Republic of North Macedonia

Public Enterprise for State Roads

A2 MOTORWAY: BUKOJCHANI – KICHEVO SECTION

Environmental and Social Impact Assessment - Addendum

September 2021

Quality Control

Issue/revision	First issue	Revision 1
Remarks	Draft for Client Review	Final
Date	July 2021	September 2021
Prepared by	Technical Specialists	Technical Specialists
Signature		
Checked by	Jenny Warhurst	Nick Archibald
Signature		Archibald, Nick (UKNJA005) Digitally signed by Archibald, Nick (UKNJA005) DN: cn=Archibald, Nick (UKNJA005), ou=Active, email=Nicholas.Archibald@wsp.com Date: 2021.09.21 10:27:52 +01'00'
Authorised by	Rachael Bailey	Rachael Bailey
Signature		Digitally signed by Bailey, Rachael (BaileyR) DN: cn=Bailey, Rachael (BaileyR), ou=Active, email=Rachael.Bailey@wsp.com Date: 2021.09.21 15:08:58 +01'00'

Jozhe Jovanovski

Manager of Environment Protection and Social Aspects,

Project Implementation Unit,

Public Enterprise for State Roads

Telephone: +38923118044 ext. 305

Address: Dame Gruev 14, 1000 Skopje, Republic of North Macedonia

Email: j.jovanovski@roads.org.mk

Website: www.roads.org.mk

Contents

Figures

Tables

1 INTRODUCTION

1.1 THE PROJECT

1.1.1. The Environmental and Social Impact Assessment (ESIA) Study for the A2 motorway, Bukojchani – Kichevo section (the Project) was prepared in line with the contract between the Public Enterprise for State Roads (the Investor) and GEING Krebs und Kiefer International and others Ltd. – Skopje (no. 08-16/7 from 26.01.2018). It was also been supplemented by assessments undertaken by WSP to meet EU and EBRD requirements. The Project is for the construction of the 10.7 km long 'Bukojchani – Kichevo' subsection of A2 motorway. This addendum has been completed in accordance with the Design Change Management Procedure as outlined in the ESMP section 5.1 and ESAP item 1.5.

1.1.2. The ESIA for the Project was disclosed on the 11th December 2020 and assessed the original alignment. However, a realignment was developed following consultation on the disclosed ESIA and is now the preferred option. This ESIA addendum for the project has been prepared to evaluate the potential implications of the realignment, which applies to a 4km section of the Project between chainage 2+000 and 6+000.

1.2 THE DEVELOPMENT OF THE REALIGNMENT

1.2.1. The realignment has been developed to address concerns raised by local residents during the stakeholder engagement activities, particularly in relation to the close proximity of the original Strogomishte Interchange to residential properties, and the potential effects of the Project on the cemetery in Dolno Strogomishte. The realignment relocates the Project, particularly one of the main structures, the Strogomishte Interchange, further from the village and the cemetery.

1.2.2. In summary, the realignment will:

- Relocate the Strogomishte Interchange, further to the west of the village of Dolno Strogomishte (between chainage 2+750 to 3+000);
- Overpass local roads and the railway, with the Project located on a linear embankment of approximately 10m in height between chainage 2+000 and 3+000 (far western extent) / 3+050 (far eastern extent);
- Include a viaduct of 710m in length (either between chainage 3+000 and 3+700 (far western extent) or between chainage 3+050 and 3+760 (far eastern extent)); and
- Relocate the proposed entrance and exit of the Kolibari Tunnel. The length of the tunnel will be 760m.

1.2.3. This realignment is the preferred option as this relatively minor realignment to the Project will reduce the likelihood of adverse environmental and social effects on residents of Dolno Strogomishte and users of Dolno Strogomishte cemetery, particularly the noise, air quality and visual effects during construction and operation. The realignment remains within the original study corridor as presented in the original ESIA, but will be located further from the village of Dolno Strogomishte, and residential receptors within the village. The detailed design which will be prepared for the Project will include this realignment. A description of the realignment is set out in Section 1.4.

1.2.4. The ESIA assumed that the construction activities would start in 2020, with the operational phase of the Project planned to begin in 2023. Due to the time that has since elapsed, construction activities are anticipated to commence in 2022 and last until 2026 when the Project will then become operational.

