



February 2012

Environmental and Social Management and Monitoring Plan Railway Corridor VIII - Eastern section

Contract No:
C21196/EBSF-2010-07-101

Macedonian Railways:
**Feasibility Study for Corridor VIII
Eastern section and ESIA**

SUBMITTED BY:



IN ASSOCIATION WITH:



Republic of Macedonia
MINISTRY OF TRANSPORT AND COMMUNICATIONS



European Bank
for Reconstruction and Development

Environmental and Social Impact Assessment

Railway Corridor VIII - Eastern section

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

Prepared for: Macedonian Ministry for Transport and Communication

Prepared by:   Mobility
Networks
Logistics

February 2012

TABLE OF CONTENTS

| | | |
|---|--|----|
| 1 | Introduction | 2 |
| 2 | Responsibilities | 2 |
| 3 | Structure of the Esmmp | 3 |
| 4 | Environmental & Social Management Plan | 4 |
| 5 | Environmental & Social Monitoring Plan | 32 |

1 INTRODUCTION

The Environmental and Social Management and Monitoring Plan (ESMMP) for the Railway Corridor VIII – Eastern Section Project is presented in this Chapter. It has been prepared so that all relevant stages of the Project are implemented in compliance with applicable laws and regulations, EBRD’s Environmental and Social Policy (2008) Performance Requirements, and in accordance with the ESIA and the result of the consultations with the stakeholders.

The ESMMP describes the environmental and social¹ mitigation and monitoring measures, the criteria for their successful implementation and the organizational measures to be implemented during the pre-construction, construction and operation of the Project.

The ESMMP adopts a long-term and phased process in the sense that it will need to be regularly reviewed and updated as the Project evolves to reflect any changes in the Project implementation and organization as well as in regulatory requirements. Following amendments, the updated ESMMP will need to be communicated to all relevant parties and stakeholders.

2 RESPONSIBILITES

Pre-Construction Phase

The ESMMP comprises of actions identified in the ESIA, which need to be undertaken during the pre-construction phase. Furthermore, the approval process for the Project is ongoing with the environmental permitting process, which involves the issuance, by the Ministry of Environment and Physical Planning (MOEPP), of the *Decision for granting consent* for the project implementation, with which the Ministry of Transport and Communication (MOTC) will issue the *Consent for project implementation* to the Project sponsor, which is the public enterprise “Macedonian Railways - Infrastructure” – PERI (hereafter referred to as PERI).

The Decision contains an assessment of whether the ESIA Study fulfils the applicable requirements, and the permit conditions for the project implementation as well as measures for prevention and reduction of the harmful effects. The ESMMP will need to be updated for any additional environmental and social requirements identified in the Decision when received. The responsible body to ensure that these actions are undertaken is PERI.

Environmental and social mitigation and monitoring measures contained within the ESMMP and other relevant project documentation and approvals will be part of tender documentation for selection of the construction contractor. Implementation of ESMMP will be a contractual commitment of the chosen contractor.

The selected Contractors will be required to provide the required plans and procedures to PERI for approval prior to construction commencing.

Construction Phase

The actual construction work will be undertaken by a railway construction Contractor to be appointed by PERI. Normally, there will be only one main Contractor, but there is the possibility that more than one main Contractor could be appointed. The ESMMP will need to be reviewed at contract award to ensure it fully reflects the project circumstances. During construction, the actual implementation of most of the ESMMP requirements will be the responsibility of the construction Contractor(s), with PERI having a supervising role.

The requirements for environmental protection and social management contained within the ESMMP, SEP and relevant project documentation and approvals will be an obligatory part of the conditions of contract for the construction Contractor. The Contractor will be obliged to adopt and follow relevant national

¹ For the purpose of this ESMMP social requirements cover: labour and working conditions including occupational health and safety; community impacts such as public health, safety and security.

legislation, Acts, Regulation, Degree, and relevant EU legislation / Good practice /International organization's standards during construction and minimize potential impacts on environmental and social receptors.

PERI is ultimately responsible for the implementation of measures outlined within the ESMMP, with the objective of ensuring effective implementation of the ESMMP, SEP and other project requirements. PERI will appoint resources to undertake environmental and social reviews and audits of the Contractor during the construction phase. Where responsibility for actions is assigned to the Contractor, the Contractor will be responsible for ensuring its sub-contractors understand the requirements contained within the ESMMP and have contract conditions in place to ensure applicable elements of the ESMMP are achieved.

An Environmental and Social Management System and Health & Safety Plans will be established for the construction of the Project.

Operational Phase

The ESMMP details environmental and social measures for the operation of the railway, including the requirement to establish and implement an Environmental and Social Management System and Monitoring Plan. Details regarding the management of the operation of the railway are not confirmed at this stage; however, PERI will ultimately be responsible for the operational management and monitoring. Therefore, the responsibility for implementation of measures during the operational phase is assigned in the ESMMP to PERI. PERI will also be responsible for ensuring its Contractors (e.g. vegetation management contractor) understand the requirements contained within the ESMMP and have contractual conditions in place to ensure applicable elements of the ESMMP are achieved.

Should PERI procure an Operator for the operation of the railway, this Operator would also be obliged to adhere to the requirements within the ESMMP, SEP and relevant project documentation and approvals. Furthermore, any Operator will be responsible for ensuring its sub-contractors understand the requirements contained within the ESMMP and have contractual conditions in place to ensure applicable elements of the ESMMP are achieved.

Public reporting

PERI and its Contractors will be required to publicly report on the Environmental and Social performance of the project on at least an annual basis.

3 STRUCTURE OF THE ESMMP

It is a requirement of EBRD policy that the project is undertaken in line with national law and EU standards. The requirements described in this ESMMP, therefore, reference the Republic of Macedonia legislation and are supplemented, where necessary, with measures needed to meet EU, International law and conventions, EBRD Performance Requirements and relevant international good practices.

The ESMMP has been structured as follows:

- Environmental and Social Management Plan with the following requirements (subchapter 8.3):
 - General Requirements for Environmental and Social Management
 - Socio-economic Requirements
 - Environmental Requirements
 - Stakeholder Engagement Requirements
 - Land Acquisition, Involuntary Resettlement & Economic Displacement Requirements
- Environmental and Social Monitoring Plan (subchapter 8.4)

