised to enhance positive effects and reduce negative ones.

It is, in any case, important to highlight that it is not the purpose of SEA to decide which alternative should be chosen for the plan or programme. This is the role of the decision makers who have to make choices on the plan or programme to be adopted. The SEA simply has to provide information on the relative environmental impact of alternatives.

In general the environmental impact categories receive different priority levels in different situations, and issues depend on feasible alternatives. The alternatives considered at project, corridor and network level vary, and between transport infrastructure plans. The main distinction is between:

- alternative construction methods, design and detailed alignment (normally assessed at project level);
- alternative indicative routing, or siting in the case of nodal infrastructure (normally assessed at corridor level);
- alternative modes and measures to influence traffic flows (assessed at corridor level or network level).

In all cases impacts are deemed relevant if:

- they can be influenced by the infrastructure plan.
- they are not influenced by the infrastructure plan but legally required to be considered and mentioned in environmental legislation and policy.

The greatest benefit is obtained when considering both infrastructure and policy-type alternatives; combining the socio-economic, economic, transport and environmental assessments enables alternatives to be identified which are desirable from a number of perspectives and are able to meet more than one type of objective. When appraising transport projects, as a general rule alternatives should be identified bearing in mind the overall objectives which have been set for the transport corridor.

Alternatives should be compared with each other and with “business-as-usual” scenario. A business-as-usual scenario plays an important role in decision-making since it provides the baseline against which to compare the effects of alternatives and will highlight the environmental/sustainability implications of a lack of action on strategic policy and infrastructure options.

The alternatives can then be compared with the predicted implementation of the current or existing plan, to show what would happen without the new plan or programme. A comparison of this can then be made with current environmental conditions to show which alternatives would improve or worsen current conditions.

An important alternative to consider is often the so called “obviation” option. In many cases obviation of demand is environmentally and socially better than providing for demand or rationing consumption through price or limited capacity. A typical case of obviation alternative is for example to improve local amenities or services (working at home, information technology) in order to reduce the travelling demand.

## **5.5. SEA objectives and criteria**

### **5.5.1. Overall SEA Objectives and Indicators**

The following primary objectives are set out for the SOPT SEA:

1. Integration of environmental considerations into the preparation and the implementation of the SOPT with the aim to decrease its adverse environmental impacts.
2. Prevention of new traffic noise pollution and reduction in exposure to traffic noise.
3. Prevention of waste generation and surplus of soil generation.
4. Prevention of water and soil pollution by minimising entry of transport related hazardous substances into the environment.
5. Protection of marine environment by minimising the risks of transport related hazardous substances, vessel traffic substances and spreading of alien species through vessel traffic ballast waters.

6. Preserving natural diversity in the planning and implementation of transport infrastructure projects.

These are then analysed in further detail in Table 3, below.

OBJECTIVE	SEA CRITERIA
<b>BIODIVERSITY</b>	
<ul style="list-style-type: none"> <li>• Halt the loss of biodiversity and contribute towards reversing previous losses;</li> <li>• Protect and enhance current habitats through the conservation, expansion and restoration of designated protected areas;</li> <li>• Promote improved ecological resilience;</li> <li>• Reduce habitat fragmentation and connectivity of habitats through creation of habitat networks;</li> <li>• Promoting consideration of biodiversity in decision-making in Bulgaria;</li> </ul>	Impact on the biodiversity of ecologically sensitive sites
	Effects on natural habitats
	Effects on designated protected areas
	Effects on flora
	Effects on fauna
<b>WATER ENVIRONMENT</b>	
<ul style="list-style-type: none"> <li>• Minimise pollution of fresh and marine surface waters and groundwater</li> <li>• Achieve and maintain the targets set by the Water Framework Directive.</li> <li>• Incorporate River Basin Management Planning Process and co-ordination with land use planning.</li> </ul>	Negative effects on water resources quality
	Impact on the course of surface flow, torrents etc
<b>SOIL</b>	
<ul style="list-style-type: none"> <li>• Preventing the reduction in quantity, quality, and nutrient status of soils in Bulgaria.</li> <li>• Promoting operations which reduce erosion of soil and/or promote soil protection.</li> <li>• Promoting the sustainable management of soils in agricultural and forestry practises.</li> </ul>	Impact on soil quality and desertification
<b>AIR QUALITY</b>	
<ul style="list-style-type: none"> <li>• Minimise the impact of transport on air quality</li> <li>• Promoting the minimisation of atmospheric pollutants and acidification.</li> </ul>	Effect on trans-boundary air pollution
	Contribution to critical acidification loads
	Impact on local air pollution
	Contribution to the formation of photochemical smog
<b>LOCAL CLIMATE AND GLOBAL CLIMATE CHANGE</b>	
<ul style="list-style-type: none"> <li>• Minimise the impact on the local climate</li> <li>• Minimise the impacts of transport on climate change by promoting activities which minimise the production of greenhouse gases from transport.</li> </ul>	Effects on local microclimate, light pollution and local heat release
	Contribution to climate change

OBJECTIVE	SEA CRITERIA
<b>POPULATION, HUMAN HEALTH AND WELLBEING</b>	
<ul style="list-style-type: none"> <li>• Promote health, reduce health inequalities and improve quality of life.</li> <li>• Creating opportunities for increased access, recreation and tourism.</li> <li>• Reducing accidents, casualties and the environmental damage caused by accidents</li> </ul>	Effect on transport safety and the incidence of accidents
	Impact on health and access to healthcare
	Effect recreation and tourism
	Impact on economic activity and regional development
	Effects on social development
<b>LANDSCAPE</b>	
<ul style="list-style-type: none"> <li>• Safeguard and enhance the distinct identity, the diverse character and special qualities of Bulgaria's landscapes.</li> <li>• Ensure that tomorrow's landscapes contribute positively to peoples environment and are at least as attractive and valued as they are today</li> <li>• Promoting landscape conservation and enhancement in differing manners to promote regional differences.</li> <li>• Prioritise landscape conservation and enhancement in nationally important landscape areas.</li> <li>• Minimise negative impacts on landscape.</li> </ul>	Visual and other impacts on landscape
<b>CULTURAL HERITAGE</b>	
<ul style="list-style-type: none"> <li>• To protect and enhance the historic environment</li> <li>• Promoting conservation and appropriate management of nationally important archaeological and historic sites.</li> <li>• Encouraging the consideration of cultural heritage during development in Bulgaria.</li> <li>• Strengthen Bulgaria's cultural identity and Promoting awareness, understanding and pride in Bulgaria's cultural heritage.</li> <li>• Promoting awareness, understanding and pride in Bulgaria's cultural heritage.</li> </ul>	Contribution to the deterioration of cultural and environmental heritage
<b>RESOURCES AND WASTE</b>	
<ul style="list-style-type: none"> <li>• Promoting the effective use of resources including chemicals and fuel in Bulgaria</li> <li>• Minimise the volumes of waste generated and disposed of in Bulgaria</li> <li>• Promoting the recycling hierarchy</li> <li>• Encouraging the reuse of waste and</li> <li>• Reduction in waste being disposed of to landfill.</li> </ul>	Effects on resource use and depletion
	Contribution to increased waste generation