1.3 PURPOSE OF THIS ESIA ADDENDUM

1.3.1. This ESIA addendum has been prepared to evaluate the potential benefits of the realignment, together with the potential for any effects to be significantly changed to the findings of the original ESIA due to the proposed realignment. It also considers whether any further mitigation needs to be included in the ESMP. This ESIA addendum considers the implication for each of the following environmental and social topics, which were considered in the ESIA:

- Air Quality (Chapter 4);
- Climate (Chapter 5);
- Groundwater (Chapter 6)
- Surface Water (Chapter 7)
- Geology and Soils (Chapter 8);
- Waste Generation and Resource Efficiency (Chapter 9)
- Noise and Vibration (Chapter 10);
- Biodiversity (Chapter 11);
- Landscape and Visual Impacts (Chapter 12);
- Social and Community Effects (Chapter 13);
- Occupational Health, Safety and Security (Chapter 14);
- Property and Livelihood (Chapter 15);
- Cultural Heritage (Chapter 16); and
- Cumulative Effects (Chapter 17).

1.3.2. The description of the realignment, implications in relation to the Project requirements, stakeholder engagement, and summary of the potential effects are outlined in the following chapters:

- Chapter 1 – Introduction – this presents an explanation of why the addendum has been prepared and a description of the realignment;
- Chapter 2 – ESIA Legislation and Requirements – this considers any implication in relation to the legislation and regulations since the preparation of the **ESIA**;
- Chapter 3 - Stakeholder Engagement – this considers the further stakeholder engagement that has been undertaken since the preparation of the **ESIA** and the further consultation that is required as a result of the realignment;
- Chapter 18 – Summary – this presents a summary of the potential for any effects to be significantly changed due to the realignment and further mitigation measures, if required, as identified in each topic assessment.

1.3.3. The ESMP in Chapter 19 of this ESIA addendum has been updated with further mitigation, where required.

1.3.4. The following reports were included in the disclosure submission, and they have also been updated in response to the realignment:

- Stakeholder Engagement Plan (SEP);
- Land Acquisition Framework (LAF); and

- Environmental and Social Action Plan (ESAP).

1.3.5. The PESR will undertake public disclosure of the ESIA Addendum, and the following updated documents: LAF, SEP, ESAP and Non-Technical Summary (NTS) for the ESIA. These documents will be available in the following languages:

- Updated LAF – Macedonian, English and Albanian;
- Updated NTS – Macedonian, English and Albanian;
- Updated SEP – Macedonian, English and Albanian;
- Updated ESAP – Macedonian, English and Albanian;
- Updated ESMP – Macedonian and English; and
- ESIA Addendum – Macedonian and English.

1.4 DESCRIPTION OF THE REALIGNMENT

1.4.1. The realignment is shown in **Figure 1-1**. The realignment will be located between the two maximum extents shown in pink, referred to throughout as the 'far western' and 'far eastern' extent. The original alignment is shown in green.

1.4.2. The realignment will be up to a maximum of 1.5km to the southwest of the original alignment. The maximum extents of the realignment indicate that the length of the Project is likely to increase by less than 1km.

1.4.3. The specification for the motorway (such as the lane widths, speeds, central reservation and hard shoulders) remain unchanged from those set out in **Table 2-1** of the **ESIA** and will apply to the realigned section of the Project.

1.4.4. The realignment will require the introduction of overpasses for local roads and the railway. The embankment will start at chainage 2+000 and connect into the viaduct at either chainage 3+000 (far western extent) or 3+050 (far eastern extent). The length of the embankment will be between 1km (far western extent) and 1.05km (far eastern extent). The embankment will be approximately 10m in height.

1.4.5. The Strogomishte Interchange will be relocated approximately 1km to the southwest of the original location of the interchange (between chainage 2+750 to 3+000). The size and configuration of the Strogomishte Interchange will be similar to that originally proposed.

1.4.6. From the Strogomishte Interchange there will be a link road (as shown in red on **Figure 1-1**). To the east of the Strogomishte Interchange the link road will pass over local roads and the railway and connect to the village of Dolno Strogomishte. To the west of the Strogomishte Interchange the link road will pass over a local road and connect to the A2 national road.

