

**Construction of new railway section from Kriva Palanka to
the border with Republic of Bulgaria, as part of Corridor
VIII**

ESIA Non-Technical Summary

**Public Enterprise for Railway Infrastructure Railways of Republic of
North Macedonia – Skopje**

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This document has been prepared by Mott MacDonald | CONNECTA Consortium as part of the assignment “Gap Analysis and Safeguard Documentation: Category A Project CORRIDOR VIII Railway - Section 3 Kriva Palanka-Border with the Republic of Bulgaria, Republic of North Macedonia”, supported by the Technical Assistance to connectivity in the Western Balkans EuropeAid/13785/IH/SER/MULTI.

Explanation note:

The project is expected to be financed in part by an approved Instrument for Pre Accession II (IPA II) grant. This grant shall be deployed through the IPA Operating Structure. See for further details: IPA 2014-2020 (IPA II) - CFCD (finance.gov.mk). In that context, the Environmental and Social instruments, including this document, shall be implemented by the Public Enterprise for Railway Infrastructure Railways of Republic of North Macedonia – Skopje in collaboration with the Contracting Authority, the Central Financing and Contracting Department within the Ministry of Finance, and the Ministry of Transport and Communication.

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List of Abbreviations

Abbreviation	Meaning
BMP	Biodiversity Management Plan
CEPRP	Construction Emergency Preparedness and Response Plan
CESMP	Construction Environmental and Management Plan
CFP	Chance Find Procedure
CM	Cadastral municipality
dB	Decibel
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EMF	Electromagnetic fields
EPRP	Emergency Preparedness and Response Plan
ESAP	Environmental and Social Action Plan
ESIA	Environmental and social impact assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
EU	European Union
GHG	Greenhouse gases
H&S	Health and safety
IFI	International Financial Institution
ILO	International Labor Organization
IPA	Instrument for Pre-accession Assistance
KP	KrivaPalanka
kV	Kilovolt
LSGU	Local Self Governmental Units
MoEPP	Ministry of Environment and Physical Planning
NTS	Non-Technical Summary
OCL	Overhead contact line
OCLS	Overhead Contact Line System
OESMP	Operation Environmental and Management Plan
OG	Official Gazette
OGRNM	Official Gazette of Republic of North Macedonia
OSH	Occupational Health and Safety
PAP	Project Affected Person
PC	Partial Compliance
PC	Partially compliant
PE ZRSMI	Public Enterprise for Railway Infrastructure Railways of Republic of North Macedonia - Skopje
PIU	Project Implementation Unit
PR	Performance Requirement
PWS	Private Water Supply
RAP	Resettlement Action Plan
RNMT	Railways of North Macedonia Transport
SBA	Supplementary Biodiversity Assessment
SEP	Stakeholder Engagement Plan
TS	Transformer station

Abbreviation	Meaning
TSI	Technical Specifications for Interoperability
TPS	Traction Power Substation
TSS	Traction substation
WHO	World Health Organization
WMP	Waste Management Plan

1 Introduction

The Public Enterprise for Railway Infrastructure Railways of Republic of North Macedonia – Skopje Public Enterprise Railways of the Republic of North Macedonia, Infrastructure (PE ZRSMI) is a public company in charge of the construction and maintenance of the railway. PE ZRSMI intends to select a future contractor to finalise the design of and construct the 23.4km new single-track, 100km/h max. speed railway between Kriva Palanka and the border with Bulgaria (the Project or Section 3), which is part of the Railway Corridor VIII - Eastern Section Project. The project is intended to be financed by the European Bank for Reconstruction and Development (the “EBRD”) and the European Investment Bank (the “EIB”) and by funds from the European Union.

This document is the Non-Technical Summary (“NTS”) and it provides an easy-to-understand summary of the information that is provided in the Environment and Social Impact Assessment (ESIA) process undertaken for the project.¹ The purpose of the NTS is to help the public and stakeholders to understand: the project need and background, project description, the ESIA process (including stakeholder engagement and grievance mechanism), the potential adverse and beneficial environmental and social effects of the Project, and the mitigation measures that will be implemented to avoid or reduce adverse effects and enhance the benefits.

2 Project Description

The Railway Corridor VIII – Eastern Section runs across the North-Eastern region of Republic of North Macedonia, the municipalities of Kumanovo, Staro Nagoričane, Kratovo, Rankovce and Kriva Palanka. It is a single-track railway and comprises the following sub-sections:

- Section 1: Kumanovo – Beljakovce (30.8 km) which was partially completed between 1994 and 2004 (approx. 50%). The original rehabilitation/ construction works under the EBRD loan were delayed for several reasons between 2013 and 2020 when the works were re-tendered in combination with Section 2. The works contract was signed with Strabag Sp.zoo. &Strabag ag &Strabag Rail a.s. in July 2022. Works commenced shortly after and are on-going and planned to be completed by the end of 2025;
- Section 2: Beljakovce – Kriva Palanka (34 km) which was under construction between 1996 and 2004 when some of the structures (viaducts, tunnels, underpasses, culverts) were partially built. The rehabilitation/ new construction works under the EBRD loan were awarded to Gulermak Agir Sanayi Insaat Ve Taahhut Anonim Sirketi in July 2022. Works commenced shortly after and are on-going and plan to be completed by the end of 2025.
- Section 3: Kriva Palanka–Deve Bair (the state border with Bulgaria) which is a 23.4 km-long stretch yet to be constructed with the maximum design speed of 100km/h.

The Project comprises the construction of Section 3: Kriva Palanka – Border with Bulgaria and electrification of the Eastern Section (Section 1, Section 2, Section 3, i.e. 88 km in total). The Project route is shown on Figure 1.

¹ ESIA process for this Project included:(1) 2012 ESIA prepared as part of the Feasibility Study for the (entire) Railway Corridor VIII Eastern Section (all three Sections, including electrification), financed by the EBRD; (2) 2017 ESIA prepared for Section 3 only as part of the EU IPA Programme for Preparation of Detailed Design and Tender Documents for Section 3, which have been reviewed and incorporated into (3) the 2023 Supplementary Environmental and Social Disclosure Package, including ESIA Addendum prepared as part of EU Connecta Technical Assistance.

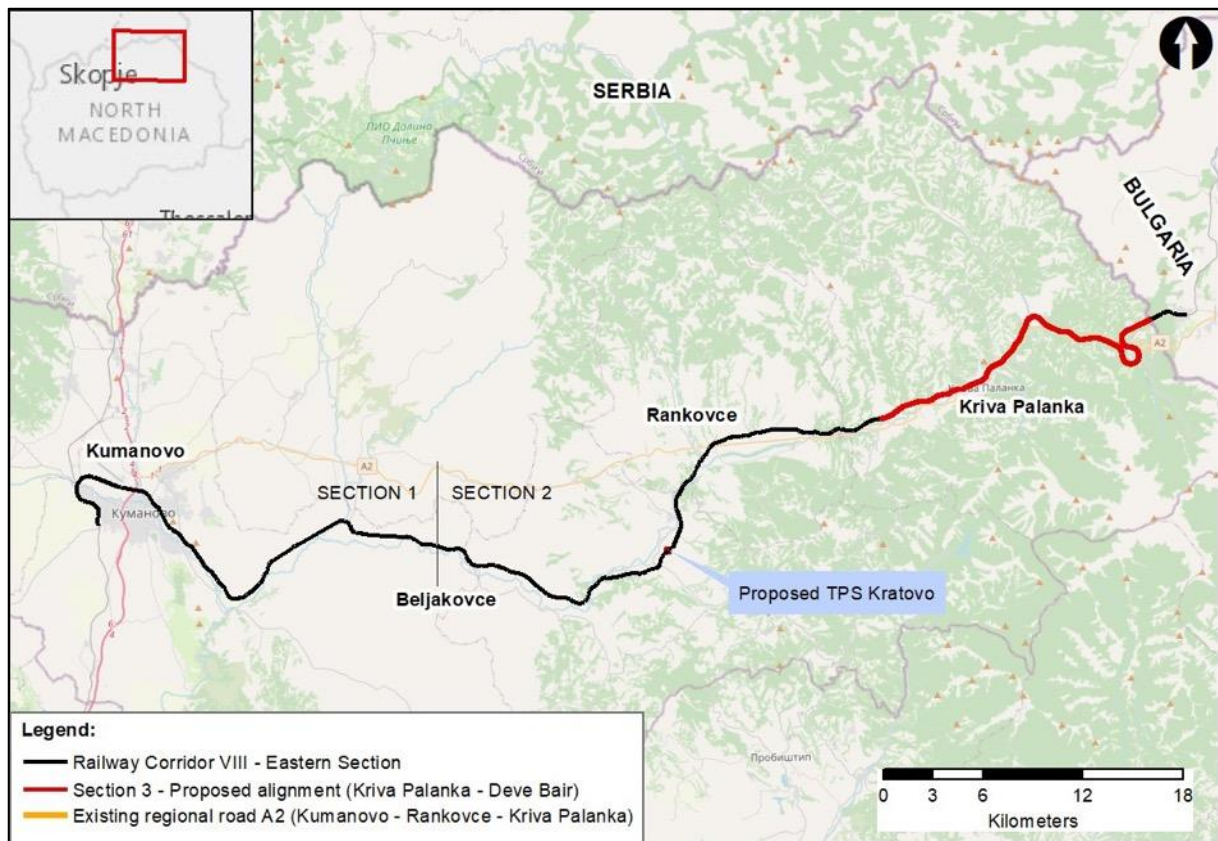


Figure 1 Railway Corridor VIII – Eastern Section

The Project is anticipated to be tendered in 2023, with construction works commencing in 2024 and to become operational after 5 years, in 2027/2028.

The Project design was conducted in line with Macedonian and EU technical and operational standards (including the Technical Specifications for Interoperability – TSI).

Section 3 Railway Line.

The project area (Section 3) is located on the territory of the municipality of Kriva Palanka, which belongs to the Northeast Region of the Republic of Macedonia. Section 3 starts before the town of Kriva Palanka (at km 64 + 942.01) and goes to the border with the Republic of Bulgaria (at km 88 + 364.65). The project area encompasses the following settlements: T'Iminci, Kriva Palanka, Gradec, Lozanovo, Drenje, Kiselica, Trnovo, Zidilovo, Krklja, Kostur and Uzem (Figure 2).

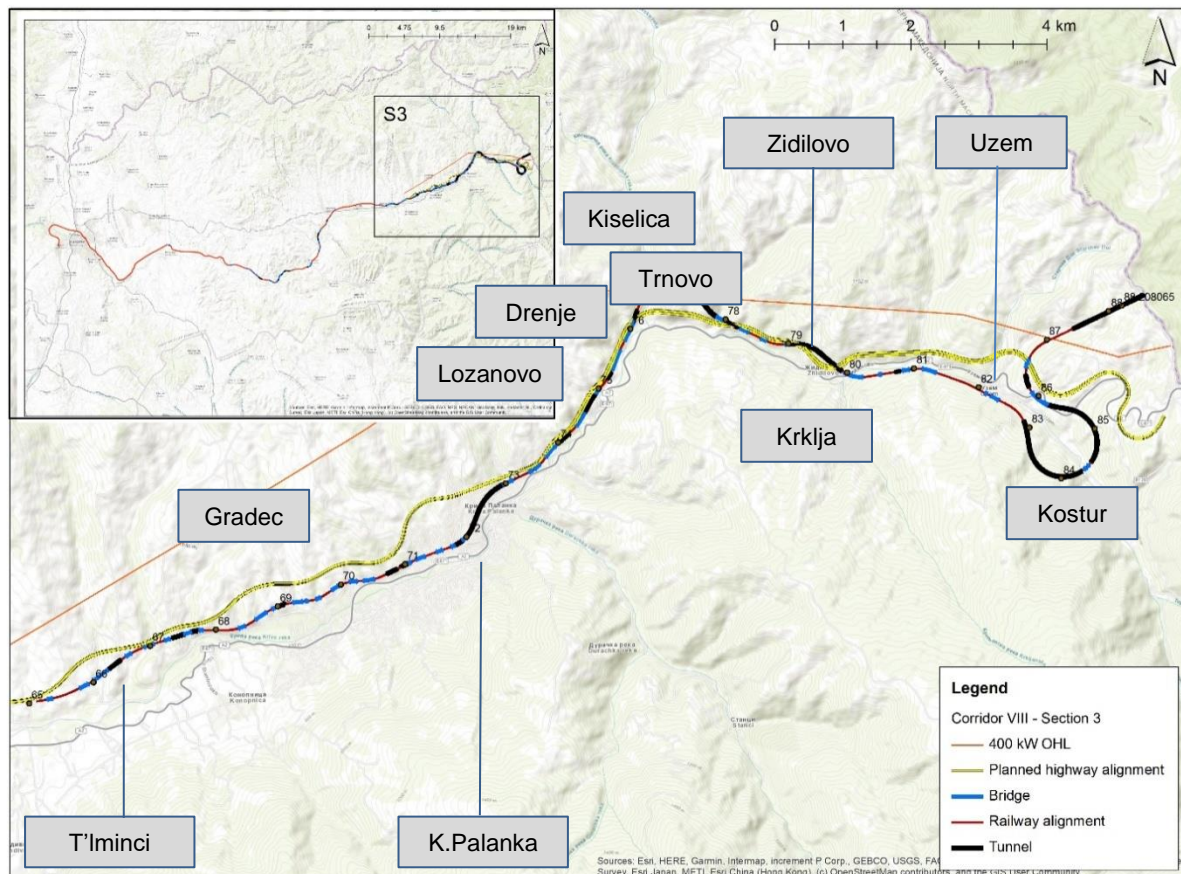


Figure 2 View on the Railway Corridor VIII – Eastern Section with a detailed overview of Section 3 KrivaPalanka (T'Iminci) to Deve Bair²