OBJECTIVE	SEA CRITERIA
<b>NOISE</b>	
<ul style="list-style-type: none"> <li>Reduction in the public's exposure to traffic noise</li> <li>Avoidance of new traffic noise pollution</li> </ul>	Effects on noise pollution
<b>FLOODING</b>	
<ul style="list-style-type: none"> <li>Minimising the impacts of flooding by promoting sustainable flood management</li> <li>Reducing and mitigating against the risks of flooding. Promoting the consideration of sustainable flood management during land use planning.</li> </ul>	Impact on flooding problems

**Table 3: Objectives and Criteria for the Assessment of SOPT**

Once the objectives and criteria have been defined, simple, measurable indicators should be chosen in order to allow the environmental assessment to be implemented. These indicators need to be directly relevant to the assessment objectives chosen and need to be supported by available data.

Table 4 below provides a summary the criteria that will be used in the SEA process, grouped in terms of the scale of their impact.

<b>Environmental Assessment Criteria</b>	
<b>Scale</b>	<b>Impact Description</b>
Global Environment	Contribution to climate change
	Effect on trans-boundary air pollution
	Contribution to critical acidification loads
Natural Environment and Resources	Contribution to increased waste generation
	Effects on resource use and depletion
	Visual and other impacts on landscape
	Impact on the biodiversity of ecologically sensitive sites
	Effects on flora
	Effects on fauna
	Effects on natural habitats
	Effects on designated protected areas
	Contribution to the deterioration of cultural and environmental heritage
	Negative effects on water resources
	Impact on the course of surface flow, torrents etc
	Impact on soil quality and desertification
	Effects on local microclimate, light pollution and local heat release
Local Environment and Community Quality of Life	Effects on human health
	Effect on noise pollution
	Impact on local air pollution
	Contribution to the formation of photochemical smog
	Impact on flooding problems
	Effect on transport safety and the incidence of accidents
	Social effects
	Economic activity

**Table 4: Final Criteria for the Assessment of SOPT**

## **6. ASSESSMENT OF ENVIRONMENTAL EFFECTS AND PROPOSED MITIGATION MEASURES**

### **6.1. Definitions and requirements**

Whilst **identification** and **description** are covered within the scoping phase, the Environmental Assessment concentrates on **evaluation**, which is designed to contribute relevant environmental information to the decision making process of policies, plans and programs. In practical terms, the Environmental Assessment phase must produce all environment related evidence required for decision making.

The Directive states that the “information that may reasonably be required to prepare the SEA report can be obtained making use of:

- current knowledge and methods of assessment and taking into account:
- the contents and level of detail in the plan or programme
- its stage in the decision making process

It is therefore important to note that the SEA Directive

- explicitly requires an integration of the environmental assessment into the decision making process;
- recommends that information ought to be obtained by making use of “current knowledge and methods”;
- states that the impacts must be described in such a detail that correlates to the definition of the plan or programme.

In practice, in the environmental report for a broad brush plan or programme, very detailed information and analysis is not necessary, whereas much more detail would be expected for a plan or programme that itself contained a higher level of detail.

Finally, point (f) of Annex 1 to the Directive outlines that the likely significant effects the environmental impact assessment has to deal with:

- biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors

### **6.2. Assessing the effects of the plan or programme**

The assessment stage in SEA should seek to predict and evaluate the effects of elements of the evolving plan or programme. Where adverse effects are seen to be likely, possibilities for mitigation should be considered.

There are three principal methods for identifying environmental effects and impacts

**Checklists:** Checklists are comprehensive lists of environmental effects and impact indicators designed to stimulate the analyst to think broadly about possible consequences of contemplated actions. Checklists are found in one form or another in nearly all environmental impact assessment studies.

**Impact Matrices:** Matrices typically employ a list of human actions in addition to a list of impact indicators. The two are related in a matrix which can be used to identify (to a limited extent) cause-and-effect relationships by the analyst.

**Flow diagrams:** Flow diagrams are sometimes used to identify action-effect-impact relationships. The flow diagram permits the analyst to visualize the connection between action and impact. The method is best suited to single-project assessments, and is not recommended for large projects as the display becomes so extensive that it will be of little practical value, particularly when several action alternatives must be examined.

The most common type of assessment is the **impact matrix**, which ranks project actions against their potential environmental impact and provides a quick indication of the problematic areas to decision-makers.

Impact matrices can be used as a basis for discussion, either between experts or with the public, about the impacts of a strategic action and possible mitigation measures. They can be used as a presentation tool to summarise the results of more detailed studies about a strategic action's impacts.

### 6.3. Quantifying Impact Characteristics

The significance of an impact is derived from an analysis of:

- The sensitivity of the environment to change including its capacity to accommodate the kinds of changes the project may bring about;
- The amount and type of change, referred to as the impact magnitude, which includes the timing, scale, size and duration of the project;
- The likelihood of the impact occurring; and
- Comparison with the impacts from the do nothing option.

In simple terms, the aim is to assign a level of significance based on impact magnitude and receptor sensitivity. Impact significance is assessed on the basis that the mitigation described within the chapter will be implemented.

## **Nature of Impact and Magnitude**

The following parameters can be used to indicate the character of the impact:

- Predictable / Unpredictable
- Short / Medium / Long term
- Direct / Indirect
- One-off / Intermittent / Continuous
- Positive / Adverse
- Certain / Uncertain
- Temporary / Permanent
- Avoidable / Unavoidable
- Reversible / Irreversible
- Small / Large
- Localised / Widespread
- Individual/Cumulative

Impact magnitude and receptor sensitivity are combined to indicate significance. Impact significance range can be described in terms of major / moderate / minor / negligible and neutral.