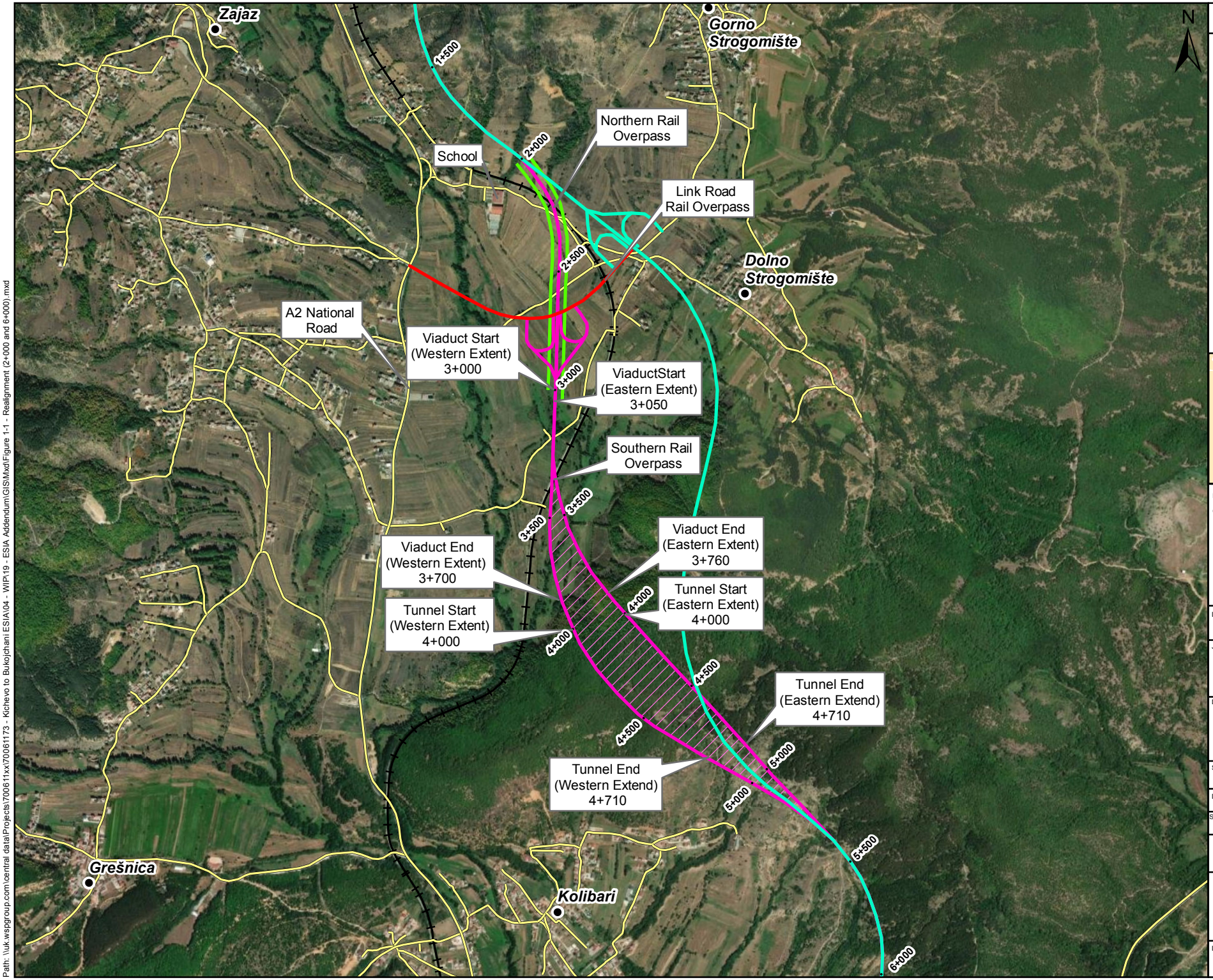
1.4.7. A viaduct will connect the southern end of the embankment to the Kolibari Tunnel entrance. The viaduct will be 710m in length. For the far western extent the viaduct will be located between chainage 3+000 and 3+710 and for the far eastern extent between chainage 3+050 and 3+760. The viaduct will cross over local roads and the railway.

1.4.8. The realignment requires changes to the Kolibari Tunnel, including the location of the entrance and exit and the length of the tunnel. The tunnel will be 760m in length. For the far western extent the tunnel will be located between chainage 3+710 and 4+470 and for the far eastern extent between chainage 3+760 and 4+520.

1.4.9. A comparison of the viaduct and tunnel lengths and chainages for the realignment compared to the original alignment is shown in **Table 1-1**.