The Project comprises the following:

- Section 3: Construction of 23.4km new single-track, 100km/h max. design speed railway between Kriva Palanka and the border with Bulgaria. The scope includes the following:
 - a station in Kriva Palanka with 2 side tracks and 3 tracks for maintenance and stabilisation,
 - a halt in the village of Zhidilovo with 2 side tracks,
 - border tunnel "Deve Bair" on the territory of North Macedonia³,
 - 22 tunnels with a total length of about 10 km and
 - 52 bridges (viaducts) with a total length of about 5 km.
- Electrification for Sections 1, 2 and 3 which includes:
 - Construction of approx. 90 km of overhead contact line (OCL) and the relevant earth protection system.
 - Construction of 1 new traction substation (25 kV TSS) 25 kV AC in Kratovo (located on Section 2: Beljakovce to Kriva Palanka) and 1 in Kriva Palanka.
 - connection to 110 kV feeder and construction of 110 kV current transformer station (110 kV TS) on the same location of 25 kV TSS.

The scope of work related to Section 3 consists of the following activities:

- The execution of earthworks and drainage,

² Figure taken from EIA 2012

³ The tunnel on the territory of Bulgaria and the planned short connection to the existing railway line at Gueševo will be completed by the Bulgarian authorities

- The construction of 52 bridges and 22 tunnels, including reconstruction of the 1150m border tunnel within the Macedonian territory,
- The execution of 23.5 km main track, 4.3 km station tracks and 14 sets of points,
- The construction of a substation West of Kriva Palanka.
- Temporary roads to provide access to construction sites.

In respect of related facilities, Section 3 is foreseen to have:

- one station (in KrivaPalanka at km 70.58 with 2 side tracks and 3 tracks for maintenance and stabilisation),
- one halt in the village of Zhidilovo at km 80.37 with two side tracks, and
- passenger building and a railway maintenance facility.

The Project construction will require⁴ operation of borrow pits, quarries, concrete batching plants, disposal of excess spoil material (landfills) and construction of temporary roads to provide access to construction sites⁵.

Key expected benefits will be reducing of the travel time between Skopje and Sofia compared to the current road travel time, shortening the railway link between N. Macedonia and the Black Sea and the Istanbul link, increasing freight capacity and providing alternative to the current road truck transport. On the environment side, the electrified railway will introduce energy efficient and sustainable mode of transport to the area where road transport is still predominant lowering the transport carbon footprint, avoiding air pollution emissions and lower noise impact.

The total number of the project affected land plots for permanent expropriation for the construction of the permanent way and access roads in the project area is 522 and total of 646,801 m² affected area. The total number of affected buildings (houses) by the Project is 15, which was significantly reduced from the initially identified (38) with a redesign of few access roads.

2.1 Section 1, 2 and 3– Electrification Works

The electrification works of the Section 1, 2 and 3 will include building of a completely new Overhead Contact Line System (OCLS) along the entire length, using 25kV AC at 50Hz.

According to the Detailed Design, traction power will be provided by the Traction Power Substation (TPS) of Kratovo which will be built adjacent to the Railway Station Kratovo at km 47.5 and will be connected to the grid via the existing 110kV overhead line. The initial 10km of the Section 1 will be fed from the existing TPS Miladinovci along the railway Corridor X (Skopje – Kumanovo), the remaining part of the Section 1, 2 and 3 will be fed from the proposed TPS in Kratovo.

⁴ Considered as project related facilities and have been assessed in the ESIA process

⁵ Most of it already in place because of the ongoing construction of other infrastructural projects in the area.

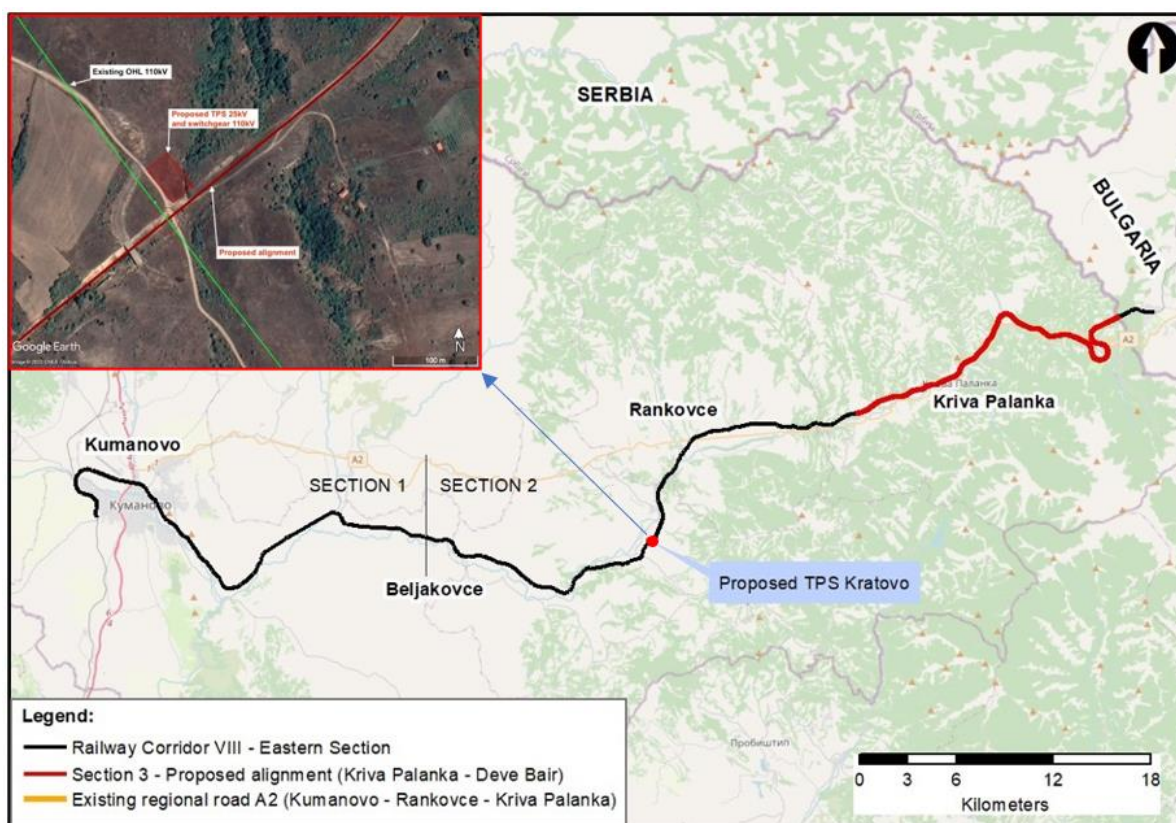


Figure 3 Aerial View of the location of Proposed Traction Power Substation 25kV and Switchgear 110kV “Kratovo” (August 2020)

Electrical feeding of the initial 10km of the Section 1 will require installation of a load break switch at the Kumanovo Railway Station and building of a switching station at km 10 (Section 1). The Kratovo TPS will comprise two traction power transformers 110/27.5 kV of 8 MVA each, and an appropriate switchgear 110kV.

No additional land acquisition will be required for the electrification works, including the electrical feeding work at the Kumanovo Railway Station and the construction of the proposed TPS Kratovo.

An additional TPS in Kriva Palanka or Židilovo remains a possibility in order to mitigate the potential issue of instable supply of electricity in the case of failure of TPS Kratovo. The TPS site in Kriva Palanka or Židilovo has not been determined yet.

3 Background

3.1 Rationale for the Project

The corridor VIII is a multi-modal transport network, it is an integral part of one of the five new Transnational European axes - Southeast axis. Along its route, Corridor VIII connects with the Pan-European corridors IV, IX and X. The railway from Corridor VIII has a total length of 315 km out of which so far only 50% has been built. The absence of these connections is an obstacle for easier development and international trade, not only with neighbouring countries, but also between the entire Eastern region and Europe. The National Strategy for Transport of the Republic of Macedonia 2018-2030 confirms the priority of the railway Corridor VIII for the country.

3.2 Project Development and Planning History

The plans and activities for the construction of the eastern part of the railway from Kumanovo to the Bulgarian border started at the beginning of the 19th century and were carried out continuously with interruptions until 2004 when the works, which were started in 1994, stopped due to lack of financial resources.

The reconstruction of the existing railway section Kumanovo – Beljakovce started in 2014, but were suspended in 2021, completing about 54% of the works on Section 1. The rehabilitation/ new construction works under the EBRD loan for Section 1 and 2 were re-tendered and new contractors were selected in July 2022. Works commenced shortly after and are ongoing and planned to be completed by the end of 2025.

No works have been done on Section 3 so far, except for some early works on the construction of the tunnels (partly drilled tunnel in Kriva Palanka and border tunnel "Deve Bair" on the territory of North Macedonia started in the 1940's).

3.3 Alignment Selection and Consideration of Alternatives

Alternatives have been considered as part of the preparation of the ESIA, in 2012 and in 2017 and reviewed as part of the ESIA Addendum analysis.

Three strategic alternatives ('Do Nothing/No Project', 'Reference Alignment (or Alternative A)' and 'Alternative Alignment' (or Alternative B), (Figure 4) for the entire Eastern Section of the Corridor VIII railway were assessed as part of a Feasibility Study completed in 2011⁶, and initially reported on in the 2012 ESIA. Reference Alignment (or Alternative A) was selected as the preferred alternative based on an analysis of different criteria including costs, technical, operational, environmental and social considerations and results of preliminary public consultation for all Sections. This route was recommended by the Ministry of Transport and Communication to the Government of the Republic of Macedonia, who issued the final decision to adopt the Reference Alignment in 2011 (Decision No. 51-3556/1, 19.07.11).

Sections 1 and 2 of the Eastern Section were approved for financing based on the findings of these documents. A further Feasibility Study was completed in 2017⁷, which did not include an update of this assessment of strategic alternatives.

⁶ Selection of Preferred Alternative Report, Macedonian Railways: Feasibility Study for Corridor VIII - Eastern Section, Contract No: C21196/EBSF-2010-07-101, Ministry of Transport and Communications, Republic of Macedonia, 2011.

⁷ Preparation of detailed design and tender documentation for construction of new railway section Kriva Palanka – border with Republic of Bulgaria, as part of corridor VIII. Report on Update of the Feasibility Analysis Version C, 16th November 2017. Europe Aid/136050/IH/SER/MK.



Figure 4 Route of the Reference and Alternative Alignments in Section 3 (Source: Report on Update of the Feasibility Analysis Version C, 16th November 2017)

Given the time that has passed since the original analysis was completed, and the difference between the E&S impact scores for the two Section 3 alternatives (with Alternative B preferable from an environmental and social perspective), the ESIA addendum has reviewed and updated the basis of the scores given for social impacts (with a focus on resettlement) and environmental impacts (with a focus on biodiversity), based on current baseline conditions and recent changes to the Project design.

With reference to impact on biodiversity, given the recent changes in the area of impact the Reference alignment further benefits over the Alternative alignment, including causing less habitat fragmentation due to its proximity to the under-construction highway.

Based on the element of resettlement, the Reference Alignment is now considered the better option (majority of the houses earmarked for demolition to enable construction of the Reference Alignment, were impacted because of the location of planned access roads in Kriva Palanka, rather than the railway line itself, compared with estimated minimum of 25 buildings related to the Alternative Alignment). This reduction was in response to a concern raised on a meeting with project affected persons in 2022. In March 2023 PE ZRSMI initiated a process for redesign of the access roads in Kriva Palanka that is will result in significant reduction of the social impact from the project (avoiding 23 houses to be demolished).