### **6.4. The Problem of Uncertainty**

An environmental impact assessment study contains four kinds of uncertainty, due to:

- the natural variability of the environment
- inadequate understanding of impact processes
- inadequate environmental data
- socio-economic uncertainties (inadequate understanding and inadequate data).

Methods concentrate on predicting the first kind of uncertainty. The second and third types of uncertainty are more difficult to manage as the degree of knowledge and data varies from discipline to discipline. The fourth kind of uncertainty is the most difficult to quantify.

The construction of a highway may sometimes produce unexpected adjustments by the local population; for example, there is always uncertainty in predicting the ways in which a community will respond after a highway has been constructed: in terms of employment, housing, recreational, and other kinds of patterns. A related problem is due to the fact that uncertainty increases as a prediction is made for times further and further into the future.

## 6.5. Proposed Environmental Impact Assessment Matrix

The proposed assessment matrix is shown in Table 5 below:

Scale	Impact Description	Impact Magnitude	Impact Nature
Global Environment	Contribution to climate change		
	Effect on trans-boundary air pollution		
	Contribution to critical acidification loads		
Natural Environment and Resources	Contribution to increased waste generation		
	Effects on resource use and depletion		
	Visual and other impacts on landscape		
	Impact on the biodiversity of ecologically sensitive sites		
	Effects on flora		
	Effects on fauna		
	Effects on natural habitats		
	Effects on designated protected areas		
	Contribution to the deterioration of cultural and environmental heritage		
	Negative effects on water resources		
	Impact on the course of surface flow, torrents etc		
	Impact on soil quality and desertification		
	Effects on local microclimate, light pollution and local heat release		
Local Environment and Community Quality of Life	Effects on human health		
	Effect on noise pollution		
	Impact on local air pollution		
	Contribution to the formation of photochemical smog		
	Impact on flooding problems		
	Effect on transport safety and the incidence of accidents		
	Social effects		
	Economic activity		

**Table 5: Proposed Environmental Impact Assessment Matrix**

The sensitivity of the assessment matrix is examined in Table 6, below.

<b>Sensitivity of Assessment Criteria</b>				
<b>Scale</b>	<b>Impact Criterion</b>	<b>Construction Method</b>	<b>Project Location and Routing</b>	<b>Modal Alternatives</b>
Global Environment	Contribution to climate change		✓	✓✓
	Effect on trans-boundary air pollution		✓	✓✓
	Contribution to critical acidification loads		✓	✓✓
Natural Environment and Resources	Contribution to increased waste generation	✓✓	✓	
	Effects on resource use and depletion	✓	✓✓	
	Visual and other impacts on landscape	✓	✓✓	
	Biodiversity – impacts on ecologically sensitive sites	✓	✓✓	
	Effects on flora		✓	
	Effects on fauna		✓	
	Effects on natural habitats		✓	
	Effects on designated protected areas		✓	
	Contribution to the deterioration of cultural and environmental heritage		✓	
	Negative effects on water resources		✓	
	Impact on soil quality and desertification		✓	
	Effects on local climate		✓	
Local Environment and Community Quality of Life	Effects on human health	✓	✓	✓
	Effect on noise pollution	✓	✓✓	✓
	Impact on local air pollution	✓	✓✓	✓
	Contribution to the formation of photochemical smog			✓
	Impact on flooding problems	✓	✓	
	Effect on transport safety and the incidence of accidents		✓	✓
	Social effects		✓	✓
	Economic activity		✓	✓

Key: ✓ Average Relevance; ✓✓ Strong Relevance

**Table 6: Assessment of Matrix Sensitivity**

## **6.6. Assessment of Environmental Impacts**

### **6.6.1. Priority Axis 1 – Development of railway infrastructure along the major national and Trans-European Transport Axes**

#### **Railway Infrastructure Refurbishment**

The environmental impact of reconstruction and rehabilitation of the existing railway track, signalling, telecommunications and power supply systems as well as procurement of new rolling stock must be identified and appropriate mitigation measures adopted. Therefore, the project must include environmental assessment, environmental management, environmental training and implementation of appropriate mitigation measures and detailed environmental monitoring. The environmental assessment must examine issues such as ecology, water quality, soil and geology, hydrogeology, waste disposal, noise, energy consumption and dust.

The environmental impact associated with projects of this type is however considered fairly limited. These can be mitigated through appropriate waste management, regulation of the use of hazardous chemicals, noise abatement, dealing with specific problems of ballast contamination and audit of workshops, quarries and equipment production plants.

It is important that environmental management is undertaken and implemented successfully in order to ensure that environmental mitigation measures are integrated into technical specifications and programmes for the modernisation works. Similarly, the implementation of comprehensive staff environmental training is equally significant.

#### **The GSM-R Railway Communications System**

The GSM-R system is similar to other GSM microwave systems and uses a carrier frequency close to 900MHz. It is based on two way radio communication between a mobile handset in the train and the nearest base station. Each base station can serve a line length of up to 4km. in each direction, dependent upon the topography. There is considerable public concern over the adverse health effects of long-term exposure to low-intensity microwaves.

The effects are divided into heating and non-heating effects. Heating effects are similar to that used in a microwave oven, which become insignificant when distance from a microwave transmitter exceeds a few metres. Non-heating effects mainly relate to the hazards of microwave, radio frequency and electromagnetic fields emissions

Research on the effects of mobile communication technology is in its infancy. A group of independent experts led by Sir William Stewart in the United Kingdom concluded that there are gaps in scientific knowledge and recommended a **precautionary approach** until more research findings become available.

Further research is now being set up to keep pace with developments in mobile phone technology. It is clear that it may be many years before there is definitive answer to people's concerns.