4 ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|--|---------------------------|------------|
| General Requirements: | | | |
| Environmental and Social Management | | | |
| PERI and the Contractor will regularly review and update as required the ESMMP and SEP to ensure it is responsive to changes in project circumstances. | Continual through all Phases | PERI, Contractor | All Phases |
| Applicable Standards | | | |
| The project will be managed, constructed and operated in a manner that is compliant with applicable national, EU and International law and conventions, and relevant EBRD and EIB requirements, policies and guidance | Continual through all Phases | MOTC, PERI, Contractor | All Phases |
| Applicable Project Documentation | | | |
| PERI and Contractor will implement and comply with all measures specified within the relevant Project Documentation, including inter alia: <ul style="list-style-type: none"> • ESMMP • Stakeholder Engagement Plan (SEP) • Resettlement Compensation Framework (RCF) • Project contractually binding documents, including the Employer Requirements • Environmental and Social Impact Assessment/Statements and related Decisions from the Competent Ministry/Authority | Performance monitoring demonstrates compliance with environmental and social requirements. | PERI, Contractor | All Phases |
| PERI Environmental & Social Resources & Organisation | | | |
| PERI will establish within their organisation the environmental & social management capacity and capability to undertake inter alia: <ul style="list-style-type: none"> • Reviews of the environmental and social performance of their contractors and suppliers during railway construction and operation; • Co-ordinate the implementation of actions/measures under the ESMMP which are the responsibility of PERI; • Regular reviews of compliance with the ESMMP obligations; and • Review and update to ESMMP to ensure it reflects project circumstance and still complies with Lender Requirements. | PERI to establish sufficient environmental and social management capacity and capability for each phase. | PERI | All Phases |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|---------------------------|---------------------------|
| Environmental & Social Management Systems | | | |
| Construction Environmental & Social Management System (CESMS) | | | |
| <p>As part of the Site Management Plan the Contractor will develop and implement a Construction Environmental & Social Management System (CESMS) to support the implementation of the ESMMP & SEP and support good environmental & social management practices. The CESMS will be developed and implemented in-line with international standards (i.e. ISO 14001, EU EMAS & SA 8000) and include inter alia:</p> <ul style="list-style-type: none"> • Organization, responsibilities and resources (including commitment that critical ESHS positions will be identified and maintained) ; • Construction Environmental & Social Management Plan, including supplementary plans (e.g. Waste Management Plans, Hazardous Materials Management Plans); • Procedure which assesses ESHS risks; • Monitoring Plan (see Section 8.4); • Emergency Preparedness & Response Plan; • An audit process and programme (including performance audits, audits on labour & working conditions); • Training programme; and • Reporting of Environmental & Social performance. <p>The Contractor shall appoint an appropriately qualified Environmental, Social, and Health & Safety (ESHS) Manager who will be responsible for the development and implementation of the CESMS and co-ordination to ensure the provisions of the ESMMP are complied with. The ESHS Manager shall have appropriate qualifications, training, authority & responsibility and resources. The ESHS Manager shall have assigned responsibilities including, but not limited to:</p> <ul style="list-style-type: none"> • Implementation and maintenance of the CESMS (including audits, corrective actions, etc.); • Implementation of the ESMMP; • Implementation and co-ordination of Construction Environmental & Social Management Plan and associated management & mitigation plans; • Preparation of quarterly reports for compliance with ESMMP (and other applicable standards/documents) and related to CESMS and Construction Environmental & Social Management Plan; • Managing an incident reporting system (including near-misses); and • Preparation and submission of environmental monitoring reports to PERI and reports as required to EBRD/Lenders which will include review of compliance with ESMMP obligations. <p>In the event more than one main contractor is appointed then one overarching Project CESMS should be established for all Contractors to adopt.</p> | <p>CESMS must be in place prior to construction. Draft Manual to be provided for review and approval by PERI within 45 days of contract award.</p> | <p>Contractor</p> | <p>Construction Phase</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|---|---------------------------|---------------------------|
| Operational Environmental & Social Management System (OESMS) | | | |
| <p>PERI will develop and implement an Operational Environmental & Social Management System (OESMS) to support the implementation of ESMMP & SEP and support good environmental & social management practices. The OESMS will be developed and implemented in-line with international standards (i.e. ISO 14001 & SA 8000) and include (but not be limited to) the following:</p> <ul style="list-style-type: none"> • Organization, responsibilities and resources; • Operational Environmental & Social Management Plan, including supplementary plans e.g. Waste Management Plans, Hazardous Materials Management Plans, etc; • Operational Monitoring Plan (see Section 8.4); • Emergency Preparedness & Response Plan; • An audit process and programme, including performance audits and railway safety audits; • Training programme; and • Reporting of Environmental & Social performance. <p>PERI shall appoint an appropriately qualified ESHS Manager who will be responsible for the development and implementation of the OESMS and co-ordination to ensure the provisions of the ESMMP are complied with. The ESHS Manager shall have appropriate qualifications, training, authority & responsibility and resources. The ESHS Manager shall have assigned responsibilities including, but not limited to:</p> <ul style="list-style-type: none"> • Implementation and maintenance of the OESMS (including audits, corrective actions, etc); • Implementation of the ESMMP; • Implementation and co-ordination of OESMP (and associated management & mitigation plans); • Preparation of quarterly reports for compliance with ESMMP (and other applicable standards/documents) and related to OESMS; • Managing an incident reporting system (including near-misses); and • Preparation and submission of environmental monitoring reports to PERI and reports as required to EBRD/Lenders which will include review of compliance with ESMMP obligations. | <p>OESMS must be in place prior to commissioning and operating of the railway</p> | <p>PERI</p> | <p>Operation Phase</p> |
| Site Management Plan (SMP) | | | |
| <p>Preparation and implementation of Site Management Plan for construction, including inter alia:</p> <ul style="list-style-type: none"> • Location of borrow pits and inert waste landfills to be used; • Location of batching and crushing plants and construction camps; • Haulage routes (as far as possible Haulage Routes previously used on Sections 1 & 2 should be re-used); • Site Clearance plan; • Construction Travel Plan (including volume and type of construction vehicles etc) & Traffic Management; • Location of workforce accommodation camps; and • Security plan. <p>Within the Site Management Plan the Contractor must demonstrate how they intend to ensure clear delineation of the 'Project Area' (i.e. site) to ensure construction activities (including site clearance, movement of machinery & vehicles etc.) do not go outside specified area approved in main design and clearly identify any additional land acquisition needs will comply with the RCF and RAP(if appropriate) .</p> | <p>The SMP must be in place prior to construction. Draft SMP to be provided for review by PERI within 45 days of award.</p> | <p>Contractor</p> | <p>Construction Phase</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|--|---------------------------|--|
| Sub-contractor/Supplier Management | | | |
| <p>The railway Contractor/Operator will apply contractual agreements for securing services of sub-contractors and suppliers, which ensure they are obliged to comply with all environmental and social requirements contained with applicable Project documentation and standards. The Contractor/Operator will advise their sub-contractors and suppliers of their Environmental, Social, Health & Safety (including Labour & Working Conditions) responsibilities, including relevant requirements within the ESMMP. Applicable ESHS requirements shall be contained within contractual agreements, including the requirement for sub-contractors to pass requirements to any of their sub-contractors and establish provisions for EHS reporting.</p> | <p>Sub-contractor & supplier agreements to contain ESHS requirements.</p> | <p>Contractor, PERI</p> | <p>Construction Phase/ Operational Phase</p> |
| Socio-economic requirements | | | |
| Stakeholder Engagement | | | |
| <p>PERI shall maintain and implement a Stakeholder Engagement Plan (SEP) and grievance mechanism relevant for each Phase of the Project to ensure that all stakeholders are identified, that sufficient information about issues and impacts arising from the Project (e.g. construction impacts) and proposed mitigation are disclosed in a timely manner and that all stakeholders are consulted in a meaningful and culturally appropriate way throughout project implementation. Determine whether any vulnerable / disadvantaged groups or communities are likely to be disproportionately or permanently and adversely affected by the Project and identify and implement appropriate communication methods to consult with them about mitigation measures.</p> <p>Contractors shall adopt the SEP and grievance mechanism principles and requirements within their own Management Systems as appropriate, and provide training to staff on the SEP requirements.</p> <p>PERI will aim to involve stakeholders and to keep good communication practices during the lifetime of the project through its PR Division. Their objectives will be:</p> <ul style="list-style-type: none"> • Providing local communities with a project schedule and information on project activities that may affect them, together with mechanisms for their feedback • Provide general information to improve knowledge of what the project involves, with all stages and expected performance • To make available to the public a grievance procedure, in order to collect , respond and resolve issues and complaints on a timely basis (30 days) <p>For each of the stakeholder groups defined in the SEP communication tools suggested will be used in order to ensure easy, transparent, direct, open and interactive communication with all stakeholders .</p> | <p>Stakeholder Engagement Plan and operational grievance mechanism in place prior to construction.</p> | <p>PERI/MoTC</p> | <p>During all phases</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|--|---------------------------|--|
| Land acquisition, involuntary resettlement & economic displacement | | | |
| Information and consultation with affected people | | | |
| <p>All feasible alternative project designs should be explored to avoid or at least minimise physical and/or economic displacement.</p> <p>The Project shall comply with and implement the RCF and associated RAP's and ensure all affected owners / users of land (including those who are using land informally) are appropriately informed, consulted and compensated for their assets and any losses:</p> <ul style="list-style-type: none"> – Primarily through negotiated settlements; – At full replacement cost; – Additional assistance to be provided to the people who will be resettled for restoring their standards of living and further improve them; – People who have not vacated their houses which were expropriated during 2004 should be advised in good time about the Project and the risk of remaining nearby the line so they can move out; – Prior to displacement; and – With any additional resettlement assistance needed <p>Any grievances are resolved on a timely basis, with evidence of formal and informal communication retained.</p> <p>Resettlement Action Plans to be prepared by a suitably qualified specialist approved in consultation with EBRD for each section based on Expropriation Studies, socio-economic surveys and a census. The RAPs are to be compliant with EBRD PR 5 requirements and approved by EBRD/Lenders in advance of any land acquisition in Section3.</p> <p>Affected persons shall be given the opportunity to participate in the negotiation of the compensation packages, eligibility requirements, resettlement assistance, suitability of proposed resettlement sites and the proposed timing.</p> | <p>Resettlement Action Plans to be prepared separately for each section</p> <p>Affected people are informed about final Project footprint. during design phase</p> <p>All project affected people have restored their livelihoods and standards of living.</p> <p>Monitor number and type of submitted grievances.</p> | <p>PERI</p> | <p>Design Phase/Construction phase</p> |
| <p>Detailed socio-economic survey needs to be undertaken in order to recognize the real situation for all project affected people particularly on Section 3, taking into consideration those without legal rights over properties and belongings. This survey should take into consideration the Expropriation Study for Section 3 (prepared in 2010).</p> | <p>Detailed survey and census to be conducted</p> | <p>PERI/MoTC</p> | <p>Design Phase</p> |
| <p>Census to be conducted in line with PR 5 requirements in order to facilitate the process and successful outcomes of resettlement and/or livelihood restoration.</p> | | | |
| <p>Resettlement Action Plans to be prepared, separately for each section based on Expropriation Study, Detailed survey and Census. PERI shall ensure that the affected families are duly compensated for all their belongings and expenses connected with being resettled in accordance with the Resettlement Compensation Framework developed under this ESIA.</p> | <p>Resettlement Action Plans to be prepared separately for each section</p> | <p>PERI/MoTC</p> | <p>Design Phase</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|--|--|--|
| With regards to the loss of gardens and agricultural production due to temporary land loss in Section 3, owners to be compensated according to the Resettlement Compensation Framework. When available and preferred by owners, other land (state owned) to be utilized for continuation of agricultural production. | Support to affected families in restoring their life and standards | PERI/MoTC | Design Phase |
| Community Health and Safety | | | |
| Construction work shall commence on site only when the construction phase Health & Safety (H&S) Plan has been adequately developed by the Contractor and approved by PERI's Representative. | H&S Plan will be developed | PERI/Contractor | During the Design Phase and prior to the start of construction works |
| Traffic Management Plan will be developed for the safe use of vehicles on and off site ; driving standards; safe access to construction sites with minimum negative impact on the existing roads and in parallel for ensuring community safety and easy access to their properties (homes, land and gardens). Workforce transportation should be considered within TMP. | Development and implementation of the Traffic Management Plan | Contractor/PERI Contractor: will prepare Plan in discussion with PERI (Approval by PERI). The Police will be a consulted part in the development of the plan | During the Design Phase, prior start of construction works and during construction works |
| For traffic control and safety, the information about the project activities and driving standards will be announced through the local radio/TV. PERI and the Contractor/s will openly and transparently inform residents in the affected places and villages as a minimum on a quarterly basis regarding the planned activities and safety measures to be employed. | | | |
| The traffic flow through the site and within the urban areas will be coordinated with the responsible traffic engineers in the municipalities. | | | |
| The main design studies for construction of the railway alignment will be developed and revised by supervisor/s according to the national legislation on construction and best construction practice as well environmental requirements and pollution prevention principles. | All main design studies for railway construction prepared by designer to be reviewed by PERI. Evidence of public consultation on crossing locations. | PERI/Designer | Prior start of Construction Phase |