4 Summary of Legal Compliance, ESIA Process and Lenders Requirements

4.1 National Legal Framework

The Project has been structured to comply with all applicable national legislation, including the Law on Environment (O.G. of RM no. 53/05 and its amendments) and transport strategies.

Lender E&S requirements

The Project has also been structured to comply with Lenders E&S requirements and standards:

- EBRD: EBRD E&S Policy (ESP) (2019) and associated Performance Requirements (PRs) 1-6, 8 and 10 EIB: European Investment Bank Environmental and Social Standards (2022) 1-10 World Bank Group Environmental, Health, and Safety (EHS) Guidelines

4.2 ESIA Process Carried Out

National ESIA process related to Section 3 had been undertaken in 2017 to identify environmental and social impacts throughout the Project's lifecycle. The ESIA presents the findings of the assessment for environmental and social topics, identifying the potential for significant effects and suitable mitigation measures. The Project development has been compliant with the national environmental requirements and includes consideration of technically and financially viable alternatives with the participation of local communities. Results of the 2017 Project ESIA have been incorporated into the detailed design.

Section 3 of the Project has been subject to design changes and new Lender requirements which required update of the ESIA to address changes to the project, their associated impacts and proposed mitigation measures. An ESIA Addendum has been prepared to provide up to date information on the project and undertake additional assessment of impacts and development of mitigation measures. The Addendum is supported by the following documents part of the E&S disclosure package:

- A Resettlement Action Plan (RAP) has been developed to ensure that project-affected peoples (PAPs) and communities are properly resettled and compensated for any losses.
- A Stakeholder Engagement Plan (SEP) for Section 3 has been prepared and sets out PE ZRSMI's commitment to stakeholder engagement during the whole project duration.
- An Environmental and Social Management Plan (ESMP) and Environmental and Social Action Plan (ESAP) have been developed to identify and describe E&S mitigation and monitoring measures during pre-construction, construction and operation of the project to ensure compliance with national and Lenders' requirements.
- Biodiversity Management Plan (BMP) is prepared which further describes biodiversity mitigation and management measures, supported by Supplementary Biodiversity Assessment (SBA) as an Annex.

All documents are publicly available as explained in Section 10.

Section 3

Environmental and Social Assessment

The environmental and social assessment of the Section 3 project has been implemented as follows⁸:

- (1) in 2012, a Feasibility Study for the (entire) Railway Corridor VIII Eastern Section (all three Sections) and an ESIA were prepared (financed by the EBRD). Based on this, construction permits had been issued for Section 1 and 2;
- (2) in 2017, as part of the EU IPA Programme for Preparation of Detailed Design and Tender Documents for Section 3, an ESIA was prepared for Section 3 only;
- (3) Additional environmental and social assessment in 2022 and preparation of an ESIA Addendum, which included an analysis of existing documentation and development of key safeguard documentation complementary to Lenders' standards.

A Feasibility Study has also been developed for Section 3 in parallel with an ESIA. Preliminary and detailed designs were prepared in 2017.

A detailed national Environmental and Social Impact Assessment (ESIA) was prepared in 2017 for Section 3 by a consortium of consultants acting on behalf of PE ZRSMI and was approved by local

⁸ The Law on Environment recognizes an EIA as a mandatory document whereas the documents prepared in 2012 and 2017 are ESIA, where social aspect is supplementary, not affecting the national procedure for approval.

environmental authorities in 2018 (Decision for issuing project consent, No. 11-77/2, 05.06.2018), renewed in 2021 according to local legislation. Given that the construction will not commence before 2024, PE ZRSMI has submitted a request for second renewal of the EIA Decision (Archive No.1902-501/1, 02.02.2023). The permitting for the Project is continuing, the Construction Permit is yet to be obtained.

The electrification of Section 1, 2 and 3 was subject to the 2012 ESIA. The EIA Consent was issued in 2012 (Archive No. 11-1974/5, 05.11.2012) and now is formally expired. The procurement process for the construction of Section 3 has not yet been initiated and construction activities have therefore not commenced.

The Contractor will be responsible for permits for project related facilities (for example borrow pits, disposal sites or extraction from the Kriva River stretch), as well as for any use of river water or discharge of wastewater into water courses. Electrification works should be subject to a new EIA, according to article 24 of the Law on Environment (simpler EIA).

This NTS incorporates the latest updates on the project development and design since 2017 and in addition, summarizes impacts and mitigations from both the 2017 ESIA and the ESIA addendum and associated documents.

4.3 Environmental and Social Management Plan (ESMP)

An ESMP has been prepared for the Section 3 of the Project to:

- Set out the key environmental and social risks, impacts and sensitivities related to the Project (as identified throughout the ESIA);
- Ensure that the Project will comply with the relevant standards;
- Describe the mitigation measures and management procedures (as identified throughout the ESIA);
- Set out how the effectiveness of the mitigation measures and management procedures will be monitored;
- Identify roles and responsibilities for the mitigation measures and management procedures;
- Facilitate a continual review of Project activities based on performance data and consultation feedback; and
- Implement corrective actions or adaptive management procedures, as required.

It represents a commitment by PE ZRSMI to environmental and social sustainability, and this commitment will also apply their contractors and sub-contractors and supply chain.

The Contractor will be required to develop the ESMP into the Construction Environmental and Social Management Plan (CESMP) prior to the start of construction. PE ZRSMI will be required to update and further develop the ESMP into the Operation Environmental and Social Management Plan (OESMP) prior to the start of operation.

Both the CESMP and the OESMP will contain several sub-plans as shown in the Table 3 below.

Table 1 CESMP and OESMP Sub-Plans

CESMP	OESMP
<ul style="list-style-type: none"> ▪ Air Quality and Dust Suppression Plan; ▪ Surface Water Management Plan; ▪ Waste and Materials Management Plan; ▪ Earthen Material / Spoil Management Plan; ▪ Construction Erosion Control Plan ▪ Hazardous Material Management Plan 	<ul style="list-style-type: none"> ▪ Stakeholder Engagement Plan ▪ Operational Maintenance Plan ▪ Tunnel Operation Management Plan ▪ Operational Biodiversity Management Plan ▪ Operational Soil Erosion Management Plan ▪ Operational Waste Management Plan

CESMP	OESMP
<ul style="list-style-type: none"> ▪ Construction Biodiversity Management Plan (based on the 2022 BMP) ▪ Noise and Vibration Management Plan; ▪ Tunnel Construction and Blasting Management Plan; ▪ Landscape and Planting Management Plan; ▪ Health, Safety and Security Plan (including occupational health and safety (OHS)); ▪ Construction Emergency Preparedness and Response Plan; ▪ Construction Traffic Management Plan; ▪ Construction Worker's Accommodation Management Plan; ▪ Employment, Labour Management and Monitoring Plan; ▪ Training Plan; ▪ Supply Chain Management Plan; ▪ Management of Change Procedure 	<ul style="list-style-type: none"> ▪ Operational Noise and Vibration Management Plan ▪ Operational Occupational Health, Safety and Security Plan ▪ Operational Community Health, Safety and Security Plan ▪ Operational Emergency Preparedness and Response Plan ▪ Contractor Management Plan

5 Stakeholder Engagement and Land Acquisition Process

5.1 Public disclosure and Stakeholder Engagement

Consultations for both ESIA studies, in 2012 for the entire railway alignment (Section 1, 2 and 3) and in 2017 for Section 3 have been conducted prior to ESIA approvals by the Ministry of Environment and Physical Planning (MOEPP) in line with the with national legislation. Consultations for ESIA 2012 were conducted at several locations where different stakeholders participated and consultations for the ESIA in 2017 were conducted in Kriva Palanka.

Additional public consultations for Section 3 have been conducted in 2022 and 2023 for project information and resettlement purposes, having in total 15 meetings with different stakeholders and relevant institutions. The meetings were organized by PE ZRSMI, inviting the stakeholders directly by phone calls, by public invitations and in cooperation with the local municipality.

Stakeholder engagement

A Stakeholder Engagement Plan (SEP) for the development of Section 3 has been developed to design PE ZRSMI's strategy for communication and engagement of the stakeholders on national and local level, with particular focus to the Project affected parties. The SEP sets out PE ZRSMI's commitments to stakeholder engagement and disclosure activities in connection with the project.

The SEP includes consultation activities to inform local communities about how the Project design has changed in response to their concerns, provide information on the nature and location of the realignment and also to engage them during the design, construction and operational phase.

The SEP includes also a Grievance Mechanism to allow affected individuals to raise grievances, concerns and queries to the PE ZRSMI, the Construction Contractor or Maintenance Contractor and all other suppliers.

The SEP will be disclosed, as part of the project disclosure package, in English and Macedonian language on PE ZRSMI's web site (www.mzi.mk), in accordance with the demographical characteristics of the municipality of Kriva Palanka. Hard copies will be available at PE ZRSMI and the municipality of

Kriva Palanka. Also in addition, project leaflet will be available in hard copy in public places in the affected communities in the project area.

5.2 Land Acquisition

For the purposes of land acquisition and resettlement, Resettlement Action Plan (RAP) has been prepared for the entire project scope (permanent alignment and access roads). The objective of this RAP is to set out the principles, objectives, policies, procedures, measures, and organisational responsibilities and proposed schedules, related to the resettlement and compensation of Project Affected Persons (PAPs) for Section 3 of the railway.

For the needs of the expropriation and the RAP, Geodetic report / Elaborate for expropriation for Section 3 was prepared together with valuations of the properties by the relevant competent institution⁹ and expropriation process initiated.

6 Environmental Benefits, Potential Adverse Impacts, Mitigation and Management Measures of the Project

6.1 Resource Efficiency

The main materials required for the project will be aggregate (for sub-base and ballast), asphalt (base and surface course), gravel, reinforced concrete and precast concrete (piles, foundations, bridges facades, drainage features, buildings), steel and metal, plastic (pipework), and fill material (rock, stone, etc.). The ESIA noted that the Project will require c. 80,000 m³ of aggregate and 220,800 m³ of concrete. Most of the material required to build the embankments will be re-used excavated material generated during the construction of tunnels and cuttings. The material resource consumption for the Project is considered to be at a local scale and non-significant.

The Project construction will generate significant volumes of earthen material including the spoil, some of which will not be suitable for re-use and will have to be disposed of at spoil disposal sites in line with authorities' requirements.

The ESMP specifies the requirement for the Contractor to develop a Materials Management Plan, Earthen Materials Management Plan and a Waste Management Plan and the requirement to maximise waste reducing, reuse and recycling where possible. The waste must be disposed to sites that meet EU standards.

6.2 Air Emissions

Baseline

The primary air pollutants in the Project area are traffic and individual fossil-fuel combustion sources used for heating in winter. The local waste dump site in Kriva Palanka is an occasional source of air emissions due to spontaneous waste combustion.

Supplementary baseline monitoring of ambient air quality was undertaken over the course of two weeks in May 2022. Ambient air quality was monitored continuously for 7 days at five locations in the

⁹ Bureau of Judicial Expertise

settlements of Tlminci, Kriva Palanka (2 locations), Židilovo, and Uzem. The pollutant of interest was PM₁₀.

The monitoring results indicated that PM₁₀ was mostly below the 24-hour limit value (50 µg/m³) except one daily exceedance at the monitoring points in Tlminci (57 µg/m³), Židilovo (74 µg/m³), and Uzem (55 µg/m³).

Construction Impacts and Mitigation

During the construction phase, there is significant potential for emissions of dust and particular matter (primarily PM₁₀) from working areas, access roads, tunnel excavation, stockpiles, during loading/unloading activities, and truck transport of spoil off-site. The source of localised NO₂ emissions will be the construction machinery and plant in the areas adjacent to the construction site access.

The air emissions may affect nearby communities, especially those situated less than 300m from the proposed alignment and associated access roads. The Project area is windy year-round, with winds blowing in all directions. The residential area of Kriva Palanka will be particularly exposed, as it is intersected by the alignment. The small communities of Tlminci, Gradec, Zhidilovo, Uzem, and Kostur may be affected as well. The ESMP for the Project includes the requirement to develop and implement a Dust Suppression Plan and a Construction Traffic Management Plan to include good practice measures to minimise effects on air quality. This will include dust and PM₁₀ monitoring and site inspections, especially during high-wind periods.

The effects will be temporary and pollutant concentrations will return to ambient levels upon completion of the construction works.

Operational Impacts and Mitigation

Air emissions during Project operation will only be associated with diesel-locomotives¹⁰ and machinery which will be used for the railway maintenance, however these emissions are considered to be limited and non-significant.