The assessment matrix for Railway Transport is shown in Table 7 below:

<b>Scale</b>	<b>Impact Description</b>	<b>Impact Magnitude</b>	<b>Impact Nature</b>
Global Environment	Contribution to climate change	Moderate	Long Term
	Effect on trans-boundary air pollution	Minor	Un-predictable
	Contribution to critical acidification loads	Moderate	Un-predictable
Natural Environment and Resources	Contribution to increased waste generation	Minor	Short Term
	Effects on resource use and depletion	Minor	Long Term
	Visual and other impacts on landscape	Minor	Direct
	Impact on the biodiversity of ecologically sensitive sites	Minor	Direct
	Effects on flora	Minor	Direct
	Effects on fauna	Minor	Direct
	Effects on natural habitats	Minor	Direct
	Effects on designated protected areas	Minor	Direct
	Contribution to the deterioration of cultural and environmental heritage	Minor	Localised
	Negative effects on water resources	Moderate	Indirect
	Impact on the course of surface flow, torrents etc	Moderate	Indirect
	Impact on soil quality and desertification	Minor	Indirect
	Effects on local microclimate, light pollution and local heat release	Minor	Indirect
Local Environment and Community Quality of Life	Effects on human health	Minor	Indirect
	Effect on noise pollution	Major	Positive
	Impact on local air pollution	Major	Positive
	Contribution to the formation of photochemical smog	Major	Positive
	Impact on flooding problems	Moderate	Indirect
	Effect on transport safety and the incidence of accidents	Major	Positive
	Social effects	Major	Positive
	Economic activity	Major	Positive

**Table 7: Railway Environmental Impact Assessment Matrix**

### 6.6.2. Priority Axis 2 – Development of road infrastructure along the major national and Trans-European transport axes

The environmental impact associated with construction of the motorway is related to air emission, water pollution, noise caused by traffic, disposal of construction material, wildlife protection and landscape infringement. Protective and mitigation measures must be carried out during project design, implementation, and operation and maintenance. These measures are related to air, surface and groundwater protection, noise reduction, disposal of construction material and waste management, provision of fencing and animal underpasses and prevention of landscape infringement.

Specific impacts are analysed individually, below:

#### **Air Pollution**

Air emissions will be generated during the construction phase but these will be temporary and, given proper work standards, can be kept to a minimum. Once the motorway is operational, vehicle traffic is a source of air pollutants which are emitted from the engines exhausts.

In order to mitigate the negative impacts from vehicle traffic, in addition to vehicle regulatory measures, the following measures can be introduced:

- (i) replanting of greenery removed during the construction phase;
- (ii) planting new greenery to reduce the NO<sub>x</sub> emissions, planted in the form of rows, belts, and elongated strips. At the initial section of the road – near the entryways into the flyover – the greenery will be introduced in the form of clusters.

#### **Vibration and Noise**

The principal issues during construction works are piling and vibration operations. The type of noise associated with piling works depends on the method of piling used. Any negative impacts can be reduced to a minimum by scheduling as much as possible of the piling works for the winter months. The large-scale construction activities, including the use of a variety of engines, rock breaking and construction traffic, may temporarily generate significant levels of noise. The contractors will be obliged to take specific noise abatement measures.

During the construction phase noise intensive works should be executed only during daytime. Works that require the use of vibrations generating equipment and devices are to be conducted to prevent potential damage to existing buildings.

The noise generated by vehicle traffic will affect the settlements located alongside the road links. For evaluation of noise impact and determination of suitable noise abatement measures (such as noise prevention screens), calculations of noise levels should be carried out.

## **Water**

Hydrography and surface waters will be impacted due to extensive regrading and realignment works along streams. In addition, a number of existing watercourses may become part of the drainage works for the proposed road. At watercourse crossings, flat/modest gradients within culverts or bottomless culverts will be used to allow passage by fish. During construction, discharge of silt into the water column will be mitigated through pollution control measures.

During the construction phase, care will need to be taken to avoid any pollution by oils and lubricants of ground and surface waters. During the operation phase surface run-off contaminated with tyre abrasion, solid particles and salt or other de-icing agents will be directed into the drainage system and subsequently treated where possible.

## **Habitats**

Field surveys must be carried out to develop the appropriate strategies to reduce the disturbances to nature conservation areas and where intrusion is unavoidable, habitat relocation must be implemented.

## **Waste**

A **waste disposal plan** must be prepared so as to cater for the safe control and handling of waste, especially contaminated materials and show how reusable materials will be recycled.

## **Impacts on Soils and Erosion:**

In general, soils are mainly affected through cut and fill operations. The construction is not anticipated to have any significant impact on soils if proper protection measures are applied. Special care must be taken to avoid soil and groundwater contamination by spill or hazardous substances. Special care should be taken for construction of drainage at those cut sections where permanent water seepage appears after construction. It is proposed to re-use topsoil as far as possible.

In areas where there will be new land acquisition and construction works, **archaeological (reconnaissance) surveys** should be commissioned to determine if there are any other remains of interest. The surveys will be required to make recommendations as to any further archaeological investigations and

mitigation measures, including changes to scheme design where and if appropriate.

### **Socio-economic benefits**

The new road will also have some socio-economic benefits, such as revival of local economy (shops, restaurants, gas stations, local products, etc) and provision of a better connection with other areas and make it easier for inhabitants of smaller villages to use services and facilities (schools, clinics and sport facilities, etc.) of the neighbouring, larger towns. A decrease in vehicle accidents may be achieved by reducing the number of accidents.

### **Summary of Environmental Mitigation and Management Measures**

The **visual impact** of the motorway must be assessed.

A scheme for providing **landscape planting** throughout the road length must be prepared as part of the highway design.

Consideration should be given to **air pollution**.

**Noise impacts** should be minimised through the implementation of noise reduction measures in the detailed design. The successful contractor for the new Beska Bridge should be required to prepare a **noise minimisation plan**. This should include predictions of noise from the construction site and measures to reduce noise to a minimum. The design of roadside facilities should incorporate **noise reduction measures**.

**Water resources** can be affected by a wide range of potential pollutants arising from road traffic. Building interceptor traps areas close to streams can reduce pollution. The construction of interceptor drains will also reduce the impact of any accidental spills. Interceptor drains must be regularly cleaned and maintained so as to ensure that they are always effective. The spreading of winter salt should be carefully managed so as to reduce its use to an absolute minimum consistent with road safety.

### **Monitoring**

An **Environmental Monitoring Plan** should also be prepared setting out proposal for monitoring the environmental mitigation measures during the construction phase.

It is recommended that tender dossiers should include the environmental obligations the contractor should fulfil. The contractor should be obliged to follow a proper environmental practice during all construction work activities and to

keep damage to vegetation, soil, ground water, surface water, landscape and disturbance to a minimum.

### **Environmental Management Plan**

An **Environmental Management Plan (EMP)** must be prepared in order to define the environmental measures and procedures that will need to be adopted for the scheme and to identify those responsible for their implementation.

An Environmental Management Plan (EMP) should be developed in order to define the environmental measures and procedures to prevent, minimise and mitigate adverse impacts and to ensure compliance with applicable environmental standards during both the construction and operation of the road. The EMP will define necessary mitigation measures, environmental monitoring plan and institutional measures to be taken during project construction and operation. The EMP will be finalised when the detailed design of the project is completed. It may need to be revised during the course of the project implementation. The environmental monitoring of the key impacts identified in the EIA will ensure the efficiency of the planned mitigation measures.