| A separate study on the siting and types of pedestrian/vehicle crossings (over/under crossings) will be developed based on the site visits and consultations with project affected local communities. | | | |
| The structural elements (tunnels, bridges including the reconstruction of the bridge over river Pcinja in Section 1, over/underpasses, viaducts) will be designed in accordance with national and international standards on safety and functionality. | | | |
| A CONSTRUCTION Community Health and Safety Educational Programme will be developed to inform and build awareness and understanding of the local community and drivers on the construction hazards and potential adverse impacts during the construction phase and how to minimize the potential for an accident and/or injury to occur. The Programme will be linked to the SEP and utilise various communication methods to address the needs of vulnerable groups such as children and illiterate residents. | Development and implementation of a Community Health and Safety Educational Programme | PERI/Contractor | During the Design Phase, prior start of construction works and during construction works |
| Workers must receive training and guidance on how to avoid conflicts with the local community members and sign a code of conduct, in order not to create conflicts with the local environment. Any damage or grievance shall be managed by the Grievance Process and any repair/compensation be made in a timely basis. Worker transportation and to avoid negative impacts on local residents | Avoid conflicts between workers and local communities. No community related grievances. | PERI/Contractor | Prior start of construction works/Construction Pphase and Operations (security) |
| Worker transportation and modes for workforce movements during construction works will be organised in a way that will minimize negative impacts on local residents. | | | |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|--|---|
| To avoid unauthorized entrance at worker camps and contractor's facilities, the design, layout and site location of facilities should facilitate natural surveillance by police and the security guards engaged by Contractor/s. Worker camps not to be adjacent to local settlements. | | | |
| Adequate selection of qualified security guards and appropriate training. The project shall apply the Voluntary Principles on Security and Human Rights . | | | |
| The design and location of railroad level crossings overpasses and underpasses must take into account the views and concerns raised by local residents and other stakeholders . Evidence of consultation with stakeholders to be retain particularly in respect of Section 1 where the existing level crossing to be replaced with two level crossings. | Ensure all level crossings are either under and over passes. Warning devices within design and submitted to PERI for approval/review. Consultation Plan. | Designer/Contractor (PERI: review and implement (as required) provisions during Operation Phase) | During the Design Phase |
| Warning devices to be installed to warn pedestrians that a train is approaching, special attention to be given to the stations and where vulnerable residents are located e.g. children. Any hazards such as overhead power lines will be fitted with appropriate warning signs. | | | |
| A Community Health and Safety Educational Programme will be developed for railway OPERATION | Development of a Community Health and Safety Educational Programme for start of railway operation. | PERI | Prior to start of Operational Phase |
| PERI (Macedonian railways – Infrastructure), together with operator Macedonian railways – Transport will undertake a series of public relation activities (must run and support a series of community activities, including school visits, safety centres, diversionary activities and communications programmes), in order to inform local citizens, passenger and workers about the dangers associated with the railway line operation, crossing at unauthorised locations, electrical safety , trespass and/or vandalism. | Public access to the information on railway, informing local citizens, passengers and workers on the nature of the railway operation, benefits and risks | PERI/Macedonia Railways - Transport | Prior start of Operational Phase/During Operational Phase |
| Community Issues | | | |
| Workers will receive training and guidance on how to avoid conflicts with the local community members and sign a labour code of conduct, in order not to minimise potential conflict and community tensions. | No community tensions | PERI/ Contractor/s | Prior and during Construction Phase |
| Location of workers camps to be outside existing communities. | | | |
| Local Workforce Recruitment Plan to be developed in order to assure employment of much as possible local workforce. | | | |
| Modes for workforce movements (will be well organised and reviewed by PERI and Contractors. | | | |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|---|--|--|
| Access | | | |
| <p>A Traffic Management Plan should will be developed and implemented, and will cover inter alia:</p> <ul style="list-style-type: none"> • The risks assessment that which clearly identifies all risks from the construction works to the travellers, drivers, workers will need to be developed. • Identification of the new access roads for construction vehicles and safety measures used for pedestrian access and crossings minimizing and avoiding agricultural temporary land loss. • Identification of all public roads and paths that will be affected and proposed for the transport routes during the construction period (which sections will be closed and till when, where the traffic will be diverted).; • Minimization of the traffic disturbance ; • The signing of the construction area, new directions, ring roads, access roads etc.; and • Public notification of any traffic-related concerns, such as road/streets closures.. • The risks assessment which clearly identifies all risks from the construction works to the travellers, drivers, workers needs to be developed • Identification of the new access roads for construction vehicles and safety measures used for pedestrian access and crossings minimizing and avoiding agricultural temporary land loss • Identification of all public roads and paths that will be affected and proposal for the travelling route during the construction period (which sections will be closed and till when, where the traffic will be diverted); • Minimization of the traffic disturbance; • The signing of the construction area, new directions, ring roads, access roads; • Public notification of any traffic-related concerns, such as road/streets closings; | Development and implementation of a Traffic Management Plan | PERI/Designer/Contractor/ (The Police will be a consulted part in the development of this plan and PERI will work with the Police to achieve the correct implementation of the plan) | Prior and during Construction Phase |
| Risk assessment that clearly identifies all risks from the construction works to the travellers, drivers, workers will be developed. | | | |
| Utilities | | | |
| Prior to construction works during the Design Phase, the designer will obtain available underground cadastre from relevant service providers. | Minimal disruption of utilities | PERI/Designer/Contractor/ | Design Phase/ Construction Phase/Operational Phase |
| Prior excavation works, Contractor/s will inform service providers in writing about planned construction activities which could affect some utilities and to request presence of their representatives on site. Where necessary the isolation of services which may pose a problem are to be arranged. | | | |
| In case of lack of underground maps consultation with local citizens will be carried out to identify underground connections especially in regards with their properties and consequently to inform referenced service providers. | | | |
| Ensure water and electricity requirements for Project do not result in supply issues with utilities to surrounding area. | | | |
| Provide adequate electrical capacity in the area such that the electrification of railway will not reduce the availability or disrupt the electrical supply in the area. | | | |
| Vulnerable Groups | | | |
| Traffic solution for Pero Cico settlement will be designed and later constructed in order to provide safe and regular access of the inhabitants to their houses (e.g. overpasses). | Implementation of structural improvements to houses, noise mitigation measures and provision of a | PERI/Designer/Contractor | Design Phase/ Construction Phase/Operational Phase |
| To ensure the safety of people living near railway, there will be adequate markings and signage, for both construction and operational phase. | | | |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|---|---------------------------|--------------|
| <p>To protect third parties from electrical hazards, adequate physical barriers and signage shall be located in the immediate areas of the settlement. The signage shall be pictorial in nature.</p> <p>The level of literacy of the affected people should be taken into consideration in the communication methods and signage design.</p> <p>Strengthen any structurally unstable houses/residencies near the track, including in Pero Cico, which could be affected by vibration created by construction and operational activities in negotiation with the house owners in advance of works.</p> <p>A Detailed Railway Noise and Vibration Study will be completed during the development of the detailed design of the railway project to refine the results of this ESIA noise and study and with the main aim of determining the specific and optimum noise abatement measures to be taken, according with national and EU/WHO standards.</p> <p>Noise mitigation such as anti-noise wall/barriers, house insulation and triple glazing of windows, to reduce the adverse impact of the noise (and provide additional security and safety of residents) to an acceptable level will be discussed and agreed with vulnerable groups.</p> <p>For section 1, during stage 1, noise abatement measures will need to be installed at locations in Chereskoselo, Lopate, Rezanovce, Sredorek, PeroCico, Proevce, Kumanovo spa, ShupliKamen, and Dovezance.</p> <p>During stage 2, in addition to the noise abatement measures installed in section 1, abatement measures will be need in the locations of Krilatica/Ketenovo, Odreno, Petralica and T'liminci in section 2, and KrivaPalanka and Zidilovo in section 3.</p> <p>Compensation for the loss of space at the front of the houses at Pero Ciro settlement (currently used for storage and as a children's play space). To be achieved in cooperation with the Municipality of Kumanovo. PERI must allocate a childrens's play space close to the community area affected and a safe access route to this space should be provided.</p> <p>Another location will be allocated to the Pero Cico affected community for storing plastic bottles. PERI will agree this location in close cooperation with Municipality of Kumanovo and discuss with the community, so that can continue to carry out this activity.</p> <p>Compensation will be agreed with the affected people for any loss of businesses and incomes.</p> <p>Anti-noise wall, house isolation and triple glazing in the windows will be implemented as a mitigation measure for settlement of Pero Čičo (where practicable) to reduce impacts to an acceptable level.</p> | compensatory play area and bottle storage for the Pero Cico settlement. | | |
| Workforce & Worker Accommodation | | | |
| <p>To adopt and/or maintain appropriate Human Resources Policies and procedures. These policies will be clear, understandable and accessible to workers and comply with PR2 requirements.</p> <p>To develop policies to promote non-discrimination and equal treatment and to prevent harassment (including sexual harassment) and bullying in the workplace, and make sure that they are clearly communicated and accessible to management, supervisors and workers.</p> <p>To ensure that managers and supervisors are trained in the application of the HR policies.</p> <p>To ensure that job advertisements, job descriptions and applications do not refer to applicants/workers race, gender etc. (except rare cases where legal exceptions apply).</p> <p>To ensure that decisions on hiring, working conditions, pay, benefits, training, promotion, termination, redundancy are not made on the basis of discriminatory grounds or on the basis of criteria which disproportionately impact on one group more than another.</p> <p>To ensure that women and men are paid the same wages for work of the same value, i.e. remuneration is based on the employee's skills, experience, responsibilities and other objective, non-gender related factors</p> | Human Resources policies to be prepared and implemented | PERI | Design Phase |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|---|--|
| To monitor the workplace for any form of harassment and, where it is found, act quickly to address it. | | | |
| To ensure that workers are not asked about or required to undergo health or pregnancy testing, except where there is a genuine health and safety need. | | | |
| To take steps to enable workers with disabilities to retain their jobs and make accommodations required by national law for physically disabled persons. | | | |
| Workers camps to be located outside communities. | | | |
| PERI to undertake audits of the design and implementation of the worker's compounds against the checklist in the IFC/EBRD guidance document ² ; audits will be scheduled as follows: <ul style="list-style-type: none"> – prior to construction of the accommodation (i.e. an audit of the design); – prior to its opening; – on an annual basis (each year after opening). | Ensure workers camps are designed and constructed/operated according to EBRD guidance document | PERI | Prior to Construction Phase and annually |
| Audits of worker accommodation to be undertaken by PERI against the IFC/EBRD worker accommodation guidelines. Any defects or issues (where relevant) identified in the audits to be addressed and then reassessed for compliance within one month of the audit. | | | |
| All workers will receive appropriate ESHS training in required languages. This will form part of the site/project induction process. The ESHS training will cover appropriate ESHS requirements including: the Code of Conduct, community interactions, the grievance mechanisms and biodiversity issues; prevention measures and awareness raising of potential diseases and health issues that may be introduced or effect the workforce and Emergency Planning and Response. | Site/Project Induction Information/ ESHS Training planned within CESMS & OESMS and grievance mechanism& Response | Contractor: Construction PERI: Operation | Construction Phase & Operation PhaseCPCP |
| Social Facilities and Services Plan for workers to be prepared which regulates the following: <ul style="list-style-type: none"> • Housing standards must include special attention to minimum space allocated per person, supply of safe water in the workers' dwelling in sufficient quantities, adequate sewage and garbage disposal systems and appropriate protection against heat, cold, damp, noise, fire, and disease-carrying animals, and, in particular, insects. • Medical Risk Assessment and Medical Response Plan for on-site first aid requirements and medical emergencies in compliance with Lenders requirements. • For facilities located in hot weather zones, adequate ventilation and/or air conditioning systems must be provided. Both natural and artificial lighting must be provided and maintained in living facilities. • A separate bed for each worker must be provided. The practice of "hot bedding" should be avoided. The minimum space between beds should be 1 metre. Double deck bunks are not advisable for fire safety. • Canteen, cooking and laundry facilities must be built in adequate and easy to clean materials. Canteen, cooking and laundry facilities are kept in a clean and sanitary condition. If workers wish to cook their own meals, kitchen space will be provided separate from sleeping areas • There must be management plans and policies especially in the areas of overall operation of the facility, health and safety (with emergency responses), local community and security. • A security plan including clear measures to protect workers against theft and attack is implemented. Security staff must be checked to ensure that they have not been implicated in any previous crimes or abuses. • Community representatives must be provided with an easy means to voice their opinions and to lodge complaints to the management. There must be a transparent and efficient process for dealing with community grievances. | Delivery of Social Facilities and Services Plan, Management plans and policies, Security plan, Processes and grievance mechanisms, Workers' consultation and grievance mechanism, Emergency Preparedness & Response Plan | Contractor/s but approved by PERI | Prior to start of Construction Phase and during Construction Phase |