6.3 Noise

Baseline

To determine the background noise along the Project alignment, baseline noise survey (both during the daytime and night-time period) was undertaken in May 2022. The noise survey was conducted within the identified noise-sensitive (residential) areas at the following locations: Village of Tlminci, KrivaPalanka (South-West), KrivaPalanka (North-East), Village of Židilovo and Village of Uzem.

The noise monitoring results indicated that the background noise levels at the locations classified as 'Quiet areas outside the agglomerations' exceed the legal limit values for both the day-time (40dB(A)) and night-time periods (35dB(A)). The recorded noise levels were in the range from 49.3dB(A) in Uzem during the daytime to 41.7dB(A) during the night-time in Tlminci, while in in Kriva Palanka town (III degree area of noise protection) were lower than the legal limit values for both the day-time (60dB(A)) and night-time periods (50dB(A)).

All sensitive areas are situated in valleys which are proposed to be passed by viaducts or bridges. The current primary noise sources in the Project area are traffic along the regional road A2 and nearby business activities.

¹⁰ The railway is expected to be electrified; however, diesel locomotive is used for hauling in stations

Construction Impacts and Mitigation

Construction activities have the potential to give rise to significant adverse noise effects for most community areas within 300m of the Project, especially during preparatory works, earthworks, piling activities, blasting for tunnels and borrow pits, construction of bridges and retaining walls, railway and access roads.

As required in the ESMP, the construction contractor will implement good practice measures to minimise the noise and vibration effects on the surrounding environment and limiting night-time working.

The Project will be constructed in sections, therefore, noise generating activities will only affect local communities for a small proportion of the overall construction programme. Noise levels will be monitored during construction to prevent unacceptable loading. Local communities will also be given advance notification of noise generating activities. Temporary accommodation will be offered where works generating significant noise are required for a long duration in a particular area.

Operational Impacts and Mitigation

The Project will benefit from cuttings and tunnels (9km out of 23km) which will reduce the overall noise effect.

The noise-sensitive (residential) areas along the alignment where the exceedance of noise levels is predicted to be significant are proposed to be protected by noise barriers and others by replacement of windows. The noise barriers have been modelled to reduce the noise levels in line with the World Health Organization (WHO) guidelines (Lden of 54dB(A) and Lnight of 44dB(A)).

The noise barriers have been proposed for inclusion in the design in the following locations (Table 2)

Table 2 Locations of noise barriers

Section	Location	Height [m]	Type
1	v.Tlminci, 65+600 km to 66+100 km on the right and left side	3	Solid curved barrier on bridges
		4	Absorptive curved A2 metal barrier on section without bridges
2	Before the Municipality of Kriva Palanka, 67+600 to 68+800 km on the right side	3	Solid curved barrier on bridges
		4	Absorptive curved A2 metal barrier on section without bridges
3	Municipality of Kriva Palanka, 68+960 km to 70+350 km on the right side	3	Solid curved barrier on bridges
		4	Absorptive curved A2 metal barrier on section without bridges
4	Municipality of Kriva Palanka, 70+660 km to 71+630 km on the right and left side	3	Solid curved barrier on bridges
		6	Absorptive curved A2 metal barrier on section without bridges
5	Municipality of Kriva Palanka, 72+790 km to 73+050 km on the right and left side	3	Solid curved barrier on bridges;
		6	Absorptive curved A2 metal barrier on section without bridges
6	Municipality of Kriva Palanka, 73+050 km to 73+825 km on the right side	3	Solid curved barrier on bridges;
		6	Absorptive curved A2 metal barrier on section without bridges
7	v.Zidilovo, 79+740 km to 80+060 km on the right and left side	3	Solid curved barrier on bridges
		4	Absorptive curved A2 metal barrier on section without bridges
8		3	Solid curved barrier on bridges

Section	Location	Height [m]	Type
	v.Zidilovo, 80+060 km to 80+600 km on the left side	4	Absorptive curved A2 metal barrier on section without bridges
9	v.Uzem, 81+950 km to 82+430 km on the left side	4	Absorptive curved A2 metal barrier on section without bridges
		3	Solid curved barrier on bridges
10	86+178 to 86+300 km on the left and right side	3	Solid curved barrier on bridges
		4	Absorptive curved A2 metal barrier on section without bridges

No significant effects remain after the implementation of the noise barriers, thus no additional localised mitigation measures are considered.

On four other locations (74+320 km to 74+420 km; 76+380 km to 76+530 km; 81+480 km to 81+700 km; 82+430 km to 82+790 km and 86+980 km to 87+180 km), replacing the windows to provide improved noise insulation will be offered to affected properties and installed to ensure the noise level is met.

The ESMP includes a requirement for the Contractor to update the noise assessment and modelling based on the final design. The above locations for barriers and property mitigation are therefore preliminary at this stage and will be finalised and communicated by PE ZRSMI and the contractor on completion of the final design. It also includes a requirement for PE ZRSMI to develop and implement a procedure in case of complaints from the local residents related to noise. The procedure should define how the noise issue should be verified and what mitigation measures will be undertaken in response. The procedure should include regular communication with potentially affected residents (through the SEP and grievance mechanism). In the case that significant noise effect is identified, mitigation measures need to be applied.

6.4 Vibration

Baseline

The Section 3 ESIA (2017) identified 13 zones sensitive to vibration during the construction works, mostly in the areas of the proposed tunnels, cuttings, and viaducts.

There are no significant existing sources of vibration in the area and also there is no vibration measurements and no modelling was done to predict the potential impact potentially resulting from the implementation of the project.

Construction Impacts and Mitigation

The construction activities that are most likely to result in significant vibration effects are:

- Tunnelling undertaken using mechanical methods (road-heading and rock-breaking);
- Blasting to create tunnels using the New Austrian Tunnelling Method (NATM);
- Blasting undertaken for any borrow pits, if required;
- Piling activities undertaken during the construction of any structures; and
- Surface compaction undertaken with vibratory rollers.

Vibration from construction activities has the potential to give rise to significant adverse vibration effects on buildings and structures and on people (annoyance/disturbance). Additionally, vibration can give rise to audible noise within dwellings and other noise sensitive spaces. This is described as 'groundborne noise'. Potential damage to buildings from vibration could occur within 16m of general construction activities, except impact piling, where this distance increases to 60m. During construction activities vibration could cause potential disturbance or annoyance to people in buildings up to 50m away, except

piling, where the distance increases to approximately 190m. Groundborne noise may be at levels which cause disturbance in noise sensitive buildings (dwellings, schools etc.) at distances up to 80m.

The above distances for potential vibration effects are based on reasonably foreseeable worst-case predictions and therefore it is expected that in many instances the actual levels of vibration arising will be lower. At the start of each phase of vibratory works which are within the stated distances of sensitive receptors, trials will be undertaken with concurrent vibration and/or noise monitoring at nearby sensitive receptors. Where potential significant effects are identified, alternative low vibration methods will be used where practicable. This may result in a trade-off between higher vibration levels for a shorter period or lower vibration levels for a longer period and therefore the best solution should be established in conjunction with local community representatives.

Pre-condition surveys of nearby properties will also be undertaken by an independent surveyor to visually identify all existing signs of exterior or interior damage, cracks (including size, type and direction) and settlement. The assessment should include a written record and photographs of the existing situation. The Contractor will apply good practice measures to minimise residual vibration effects. Any change due to the construction activities will be monitored at least bi-monthly to identify any damage that needs to be repaired by the Contractor, in consultation with the affected people.

Construction of the tunnels using the NATM will require blasting to be undertaken. Where there are sensitive receptors within 200m of blast locations, a series of test blasts (at reduced scale) will be conducted. Following the test blasts, the findings will be used to define permissible maximum charges to meet safe vibration limits. The impact of vibration from blasting operations will be minimized by choosing the appropriate blast charge configurations; ensuring appropriate blast-hole preparation; optimizing blast design, location, orientation and spacing; and selecting appropriate blast times. Temporary accommodation will be offered where works generating significant vibration are required for a long duration in a particular area.

All potential construction vibration and groundborne noise effects will be managed through the implementation of a construction noise and vibration management plan.

Operational Impacts and Mitigation

Groundborne noise and vibration from passing trains are likely to be experienced by people in properties situated in the vicinity of the alignment. Levels of vibration expected to be well below levels which could cause damage to buildings.

Based on a reasonably foreseeable worst-case assessment, allowing for 13 train passbys during the night-time (the most sensitive time period), vibration impact zones extend up to 30m and ground-borne noise impact zones extend up to 85m from the alignment; dependent on whether the track is on the surface or in tunnel and track configuration. The number of properties in these areas, identified as sensitive to operational ground-borne noise and/or vibration, which may be disturbed to a greater or lesser extent, is anticipated to be around 715. At the detailed design stage, the impacts will be reassessed taking into account design details and detailed operational assumptions that will be available at that stage (which are likely to include lower speed assumptions in some urban areas).

Measures which can be considered to mitigate the impacts and effects of ground-borne noise and vibration at the detailed design stage are as follows:

- Rolling stock selection (and maintenance)
- Track systems (including rail pads, fastener, sleeper and ballast enhancements and, if shown to be required, floating slab track in tunnels)
- Rail condition (and maintenance)

The PE ZRSMI will develop an Operational Vibration Management Plan in order to prevent negative vibration and groundborne noise impacts along the railway alignment. During the course of railway operation, the running surface of the rail will be regularly inspected and maintained as necessary.

Mitigation measures will reduce impacts as reasonably practicable and are likely to result in a significant reduction in the number of properties predicted that will experience disturbance.

6.5 Water Resources and Wastewater

Baseline

The Project route mostly runs in the upland area above the Kriva River valley and will cross a number of intermittent and ephemeral streams which run down the slopes and discharge into the Kriva. However, the Project area is not identified as an area under risk of heavy rainfall and rapid snow melt, according to the national Hydro-Meteorological Institute.



Figure 5 The Kriva River in the Židilovo Halt Area in January 2022

Water samples were taken from watercourses in early May 2022 to determine the existing water quality. The survey was focused on watercourses that will be crossed by bridges and will require near-water or in-water works (Gabarskareka (bridge 03), Gradeckareka (bridge 05), Ranglel (bridge 07), Kiselicka reka (bridge 32), Krivareka (bridge 37) and Krivareka (bridge 43).

The survey confirmed the assumptions regarding the pressures on surface water quality in the Project area. Untreated domestic wastewater from settlements is the primary cause of degraded water quality, followed by the flotation tailings effluent from 'Toranica' mine which affects the upper stretch of the Kriva River.

Construction Impacts and Mitigation

There is a risk of increased sedimentation and pollution in the Kriva River and its tributaries during construction activities, particularly for bridge works and river regulation works. The sediment run-off may cause deterioration of the water quality. Accidental release of chemicals during construction could also affect the watercourses.

As required in the ESMP, construction risks will be controlled by implementing best practice construction techniques and procedures (such as sediment barriers, silt curtains, storage measures and provision of spill kits) to reduce sedimentation and spillage of harmful substances, so the construction works will not have a significant effect. The Project ESMP requires the Contractor to develop and implement specific method statements for construction works in or near watercourses, including the construction of bridges, culverts, riverbed regulation and diversion of streams.

Any damage caused to surface water infrastructure such as supply systems (public or private), irrigation systems, flood defences or drainage ditches must be repaired by the Contractor.

Operational Impacts and Mitigation

Typical pollutants, such as oils and fuels are unlikely to be present due to the Project being electrified. Maintenance trains or vehicles might not be electrified and could pose a risk of diesel or oil leaks, though this risk is low. No significant effects are anticipated on the quality of the surface water environment from run off.

A new drainage system will drain the track within the rail corridor, with lines installed to ensure surface flows and natural drainage flows are maintained. Measures set out in the ESMP will ensure that drainage systems are regularly inspected, cleared and maintained so any effect will not be significant.

The Project is generally at low risk of flooding. The Detailed Design has considered the floodplains of watercourses in the case of the 100-year rainfall event and designed bridges to include countermeasures for reducing bridge pier scour. The measures include local protection around piers (e.g. mattresses, gabions) and river training works to control the width and velocity of the flow to minimize flooding areas and to avoid flood interference with the project structures.

6.6 Geology, Topsoil and Groundwater

Baseline

Geology; The Project route passes along the upland area on the right valley of the Kriva River, which separates the Osogovo and Bilino mountains. The area is mostly built of very old metamorphic and igneous rock (dacite, quartzite, granitoid, andesite and a variety of schists). Wind, ice and surface run-off are the main contributors to weathering and erosion, shaping the rocky surface and forming gullies and small valleys for ephemeral streams.