During detailed design, a **Pollution Incident Plan** should be prepared to deal with emergency situations, such as accidental spillage of oil, fuel or hazardous materials as the result of a collision on the motorway.

The assessment matrix for Road Transport projects is shown in Table 8 below:

<b>Scale</b>	<b>Impact Description</b>	<b>Impact Magnitude</b>	<b>Impact Nature</b>
Global Environment	Contribution to climate change	Moderate	Long Term
	Effect on trans-boundary air pollution	Moderate	Long Term
	Contribution to critical acidification loads	Moderate	Long Term
Natural Environment and Resources	Contribution to increased waste generation	Moderate	Short Term
	Effects on resource use and depletion	Moderate	Long Term
	Visual and other impacts on landscape	Moderate	Irreversible
	Impact on the biodiversity of ecologically sensitive sites	Moderate	Direct
	Effects on flora	Moderate	Direct
	Effects on fauna	Moderate	Direct
	Effects on natural habitats	Moderate	Direct
	Effects on designated protected areas	Moderate	Direct
	Contribution to the deterioration of cultural and environmental heritage	Moderate	Localised
	Negative effects on water resources	Moderate	Indirect
	Impact on the course of surface flow, torrents etc	Major	Direct
	Impact on soil quality and desertification	Minor	Indirect
	Effects on local microclimate, light pollution and local heat release	Minor	Indirect
Local Environment and Community Quality of Life	Effects on human health	Moderate	Indirect
	Effect on noise pollution	Major	Direct
	Impact on local air pollution	Major	Direct
	Contribution to the formation of photochemical smog	Major	Direct
	Impact on flooding problems	Major	Indirect
	Effect on transport safety and the incidence of accidents	Major	Positive
	Social effects	Major	Positive
	Economic activity	Major	Positive

**Table 8: Road Transport Environmental Impact Assessment Matrix**

### 6.6.3. Priority Axis 4 – Improvement of the maritime and inland-waterway navigation

Coastal engineering includes expertise in dredging and reclamation. These projects often present a significant degree of risk, such as; unforeseen ground conditions, loss of placed material, unsuitability of dredged material, and impacts of dredging on the environment. Anticipating and solving these problems requires a combination of technical expertise and practical experience.

Materials resourcing studies for amenity beaches and construction materials; environmental impact assessments; modelling of sediment dispersal; ecological surveys, noise monitoring, and siltation studies; solutions for arising disposal; applications and consultation for licences and consents; beneficial use of dredging arising; and design of mitigation measures.

This section provides an overview of the key potential impacts of the proposed interventions during its construction and operational phases.

Potential impacts on the human environment are considered to comprise of impacts on the following aspects:

- Commercial and recreational navigation;
- Archaeology and heritage;
- Recreation and leisure;
- Noise and vibration;
- Air quality;
- Infrastructure, land drainage and coastal protection;
- Traffic and transportation; and
- Socio-economics.

Potential impacts on the 'natural environment' are considered to comprise the following aspects:

- Sediment quality;
- Water quality;
- Marine and coastal ecology;
- Marine and coastal ornithology;
- Coastal and terrestrial ecology;
- Fish and shellfish resource; and,
- Geology, landscape and visual setting.

#### **Analysis of potential impacts**

During the construction phase, the main potential impacts on commercial and recreational navigation are the relocation of moorings, potential for collision

during dredging and potential for effect on the operation of the chain ferry. It is concluded that the risk of collision between the dredger and commercial or recreational vessels is negligible, given that it would be operating within a navigation channel that is subject to the standard navigational control procedures and that particular measures are applicable to vessels undertaking construction works (e.g. display of appropriate signals).

During the operational phase, the key potential impacts on commercial and recreational navigation are associated with potential changes to the hydrodynamic and sedimentary regime (both directly through changes in current speeds and direction as well as wave activity and indirectly through potential silting up of channels).

It is also predicted that the proposed channel deepening would have an effect on the pattern of erosion and deposition of fine sediment. Although in the short term such changes are insignificant, over the longer term an impact of minor adverse impact is predicted for recreational navigation in those locations where the rate of deposition would be increased. This impact is not possible to mitigate, but could be dealt with in the future by some limited maintenance dredging in affected channels if required.

With respect to archaeology and heritage, there is the potential during the channel dredging to impact on Palaeolithic or Mesolithic sites that may be present within sedimentary deposits. Although there are no such known sites, should they exist their importance would be likely to be of high significance. In view of this, a mitigation strategy would be developed and agreed which would include the preparation of a protocol for reporting any finds made during dredging.

The dredging also has the potential to impact on the maritime archaeological resource. The geophysical survey identified a number of anomalies of varying archaeological potential that could be either directly or indirectly (i.e. through changes to the hydrodynamic and sedimentary regime) impacted by the proposed dredging. In addition to the mitigation strategy described above, it is proposed that diving would be undertaken on a range of identified anomalies to characterise them and to confirm their importance.

The main potential effects of the scheme on noise and vibration and air quality are associated with the presence of the dredger and plant at the beach nourishment locations. However, no significant impacts are predicted given that the works would comprise a small number of plant for a limited period of time.

The impacts on infrastructure and land drainage are positive given that the proposed dredging would deepen the river bed and thus facilitate the drainage of tributaries.

The effects of the proposed scheme on sediment and water quality are interlinked, given that the existing sediment quality of the proposed dredge areas influences the effect of the scheme on water quality. In summary, the concentrations of various substances within the sediment in the proposed dredged areas are similar to those present in 'receptor areas' (i.e. those areas that are predicted to be influenced by fine sediment dispersed during dredging). As a result, no significant impacts are predicted with respect to the mobilisation of contaminants.

The main potential for the scheme to affect water quality is, therefore, a physical rather than a chemical phenomenon. It is predicted that the concentration of suspended sediment in the water column would be significant.

The potential impacts of the proposed scheme on certain aspects of marine and coastal ecology and the potential impacts on marine and coastal ornithology are closely linked. For example, the habitats and the species they support are the feeding resource for a variety of water birds for which a nearby area is designated as a SPA. The main potential impacts of the scheme on these parameters are due to the predicted effects the river morphology and the effect of the dispersal and deposition of fine sediment.