² <http://www.ebrd.com/downloads/about/history/workers.pdf>: Workers' accommodation: processes and standards (A guidance note by IFC and the EBRD): August 2009


| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|--|-----------------------------------|--|
| <ul style="list-style-type: none"> Mechanisms for workers' consultation and grievances to be designed and implemented for the duration of the project. Processes and grievance mechanisms for workers' to articulate their grievances must be provided and clearly explained to workers. Such mechanisms must be in accordance with PR2 Emergency Preparedness & Response Plan for the construction stage. | | | |
| <p>Occupational Health and Safety Plan to be provided to ensure compliance with National and EU safety requirements.</p> | Occupational Health and Safety Plan | Contractor/s but approved by PERI | Prior to the start of Construction Phase and during Construction Phase |
| <ul style="list-style-type: none"> All work activities carried out on site are to be properly planned and assessed so that all hazards have been recognised, those who may be at harm have been identified and adequate control measures implemented to reduce the risks to those workers and third parties who may be harmed to as low as reasonably practicable. All workers are to be provided with suitable information, instruction, training and supervision as is necessary to ensure the health, safety and welfare of all persons working on site. Any lifting operations carried out on site will be properly planned, assessing the ground conditions and above ground obstruction in the immediate area. The equipment will not exceed the safe working load and be operated by a suitable competent operator. All loads will be secured and the lift control by a competent person at all times in direct communication with the crane operator at all times. Any working at heights which can't be avoided will be carried out using suitable working platforms with adequate guard rails to prevent falls. Where a risk of falling may still be possible all workers must be provided with, and trained in the use of, suitable safety harnesses / fall arrest equipment to mitigate the consequences if a fall should occur. All construction traffic on site will be restricted to a maximum speed of 10km/hr at all times on site. Any reversing will be carried out under the guidance of a suitable trained person wearing high visibility clothing. All traffic will have suitable warning devices to allow others of its approach and be suitable segregated from any pedestrians. Any temporary work structures used during the construction phase will be designed and constructed under the guidance of a suitable competent engineer. All work activities on site are to comply with EU Directives and meet best international practise. | | | |
| <p>Implementing strict and enforceable safety practices. The general contractor and all subcontractors on a job site are required to provide a safe work environment and to warn employees of hazards there. They must hire responsible personnel to coordinate job safety, and to supervise compliance with legal rules and regulations.</p> | Implementing strict and enforceable safety practices | Contractor/s but approved by PERI | Prior to the start of Construction Phase and during Construction Phase |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|--|-----------------------------------|--|
| <p>Construction and Electrical Safety Plan is to meet international best practice and ensure compliance with EU requirements and is to be approved by PERI prior to works commencing.</p> <ul style="list-style-type: none"> Electricians are particularly at risk of death or serious injury from electric shock or burns if they fail to follow safe working procedures. It is therefore important to comply with all health and safety laws, in particular the ones to do with working safely. Electrical contractors should not allow dangerous work practices, such as working with live electricity or switching electricity on before they have finished their work and everything has been installed correctly. It is never absolutely safe to work on or near live electrical equipment. But sometimes electrical contractors agree to switch the electricity on before they have finished their work, to make the jobs of designers, commissioning engineers, clients, main contractors or people in the finishing trades easier. By doing this, except in some very specific circumstances where they have taken steps to prevent themselves and others getting injured, they are imposing the workers to life threatening situations. The work cannot be done if the electricity is switched off, and it is reasonable to work on or near the live conductors, and suitable steps have been taken to prevent the person doing the work and others from getting injured. All workers, supervisors and managers on construction sites should be made aware that it is not considered acceptable to work on or near live conductors solely on the grounds of convenience, or of saving time or cost. When the electricity is switched on, the main contractor is responsible for making sure that everyone working on site is aware of any live circuits in an area. They are also responsible for making sure that their electrical subcontractors use safe isolation procedures before working on any circuits that could possibly be live. The electrical subcontractor has the same duty and responsibility to use safe isolation practices when required. | Construction and Electrical safety Plan | Contractor/s but approved by PERI | Prior to the start of Construction Phase and during Construction Phase |
| <h2>Quality of life</h2> | | | |
| <h3>Dust Management</h3> | | | |
| DUST Management | | | |
| Construction site, transportation routes and materials handling sites will utilise dust suppression measures such as water-spraying on dry and windy days to reduce dust emissions. This is especially relevant to any residential areas and commercial and business areas. This will be achieved through the implementation of Dust Management Plan . | Dust Management Plan to minimize annoyance caused by dust | Contractor/s but approved by PERI | Prior to the start of Construction Phase |
| If crushing of construction material or waste is required, crushers should be located away from sensitive receptors. | | | |
| Vehicles and construction machinery will be required to be properly maintained and to comply with relevant emission standards and to reduce the leakages of motor oils and dispersion of pollution in waters and soil (the maintenance should be provided by the professional service company). | | | |
| Restriction of the vehicle speed to 30km/hr on all access roads and settlements. (There needs to be a figure here although I am not familiar with the types of roads or existing speed limits) | | | |
| Construction materials will be stored in appropriate places and covered to minimize dust. | | | |
| Vehicle loads likely to emit dust will be covered. | | | |
| Usage of protective masks for the workers if dust generation is expected. | | | |
| <h3>Noise and Vibration Management (Design and Construction Phase)</h3> | | | |
| Reduce the risk from any electromagnetic field, noise and vibration impacts by ensuring that the newly constructed railway corridor is at a distance of at least 10 meters from the residences. | No newly constructed railway corridor closer than 10 meters of any residence | Designer/s, PERI | Design, construction and operational phase |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|--|---|
| Information to the public about the construction works will be announced through the local radio/TV station for carefully low speed driving near the construction location (especially important for Kumanovo and Kriva Palanka within the urban settlements). | Providing information to citizens | Contractor/s through PERI | During Construction Phase |
| Methods and equipment which minimize noise during execution of foundation works will be utilized, especially when working in densely populated areas as Kriva Palanka and near preservation-worthy buildings and cultural heritage. Methods to minimize the noise level include using less machines at the same time for the work. | Minimize annoyance caused by noise No grievances relating to noise issues. | Contractor/s but approved by PERI | Prior construction and during Construction Phase |
| The construction work should not be permitted during the nights, the operations on site shall be restricted to the hours 07.00 -19.00 h. | | | |
| The vehicles that are excessively noisy due to poor engine adjustment or damage of noise abatement equipment shall not be operated until corrective measures have been taken. | | | |
| The maximum permissible speed for the heavy mechanization vehicles and predetermined route for passing near the settlements will be strictly enforced. | | | |
| The local residents will be kept informed of the planned works and advised in advance of noisy works. | | | |
| The location of noisy equipment will be chosen as far as possible away from sensitive receptors (houses, workplaces, schools and hospitals). | | | |
| The workers will be provided with ear protective devices (ear muffs and/or ear plugs). | | | |
| The good management practice would be used for the on distribution of the heavy noise equipment along the route, to avoid cumulative noise. | | | |
| The construction work will as much as possible be organised in a manner where noise is limited as much as possible, e.g. work should be performed during day time in the populated areas and should be announced ahead in good time. | | | |
| In cases where the very noisy work has to go on at night or during a longer period than one day in a place, a noise shield will be erected around the working area. | | | |
| Monitoring of vibration during performance of critical working processes will be undertaken. Buildings which are within a distance of 20-30 meters from the area where the foundation of piles and catenary masts take place will be monitored during the work. | Vibration monitoring, measures for preventing damages and fair compensation of damages | Contractor/s and PERI | Prior to construction and during Construction Phase |
| Damaged buildings will be repaired or compensation paid if damage from vibration occurs. | | | |
| Before construction work is initiated, the houses nearby the area where the foundation of piles and catenary masts will take place should be photo registered for later documentation of any damages, which the work may have caused. | | | |
| Noise and Vibration Management (Operation Phase) | | | |
| Mitigation of noise at the source, by ensuring adequate maintenance of rails, railroad switch and other material. Adequate measures can reduce the noise with up to 6 dB. | Minimize annoyance caused by operational noise at all affected properties | Designer/s, Contractor/s, overall responsibility with PERI | Design, Construction and Operational phase |
| Mitigation of noise at the receptors will be reduced through erecting noise protection shields. | | | |
| All residences which will be exposed to a noise level which is larger than the max levels established by Macedonian legislation /WHIO standards will be offered noise protection measures such as noise protection shields, triple glazing. which are fully financed by the project. | Minimize annoyance and no lasting damages to buildings | Designer/s, PERI | Design, Construction and Operational phase |
| The vibration from the trains will be reduced as much as possible by ensuring continuously maintenance of wheels and rails. Noise and vibration complaints to be recorded and investigated through the grievance mechanism. Damaged buildings will be repaired or compensation paid if damage as a result of the project is proven. During construction of the railway line, it should be ensured that likely vibrations are limited as much as possible by inter alia installing protection material below the rails. | | | |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|---------------------------|-------------------------------------|
| Environmental requirements | | | |
| General | | | |
| Construction workers will be given training sessions, prior and during construction works, to make them aware of the importance of soil, surface water and groundwater, flora, fauna, landscape, and archaeological remains as valuable resources for humans and nature, and the need for protecting them. | High level or awareness on environmental issues in the construction workforce | Contractor/PERI | Prior and during construction phase |
| Soils | | | |
| <p>Sedimentation and Erosion Control Plan, will be developed in order to identify specific erosion control techniques for use at particular sites along the railway alignment. The Plan will be based on several principles and approved by PERI prior to construction:</p> <ul style="list-style-type: none"> • Each site characteristics (topography, soils, drainage patterns, and covers) will be considered when developing the plan. Areas which are prone to erosion will be left undisturbed and undeveloped if possible. Entrance and exits points for runoff will be protected from erosion and equipped with sediment control devices. • Minimize the extent of the disturbed area and the duration of exposure and stabilize disturbed areas as soon as possible. Typically, if an area is not going to be worked on in more than 45 days, it will be protected by erosion control mats. • The use of heavy equipment and techniques that will result in excessive soil disturbances or compaction of soils will be minimized, especially on unstable slopes. • The drainage and runoff controls will be established before starting the site clearance and earthworks. The existing vegetation will be retained as much as possible. • Where water would need to be removed from excavations, it will be transferred at the minimum practical distance to be discharged. • Concentrated flows if possible will be diverted away from sensitive areas. • Sediment control devices such as sediment control ponds will be used to retain sediments from leaving the site. • The most effective erosion control devices will be implemented: i) temporary seedings; ii) temporary mulching; iii) permanent sodding; iv) temporary or permanent erosion control blankets; v) permanent vegetative buffer strips • Sediment control devices to be implemented will include: i) site fencing; ii) straw bales; iii) sediment basins or traps; iv) storm inlet traps; vi) rock check dams and vii) interception berms/swales. • Once construction is completed at a site, the decompaction and restoration of the disturbed areas that are not going to be occupied by permanent structures will be carried out by tilling the land before proceeding to the vegetation reinstatement. • Each river or large stream will have a specific Crossing Plan defining the mitigation measures to be applied (see Surface water below). | Preparation and implementation of the sedimentation and erosion control plan minimize the loss of soil | Contractor/PERI | Construction phase |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|---|---------------------------|---------------------------|
| <p>Hazardous Materials Management and Spill Prevention Plan to address issues such as:</p> <ul style="list-style-type: none"> All roads and hard standings will be kept clean and tidy to prevent the build-up of oil and dirt that may be washed into a watercourse or drain during heavy rainfall. The spill kits will be located close to the construction sites in case there is an accidental spill, so that it can be immediately cleaned up. No refuelling, storage, servicing or maintenance of the equipment will take place within 100 m of drainages, water courses, alluvial plains or other sensitive environmental resources. If these activities had to be done at the construction site, all precautionary measures shall be taken to prevent leaks or spills from reaching the soil or nearby water courses. These activities (refuelling, storage, servicing or maintenance) will take place in designated repair and maintenance third party sites adequately prepared for these purposes (adequately lined for preventing any soil and groundwater contamination, and equipped with culverts along the perimeters to collect water runoff that will be directed to wastewater treatment facilities). Ready-mix concrete trucks containing alkaline cement or residues of cement will not be allowed to enter any watercourse. Washout of the concrete trucks shall be performed at the concrete batching plant camp, where appropriate facilities will be provided. If the washout of concrete trucks were necessary at or near the construction site, this shall be done at distance greater than 200 m of any watercourse and never in a very high or high habitat sensitivity area. The washout area will be clearly signposted and drivers shall be aware of the designated locations for washout. Setting up camps on alluvial terrains has to be avoided because of the high levels of the underground water table and the risk of pollution. The proper handling and storage of lubricants, solvents will be organized as well proper usage of construction equipment. The storage of substances that are harmful to soils and waters (e.g. fuels for construction machinery) on the construction site will be minimized. All hazardous substances either products to be used or waste, shall be stored in adequate places, far from sensitive areas (e.g. water courses, habitats with a rich biodiversity) and adequately equipped to prevent any soil, surface water or groundwater contamination). For the storage of the wooden sleepers removed from the railway track in section 1, the temporary storage areas near the construction site will be lined and provided with runoff collectors. Removed sleepers will be taken to a safe storage place or handled to a hazardous waste contractor as soon as possible. Vehicles and construction machinery will be subject to regular preventive maintenance so as to reduce leakages of lubricants, motor oil and fuel. | <p>Preparation and implementation of the Hazardous Materials Management and Spill Prevention Plan to prevent the contamination of soil and waters with hazardous substances</p> | <p>Contractor/PERI</p> | <p>Construction Phase</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|--|---|---|
| <p>The Waste Management Plan will implement procedures for waste minimisation, recycling, treatment and disposal in accordance with national and EU requirement and will cover the following:</p> <ul style="list-style-type: none"> The different waste types that could be generated at the construction site (due to the materials used and waste generated in different sections) shall be identified and classified according to the national List of Waste (Official Gazette no.100/05) on hazardous and non-hazardous waste streams. Complete separation of hazardous from non-hazardous waste streams at the construction site will be done. The waste material (concrete, iron, rocks, etc.) accidentally deposited will be immediately removed from highly sensitive habitats. Municipal solid alike waste generated in the construction site and camps (food, beverages, packaging waste such as paper, bottles, glass, etc., glass bottles, batteries) will be collected and treated according to national legislation (separation of recycling waste materials from the waste stream that will be disposed of in the solid waste municipal landfill). Recyclable waste will be given to an authorized recycling company. The Annual Report for non-hazardous waste management will be fulfilled before the municipalities of Kumanovo, Rankovce, Kratovo and KrivaPalanka and reported to the Ministry of Environment and Physical Planning. A contract with the company for waste collection and transportation shall be signed for the collection and transport of the waste generated at the construction site to the nearest municipality landfill. Inert waste landfills shall be constructed according to specifications set in the national and EU requirements. The Closure Plan for the closure of the inert landfills will be established and implemented taking into account the need for cultivation of the landfills area. The contracts signed with the companies dealing with waste recycling and recovering will ensure that the delivery and acceptance of the waste streams is performed on a frequent basis so that the construction sites remain clean at any time. The excavated soil and construction waste will be reused as much as possible. Possible hazardous waste (motor oils, vehicle fuels) should be collected separately and authorized collector and transporter should be sub-contracted to transport , recovery or finally dispose the hazardous waste; The Temporary Hazardous Waste Storage Points should be established according the national legislation on handling, labelling, storage and management with hazardous waste; The hazardous waste management procedure should be established and followed The hazardous waste will be packaged and labelled showing the R and S phrases (risk and safety statements of the hazardous waste) and it will be temporary stored on safety storage facility equipped with adequate ventilation, fire resistant conditions especially if there are VOC emissions, mercury containing lamps, asbestos materials form demolition works; The access to these temporary hazardous waste storage points need to be allowed only for trained and equipped staff with prohibited entrance of workers and public; All waste spills will be promptly cleaned up; Full records of the type of waste stream generated, quantity composition, origin, disposal destination and method of transport for all different waste streams will be kept be available for inspections; The reporting on waste management will be done on regular base to the particular municipality and the legal obligation is for further reporting by the municipality to the MoEPP through the Annual Reports; <p>The waste material (concrete, iron, rocks etc.) accidentally deposited will be immediately removed from highly sensitive habitats.</p> | <p>Waste Management Plan to be prepared and implemented to prevent soil and water contamination with hazardous substances contained in wastes, the introduction of extraneous materials in soils and waters, and to prevent the impairment of the landscape quality.</p> | <p>Contractor – Construction Phase PERI – Operational Phase</p> | <p>Construction Phase & Operational Phase</p> |