Topsoil; The Project route runs across a variety of soils – brown forest soil is predominant in higher elevations, alluvial soil is present in the Kriva River valley (and its tributaries) while the remaining sections are dominated with regosol (weakly developed, low organic matter) and ranker (high organic matter, low clay content). The soil is known to have naturally elevated concentrations of lead and zinc (hence the history of mining activities). Adverse man-made effects on soil have been assumed to originate from agriculture, poor waste management and traffic. Apart from the lead and zinc mine 'Toronica' (1km from the proposed railway) there is no significant industrial activity in the area.

A baseline survey of soil was undertaken in early May 2022 when a total of 10 composite soil samples were taken from 10 locations along the proposed railway. Overall, the baseline concentrations of metals were found to be below the levels where remedial measures are required values in all samples with some metals (zinc, nickel, cadmium).

Groundwater; Groundwater has a very limited potential to be stored within cracks of the subsurface weathered zone, forming only locally-spread groundwater accumulations, discharged through numerous springs of variable yield. No major groundwater aquifers of regional importance are likely to

be present in the wider project area. Narrow belts around seasonal surface streams and the Kriva River are covered by alluvial deposits but have very limited potential for water supply.

Drinking water supply in the project region is organised by tapping water from numerous springs in the uplands, accumulating in the reservoirs and further gravitational distribution to consumers in the villages, through several separate water supply systems. The villages are facing water shortages and there are plans to build several dams at the nearby rivers to overcome this issue. The sensitivity of the shallow geology can be considered low due to the limited potential for aquifers. This includes the area of the cross-border tunnel No. 22 which is low permeability and thus not considered to be sensitive in respect to groundwater resources.

Construction Impacts and Mitigation

Ground Contamination: The construction phase of the Project will result in additional traffic movements associated with heavy good vehicles and machinery and the storage of hazardous substances, with potential for leaks or spills to occur, resulting in ground contamination. During construction, the Contractor will implement relevant sections of the ESMP, including measures to reduce pollution and contamination, manage materials and waste, health and safety, and emergencies, including spills. This will ensure a safe environment for construction workers, and local communities.

Impact on Groundwater Supply: The Project alignment comprises 24 tunnels (with a total length of about 9km) and other structures whose construction will cause disturbance of subsurface environment. Given that the major sources of water supply (usually a group of springs) are located several kilometres upland from the project route (the major one is a Kalin Kamen supplying Kriva Palanka), the potential for significant effects on potable groundwater resources is considered to be low.

However, various solutions for private water supply of the residential houses (and livestock) in the vicinity of the alignment are very likely (shallow groundwater wells, tapped low-yield springs, collection of near-surface or surface water). In that respect Contractor will develop Procedure for Private Water Supplies to prevent disruption, or provide alternatives sources in advance of short periods of planned, temporary disruption. Any damage caused to surface water infrastructure will be repaired by the Contractor, including provision of temporary or permanent alternative water supplies, if necessary. A permanent alternative source should be comparable to or better than the current source.

Operational Impacts and Mitigation

The ESMP includes measures to inspect and maintain drainage and treatment systems along the Project route. An Emergency Response Plan will be in place prior to operation and will include soil and groundwater pollution prevention procedures. The Operational Maintenance Plan and Tunnel Operational Management Plan will include measures to manage potential impacts on groundwater quality, flow and recharge.

6.7 Erosion Risk

Baseline

The Project area is moderately to highly susceptible to erosion initiated by heavy rainfall and streams. The landslide risk is understood to be medium to high as well.

Construction Impacts and Mitigation

The extensive earthworks, excavations, quarrying and blasting (for tunnels, cuttings and bridges foundations) may change surface environment and its susceptibility to erosion and landslides. Soil

erosion may occur as a result of exposure to wind and water runoff and removal of top-soil. Erosion may lead to impacts on rivers and streams as explained earlier.

Construction Impacts and Mitigation

Revegetation requirements to minimise erosion will be included in the CESMP and in the Landscape Management Plan. These will include measures to reinstate and restore lost fertile topsoil on agricultural land. In addition, the Contractor will develop a soil erosion control plan and implement measures to reduce erosion from the construction area e.g. installation of silt fences.

Operational Impacts and Mitigation

The Detailed Design has been informed by the geotechnical surveys and included the stabilisation with retaining walls in areas prone to erosion. To prevent soil erosion, loss and degradation along the Project alignment the PE SZRMI will prepare Operational Soil Management Plan (OSEMP). Following significant rain events, the railway alignment will be inspected for signs of erosion. Slope stability and erosion control measures will be regularly inspected and maintained.

The OESMP will include measures for revegetation and/or maintenance of vegetation to increase the stability of potentially loose materials and surfaces which may develop during the operational phase of the Project.

6.8 Biodiversity and Nature Conservation

Baseline

The Project route crosses a variety of habitats including forest, grassland, riparian woodland and agricultural land.

From total of ~40 habitats and ~415 species, only 10 habitat types and 68 species are classed as potentially sensitive from a biodiversity perspective. Of these, 8 habitat types were assessed as priority biodiversity features and two as the most sensitive type of habitat (critical habitat). Many of these habitats are however degraded e.g. forest habitats due to the long-term use for firewood or as construction material; grasslands due to abandonment of agricultural and woodlands along rivers due to presence of non-native species. Other on-going highway and hydropower projects also contribute to degradation of habitats.

Presence of patches of habitats of importance are present, largely in the area between Drenje and Uzem [**Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietaea* and *Salix alba* and *Populus alba* galleries**]

Faunal surveys noted a range of species of conservation concern including species not noted in the previous studies two bats (Soprano pipistrelle (*Pipistrellus pygmaeus*) and Schreiber's Bent-winged Bat (*Miniopterus schreibersii*), the Black stork (*Ciconia nigra*) and the Dahl's whip snake (*Platyceps najadum*). Other species of note include: wild cat, wolf, falcon, reptiles and amphibians [add any species e.g. falcon]. All faunal species present are considered to be relatively widespread and common in the region.

The railway route passes through 3 areas that are proposed for protection or identified as important for conservation, in accordance with international conventions and initiatives:

- Proposed area for protection, Nature Park "Gorge of Kiselichka Reka",
- proposed Emerald site Pchinja-German – MK0000029,
- proposed Emerald site Osogovo Mountains – MK0000023

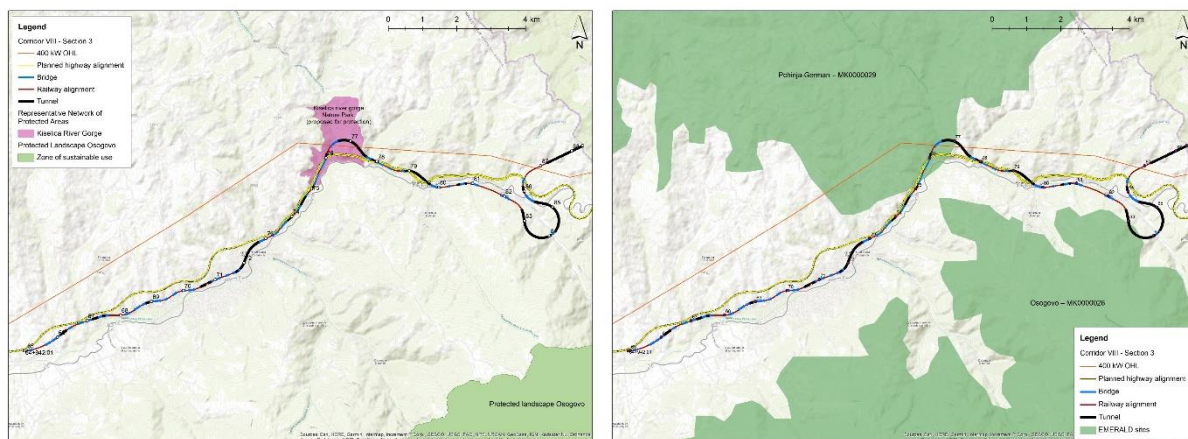


Figure 6 Areas proposed for protection and protected areas (left) and proposed Emerald sites (right) in the area along the railway route

Following the impact assessment and the mitigation, as set in the Biodiversity Management Plan, it is considered likely that there will be no significant residual impacts from the project on biodiversity.

Construction Impacts and Mitigation

Temporary and permanent removal of vegetation during the process of construction of the railway line, as well as clearing vegetation to create access tracks, will result in habitat loss. Construction of the railway will have some added impacts on habitats resulting from habitat degradation on sites used as borrow pits and spoil disposal areas. These sites will not be located in protected areas or areas with important biodiversity.

Railway construction will impact species through range of disturbances including noise from earth moving machines, workers and transport vehicles and construction work, which will result in resulting in habitat loss; but could also result in habitat severance, death and injury. The most significant impacts on species populations are related to the loss and degradation of their habitats.

All impacts during construction are assessed as non-significant should appropriate mitigation measures this will include: inclusion of culverts adapted for fauna as required to cross the Project route safely; measure to minimise electrocution of birds in sensitive areas and restoration or revegetation for the most sensitive habitats to ensure either no net loss or net gain these habitats as a result of the Project. These measures and other mitigation measures are detailed in the BMP and when implemented, it is assessed that the project would have a non-significant impact on the biodiversity features in the project area.

Operational Impacts and Mitigation

Excluding the maintenance clearings of vegetation in the immediate surrounding of the railway line (1m on each side) no additional habitat loss is anticipated during the operation phase, as land take will occur only during construction. Approximately 2/3 of the the alignment is routed through tunnels and bridges and hence negative impacts on sensitive habitats are largely avoided (particularly during operation). Mitigation for reducing the spread of invasive species should be imposed.

During the operational phase, it is anticipated that there will be no impacts on fauna through habitat loss; however, noise, disturbance and collisions may cause impacts. Even if impacts during the operational phase are assessed as non-significant, mitigation will apply to minimise any adverse effects that the railway operation will have on species.

Monitoring of re-vegetated habitats and of sensitive faunal species in the Project area will be undertaken in the early operations phase as described in the BMP. All impacts during operation are assessed as non-significant when the mitigation measures and management actions as detailed in the BMP are implemented.

6.9 Landscape and Visual Impacts

Baseline

The Project, almost completely, extends across an area characterized as Osogovo Mountain Rural Landscape. This landscape is typical for the north-eastern part of Macedonia. This landscape is typically forested rural and hence it is considered to have potential for rural tourism development. The landscape around the Project route is sparsely populated, the largest town being Kriva Palanka, and several smaller rural villages (including Tlinci, Židilovo, and Uzem) with around 300 residents. Agricultural land is found along the Kriva river and areas of uncultivated land and pastures on some hill and mountain areas are gradually being replaced by forests via natural processes. The route passes along the right valley side of the Kriva River, with a 1km section crossing the Kiselička Reka Gorge which is important from a landscape perspective due to its depth and presence of interesting rock-forms. In addition, the route crosses several proposed and protected areas as described in the biodiversity section which are of higher landscape value.

Residents of towns and villages have a high sensitivity to changes in views, although existing views from my properties are already obscured by the combination of terrain, existing buildings and vegetation. Visitors to proposed or protected areas such as Kiselička Reka gorge and Osogovo Emerald site are also considered to be of high sensitivity

Construction and Operational Impacts and Mitigation

The location of the route within the Kriva Reka valley provides and the presence of approximately two thirds of the route within tunnels limits the landscape and visual impacts, both during construction and operation. The construction activities will have a temporary impact on the landscape and visual receptors which is reversible and will cease with the completion of construction. The Contractor will be required to manage the disposal of surplus earth materials to avoid proposed and protected areas including Kiselička Reka gorge and to undertake stabilisation and re-vegetation of slopes.

Negative Impacts on the landscape during operation are considered to be of medium significance along the route due to the nature of the railway and presence of linear, large-scale structures, particularly bridges and of high significance between km 73+ 540 to km 88+ 360, in areas of higher value including Kiselička Reka gorge. Negative visual impacts for some residents and facilities (e.g. schools, soccer fields) in Kriva Palanka, Židilovo and Uzem are also predicted to be of high significance for those with unobstructed views of large bridges and bridge pillars as they are located very close to or in some cases under bridges.

Mitigation measures including re-vegetation and replanting of removed forest areas will be undertaken and defined in a Landscape and Planting Plan, subject to safety restrictions on planting in proximity to the newly operating railway and may mitigate impacts to a small extent. However even with the application of mitigation measures significant impacts will remain which cannot be mitigated. Photomontages of the views of the railway from nine locations are presented in the ESIA Addendum, with selected locations below.



Figure 7 Kriva Reka- soccer field- panoramic view to the north- photomontage



Figure 8 Židilovo - panoramic view to the west-southwest- photomontage



Figure 9 Kiselička reka - panoramic view to the north-northwest- photomontage



Figure 10 Uzem - panoramic view to the east-northeast- photomontage

During operation, it is expected that the railway line will increase availability and accessibility of visual scenery towards the surrounding mountainous terrain during travelling, and there may be some indirect benefits for increased tourism in the Municipality.