The proposed scheme has the potential to have a number of potential impacts on habitats and communities during the construction phase. Potentially, the most significant of these include the effects of increased suspended sediment concentrations and the deposition of fine sediment.

There are a number of species of nature conservation importance in the area. The deposition of fine material in areas where these species are known to be present must be avoided.

The potential impacts of the scheme on coastal and terrestrial ecology are limited to effects that may arise indirectly as a result of predicted changes to the hydrodynamic and sedimentary regime.

Given the nature of the proposed works, minimal potential exists for an impact on geology, landscape and visual setting to arise. The main potential for impact on these aspects arises due to the beach nourishment works; however, all works would take place on existing recreational beaches and no significant effects are predicted because there would be no change to the existing landscape character. No direct or indirect impacts are predicted on important geological sites.

The assessment matrix for Waterborne Transport is shown in Table 9 below:

<b>Scale</b>	<b>Impact Description</b>	<b>Impact Magnitude</b>	<b>Impact Nature</b>
Global Environment	Contribution to climate change	Neutral	–
	Effect on trans-boundary air pollution	Neutral	–
	Contribution to critical acidification loads	Neutral	–
Natural Environment and Resources	Contribution to increased waste generation	Moderate	Reversible
	Effects on resource use and depletion	Moderate	Long Term
	Visual and other impacts on landscape	Moderate	Localised
	Impact on the biodiversity of ecologically sensitive sites	Moderate	Direct
	Effects on flora	Moderate	Direct
	Effects on fauna	Moderate	Direct
	Effects on natural habitats	Moderate	Direct
	Effects on designated protected areas	Moderate	Direct
	Contribution to the deterioration of cultural and environmental heritage	Moderate	Indirect
	Negative effects on water resources	Neutral	–
	Impact on the course of surface flow, torrents etc	Minor	Indirect
	Impact on soil quality and desertification	Neutral	–
	Effects on local microclimate, light pollution and local heat release	Minor	Indirect
Local Environment and Community Quality of Life	Effects on human health	Neutral	–
	Effect on noise pollution	Neutral	–
	Impact on local air pollution	Neutral	–
	Contribution to the formation of photochemical smog	Neutral	–
	Impact on flooding problems	Neutral	–
	Effect on transport safety and the incidence of accidents	Major	Positive
	Social effects	Major	Positive
	Economic activity	Major	Positive

**Table 9: Waterborne Transport Environmental Impact Assessment Matrix**

#### 6.6.4. Priority Axis – Improvement of inter-modality for passengers and freights

Both phases of the extension of the Sofia Metro pose different environmental challenges requiring careful consideration so as to minimise any adverse impact. Communities have been protected from noise impact by the construction of cut-and covers tunnels. Field surveys have been carried out to develop the appropriate strategies to reduce the disturbances and where intrusion has been unavoidable, habitat relocation has been implemented.

A set of Environmental Minimum Requirements has to be established for the project which includes a Code of Construction Practice. This must be developed in consultation with local authorities and other bodies and must sets out a series of objectives and measures to protect the environment and limit disturbance from construction activities as far as reasonably practicable.

An Environmental Management System will have to be implemented to ensure that environmental issues are addressed and managed effectively during design and construction. This would cover landscape, ecological and heritage objectives, the control of noise and dust, minimizing waste, protection of water, and being a good neighbour during construction.

The extension of the Sofia metro provides an excellent opportunity for schools to develop knowledge and understanding about the engineering, community, environmental, political and transport aspects of this exciting project.

The assessment matrix for Inter-modal Transport is shown in Table 10 below:

Scale	Impact Description	Impact Magnitude	Impact Nature
Global Environment	Contribution to climate change	Minor	Indirect
	Effect on trans-boundary air pollution	Neutral	–
	Contribution to critical acidification loads	Minor	Indirect
Natural Environment and Resources	Contribution to increased waste generation	Minor	Indirect
	Effects on resource use and depletion	Minor	Positive
	Visual and other impacts on landscape	Minor	Indirect
	Impact on the biodiversity of ecologically sensitive sites	Minor	Direct
	Effects on flora	Minor	Direct
	Effects on fauna	Minor	Direct
	Effects on natural habitats	Minor	Direct
	Effects on designated protected areas	Minor	Direct
	Contribution to the deterioration of cultural and environmental heritage	Minor	Direct
	Negative effects on water resources	Minor	Indirect
	Impact on the course of surface flow, torrents etc	Neutral	–
	Impact on soil quality and desertification	Neutral	–
	Effects on local microclimate, light pollution and local heat release	Minor	Indirect
Local Environment and Community Quality of Life	Effects on human health	Moderate	Indirect
	Effect on noise pollution	Moderate	Temporary
	Impact on local air pollution	Moderate	Positive
	Contribution to the formation of photochemical smog	Moderate	Positive
	Impact on flooding problems	Minor	Indirect
	Effect on transport safety and the incidence of accidents	Major	Positive
	Social effects	Major	Positive
	Economic activity	Major	Positive

**Table 10: Inter-modal Transport Environmental Impact Assessment Matrix**

## 6.7. Cumulative, Secondary and Synergistic Effects

Annex 1 of the SEA Directive mentions cumulative, synergistic and secondary effects. These effects imply an interaction between potential impacts, possibly resulting in an impact of greater (or lesser) significance than the effects in isolation.

These effects are explained below:

**Cumulative effects** occur when individual developments that each on their own has an insignificant effect combine to produce a detrimental environmental impact.

**Secondary effects** are indirect effects which occur away from the original effect or through a complex pathway and not as an obvious result of the Transport Plan.

**Synergistic effects** arise when a combined effect is greater than the sum of the individual effects.

The assessment of cumulative impacts can only be performed in plans or projects for which sufficient information exists to allow consideration of the potential for a cumulative effect to arise. In the case of the Sectoral Operating Programme on Transport it is not possible to properly consider cumulative effects.

As part of the implementation of the SOPT and monitoring that will be carried out it is suggested that cumulative, secondary and synergistic effects are examined. The scope of plans or projects to be included in a cumulative impact assessment can be defined as those projects whose effects may overlap with the proposed scheme in space or time.

## **7. MONITORING REQUIREMENTS AND POTENTIAL INDICATORS**

### **7.1. Introduction**

This chapter summarises the environmental impact assessment and permitting process provided for in the Bulgarian national legislation and the monitoring proposals which arise from the SEA. The link between environmental impact assessment, permitting and monitoring is clear, as environmental permits set out the conditions for the implementation of the project and monitoring provides the means by which these conditions are enforced.