|  | <p>Railway Corridor VIII - Eastern section</p> | | <p>19</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|---|---------------------------|---------------------------|
| <p>Soil Management Plan shall be prepared by Contractors and approved by PERI. Selective removal and storage of top soil will be conducted which will :</p> <ul style="list-style-type: none"> • Topsoil will be stripped from the soil surface so as to serve for reuse in the restoration of disturbed areas not occupied by the railway. • Topsoil will be reused to restore cuttings, embankments, wildlife crossings, construction and workers camps, landfills, and borrow pits. • Temporary storage areas will be located along the strip of land along the alignment, near the sites where the soil was removed from, so that it can be reused in those same areas. • The layers of the stripped top soil will be placed aside, on the established storage areas, in the same order as the original soil levels. The topsoil removed will be collected on ridges to be built in flat areas so as to avoid the loss of the organic and biotic properties of the soil, and protected it from weather agents, mainly wind and rain, which cause the erosion of the soil ridge. The top soil storage areas shall be signposted and maintained in proper condition until the reutilization of the topsoil. | <p>Selective removal and storage of topsoil to be conducted to minimize the loss of fertile soil and ensure its properties are preserved for its reuse in rehabilitated construction sites or elsewhere (e.g. agricultural amendment)</p> | <p>Contractor/PERI</p> | <p>Construction Phase</p> |
| <p>A Chemical Accident and Spills Management Program will be developed for all railway operations to prevent and mitigate the negative impacts to soil, surface water and groundwater that could arise from eventual railway accidents and spills involving hazardous substances, and provide early response actions as well. The program shall be prepared in close cooperation with the Crisis Management Centre and the local offices of Kumanovo, KrivaPalanka and Kratovo. The Chemical Accident and Spills Program will provide information that at a minimum will accomplish the following:</p> <ul style="list-style-type: none"> • Present the measures that will be taken to minimize the risks associated with chemical, fuel, oil spills and accidents. These measures will include issues like: monitoring purchasing requirements, product substitutions, design features for containment, operational controls, work practices, labelling and storage requirements. • Specify the document-control procedures for maintaining material inventories and MSDS (Material Safety Data Sheets). • Assign an emergency response team involved in assessing the risk of hazardous material releases and working to avoid any harmful effects if any accidents happened. They will evaluate the concentrations of the chemicals, where and how population might be exposed and the potential toxic effects on the exposed people, soil and waters. They will plan and implement rapid clean up measures depending of the extent of the spills (bioremediation, floating booms and adsorbents, solid materials that capture the soil, chemical oxidation in order to break the chemicals down). • The emergency calls and coordination with the national authorities relevant for Crisis Management will be essential. The relevant national institution is the Crisis Management Center with its regional branch offices across the country. The local Crisis Management offices in the North-Eastern region are in Kumanovo, KrivaPalanka and Kratovo. • Chemicals used for everyday trains operation (fuel, lubricant oils, solvents, greases) will be appropriately stored in areas specifically designed for such purpose (either in stations along the railway or in the train) | <p>Chemical Accidents and Spills Management program to be prepared and implemented to prevent / manage spills and prevent the contamination of soil and waters with hazardous substances</p> | <p>Operator/PERI</p> | <p>Operational Phase</p> |
| <p>Train maintenance shall be done on a regular basis in order to avoid leaks and spill of hazardous materials</p> | <p>Regular maintenance of trains for avoiding leaks and spill of hazardous materials</p> | <p>Operator/PERI</p> | <p>Operational Phase</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|---|-------------------------------|
| Surface Water | | | |
| Each river or large stream will have a specific Crossing Plan defining the risks and mitigation measures to be applied (taking into account the measures listed below as relevant). Plans will be approved by PERI in advance of works. | River Crossing Plans | Contractor approved by PERI in advance | Before Construction Phase. |
| The construction of drainage pipes and bridges in watercourses will be carried out during the dry season. The design of the drainage pipes will take account of projected maximum flood events and potential changes in future flow regimes due to climate change. | Construction of civil objects in water courses to be done during dry season to minimize effects on water flow, water quality and aquatic flora and fauna | Contractor/PERI | Construction Phase |
| The extension of the construction area next to water courses will be only that strictly necessary to adequately perform the construction works. The perimeter of the area will be marked with signalling ribbons that neither vehicles and machinery nor workers will trespass. No occupation of the stream bed or the banks will be allowed, unless there is no other reasonable alternative to carry out the construction work. | Any extension of the construction area next to water courses only occurs when signed off by PERI | Contractor for application to develop near water course. PERI to sign off on application. | Construction phase |
| <p>The following guidelines will be taken into account in the construction of bridges:</p> <ul style="list-style-type: none"> • Single span bridges are the preferred structure for crossing streams as they cause the least disturbance to watercourses both hydraulically and environmentally. • Multiple span bridges are acceptable on wide streams. Acceptable arrangements will include: <ul style="list-style-type: none"> ○ Piers located outside the normal low flow stream width. In this regard, a three span bridge may be preferable to a two span bridge. The spans do not need to be of equal length. ○ Piers aligned parallel to the direction of flow. ○ Riprap provided around the piers to mitigate local scouring. ○ If piers/piles have to be constructed inside the normal low flow stream width, they would occupy less than 5% of the cross sectional area for not to cause a significant change to the available waterway. ○ The bridge abutments would be located so they do not significantly encroach into the waterway and thereby reduce the available waterway area. Abutments will also be located so as to avoid obstruction of movement of terrestrial fauna along the riparian zone. ○ Rock beaching will be used on the batters to protect against abutment scour, as this area will generally not revegetate due to inadequate light and lack of rainfall. Beaching should generally extend 3 metres upstream and downstream of the bridge abutments. ○ The batter is to be excavated to the depth of the beaching to maintain the waterway area. The slope of the batters would be in the range of 1V:1H to 1V:2H. In general, the beaching should extend at least 600 mm below the toe of the bank to mitigate undermining. Where the stream banks are stable, rock beaching may not be required. | Design & Construction to follow stated guidelines | Designer/Contractor/PERI | Design and Construction Phase |
| The railway drainage will be directed to retention basins or grassed filter zones to trap sediments and other contaminants, rather than discharging directly to the water courses. These sediment and contaminant retention structures will be constructed in the areas where habitats of very high or high sensitivity are located along the alignment or in a close location downstream of the effluent discharge point. | Designing & Construction to follow stated guidelines | Designer/Contractor/PERI | Construction Phase |
| Domestic type wastewater generated in the construction camps will not be allowed to be discharged untreated into natural water courses. The camps will be provided a wastewater treatment system to treat effluents to admissible levels for discharge in the water body. The construction sites will be provided with chemical portable toilets and the waste adequately managed. | No untreated wastewater discharge in watercourses | Contractor/PERI | Construction Phase |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|---------------------------|--------------------|
| Regular control and maintenance of drainage structures and retention basins will be conducted to check they are not clogged with debris or sediments | No blocked drainage structures | PERI | Operational Phase |
| Domestic type wastewater generated at the stations will be treated according to the relevant national legislation and EU standards. Untreated wastewater will not be allowed to be discharged into natural water courses. In the event the connection of the sewage system of the station to the municipal collector were unfeasible, the station shall be provided with a wastewater treatment system to treat effluents to admissible levels for discharge in the water body. | No untreated wastewater discharge in watercourses | Designer/PERI | Operational Phase |
| The cleaning water generated by the washing of the trains will be treated. | No untreated wastewater discharge in watercourses | Operator/PERI | Operational Phase |
| Groundwater | | | |
| Where the groundwater table is encountered during excavation, cutting or tunnelling works, the intercepted area will be sealed as soon as possible so as to re-establish the normal hydrogeological flow regime. | No major alterations of groundwater flow | Contractor/PERI | Construction Phase |
| Hazardous Materials Management and Spill Prevention Plan to be developed (see mitigation measures for soil) and will address the potential for direct groundwater contamination for activities where the groundwater may become exposed to the atmosphere (e.g. during the construction of pillars near a water course). | No significant contamination of groundwater | Contractor/PERI | Construction Phase |
| Air Quality | | | |
| <p>Measures to be implemented to minimize dust emissions and included with a Dust Management Plan:</p> <ul style="list-style-type: none"> • Hoardings will be constructed around the construction sites to minimize the spread of dust. • Accesses and construction sites will be kept moist to reduce dust formation. Water sprays will be implemented during drilling and excavation activities. • In the dry season, hygroscopic additives will be used in water to increase its presence in the ground. • Dust-generating activities will be slowed down in days of strong wind. • In windy and dry conditions, earth stockpiles will be moistened to prevent the lifting of dust particles. • Ground will be moistened during loading and unloading of aggregates in trucks. • Truck dumpers carrying spoil or other dusty materials will be covered with tarps. • Loaded trucks will be washed down prior to exit from the working site to ensure that loose material is not tracked onto the roads. • During tunnel construction, movement and handling of excavated spoil will be performed within enclosed work sheds constructed prior to the start of tunnelling. • Work sheds will be large enough to allow stockpiling of the excavated tunnel material, access of trucks and truck loading operations. • Tunnels will be ventilated during the excavation works using particulate filters, which need to be regularly maintained. | Dust Management Plan to be prepared and implemented | Contractor/PERI | Construction Phase |
| <p>Measures to be implemented to minimize emissions of combustion gases:</p> <ul style="list-style-type: none"> • Vehicles and construction machinery will be required to be properly maintained and to comply with relevant emission standards. • No unnecessary idling of construction vehicles at the construction sites will be allowed. • Construction truck traffic will be optimized so as to get a minimum number of trucks carrying the maximum volume of materials. This will be addressed in the Construction Traffic Management Plan. • The truck routes will be planned to avoid peak traffic hours or routes with heavy traffic. | Minimise emission of combustion gases and no breach of limit values. | Contractor/PERI | Construction Phase |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|---------------------------|---------------------------|
| <p>Measures to be implemented to avoid asbestos emissions during demolition of buildings:</p> <ul style="list-style-type: none"> An asbestos operational control procedure during demolition works will be developed according to national legislation on hazardous waste, Directive 91/689/EEC on hazardous waste, Council Directive 87/217/EEC on the prevention and reduction of environmental pollution by asbestos and EU Directive 2009/148/EC on the protection of workers from the risks related to exposure to asbestos at work. The storage and transport of demolition materials will be removed, packed, labelled and processed in according the national and EU legislation on management of hazardous waste and asbestos (Directives 87/217/EEC and 91/689/EEC). A risk assessment will be carried out before beginning an activity involving exposure to asbestos dust or to materials containing asbestos. | Management of asbestos emission and no exposure to any parties | Contractor/PERI | Construction Phase |
| <p>Regular maintenance of the diesel locomotives will be performed to keep them in optimal working conditions, including the achievement of minimal air emissions set by the manufacturer.</p> <p>Every effort will be made to use the cleanest fuels (e.g. on-road grade diesel) within technically feasible possibilities.</p> <p>In train stations with heating systems based on fossil fuels, these systems will be subject to regular maintenance so that combustion is complete and emission of combustion gases are kept below regulatory thresholds.</p> | Minimise emission of combustion gases | PERI | Operational Phase Stage 1 |
| Noise and Vibrations | | | |
| <p>All construction equipment will comply with the requirements of EU Directive 2000/14/EC on noise emission in the environment by equipment for use outdoors (there is a lack of national legislation on outdoor equipment emission noise levels). All the equipment shall bear the CE marking and the indication of the guaranteed sound power level and shall be accompanied by an EC declaration of conformity.</p> | Noise emissions from the Project meet national and EC guideline limits | Contractor/PERI | Construction Phase |
| <p>The equipment will be fitted with appropriate noise muffling devices that will reduce sound levels.</p> | | | |
| <p>As the project activities are performed in several noise level areas (I, II, III and IV, according to the national legislation), every effort shall be carried out to comply with the correspondent noise limits for each area.</p> | | | |
| <p>Construction works shall not be permitted during the night; the operations on site shall be restricted to the period 07.00 -19.00 h.</p> | | | |
| <p>All vehicles and machinery used at the construction sites shall be subject to regular maintenance. The vehicles and machines that are excessively noisy due to poor engine adjustment or damage noise control devices shall not be operated until corrective measures have been taken.</p> | | | |
| <p>The construction traffic plan shall establish speed limits for construction vehicles and machinery at the construction site and the haulage roads used, and organize traffic so as to avoid as much as possible populated areas.</p> | | | |
| <p>Affected local residents will be kept informed on due time of the planned works and the vibration and noise levels and periods during which they will occur.</p> | | | |
| <p>The location of noisy equipment will be chosen as far as possible from sensitive receptors (houses, workplaces, schools and hospitals). When near sensitive receptors, construction works will be scheduled and provided with the necessary resources so that the time of exposure is as short as possible.</p> | | | |
| <p>Good management practice will be used to distribute heavy noise equipment along the route so as to avoid the cumulative effects of noise.</p> | | | |
| <p>In the case where noisy works would need to be performed at night or during a longer period than one day at a given site, a noise shield shall be erected around the working area.</p> | | | |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|---|---------------------------|--|
| <p>Monitoring of vibration during the performance of critical work processes (e.g. foundation of piles and catenary masts) should be undertaken in buildings which are within a distance of 20-30 meters from the area where the these works take place. Should buildings result damaged as a result of vibrations generated by the construction works, the damaged buildings will be repaired or compensation paid.</p> <p>Operate earthmoving equipment on the construction site far away from vibration-sensitive receptors as possible.</p> <p>Activities such as demolition, earthmoving and ground-impacting operations shall be scheduled so as not to occur in the same time period. Unlike noise, the total vibration level produced could be significantly less when each vibration source operates separately.</p> | No lasting damage to buildings | | |
| <p>Decrease vibration from construction sources, including:</p> <ul style="list-style-type: none"> • Blasting. Explosive type and weight, delay-timing variations, size and number of holes, distance between holes and rows, method and direction of blast initiation. • Dynamic compaction. A smaller falling weight will produce smaller vibrations. • Pile driving. Predrilling, prejetting, replacement of displacement piles with non-displacement ones, switch impact hammer to vibratory one, replacement of driven piles with augered cast in-place piles or drilled shafts. • Select demolition methods not involving vibration impact, where possible. • Avoid vibratory rollers and packers near sensitive receptors. | | | |
| <p>A Detailed Railway Noise and Vibration Study will be completed during the development of the detailed design of the railway project to determine the specific and optimum noise abatement measures to be taken.</p> | Detailed Railway Noise Study | Designer/PERI | Design Phase |
| <p>Proposed noise mitigation measures leading to the decrease of noise exposure include measures implemented at the source of noise and measures that intercept the noise between the source and the receptor:</p> <p>At the source:</p> <ul style="list-style-type: none"> • Retrofitting international and regional trains with composite brake blocks with noise reduction potential by 8-10 dB(A). • Wheel and track absorbers with potential of reduction noise by 1-4 dB(A). <p>Between source and receptor:</p> <ul style="list-style-type: none"> • Noise barriers (protective walls) with noise reduction potential by 5-15 dB(A). • Insulation of house windows and facade with noise reduction potential by 10-30 dB(A). | Noise impacts meet national and EU legislative limits | Designer/Contractor/PERI | Construction Phase / Operational Phase |
| Landscape | | | |
| <p>The landscape impact can be mitigated by hiding from observers the construction site, the camp and ancillary areas. For this, screens will be installed around the perimeter of these sites.</p> | No significant visual impacts | Contractor/PERI | Construction Phase |
| <p>Shaping of the terrain around altered impacted areas so as to recreate the surrounding land morphology. During further design areas where potential visual and/or shading issues for residential areas/properties could occur will be reviewed and measures incorporated into design and/or mitigation measures identified and implemented.</p> | | Designer/Contractor/PERI | Design Phase/End of Construction Phase/Operational |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|---|---------------------------|--|