Cumulative impacts with the new highway being constructed from Dlabočica-Kriva Palanka are not expected to be significant because the landscape in this area is already urbanized and because railway and highway routes are above one another, parallel to each other and on the same side of the hill.

6.10 Materials and Waste

Construction Impacts and Mitigation

The key construction materials required for the Project are aggregate, asphalt, concrete, imported and reused fill, metals, plastic, precast concrete, rock and stone.

The main type of waste associated with the Project construction will be excavated rock and soil during the earthworks. Detailed Design suggests that c. 4.2 million tons of earthen material will be excavated for the Project. A significant portion of the excavated material will be suitable for re-use for the railway embankments, foundations and subgrade, due to its favourable geotechnical properties (the schists).

The Contractor will prepare a Waste and Materials Management Plan (WMMP) to cover all activities associated with the production of wastes during construction and maximise reuse and recycling. Where it is not possible to reuse the materials off site, they should be temporarily stored on site, then be disposed off-site, at locations determined in liaison with the relevant local authorities.

A total of 12 potential spoil disposal sites have been preliminarily identified during the Section 3 design preparation. The Contractor will be obliged to investigate and allocate the sites that comply with national and Lenders' requirements, selected related to topography, proximity to the alignment, biodiversity features and sensitiveness, presence of watercourses, drainage, etc as defined in the ESMP.

Operational Impacts and Mitigation

The Operational Waste Management Plan (OWMP) will be developed and implemented in the Project operational phase by PE ZSRMI. All waste generated will be managed in accordance with the waste hierarchy (avoid, reuse, recycle, recover, treat, dispose). Dedicated waste storage areas will be established at maintenance facilities, including the Kriva Palanka station and Kratovo traction power station. Waste storage areas will include areas for segregation of wastes and contained storages for hazardous wastes.

6.11 Hazardous substances

Construction Impacts and Mitigation

During the Project construction, moderate to significant quantities of hazardous materials will be used, including fuel, oil and grease. Hazardous waste is likely to include waste oil, waste paint, contaminated absorbents, etc.

The Contractor will develop a Hazardous Materials Management Plan for storing, handling of all hazardous substances and will train all staff accordingly, and in line with the legal requirements. Storage areas will be suitably bunded and constructed to minimise the potential for leaks. Firefighting and spill response systems will be provided. On-site emergency response teams will be trained to undertake the necessary actions to address fire and other incidents that may arise with areas used for storage of hazardous substances.

Operational Impacts and Mitigation

During the Project operation, hazardous materials (oil and lubricants, paints, degreasers, etc.) will be used in track and train inspection and maintenance at the KrivaPalanka station and potentially at Židilovo halt.

An appropriate storage of hazardous materials will be established at both areas. The ESMP for the Project includes requirements for PE ZRSMI for appropriate operation of the storage, including spillage prevention and response. These should be defined by an Operational Maintenance Plan and Spill Response Plan. Waste containing hazardous substances, including lead acid batteries and waste oils will be managed in accordance with the North Macedonia regulations.

6.12 Natural Hazards

Both the Preliminary and the Detailed Design of the Project have considered earthquake, flood and landslide hazards and included consultation with relevant institutional stakeholders.

Earthquake Risk: An earthquake hazard map for the Project area indicates that the Project is situated in an area of heavily damaging earthquake. The Project design has complied with the European standard for Earthquake Resistance. The seismic parameters for the design have not yet been agreed with the competent institutional stakeholder (Institute of Seismic Engineering, University of Skopje) but will need to be agreed prior to the issuance of the construction permit.

Flood Risk: There do not appear to be properties within the area of culverts that might be affected by the flood risk. The Project intersects the Kriva River floodplain by bridges whose piers are designed with a set back from the watercourses for a 100-year rainfall event to prevent impact of flow conveyance. No significant issues related to change in drainage pattern and retention of surface run-off as a result of the railway are expected.

Wildfire Risk: A 20-year history of wildfires has been checked for the Project area. No significant wildfires have been recorded in the Project area since 2001. Control measures will need to be implemented by the Contractor to manage the risk of fire, which is specified in the ESMP. The Contractor should set out the working procedures during the wildfire season (summer months) including hot work.

6.13 Climate Change - Greenhouse Gases Emission

Key sources of greenhouse gases (GHG) emission for the Project would occur in the construction phase (transport of materials and waste to and from the site, construction plant emissions).

In a wider context, the Project is part of the national strategy to mitigate the effects of climate change. The Republic of North Macedonia has committed to an 82% reduction in net greenhouse gas emissions in 2030 compared to 1990 under the 2015 Paris Agreement. The development of railroads and improvement of railway connections between towns has been incorporated into the transport sector mitigation and adaptation strategies.

The operation of the Project is expected to have a beneficial effect in reducing GHG emissions due to the switch from road travel to electrified rail travel. The construction of the railway to Republic of Bulgaria has been identified as one of the measures in the National Energy and Climate Plan - NECP (July 2020). According to NECP, once the Railway Corridor VIII – East (Section 1, Section 2, Section 3) is operational, it will result in GHG savings of 24.6 Gg CO₂-eq (in 2030) and 32.3 Gg CO₂-eq (in 2040). This result is based on the assumption that by 2040 up to 5% of the tonne kilometers (to the Republic of Bulgaria) of the heavy goods vehicles will be replaced by the railroad transport.

6.14 Climate Change – Climate Resilience

The climate resilience assessment considers the vulnerability of the Project to climate change.

Observed and Projected Climate Change

The Project area is characterised by moderate continental climate with local microclimate differences due to the terrain elevation which gradually increases from 600m a.s.l. in the west to 1,100m in the east. The lower areas in the west are characterised by warm continental climate while the very east in the Osogovo Mountain has an alpine and cold continental climate.

Whilst the **average annual temperature** in KrivaPalanka is moderate (10.9° C), temperature extremes are pronounced (from -21° C to +36° C).

Average annual rainfall is around 600mm which is moderate but the intensity of events varies throughout the year. The highest rainfall is recorded in May-June and November and the lowest in August-September and February. Short bursts of high intensity rainfall are common.

The area is **windy** with an average speed of 2.9m/s (the southern wind) while a NE wind is the most frequent.

According to available official national reports on climate change, predictions for the period 2025-2100 suggest a **continuous increase in air temperature** compared to the baseline period (1961-1990), especially in summer. Total **annual rainfall is predicted to decrease**, with the greatest decrease predicted in July and August. However, more moisture in a warmer atmosphere can result in heavy rainfall events followed by flash floods, storms and more snowfall.

Construction Effects and Mitigation

The Project may be vulnerable to the following during construction, as a result of increased average and extreme temperatures, due to climate change:

- Drying out and cracking of ground and access road surfaces, leading to slower vehicle movements and repair work, resulting in construction delays;
- Temperature effects on construction materials including melting or deformation and shorter drying times;
- Overheating of construction plant and equipment;
- Health and safety risks to construction workers from heatstroke and UV radiation and vulnerability of buildings to overheating;

The Contractor's CESMP and relevant sub-plans will be required to establish working procedures during high water and heavy rain periods, hot weather, winter preparation works, construction site drainage, stabilisation of soil in erosion prone areas, wildfire preparedness and response, etc. The Contractor will be required to consider spraying surfaces, selection of resilient air temperature where appropriate (i.e. construction materials which do not have rapid-drying properties), maintaining vehicles, and measures to protect workers. Following the adoption of the inherent mitigation measures set out in the ESMP, no significant effects for climate resilience are anticipated.

Operational Effects and Mitigation

Climate change resilience mitigation measures identified in the Detailed Design and the ESMP, includes the following:

- The Project design was conducted in line with the EU Technical Specifications for Interoperability (TSIs). The design included structural and engineering measures for climate adaptation related to drainage systems, protection of structures from 100-year rainfall events, landslide and erosion control.

- A new drainage system will drain the track within the rail corridor, with lines installed to ensure surface flows and natural drainage flows are maintained. Drainage systems will be regularly inspected, cleared and maintained so any effect will not be significant;
- The connectivity of all watercourses will be maintained through the construction of culverts and bridges, and watercourse crossings will be designed to maintain riverbanks and flood defences;
- Watercourse crossings, diversions or realignments could change erosion and sedimentation patterns through a watercourse, however, with the implementation of measures in the ESMP, the effect on watercourses crossed by the Project will not be significant.
- Methods for energy efficiency (energy saving, efficient lighting, efficient water fittings at the stations, etc.)

With the design-embedded mitigations and adaptation measures which will be defined by the ESMP, the Project is considered to be resilient to climate change impacts.

6.15 Cumulative Impacts

The following projects are under development in the Project area and considered relevant with respect to potential cumulative effects:

- **Construction of the expressway road Rankovce – Kriva Palanka (11km);**

The construction work started in June 2018 with an initial deadline of 3 years which has been delayed. The proposed road runs within 300-400m at the first 7km of the Project, intersecting the Project route in Kriva Palanka.

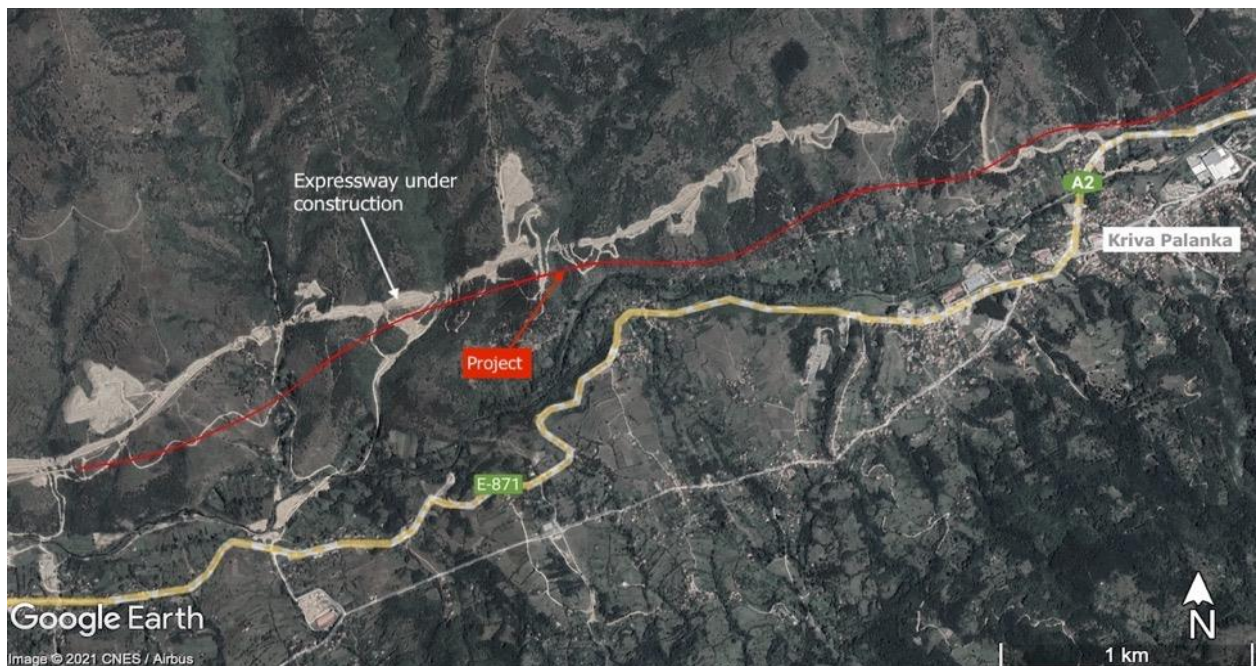


Figure 11 Relationship Between the Project and the Expressway Road Under Construction

(Source: Google Earth, imagery date: 11th August 2020)

The major earthworks appear to be completed for the Project, with works expected to be completed by the end of 2023. No significant overlap in the construction of the two developments is anticipated that would contribute to significant in-combination effects for the local community (air emission, construction noise and vibration, etc).

Once both Projects are operational, they will represent a potential source of cumulative noise in the area. On the other hand, both projects run through a largely unpopulated area in the upland above Kriva Palanka and are likely to redirect part of the traffic from the existing regional road A2 running through the town. This may result in a reduction of noise levels at residential receptors currently exposed to traffic noise from the regional road A2.

Receptors at the outskirts of Kriva Palanka and in hamlets belonging to Tlminci and Konopnitsa villages are likely to be exposed to a new source of cumulative noise.