Several potential new indicators for monitoring the effectiveness of the implementation of the SOPT are proposed. Although most take forward existing obligations, some are subject to discussion and agreement by stakeholders and the relevant costs of benefits of each proposed indicator clearly need to be carefully considered. As part of the consultation process, the Ministry of Transport welcomes views on the proposals to monitor the significant environmental effects of the implementation of the SOPT, including any priority that should be given to the indicators identified, and whether alternative or further indicators should be used.

### **7.2. Environmental Impact Assessment Process and Permitting**

This section outlines the Bulgarian EIA process. In Appendix III, the “Ordinance on the terms and procedure for making environmental impact assessment of investment proposals for construction, activities and technologies” is presented giving the detailed legislative process for EIA permitting.

Bulgaria is in the final stages of its preparation for EU accession and has completed the harmonization of the national legislation with the EU environmental *acquis*.

The Ministry of Environment and Water (MOEW) is the supreme supervisory body and Regional Inspectorates of Environment and Water (RIEW) are the bodies taking decisions on Environmental Impact Assessment (EIA). There are 15 RIEW comprising incorporating the 28 administrative government districts in Bulgaria. The Minister of Environment and Water or the relevant RIEW Directors are the competent authorities that issue an opinion on environmental assessment of plans and programs according to the Bulgarian legislation.

There are EIA Departments within the MOEW and each RIEW dealing with the regulation and coordination the activities related to EIA process. The Supreme Environmental Expert Council (SEEC) within MOEW and Regional Environmental Expert Council (REEC) within RIEW conduct the environmental assessments according to requirements of specific projects.

The major players participating in the EIA process in Bulgaria are: the Ministry of Environment and Water, Regional Inspectorates of Environment and Water, Water Basin Directorates, Nature Parks Directorates, Ministry of Regional Developments and Welfare, Ministry of Health, Ministry of Agriculture and Forest, Ministry of Culture, Regions, Municipalities and NGO's.

### **The Environmental Impact Assessment (EIA) Process:**

An Environmental Impact Assessment is conducted for plans, programmes and development proposals for construction, activities and technologies or modifications, the implementation of which are likely to have significant effects on the environment.

The project developer is obliged to notify in writing the competent authorities (MOEW / RIEW) about this investment intention in the course of pre-investment inquiries. On the grounds of the notification the competent authority determines whether the investment proposal may have impact on protected areas of the National Environmental Network and is a subject of environment assessment.

Within 1 month following the submission of the request of the investor the MOEW/RIEW rule by decision on the need for making an EIA. If it is necessary visits on site and consultations with the competent bodies within the Ministry of Health and other relevant ministries are organized.

The investor who has received the decision should assign the elaboration of a Terms of Reference for the scope of EIA. The EIA report is elaborated by a team of experts, guided by the principles of reduction of the risks to human health and of ensuring sustainable development in conformity with the existing national standards of environmental quality.

The project developer submits a copy of the report to the competent authority MOEW / RIEW, which assess the quality of the report. Public hearing on the report is made with the representatives of the affected municipalities, organizations and the general public.

The competent authority takes decision on the basis of the EIA report, the documents presented in the course of the procedure, the results of the public discussion, inclusive of the statement of opinion of the investor and the decision of the Supreme Environmental Expert Council (SEEC) with the MOEW or the Regional Environmental Expert Council (REEC) with the relevant RIEW.

The environmental assessment is completed when the decision of the Minister of Environment and Water or of the competent RIEW Director is issued outlining the conditions under which the implementation of the project is permitted.

- Investment proposal Preparation

- Notification to Competent Authority
- Screening
- Scoping
- Environmental Studies
- Submission of Environmental Information to Competent Authority
- Review of Adequacy of the Environmental Information
- Consultation with Statutory Environmental Authorities, Other Interested Parties and the Public
- Consideration of the Environmental Information by the Competent Authority before making Development Consent Decision
- Announcement of Decision
- Post-Decision Monitoring if Investment proposal is Granted Consent

### **7.3. Monitoring Requirements**

While the whole of Bulgaria is theoretically covered by the SOPT, the programme will only be implemented in those areas where grant funding is applied for and granted. Although a list of indicative projects is provided, the fact that it not known exactly which actions will be implemented poses a challenge to designing a monitoring plan and selecting indicators to assess the effectiveness of the SOPT in meeting the objectives identified during the undertaking of the SEA. However, there is a need to ensure that the monitoring that will be undertaken is sufficient to provide a solid and defensible audit trail and to enable the Bulgarian Administration to meet their obligations in relation to environmental protection.

As a minimum, the information relating to the type of activity being funded, the location and nature of the land on which the work will be undertaken, including a baseline environmental audit, should be collated during the assessment of the application for grant funding and the site visit. For ease of data manipulation it is recommended that detailed records of the habitats present should be recorded and stored on GIS.

It is strongly recommended that in the Technical Assistance measures are included that answer to the main needs of support for programme environmental monitoring.

Specific actions of the Technical Assistance priority axis include:

- The establishment of a General Environmental Monitoring Plan
- Monitoring of the Environmental Performance – Railways

- Monitoring of the Environmental Performance – Road Transport
- Monitoring of the Environmental Performance – Waterborne Transport
- Monitoring of the Environmental Performance – Inter-modal Transport
- Environmental Monitoring and performance – Information and Publicity

It is proposed that the details of the monitoring would be discussed and agreed with appropriate stakeholders. In addition, it would be necessary to agree a reporting strategy and an appropriate format and forum for the dissemination of findings. This would also provide the competent authorities with the opportunity for any agreed monitoring programme to be amended as appropriate subject to the findings that emerge.

#### **7.4. Potential Indicators**

In order to monitor the effectiveness of the actions within SOPT at meeting the environmental objectives, a series of indicators must be developed.

Criteria and indicators have to be used according to their relevance in relation to the planning level of the impact they represent, for example:

- Network and Corridor scale, determining transport infrastructure capacity between two or several urban centres respectively.
- Project scale, which consider the detailed location and design of individual infra-structure projects, including mitigation measures, and are subject to environmental impact assessment (EIA).

Table 11 and Table 12 suggest potential indicators which could be used to measure the effectiveness of the SOPT in meeting the environmental objectives identified during the SEA.