| <p>Vegetation with autochthonous species present in the surrounding area of:</p> <ul style="list-style-type: none"> • slopes of the cuttings and embankments. Vegetation measures are generally recommended for 2H:1V slopes. • areas around the tunnel mouths. • water courses and banks underneath constructed bridges, as well as in the abutment areas. • Affected areas underneath the viaducts as well as above, in abutment zones. • Aesthetic integration of the structural parts of viaducts and bridges (e.g. deck, pillars) and tunnel mouths, using construction materials with colors and textures that blend well with those of the surrounding landscape (e.g. dark concrete for pillars in a black pine forest). <p>Design of the landfill waste disposal patterns so that the final contours are integrated with those of the unaffected part of the waste receiving valley.</p> <p>Vegetation of the sealed landfills with autochthonous species adapted to the resulting valley conditions.</p> <p>If borrow pits are open for the construction of the railway project, these will be reinstated at the end of the construction works.</p> | | | Phase |
| BIODIVERSITY (Also see <i>Flora, Fauna & Protected & Designated Sites Provisions</i>) | | | |
| <p>A Biodiversity Management Plan (BMP) will be prepared and implemented for Section 3 (and covering Section 2 if determined to be required) to ensure the integrity and conservation objectives of the Emerald Sites in Macedonia and the Natura 2000 sites on the Bulgarian side, and that works in these areas or close to them are carefully managed. The BMP shall include the necessary assessments need to fully comply with Article 6 of the Habitats Directive.</p> <p>The BMP will be prepared and finalized in advance of and prior to any works in Section 2 and 3. The necessary assessments to meet the provisions of Article 6 of the Habitats Directive will be completed in consultation with national nature conservation authority and other relevant stakeholders. The BMP will be publicly disclosed.</p> | Biodiversity and Management Plan approved by national nature conservation authority and publicly disclosed. | PERI | Design Phase (prior to any construction operations in Section 3) |
| Flora | | | |
| <p>In Sections 2 and 3 of the railway alignment, the surface for carrying out the clearance of vegetation will be limited to the strip of land needed for the occupation of the permanent way and the right of way of the future railway corridor and the adjacent working width for buildings.</p> <p>As far as possible, the path of the haulage route shall avoid areas of highly sensitive vegetation, including Thermophilous oak forests; Mesophilous oak forests; Submontane beech forest; Hill pastures on stony sites; Unmanaged mesic grasslands; Rivers and streams - epipotamal and hiporhitral streams; Montane streams - Metarhitral streams; Meadows – mesophilous; Wet meadows, or very highly sensitive vegetation, including Riparian willow-poplar woodland; Hill pastures. Any requirement to impact such sensitive vegetation will be documented and approved by PERI before the work commences</p> <p>As far as possible, the workers camps constructed during the previous construction period of the railway (1994-2004) shall be reutilized. Should new camps and auxiliary facilities be needed, these will be constructed in areas of vegetation with negligible sensitivity vegetation (only on abandoned fields, ruderal and trampled sites) or low sensitivity (only on Black locust stands and plantations and Black Pine plantations)</p> | Minimal impact on Flora. No areas cleared unless required for construction. | Contractor/PERI | Construction Phase |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|---|--|--------------------------|
| <p>In areas of high and very high sensitive vegetation, the working sites will be marked by means of ribbons or other type of landmark so that workers and construction vehicles and machinery do not trespass on non-working areas.</p> <p>In forested areas, and especially those where the value of vegetation is high or very high (Thermophilous oak forests; Mesophilous oak forests; Submontane beech forest; and Riparian willow-poplar woodland), each tree lying in the border of the construction site will be protected by covering its trunk with wooden planks avoiding any damage to the tree.</p> <p>The cutting of trees, will only be done with the required permits in compliance with the applicable regulations and all the necessary permits will be obtained prior to the clearance of vegetation.</p> <p>Non operational areas will be restored to a state as close to the original conditions as possible through reinstatement activities, using native plant species from the surrounding areas.</p> | | | |
| <p>Control of vegetation along the track will be managed through an integrated vegetation control and management program, which defines: a) type of herbicides to be used, b) application doses, c) time and frequency of application, d) areas where the use of herbicide is prohibited (e.g. in areas of sensitive vegetation, in some buffer zones near the rivers or shallow groundwater), e) alternative methods to the use of chemical methods.</p> | <p>No impacts from herbicides outside of the track bed and immediate margins</p> | <p>PERI to prepare program in coordination with responsible experts from the Faculty of Agriculture (Plant Protection), the Drugs Agency and the Ministry of Health.</p> | <p>Operational Phase</p> |
| <p>From the edge of the track area to the boundary of the right-of-way, vegetation will be structured with smaller plants near the line and larger trees further away from the line to provide habitats for a wide variety of plants and animals. This means that:</p> <ul style="list-style-type: none"> • Mowing can be used to control growth of ground covers, minimize propagation of plants in the track area, and prevent the establishment of trees and shrubs in the right-of-way. • Herbicides in combination with mowing can control fast growing weedy species that have a potential to mature to heights over those permitted within the right-of-way. • Trimming and pruning can be utilized at the boundaries of rights-of-way to maintain corridor breath and prevent the encroachment of tree branches. • Hand removal or removal of vegetation, while labor intensive, can be used in the vicinity of structures, streams, fences and other obstructions making the use of machinery difficult or dangerous.); | <p>Development of a natural vegetation along the railway corridor which assist the screening of the Railway</p> | <p>Operator/PERI</p> | <p>Operational Phase</p> |
| <p>Native species will be planted and invasive plant species removed. This includes:</p> <ul style="list-style-type: none"> • Dense, thorny native shrubs can be used to help deter trespassers. • Native plants can also help to stabilize clay soils, reducing the need for ballast maintenance. • Leaves of some tree species with invasive root systems can cause traction problems for rail wheels. Therefore, such trees are often removed, even if native to the area. • Waste from removal of invasive species will be disposed of (e.g. by incineration of at a landfill) to avoid accidental spreading of the weeds to the sites.); | <p>Development of a natural vegetation along the railway corridor which assist the screening of the Railway</p> | <p>Operator/PERI</p> | <p>Operational Phase</p> |
| <p>Railways will be designed and maintained to discourage plant growth in the track area (e.g. providing lateral barriers to plant migration and ensuring rapid drainage of the track area.);</p> | | | |
| <p>Biological, mechanical and thermal vegetation control measures will be used where practical, and use of chemical herbicides on the bank beyond the transition area will be avoided (approx. 5 meters from the track);</p> | | | |
| <p>Maintenance clearing in riparian areas will be avoided or minimized.</p> | | | |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|--|---------------------------|--------------------------|
| <p>Where the integrated approach to vegetation management indicates the use of herbicides as a preferred approach to control fast growing vegetation within railway rights-of-way, the recommended precautions include:</p> <ul style="list-style-type: none"> • The herbicides used for vegetation management shall be checked to ensure that PERI uses approved pesticides and avoids using herbicides included in the “forbidden” list issued by international organizations such as WHO (Stockholm Convention) and national legislation (Law on Plant Protection – Official Gazette of RM No. 110/2007, amended 16.02.2009). • Atrazine diuron and other organic long lasting herbicides will not be used along extensive stretches of tracks. They will be replaced by more environmentally friendly glyphosphate or imazapyr containing substances. • The use of persistent soil acting herbicides shall be avoided. • Spraying will be conducted with non-residual herbicides (vs use of residual herbicides). • Application of soil herbicides will be avoided and foliar herbicides used instead (the active ingredient is taken up by the foliage rather than by the roots of plants). • The herbicides used will have a half-life of no more than 2-6 months and be totally degradable within a year of application. • Personnel will be trained in herbicide application, including applicable certification or equivalent training where such certifications are not required. • The users will review manufactures’ directions on maximum recommended dosage, as well as published reports on reduced rates of herbicide application without loss of effect, and apply the minimum effective dose. • An optimal dosage and accurate spraying only when and where needed will be practiced, even with the less toxic herbicides. • Herbicide application equipment will be maintained and calibrated in accordance with manufacturers’ recommendations. • The herbicide application will be based on criteria such as field observations, weather data, time of treatment, and dosage, and using a pesticide logbook to record data. • Application practices will be designed to reduce unintentional drift or runoff. Herbicide application shall be restricted during adverse weather conditions (e.g. avoiding extensive spraying in rain, inefficient due to dilution, or wind, inefficient due to drift. Larger quantities are needed to get same results). • Untreated buffer zones or strips will be established along water sources, rivers, and streams to help protect water sources. • Spraying of environmentally sensitive areas will be avoided (e.g. those defined in this ESIA as having very high and high sensitivity). Alternative weed removal measures will be sought for these areas (e.g. use of sealing layers, for example made of cloth, to prevent weeds from growing on embankments, or mechanical clearance where possible). • Contamination of soils, groundwater, or surface water resources due to the accidental spills during transfer, mixing and storage of herbicides will be prevented by following the Chemical Accident and Spills Management Program. | <p>No impacts from herbicides outside of the track bed and immediate margins</p> | <p>PERI</p> | <p>Operational Phase</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|---|--|---------------------------|--|
| Fauna | | | |
| <p>Construction activities shall be scheduled so as to avoid the breeding season and other sensitive seasons or times of day, especially in areas where high sensitive species are concerned associated to sensitive habitats (see Chapter 6.2.9):</p> <ul style="list-style-type: none"> High sensitive habitats for this ESIA include areas of Mesophilous oak forests, Submontane beech forest, Riparian willow-poplar woodland, Hill pastures, Rivers and streams (epipotamal and hiporhital streams), Montane streams (metarhital streams), Meadows (mesophilous), and Wet meadows. The eastern part of the alignment, particularly the stretch of section 3 between K.P. 64 and the end of the planned railway alignment needs to be specifically taken into account in the scheduling of construction activities. In this section the railway passes near or crosses Emerald sites Pchinja-German (MK0000029) and Osogovo (MK0000026), ecological corridors Osogovo-BilinaPlanina and Osogovo-German, proposed protected areas KiselickaReka and Osogovo Mountains, and the two overlapping Natura 2000 sites across the Bulgarian border, which are a continuation of the Macedonian Emerald sites (SPAOsogovo (BG0002079) and SAC OsogovskaPlanina (BG0001011)). | No construction activities during the breeding season in sensitive habitats | | Construction Phase |
| Prior to the commencement of any construction work activity on a site, a fauna survey of the area and its surroundings shall be carried out by a qualified biodiversity expert. | | Contractor/PERI | |
| If active breeding sites of sensitive species of fishes, amphibians, reptiles, bird, or mammals, including bats, are found, they will be transported by specialized technicians to another appropriate location away from the railway construction area, unless the biodiversity expert decides on other precautionary measures to take. | No significant disturbance of sensitive fauna occurs | | Construction Phase |
| If a female bear with cubs is detected in the vicinity of the construction work site, the works shall stop until they have left the area. The same approach applies to wolf, otter, wildcat and marbled polecat. | | | |
| Traffic of construction vehicles and machinery will be the minimum required to perform construction works adequately. | | | |
| The speed of vehicles in the area of construction works and hauling roads will be limited to a maximum speed and remembered to the drivers through signage and installation of speed bumps, where necessary. | No mortality of sensitive fauna | | Construction Phase |
| Any animal injury or mortality will be recorded in a logbook, and as appropriate further mitigation measures are developed. | | | |
| Hunting of wildlife in the area of the construction works will be prohibited to workers. | | | |
| Before the start of works, construction workers will be trained on the natural values of the area and the need to be proactive in implementing the measures for the protection of wildlife. | All workers to be trained on measures required to be undertaken to mitigate impacts on fauna | | Prior construction phase and during Construction Phase |
| Regular removal of food and organic waste from the railway. | | | |
| Immediate removal of animal carcasses from the railway. | | | |
| Fences will be installed in the parts of the right of way corresponding to tunnels or bridges in forested areas and in non-populated open terrains. These fences should deter animals from crossing the railway and lead them towards adequate railway crossing sites. Escaping devices will be provided to allow animals, which accidentally enter in the railway corridor, leaving the area. | Minimise animals crossing or moving on the railway | PERI | Operational Phase |
| During winter, small clearings of snow along the railway will be carried out every 50-100 m in the areas of biocorridors Osogovo-BilinaPlanina and Osogovo-German. | | | |
| Drainage pipes along the railway alignment will be adapted to facilitate the passage of small animals. | | Designer/Contractor/PERI | |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|---|---------------------------|---|
| <p>The approaches to the bridges crossing water courses will be vegetated so as to create vegetal screens that hide the railway structure (e.g. shrubs and small trees in the area of the abutments).</p> <p>Fenced areas will be vegetated with native plant species that are attractive to local fauna and with plantation patterns designed to lead the animals towards the wildlife crossings.</p> <p>Perform a detailed fauna study to determine the need of additional wildlife passages and disclose the results. Specific wildlife over-crossing for the passage of large animals may need to be constructed in the most highly sensitive areas of the railway alignment, namely biocorridors in the railway stretches that intersect the Osogovo-German corridor (km 64.5 to 68.5) and the Osogovo-BilinaPlanina corridor (km 77 to 89). These sections have a high number of bridges and tunnels (especially Osogovo-BilinaPlanina corridor) and therefore, a potential good permeability. However, there are some stretches of more than 500 meters without tunnels or bridges, where a more detailed study will be carried out in order to determine whether additional wildlife crossings will be necessary to warrant the greatest permeability needed for this part of the railway line. This study shall be extended to Section 2 of the railway alignment, where there are several high sensitivity habitats with a very rich biodiversity and where there are several stretches of more than 2 km without bridges or tunnels.</p> <p>(A Biodiversity Management Plan (BMP) will be prepared and implemented in relation to managing the potential effects on these Sensitive Habitats. Within the BMP prior to any works necessary assessments to meet the provisions of Article 6 of the Habitats Directive will be completed.)</p> | | (BMP: MoTC/PERI) | of Construction Phase/Operational Phase |
| <p>Overhead power lines and catenary shall be signalled to avoid bird collisions. There are a number of devices used to signal ground wires and conductors in transmission lines of electricity, which could be used in the railway, including balls of aluminum, colored spheres, colored plastic spirals, colored plastic bands, luminous markers, colored polyethylene pipes, silhouettes of birds of prey, signaling metal plates, X shaped strips of neoprene, black plastic hanging clamps.</p> <p>Isolation of those stretches of the overhead power line where the catenary is double to avoid the death of birds by electrocution upon contact with the catenary.</p> <p>Avoid the use of rigid insulators in the towers supporting the catenary since this arrangement of the insulators increases the risk of electrocution. It is advisable to change the arrangement of these insulators to minimize this risk (e.g. with suspended insulators).</p> | Minimise risk of electrocution of birds | Designer/Contractor/PERI | Operational Phase |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|---|---|--|
| Protected and Designated Sites | | | |
| <p>The implementation of the mitigation measures identified for flora, fauna and habitats, as well as those identified for soils, water and groundwater, and landscape will serve to ensure the integrity and conservation objectives of all the protected and designated areas in the railway corridor area, including Macedonian Emerald sites and Bulgarian Natura 2000 sites. These measures include:</p> <ul style="list-style-type: none"> • The construction of drainage pipes and bridges in water courses will be carried out during the dry season. • The extension of the construction area next to water courses will be only that strictly necessary to adequately perform the construction works. No occupation of the stream bed or the banks will be allowed, unless there is no other reasonable alternative to carry out the construction work. • Bridges will be designed and constructed so as to cause the least disturbances to the waterway and banks. • Retention basins or grassed filter zones to trap sediments and other contaminants will be constructed in the areas where habitats of very high or high sensitivity are located along the alignment or in a close location downstream of the effluent discharge point. • Untreated wastewater will not be allowed to be discharged into natural water courses. • Disturbed areas not to be occupied by permanent railway structures will be reinstated by shaping the terrain to that of the surrounding land morphology and using autochthonous plant species present of the surrounding area. • The surface for carrying out the clearance of vegetation will be limited to the strip of land needed for the occupation of the permanent way and the right of way of the future railway corridor and the adjacent working width for buildings. • The path of the haulage route shall avoid areas of highly sensitive vegetation • New workers camps and auxiliary facilities will be constructed in areas of vegetation with negligible sensitivity vegetation. • All equipment and personnel movements will occur within the established construction works site and hauling roads, especially in zones of high and very high sensitive vegetation. • Training will be delivered to constructions workers before construction works start and during construction to increase their awareness and responsibilities with regards to the surrounding natural values. • Control of vegetation along the track to be managed through an integrated vegetation control and management program. • Construction activities shall be scheduled so as to avoid the breeding season and other sensitive seasons or times of day, particularly in areas where high sensitive species are concerned associated to sensitive habitats. • Prior to the commencement of any construction work activity on a site, a fauna survey of the area and its surroundings shall be carried out by a qualified biodiversity expert. • If a female bear with cubs is detected in the vicinity of the construction work site, the works shall stop until they have left the area. The same approach applies to wolf, otter, wildcat and marbled polecat. • The speed of vehicles in the area of construction works and hauling roads will be limited to a maximum speed (30 km/h). | <p>BMP Ensure the integrity and conservation values of protected and designated sites</p> | <p>PERI/ the relevant Macedonian nature conservation/protection authority and EBRD.</p> | <p>Design phase, during construction phase and operational phase</p> |