The ESMP includes the requirement for PE ZRSMI to collaborate with the road management company (Public Enterprise for State Roads - PESR) in the operational phase, in case of complaints from the local community related to noise issues and their mitigation

- **Reconstruction and upgrade of the existing regional road A2 Kriva Palanka – Deve Bair (13km);**

The reconstruction started in November 2020 and is planned to be completed in 2023. The road follows the Kriva River valley while the Project mostly runs along the nearby hills.

- **Section 2 of railway Corridor VIII (Beljakovce - KrivaPalanka, 34km);**

Section 2 is adjacent to the Section 3 project.

It is assumed that there will be at least a 2-year gap between the commencement of the two projects which suggests that earthworks on Section 2 will be completed when the Project construction starts. The number of residential receptors close to the area of concurrent works is small, with Tlminci village being at a distance of more than 600m. Given that the construction works will be of limited duration, providing that anticipated mitigation measures are implemented, the in-combination effects (noise effects, visual intrusion, and impacts on traffic) on the nearby receptors are not considered to be significant

- **Reconstruction and Upgrade of the Regional Road A2**

The Project construction is not likely to overlap with the reconstruction and upgrade of the A2. The in-combination effects of the operation of the reconstructed and upgraded regional road A2 and the Project Section 3 are not considered to be significant.

The footprints of all infrastructural projects currently implemented in the area are discrete, since although at some sections these align to or come in close vicinity of the railway alignment, there is no intersection.

The effects of the Expressway A2, LOT 2: Sub-section KrivaPalanka – Dlabocica projected alongside the railway line have been accounted for in the expressway ESIA that assumes no significant impact. Hence, accounting for the monitoring in place¹¹ and further considering the management actions and

¹¹ Reports on supplemental assessment of impacts on and monitoring of biodiversity from project activities in the area of the Osogovo-German bio corridor during construction of Expressway A2, LOT 2: Sub-section KrivaPalanka – Dlabocica, 2020-2021, Geonatura Zagreb
Survey of the large mammal fauna during construction of Expressway A2, LOT 2: Sub-section KrivaPalanka – Dlabocica, Field report VI, October - December 2020
Field report VII, January - February 2021
Field report VIII, March - May 2021
Final assessment of impacts on biodiversity from project activities in the area of the Osogovo-German bio corridor during construction of Expressway A2, LOT 2: Sub-section KrivaPalanka – Dlabocica, Biodiversity Management Plan

mitigation measures outlined for both, including the revegetation planned to offset the habitat loss, no significant cumulative impacts are expected.

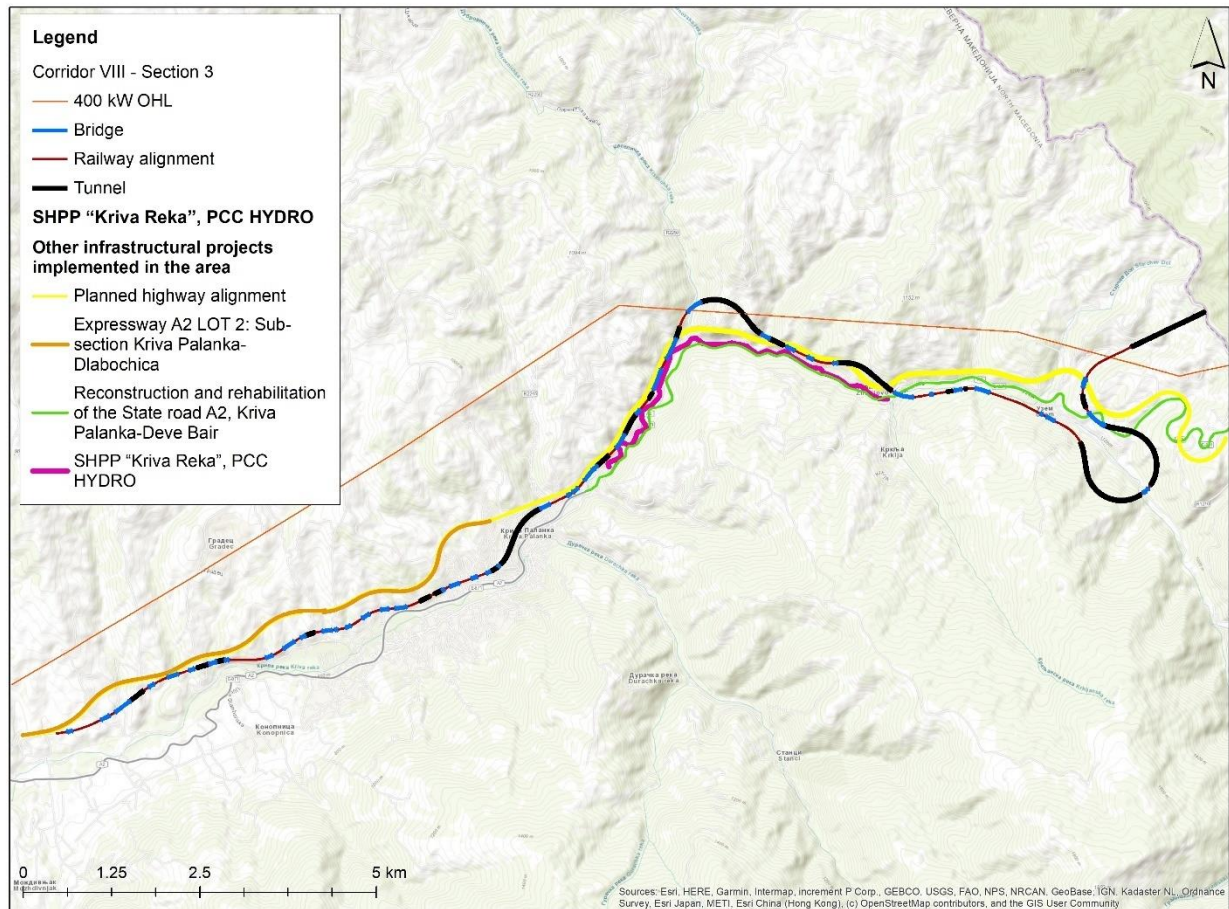


Figure 12 Map of infrastructural projects, planned and under implementation, in the AOI

7 Social Benefits, Potential Adverse Impacts, Mitigation and Management Measures

7.1 Community Health and Safety and Security Issues

Construction Impacts and Mitigation

Project construction will create an increase in noise and air pollution. Blasting might affect the structural integrity of buildings close to the tunnel excavation area.

The proposed route intersects the gas distribution pipeline at four points and the 110kV power transmission line at two points.

The electrification works (including Section 1 & 2) will be conducted with the existing right-of-way and apart from general construction risks, no major risks for community health and safety are anticipated.

The ESMP sets out requirements for appropriate method statements and management plans for the Contractor. A Tunnel Construction Plan and a Blasting Management Plan will be developed and implemented. The Blasting Management Plan should include a requirement for the Contractor to inspect structural integrity of buildings close to the tunnel excavation area and record their condition before and after blasting. Vibration levels shall be measured at representative receptor locations during blasting.

The Contractor should verify the presence and position of any suspected cables or pipes, with the local utility providers before construction. The ESMP will include the provisions that during the construction of catenary mast foundations pits should be properly fenced/ lightened. Fences and hazardous areas should have warning signs. The ESAP will require PE ZRSMI to liaise with MEPSO (national transmission operator) to avoid/ minimise disruption in electricity supply during the installation of connections.

The Contractor shall set out measures for ensuring community safety including measures such as signage, access restriction, community safety briefings (e.g., in local schools) etc.

Operation Impacts and Mitigation

During the Section 3 Project operation, safety risks include train accidents and risks for people who live near or trespass onto the railway line (freight and passenger train and structures). The risks for the general public relate to electrocution or being hit by moving trains.

Electrification of Section 1 and 2 will be related to exposure to electromagnetic fields (EMF), electromagnetic interference (EMI), and electrical accidents. The ESIA identified one settlement (Pero Čičo, Section 1) where residential structures are situated 6m from the proposed railway and can potentially be exposed to increased EMF levels.

The ESMP describes the requirements for a Community Health, Safety and Security Plan that should be developed and implemented by PE ZRSMI. The Plan should include measures related to the health, safety and security of the local community, including signage and discouraging access to tracks or structures.

The ESMP includes the provision to evaluate potential exposure to EMF in Pero Čičo settlement against the reference values adopted by the WHO. If increased EMF levels are confirmed, mitigation should be considered (engineering measures, compensation, etc.).

7.2 Local Traffic and Access Impacts

Construction Impacts and Mitigation

Project could result in increased construction traffic, road diversions, increased risk of road accidents, reduced safety due to the movement of construction plant and construction activities and reduced safety as a result of unauthorised access to the construction site, but also has the potential to temporarily restrict access for the local community to residential properties, agricultural land, and community infrastructure (including schools and hospitals), which could lead to disruption and loss of local income and livelihood during this period. It is anticipated that community access effects will be not significant following the implementation of the required mitigation measures, such as providing temporary access roads and routes, repair of any damage and liaising with affected communities.

The Contractor will be required to carefully plan site access and put in place relevant warning signage and provisions to minimise any risks and disruption to local communities, users of the route/areas etc. The ESMP outlines a Construction Traffic Management Plan which the Contractor should implement. The Plan should maintain vehicle and pedestrian access, safe passage of vehicles and pedestrians, provide effective diversions and conducting work for road closures outside peak traffic times etc.

Engagement with the Municipality of Kriva Palanka and any locally affected parties (e.g. businesses, settlements etc.) on traffic management will be required as part of the Plan.

Operation Impacts and Mitigation

The Project will not have level crossings, all crossings will be grade separated (overpass, underpass).

7.3 Impacts to Existing Infrastructure

PE ZRSMI must implement a regular practice of raising local awareness about the negative aspects of crossing the railway line at illegal pedestrian crossings but also disturbance of the local public services and existing infrastructure. Together with PESR and contractor must provide on time information to local population and affected stakeholders regarding forthcoming disturbances and disruption of the existing infrastructure. Operational Community Health and Safety and Security Plan should be also developed for mitigating possible consequences of disregarding the rules for safe passage through the railroad, that is, the crossing of the railway at illegal pedestrian crossings at the operational phase of the project.

7.4 Project Induced Population Influx and Worker Camps

Construction Impacts and Mitigation

The induced population influx may arise due to increase worker camps and construction activities during the construction phase, providing opportunities for local workforce. In order to mitigate this effect, the PE ZRSMI shall prescribe at the contractor's contracts creation of a Worker Accommodation Plan that will be in line with the standards of good international practice translated and Lenders' standards

In addition, every contracted worker from the Contractor must sign a Code of Conduct for Workers provided by the Contractor, which will include not only declarations and measures related to the labor and material process, but also respect for the local population, community and their property and measures to address gender-based violence and harassment risks. The Code of Conduct for Workers must be publicly available together with the Grievance Complaints Procedure.

7.5 Emergency Preparedness and Response

Construction Impacts and Mitigation

The Contractor will prepare the Construction Emergency Preparedness and Response Plan (CEPRP) to identify and manage all potential emergency events, which will include contacting local authorities.

Potential emergency events that could impact Project-related activities, personnel or assets and will be considered in the CEPRP will comprise but not be limited to earthquakes, landslides, flooding, wildfires, extreme temperatures – heatwaves and low temperatures, storms (wind storms, snow storms thunderstorms), heavy fog events, extreme rainfall.

Operation Impacts and Mitigation

Once the Project is operational, PE ZRSMI and Railways of Republic of North Macedonia Transport (RNMT) will be responsible for emergency preparedness and response in liaison with local authorities and emergency responders.

The majority of the Project route will run through uninhabited areas and accidents during the transport of dangerous goods will not present a risk to nearby communities. The exception is the Kriva Palanka

community which is densely populated and as such potentially more exposed to accidents with dangerous goods in the two tunnels, including fire.

Potential emergency situations that might occur in the tunnels are fire due to derailing of the wagon tanks and leakage (dispersion) of explosive or flammable materials.

Operational Emergency Preparedness and Response Plan, will be developed and implemented by PE ZRSMI and RNMT. The Plan will contain provisions related to potential accidents, including tunnels. The Plan should be cross-referenced with a Tunnel Operational Management Plan. As part of the Operational Environmental Management Plan, PE ZRSMI and RNMT should develop and implement an Emergency Preparedness and Response Plan, particularly in relation to emergencies in the two tunnels. The Plan should be developed in liaison with the state Directorate for Protection and Rescue, the local authority of Kriva Palanka and local emergency responders.

The ESMP will require PE ZRSMI and RNMT to liaise with the Municipality of Kriva Palanka in the development of the Local Plan of Protection and Rescue which local authorities are required to implement, according to the Law on Protection and Rescue (2018).