<b>Global/Regional impact of transport infrastructure plans</b>			
<b>Impact</b>	<b>Indicators</b>	<b>Unit</b>	<b>Data</b>
Resource Depletion	Energy use	Litres / Tonnes / MJoules	Changes in vehicle km Energy use per km per mode
Climate Change	Energy use	Litres / Tonnes / MJoules	Changes in vehicle km Energy use per km per mode
	CO <sub>2</sub>	Tonnes	CO <sub>2</sub> per km per mode
	N <sub>2</sub> O	Tonnes	N <sub>2</sub> O per km per mode
	CH <sub>4</sub>	Tonnes	CH <sub>4</sub> per km per mode
Acidification	Energy use	Litres / Tonnes / MJoules	Changes in vehicle km Energy use per km per mode
	SO <sub>2</sub>	Tonnes	SO <sub>2</sub> per km per mode
	NO <sub>2</sub>	Tonnes	NO <sub>2</sub> per km per mode
Photochemical smog	Energy / fuel use	Litres / tonnes / MJoules	Changes in vehicle km Energy use per km per mode
	NO <sub>x</sub>	Tonnes	Changes in vehicle km NO <sub>x</sub> per km per mode
	CH <sub>4</sub>	Tonnes	Changes in vehicle km CH <sub>4</sub> per km per mode
	CO <sub>2</sub>	Tonnes	Changes in vehicle km CO <sub>2</sub> per km per mode
	O <sub>3</sub>	Tonnes	Changes in vehicle km O <sub>3</sub> per km per mode
Eutrophication	BOD, COD, N-total (water), NOx (air)	Tonnes	Changes in vehicle km Energy use per km per mode

**Table 11: Potential Indicators of Global / Regional Impact**

<b>Local impacts of transport infrastructure plans</b>			
<b>Impact</b>	<b>Indicators</b>	<b>Units</b>	<b>Data</b>
Health hazardous emissions	Proximity of emissions to settlements	Distance	Emissions per km per mode Location of residents
	Number of affected residents	Number of residents affected by emissions	Emissions dispersion Location of residents
Noise	Proximity of settlements to traffic noise	Distance	Noise dispersion Location of residents
	Number of affected residents	Number of residents affected by noise	Noise dispersion Location of residents
Vibration	Number of affected residents	Number of residents affected by vibrations	Vibration dispersion Location of residents
Land use	Direct or indirect land take	Area of direct land take	Land take
Biodiversity	Proximity to protected habitat	Distance	Location of protected habitat
	Risk of habitat fragmentation	–	Habitat location and vulnerability
Visual / landscape impacts	Damage to landscape	Area damaged	Location of landscape and vulnerability
Water Resources	Emission of pollutants from accidents	Pollution by accidents	Number of accidents Pollution per accident
	Emission of pollutants from road use	Water Pollution	Type and Magnitude of Pollution
Waste production	<ul style="list-style-type: none"> <li>• Waste production</li> <li>• Effluent from ships</li> </ul>	Tonnes of pollutants	Traffic intensity Pollution intensity
Toxic substances	<ul style="list-style-type: none"> <li>• Heavy metals</li> <li>• Copper from railway power lines</li> <li>• de-icing, salt and other chemicals</li> </ul>	Tonnes of chemicals	Emissions of heavy metals Use of chemicals
Accidents	Risk of accidents	Number of: <ul style="list-style-type: none"> <li>• casualties</li> <li>• accidents</li> </ul>	Accident records

**Table 12: Potential Indicators of Local Impact**

## 7.5. Prioritising the Development of Indicators

The large number of gaps in data availability and quality suggest it is necessary to prioritise the development of indicators. This SEA cannot examine the feasibility and costs of developing each indicator, however, some initial priorities can be suggested:

**First:** improvement of indicators that exist already but where there are gaps or concerns about data quality. This should be more feasible and cheaper than developing completely new indicators, but the priority for developing these indicators should reflect their relative importance in terms of the environmental impacts.

**Second:** generate indicators from data sources that exist already but where the indicator is not currently compiled in a manner suitable for use as an indicator.

**Third:** indicators which depend on new data collection methods. These occur primarily in the Biodiversity, Water & Soil and Culture & Heritage and Human Health sections.

## **8. CONCLUSIONS AND RECOMMENDATIONS**

This environmental report provides an assessment of the environmental impacts of the Priority actions of the Sectoral Operational Programme on Transport.

The purpose of this report has been to document the strategic environmental assessment of the policies and strategies that are outlined in the SOPT and to document the how the SEA process has been integrated into its development.

The assessment of the Sectoral Operational Programme on Transport shows that the policies and strategies that have been developed, support the SEA Objectives for improving air quality, reducing congestion, and improving the quality of life. The SOPT promotes improvement to transport infrastructure towards a more sustainable transport and advocates the use and expansion of shared and public transport and modes, which are anticipated to result in more socially inclusive communities, accessible essential services and health benefits.

An integrated approach to land use and transport planning must be promoted throughout the SOPT together with the actions provided aimed at improving infrastructure and tackling congestion, in order to enhance the image of Bulgaria as a place to invest and live in. Through the successful achievement of the strategies being promoted through the SOPT it is anticipated Bulgaria will realise its ambitions for economic growth and sustainable development.

That said, some potential adverse effects have been highlighted. These relate to the potential infrastructure building activities being promoted. Strategic route planning and thorough assessment of the potential effects of the infrastructure schemes will be required to ensure that the beneficial effects of reduced congestion, improved local air quality and improved accessibility will be realised and that adverse effects relating to the natural and historic environment are minimised and thoroughly mitigated for. In order to ensure that any adverse effects are minimised environmental enhancements should be considered and implemented within scheme delivery.

It is strongly recommended that in the Technical Assistance measures are included that answer to the main needs of support for programme environmental monitoring.

Specific actions of the Technical Assistance priority axis include:

- The establishment of a General Environmental Monitoring Plan
- Monitoring of the Environmental Performance – Railways
- Monitoring of the Environmental Performance – Road Transport
- Monitoring of the Environmental Performance – Waterborne Transport
- Monitoring of the Environmental Performance – Inter-modal Transport
- Environmental Monitoring and performance – Information and Publicity

This report will act as a vehicle for continuing the SEA process, and will be issued to statutory consultees and other key stakeholders with an interest in the environment.

The consultation period for the SOPT SEA Environmental Report starts on 15<sup>th</sup> September 2006 and runs until 6<sup>th</sup> October 2006. After this period responses to the SOPT SEA consultation will be reviewed. In light of these comments, the Environmental Report will be amended with the final versions being published 12 October 2006.