| Receptor / Proposed mitigation measures | Target | Responsible institution/s | Timing |
|--|---|---------------------------|--------------------|
| Cultural Heritage | | | |
| PRECONSTRUCTION ARCHAEOLOGICAL SURVEY - During the construction works, and more specifically prior to any earth works in undisturbed terrain, an archaeological survey will be conducted to check that no archaeological remains are unburied/unearthed without control. The survey will be conducted by a team of expert archaeologists holding valid archaeological research licenses. The archaeologists will be permanently on site to implement the chance finds procedure. | No earthworks to be undertaken unless the area has an archaeological survey | Contractor/PERI | Construction Phase |
| The construction works should not begin until all relevant permits are provided by the responsible institution, the Administration for protection of the cultural heritage of the Ministry of Culture. | No earthworks to be undertaken unless a permit is held from the ministry | | Construction Phase |
| Chance Find Procedure to be established and implemented prior to construction works commencing. In accordance with Macedonian Law on Protection of Cultural Heritage and EBRD PR 8 requirements. In the event of the unexpected discovery of archaeological objects the Contractor shall immediately inform PERI and the Ministry of Culture and follow their instructions. The construction works will be temporary stopped while the authorities decide if any research are needed or any protection measures should be applied. The Contractor shall follow the instructions provided by the authorities responsible for the protection of cultural heritage. | Implement a Chance Finds Procedures | PERI | Construction Phase |
| Cultural Heritage training shall be provided to construction workers before the start of earth works to foster their awareness on how to identify artefacts and the importance of protecting Macedonian cultural heritage, including existing cultural monuments and archaeological sites and to be discovered sites. | All staff, particularly those operating excavation equipment to be trained in the chance finds procedure. | | Construction Phase |
| PERI to undertake the necessary works as directed by the authorities responsible for the protection of cultural heritage to protect any archaeological finds from damage and plunder. | No damage of discovered cultural heritage sites | PERI | Construction Phase |