7.6 Cultural Heritage

Construction Impacts and Mitigation

In accordance with the Macedonian Law on Protection of the Cultural Heritage, in case of unexpected discovery of archaeological sites, the Contractor is obliged to immediately inform PE ZRSMI and the Ministry of Culture and to follow their instructions. Construction work will be temporarily suspended while the competent authorities decide whether any research is needed or all protection measures should be applied. The contractor should follow the instructions given by the authorities responsible for the protection of cultural heritage. The contractor must keep the discovered objects in place and in the state in which they are detected. Additionally, the Contractor will develop Chance Find Procedure (CFP) that outlines appropriate actions required in such case. Workers should undergo basic training on the procedure for a random archaeological site (CFP).

7.7 Land Acquisition and Resettlement

For the purposes of land acquisition and resettlement, a Resettlement Action Plan (RAP) has been developed. As part of the RAP, proper information, communication, and consultation of the persons that will be expropriated, especially their homes, was conducted. People who will lose their homes are on time consulted and engaged to find a solution according to the needs and possibilities. It is necessary to remain in contact with these persons until their final resettlement and the disappearance of the negative consequences of that resettlement.

Analysis of the Geodetic Report was conducted by PE ZRSMI defining the total number of affected private land parcels. The total affected project area, including the permanent way and access roads, is 646,801 m² and 522 plots. The project will affect total of 15 structures (houses and auxiliary buildings) that will need to be demolished, located in cadastral municipality (CM) Trnovo (1 building), CM Kiselica (1), CM KrivaPalanka (6), CM Zidilovo (1) and CM Uzem (5).

The date of submission of the Expropriation proposal will be considered as the cut-off date, and there will be no eligibilities or entitlements to compensation recognized after the cut-off date. Those people or groups affected directly by the Project are eligible to receive full replacement cost and rehabilitation assistance for impacts identified as part of the screening and census. Project affected persons (PAPs) may be classified as persons:

- (a) Who have formal legal rights to land or assets.
- (b) Who do not have formal legal rights to land or assets, but have a claim to land or assets that is recognized or recognizable under national law; or
- (c) Who have no recognizable legal right or claim to land or assets they occupy or use.

PAPs with recognizable rights will be provided compensation for the land they lose, and other assistance as required by EBRD Performance Requirement 5 and EIB Standards 6 and 7. Those without recognizable rights will be provided with resettlement assistance in lieu of compensation for the land they occupy, or other assistance, as necessary, if they occupy the project area prior to the cut-off day, which is established prior to the census which is conducted as a key part of the RAP. All PAPs will be provided compensation for affected assets and livelihoods other than land.

7.8 Livelihood Impacts

Livelihood restoration comprises a set of different measures which will be implemented to address economic displacement – that is, to improve or, at a minimum, restore livelihoods and standards of living of project affected people to pre-displacement levels, in as short a period as possible.

In case when the loss of land and other assets or access to assets, leads to loss of income sources or means of livelihood (economic displacement) of PAPs, alongside compensation for affected land and assets, PE ZRSMI will create and implement Livelihood Restoration Measures. Depending on the type of impacts, livelihood improvement or restoration measures will include different measures. Such measures are divided in two categories: 1. Livelihood Assistance Measures (in agriculture and non-agricultural businesses) and 2. Additional assistance for Vulnerable PAPs.

PE ZRSMI adopted the EBRD Performance Requirements and EIB Standards according to which the project's impact on the livelihood of the PAPs should be very limited. Within this framework, the scope of the program is the implementation of the measures which will ensure that the PAPs (the owners and users of the land and assets) will have the opportunity to (i) restore their income to the level it was prior to the commencement of the project and (ii) where possible to improve it. The proposed measures are divided in two categories:

1. Livelihood Assistance Measures (in agriculture and non-agricultural businesses) and
2. Additional assistance for Vulnerable PAPs.

All landowners, co-owners, and users whose land will be acquired for the needs of the railway construction potentially will be targeted beneficiaries of livelihood restoration measures. This includes PAPs who may, because of the land expropriation or restricted use of natural resources, will experience a temporary or permanent loss of income or livelihood. Proposed livelihood restoration measures include measures for agriculture, non-agricultural businesses and vulnerable persons or persons in risk aiming to address all identified and potential impacts that may arise.

7.9 Occupational Health and Safety Issues

Common activities undertaken during construction such as the movement of heavy machinery, demolition and excavation, electrical works, handling of chemicals, and works undertaken at height, can all introduce significant risk to the health and safety of the construction workforce. The Project Technical Specifications details the specifications and standards that need to be complied with by the contractor, once they have been appointed, as well as implementation of OHS by the Contractor. Following the implementation of the mitigation required in the ESMP, effects to occupational health and safety are not considered significant.

During the operational phase, PE ZSRMI will develop and implement Operational Occupational Health, Safety and Security Plan to ensure identification and prevention of accidents, injury and ill-health to workers, to ensure that workers are provided with relevant information, instruction and training relating to health and safety hazards, risks, protective and preventive measures and emergency arrangements that are necessary for their health and safety, etc. Following the implementation of the proposed mitigation measures in the ESMP, effects to occupational health, safety and security are not considered significant.

7.10 Labour Issues, Employment and Contracting

During the construction phase, the Contractor will enhance employment opportunities for locals within the Project area. In that context, the Contractor will develop and implement an HR Policy which will set out his approach to managing the workforce consistent with national labour and employment laws and the fundamental principles and standards from ILO conventions. Also, the Contractor will develop and implement Local Recruitment and Employment Plan and Labour Management and Monitoring Plan. It is important to note that the Project will provide formal contracts, adequate facilities for workers, measures to avoid discrimination, monitoring and inspections on site, including in relation to child labour, forced labour and other unlawful activities. The required mitigation will ensure the risks associated with labour and working conditions are not significant.

In regard to the operational phase, according to the ESIA (2017), activation of the whole corridor, passenger and freight transport will induce many employment positions along the railway line. Direct employment will be created, related with operation and maintenance of railway (on permanent way, on signalization, on loading and unloading and similar) with an estimation of around 50 employees necessary for maintenance of railway and around 40 who will be employed within railway stations and halts.

To enhance employment opportunities for locals within the Project area, the Contractor will develop and implement an HR Policy which will set out his approach to managing the workforce consistent with national labour and employment laws and the fundamental principles and standards from ILO conventions; Contractor will also develop and implement the following plans:

- Local Recruitment and Employment Plan to foster equal opportunities and encourage and maximize hiring of local workers;
- Labour Management and Monitoring Plan to ensure that all workers (including sub-contractors) have employment contracts in line with both national legislation, applicable ILO standards and recommendations and Lender's requirements. All workers will have access to human resources policy and procedures.

8 Transboundary Impacts

As the Project includes the Macedonian part of the cross-border tunnel with Bulgaria, the project is subject to the Espoo Convention on EIA in a Transboundary Context. The 2017 national ESIA process involved the environment authorities of Bulgaria which provided their requirements for the ESIA, and particularly asked for consideration of potential effects of the cross-border tunnel construction on existing fissured groundwater bodies (aquifers) on the Bulgarian side. In the ESIA the groundwater aquifer was found to be low-sensitive as the rocks are low-permeable and the groundwater depth was reported to be at about 100 m below ground level.

Upon the consideration of the ESIA and associated design documents, in April 2018 the Bulgarian Ministry informed the Macedonian counterpart that the assessed effects of the cross-border tunnel were found to be acceptable by the relevant water management stakeholders and that no significant health

effects were anticipated for the population of the nearby Bulgarian village of Gyueshevo. The Bulgarian Ministry decided that no public consultation for the Project is necessary, concluding that “there is no need for further participation of the country in the EIA procedure, including a public discussion of the report in the border region of the Republic of Bulgaria”.

9 Organisational arrangements

To ensure effective implementation and management of the Project, a number of parties will be involved. Each party will appoint resources to ensure implementation of the E&S regulatory requirements and Lenders’ standards. The roles and responsibilities of the parties have been described in detail in the ESMP.

The selection and implementation of the works contract will be done by the IPA Operating Structure with the following structure:

1. Central Financing and Contracting Department within the Ministry of Finance shall be the Contracting authority for the Project, shall conduct the tendering procedure, shall sign the contract agreements, and observe the contractual and financial project implementation.

Head of Operating Structure (HOS) the Ministry of Finance will also ensure monitoring and on-the spot checks over the contracts execution, during the implementation of the Project according to the CFCD Internal Manual of Procedures and shall coordinate the IPA Coordinator in the Ministry of Transport and Communications and the Project Implementation Unit (PIU) Coordinator in the PE ZRSMI in carrying out the tasks delegated under the Operational Agreement.

2. The EU Department represented by an appointed IPA Coordinator and relevant monitoring officers within the EU department, as well as the Department for Railway within the Ministry of Transport and Communications shall monitor the overall implementation of the Project.
3. PE ZRSMI as the Final Beneficiary of the Project represented by the appointed PIU Coordinator and the relevant PIU members shall closely monitor the implementation of the Project.

The IPA Operating Structure, each within the relevant institution, will have ultimate responsibility for the Project and will oversee the implementation of the Lenders requirements during construction by overseeing construction contractor, construction sub-contractors and their involved third parties.

The IPA Operating Structure will be responsible for creating a Project Implementation Unit (PIU) which will ensure the implementation, financial management and overall delivery of the Project.

PE ZRSMI will appoint a Supervision Consultant, selected upon a international restricted tendering procedure, consisting of a range of expertise, to supervise the activities of the Contractor on a day-to-day basis, to ensure that recommendations and requirements, as set out in the disclosure package, are applied.

The Contractor will be responsible for ensuring that all their work and staff activity during the construction is compliant with the legislation, policies and standards for E&S and the permits provided by national (and local) regulators and the Project E&S requirements.

EBRD and EIB ('the Lenders') are considering financing but will not directly develop the Project. The Lenders will require the submission of progress reports that monitor the E&S performance of the Project against their requirements.

10 Communications

10.1 Contact Details

The company intends to provide all relevant information to the public. PE ZRSMI will disclose its environmental and social policy and grievance mechanism to the public. Information on public disclosure (with list of documents disclosed and addresses) will be published in daily newspaper. All interested parties will be able to find all the listed information below on the company's website (www.mzi.mk) as of June 2023, available in Macedonian and English (the NTS in Bulgarian and Albanian, also).

In addition, the company will make available hard copies of these documents at the following locations:

- The Public Enterprise for Railway Infrastructure Railways of Republic of North Macedonia – Skopje (PE ZRSMI)"
- Address: st. Jordan Mijalkov 50b, Skopje

Hard copies will be delivered and made available at the municipal buildings as well in Kriva Palanka, at the address of: st. St. Joachim Osogovski No.175, Kriva Palanka, as well as project leaflet in public places in affected communities in the project area.

The following information is publicly available in the following languages:

- Non-Technical Summary (NTS), Macedonian, English, Albanian and Bulgarian,
- Stakeholder Engagement Plan (SEP), Macedonian and English,
- Environmental and Social Action Plan (ESAP), Macedonian and English,
- Environmental and Social Management Plan (ESMP), Macedonian and English,
- Supplementary Biodiversity Assessment, Macedonian and English,
- Biodiversity Management Plan (BMP), Macedonian and English,
- Resettlement Action Plan (RAP), Macedonian and English.

All documents are electronically available at the following web address: www.mzi.mk

These documents will be disclosed for a period of 120 days, within which stakeholders can submit comments or questions using the following mechanisms:

PE ZRSMI will consult the Bulgarian National Railway Infrastructure Company in order to publish the E&S deliverables as news on their website. (<https://www.rail-infra.bg/>).

10.2 How to Address any Issue Arising (Grievance Mechanism)

A Project-level Grievance Mechanism (GM) has been established and is a process for receiving, evaluating and addressing Project-related complaints for anyone with concerns about, or affected by, the Project. Complaints can be raised verbally or written, via the following channels during construction:

- Telephone:
 - Hotline of PEZRSMI: 02 2449052
 - PIU Stakeholder Engagement Specialist: Aleksandar Ravnjashki Tel: 078 246 749
- PEZRSMI Complaints Email Address: poplaki@mzi.mk
- Face to Face:

ESIA Non-Technical summary

- Stakeholders, including the public, can discuss their grievance with assigned personnel of PE ZRSMI at local offices.
- Public Grievance Mechanism Paper Form:
 - Stakeholders including the public, can fill in the paper grievance form in Appendix A and either send it to PE ZRSMI's offices, or email it to poplaki@mzi.mk

The above contact details will be updated by PEZRSMI prior to operation of the Project and publicly disclosed on PEZRSMI's website.