5 ENVIRONMENTAL & SOCIAL MONITORING PLAN

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|---|--|--|--|---|--------------|-----------|---|----------------------------------|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| Project stage: Design and Construction | | | | | | | | |
| ENVIRONMENTAL ASPECTS | | | | | | | | |
| Top soil | All construction sites and top soil stockpiles. | Visual inspection of: <ul style="list-style-type: none"> disturbed areas for top soil erosion Top soil stockpiles for erosion. | Monthly with selected areas inspected after heavy rainfall events at the discretion of the environmental manager | To minimize the loss of top soil. | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned | |
| | All chemical and waste storage areas | Visual inspection of areas for spills and leaks which might impact top soil quality (and ultimately potentially groundwater) | Monthly | To avoid soil (and surface water and groundwater contamination). | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned | |
| Surface water | At all construction sites in vicinity of surface watercourses (up to 200 meters at each side of the banks) | Visual checking of: <ul style="list-style-type: none"> Construction sites for drainage pipes and bridges. Retention basins or grassed filter zones. Chemical analysis of outfalls from wastewater treatment systems which discharge to surface water. | Start-up of activities involving works near and at watercourses. Monthly during construction | To minimize the risk of pollution of surface water To avoid affections to flow and sedimentation patterns. To avoid health risks to residents. To minimize damages to riparian and aquatic vegetation. To minimize damage to riparian and aquatic fauna. | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned | |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|------------------------------------|---|---|--|---|--------------|-----------|---|----------------------------------|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| Groundwater | At all construction areas where the railway alignment runs on alluvial and colluvial terrains and in cutting and tunnels. | Visual checking of groundwater discharges during excavation, cutting or tunneling works for contamination and ensuring that these are sealed efficiently. | Daily or more frequently in excavations to identify groundwater flows. | To enable groundwater flows can be sealed to avoid affecting hydrogeological flow patterns. | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned | |
| | Springs and wells | Measurement of groundwater quality parameters Visual assessment (or measurement) of spring flow rates | At start of construction and quarterly and for four quarters after the completion of the works | Assessing impact on the chemistry and flow rate of springs Assessing impact on wells | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned | |
| Air Quality - Dust | On site at all three sections of the railway alignment | Visual checking of dust emissions from construction sites. Air monitoring procedures will be implemented at sensitive receptors | Monthly during construction works involving earth movements. Increased frequency during dry season. | Minimization of particulate air pollution. | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned | |
| Air Quality – Combustion Gases | On site at all three sections of the railway alignment | Visual checking of gas emissions for signs of incomplete emissions Air monitoring procedures will be implemented at sensitive receptors | Monthly during construction works | Meeting air quality standards and minimizing impacts to workers and neighbouring sensitive receptors | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned | |
| Noise | All construction sites, camps and ancillary areas. | Measurement of noise levels at sensitive receptors | At start up and then monthly | To minimize noise pollution from construction activities | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned | |
| Landscape | Construction sites, camps and ancillary areas | Visual assessment of landscape impact | At start up and then monthly | To ensure that landscaping is effectively managed and minimize temporary visual impacts during construction | | | Contractor Sign off by PERI Supervisor Audits by Environmental | |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|------------------------------------|---|--|--|---|--------------|-----------|---|----------------------------------|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| | | | | | | | Inspector from each municipality concerned. | |
| Flora | Construction sites, camps and ancillary areas | Visual inspections of all sensitive habitats adjacent to the construction sites to ensure that these are not being impacted by the construction works and are being protected in accordance with the recommendations of the flora survey. | Monthly | To reduce as far as possible impact and disturbance of flora. | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned. | |
| Fauna & Habitats | Along the three sections of the railway alignment. Section 3 Protected Sites including Emerald Sites & Bio-corridors | Visual inspections of all sensitive habitats, nesting sites, etc., adjacent to the construction sites to ensure that these are not being impacted by the construction works and are being protected in accordance with the recommendations of the fauna survey. Monitoring parameters identified in Biodiversity Management Plan. | Monthly | To reduce as far as possible impact and disturbance of fauna and on sensitive habitats. | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned. (Monitoring reports should be shared with the National Nature Conservation Authority) | |
| Cultural heritage | All areas where earth movements take place, particularly Section 3. | Visual inspection of all identified cultural heritage sites. | Quarterly unless more frequently required around sensitive locations | Preservation of archaeological sites | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned. | |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|---|--|---|--|--|--------------|-----------|--|----------------------------------|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| SOCIAL ASPECTS | | | | | | | | |
| Resettlement | Each resettled household | Input and output indicators specified in the RCF Assess resettled household to ensure that the resettlement has been undertaken in compliance with RCF and RAP, and EBRD PR 5, has been done in accordance with RCF and RAP. Complaints from residents through the grievance mechanism. | As detailed in RCF /RAP | To ensure that the RCF and RAP have been undertaken effectively. | | | PERI | |
| Community Health & Safety | Communities adjacent to the construction sites | Safety barriers and signage. Monitoring of Community health and safety educational program to ensure that it is effective. Monitoring accidents and near misses. Complaints from residents through the grievance mechanism. | Prior to the start of the construction phase Daily checking of construction sites boundaries. | Mitigating health and safety risks to residents. | | | PERI | |
| Influx | At the construction camps | Monitoring of protection measures for workers including monitoring of workforce accommodation. | Monthly and in response to grievances | Ensuring health and well being | | | Contractor Environmental Inspector from each municipality concerned | |
| Occupational health and safety measures for workers | At the construction sites | Monitoring compliance with applicable standards and national legislation for worker PPE and safety | Before the start of the project activities Every working day | To avoid occupational injuries and / or professional illnesses | | | Contractor Environmental Inspector from each municipality concerned | |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|------------------------------------|--|---|---|--|--------------|-----------|--|----------------------------------|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| | | equipment | | | | | State Inspector for OH&S issues | |
| Local employment | At the construction sites | Monitoring of number of locals employed on the project. | Before the commencement of construction works. Monthly during the construction period. | Ensuring local communities benefit from employment opportunities. | | | Contractor | |
| Project stage: Operation | | | | | | | | |
| ENVIRONMENTAL ASPECTS | | | | | | | | |
| Soil | Along the three sections of the railway alignment. | Visual inspection of the track and adjacent areas for spills and leaks which might impact soil quality (and ultimately potentially groundwater) | Before operational activities and periodically during operation: quarterly for the first year and then annually there after | To avoid soil (and surface water and groundwater contamination). | | | | PERI |
| Surface water quality | Water courses crossed by the railway alignment, upstream and downstream the crossing | Chemical analysis of surface water (Suspended particles, hydrocarbons, herbicides) Visual inspection of riparian and aquatic organisms | Before operational activities and periodically during operation: quarterly for the first year and then annually there after | Assessing impact on the chemistry of surface water Assessing impact on riparian and aquatic organisms (flora and fauna) | | | | PERI |
| Groundwater quality. | Springs and wells | Chemical analysis of groundwater water (hydrocarbons, herbicides) | Before operational activities and periodically during operation: once a year | Assessing impact on the chemistry of springs and wells | | | | PERI |
| Air Quality – Combustion Gases | Areas with sensitive residential receptors (only) | Visual checking of gas emissions of diesel locomotives and heating | Before operational activities and periodically during | Meeting air quality standards and minimizing impacts to passengers and neighbouring | | | | PERI |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|------------------------------------|---|---|--|---|--------------|-----------|--|----------------------------------|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| | during stage 1 operated with diesel traction) and train stations | systems at stations for signs of incomplete emissions Air monitoring procedures will be implemented at stations and along the track at sensitive receptors | operation: twice a year during stage 1 and once a year during stage 2 | sensitive receptors | | | | |
| Noise | Areas with sensitive receptors along all three sections of the alignment | Day and night measurement of noise levels at sensitive receptors | Before operational activities and twice a year during operation | Meeting noise quality standards | | | | PERI |
| Vibrations | Areas with sensitive receptors along all three sections of the alignment | Measurement of vibration at sensitive receptors | Before operational activities and once a year during operation or upon appearance of damages in neighbouring buildings | Assessing impacts on buildings | | | | PERI |
| Landscape | All three sections of the railway alignment, particularly: Slopes of cuttings and embankments; Tunnel mouths; Water courses and banks underneath constructed bridges; Bridge abutments; Areas underneath viaducts; Structural parts of viaducts and bridges, Stations; Landfills | Visual inspection for signs of erosion, poor vegetation cover, poor maintenance conditions of railway elements, including station buildings. | At the end of construction activities Once a year during spring time | To ensure that landscaping is effectively managed | | | Contractor Sign off by PERI Supervisor Audits by Environmental Inspector from each municipality concerned. | PERI |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|------------------------------------|--|--|---|---|--------------|-----------|--|---|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| | and borrow pits | | | | | | | |
| Flora | Areas adjacent to the right of way of the railway Riparian areas at the points of discharge of railway drainage | Visual inspection of the vegetation to check the growth (density, diversity, coverage) of local (autochthonous) plant formations | Before operational activities and twice a year (spring and autumn) during operation | To assess the impact of herbicide use in areas outside the target treatment areas | | | | PERI |
| Fauna | All three sections along the railway alignment. | Visual inspection, counting and recording of dead animals along the railway tracks. | Before operational activities Periodically during track inspection within regular maintenance procedures | To assess the impact on animal populations | | | | PERI |
| Habitats | Animal crossings | Animal surveys to assess the use of animal crossings | During the design phase Before the commencement of the operational phase Periodically during the operational phase: twice a year (in spring and autumn) | To assess the impact on habitat fragmentation | | | | PERI |
| Cultural heritage | Archaeological sites found during the construction phase | Visual inspection of sites to observe signs of plundering | Before operational activities Periodically during the operation of the railway: four times a year | | | | | Macedonian Ministry for Culture – Government of Macedonia |
| SOCIAL ASPECTS | | | | | | | | |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|--|--|---|------------------------------------|---|--------------|-----------|--|---|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| Stakeholder Engagement | Along alignment | <p>The number and types of stakeholder engagement activities should be monitored and reported on – activities need to be processed and analyzed</p> <p>Monitoring to be done through following activities: how many public meetings were held, how many people attended, what issues were discussed, what were the comments/grievances about, how will they be addressed, etc.</p> <p>The number and types of grievances received should also be monitored and reported on. This should also involve processing and analysis, for example: categorisation of grievances (those related to land acquisition, economic displacement, health and safety, construction nuisances, community impacts, etc.), average time to respond, outstanding grievances, etc.</p> | Regular monitoring on monthly base | To allow and provide full engagement of stakeholders during all phases of the project | | | | PERI Sign off by MoTC And Audits by Local Self Government |
| Land Acquisition, Involuntary Resettlement & Economic Displacement | PERI/MoTC offices, Legal and property offices/ on site | Activities related to land acquisition should be recorded in an appropriate manner to | Regular monitoring on monthly base | To assure that affected families are receiving necessary support in restoring their life and standards from | | | | PERI |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|------------------------------------|----------------------|---|-------------------------|---|--------------|-----------|--|----------------------------------|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| | | allow for data processing, monitoring and reporting, for example: number of people / households affected, type of impact - temporary or permanent land acquisition, type of compensation packages or assistance provided, identified and assisted vulnerable groups, number of negotiated settlements, number of court or administrative appeals, etc.) | | temporary and permanent land take | | | | |
| Social Monitoring | Contractor's offices | Record the number of job vacancies resulting from the Project and the number of vacancies taken up by residents of affected local communities. | On each three months | To assure proper management of Local Recruitment plan | | | | PERI |
| | Railway stations | Monitoring effects on population by reporting on a number of question for the impairments and improvements of the life from project realization and specific problem identified by local residents. | On each three months | To assure that the project realization will improve life of the residents | | | | PERI |

| Receptor/Parameter to be monitored | Monitoring Location | Monitoring Parameters | Frequency of monitoring | Reason for monitoring | Cost | | Responsibility | |
|---|---------------------|--|------------------------------------|---|--------------|-----------|--|---|
| | | | | | Construction | Operation | Designing phase, construction and reconstruction works in all three sections | Operations of the railway system |
| Labour & Workforce Monitoring | Along the alignment | Monitoring of protection measures for preventing workers accidents during operational phase, worker and labour inspections and disputes | Regularly on daily base | To assure that all required standards are fulfilled | | | Contractor/PERI/Consultant | Macedonian Railways Transport /PERI |
| | | Monitoring the safety of workers (alcohol testing) | Regularly on daily base | To prevent workers accidents | | | | Macedonian Railways Transport /PERI |
| Community health and safety educational program developed for the railway operation | Along the alignment | Checking that the program is prepared and implemented. Visual monitoring of the implementation through media and other education forms. | Regular monitoring on monthly base | To avoid accidents that may occur during the operation of railway | | | | PERI/ Macedonian Railways Transport/ MoTC |