Table 1-1 - Comparison of the Original Alignment and the Maximum Extents of the Realignment

Alignment	Viaduct Length	Kolibari Tunnel Length
Original Alignment	1,030m (chainage 2+630 to 3+660)	870m (chainage 3+660 to 4+430)
Realignment (Far Western extent)	710m (chainage 3+000 to 3+710)	760m (chainage 3+710 to 4+470)
Realignment (Far Eastern extent)	710m (chainage 3+050 to 3+760)	760m (chainage 3+760 to 4+520)



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

N

Legend

- Town
- Link Road
- Original Alignment
- Realignment
- Embankment
- Existing Roads
- Existing Railway
- Area Extents of the Realignment

Note:

Original alignment and realignment have been digitised based on a .jpeg file.

Drawing Status: FINAL

Job Title: A2 MOTORWAY: BUKOJCHANI – KICHEVO SECTION

Drawing Title: Figure 1-1 - Realignment (2+000 and 6+000)

Scale at A4: 1:20,000

Drawn			
DG			
Stage 1 check	Stage 2 check	Originated	Date
SB	JW	DG	14/07/2021

0 150 300 600 m

Drawing Number: Figure 1-1

Path: \\uk.wspgroup.com\central data\Projects\70061\xx\70061173 - Kichevo to Bukojchani ESIA\04 - WIP\19 - ESIA Addendum\GIS\Mxd\Figure 1-1 - Realignment (2+000 and 6+000).mxd

2 ESIA LEGISLATION AND REQUIREMENTS

2.1.1. The original ESIA, and this addendum, have been prepared in accordance with:

- National Environmental Impact Assessment (EIA) procedures and environmental standards;
- Relevant national legislation;
- European Union (EU) environmental standards;
- Relevant international treaties and conventions; and
- Performance Requirements (PRs) 1 to 10 (as appropriate) of the European Bank for Reconstruction and Development (EBRD).

2.1.2. **Chapter 3: ESIA Legislation and Requirements** of the **ESIA** provides and overview of the legislation and regulations which have been used in the preparation of the ESIA and this addendum. The descriptions, project categorisations and responsible bodies remain applicable to this addendum.

2.2 MACEDONIAN EIA PROCEDURES

2.2.1. The national version of the ESIA was revised and sent to the Ministry of the Environment and Physical Planning on the 15th June 2021 and a public hearing on the Project was held on the 23rd July 2021 The Ministry will decide whether to approve or reject the application for the implementation of the Project, taking into consideration: this ESIA, their compliance report, the public hearing and public feedback. This decision will be made within a period of 40 days from the date of submission of the ESIA (in accordance with Environmental Law, Article 87).

2.3 ALTERNATIVES

2.3.1. **Chapter 4: Consideration of Alternatives** of the **ESIA** outlines the main alternatives to the Project that have been considered, together with the principal reasons for proceeding with the Project.

2.3.2. This realignment provides an alternative alignment that is technically and financially feasible. While it is more expensive to construct, due to the larger number of structures required, particularly the bridges required to cross the railway and the embankment, it avoids the social concerns that were raised by the residents of Dolno Strogomishte. This alternative alignment is now the preferred option as it will reduce adverse environmental and social effects to residents of Dolno Strogomishte and users of Dolno Strogomishte cemetery.

3 STAKEHOLDER ENGAGEMENT

3.1 STAKEHOLDER ENGAGEMENT AND PUBLIC PARTICIPATION REQUIREMENTS

3.1.1. As described in **Chapter 6: Stakeholder Engagement** of the **ESIA**, EBRD's PR1 and PR10 require stakeholder engagement in order to build strong, constructive and responsive relationships between the Public Enterprise for State Roads, the Construction Contractor and the local community.

3.1.2. The EIA Directive outlines the need for public participation as part of the decision-making procedures and the role Environmental Impact Assessment (EIA) has in informing the public of the effects associated with the Project. As per the requirements of the EIA Directive, a Non-Technical Summary (NTS) was prepared for the ESIA. The NTS has been revised following the preparation of the ESIA addendum.

3.2 STAKEHOLDER ENGAGEMENT PLAN

3.2.1. A Stakeholder Engagement Plan (SEP) was publicly disclosed together with the ESIA. This has been revised in response to the realignment, and the revised SEP will be disclosed with the ESIA addendum, after which it will be regularly updated throughout the life of the Project.

3.2.2. 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 preparation of the detailed design.

3.2.3. The SEP includes a Grievance Mechanism to allow affected individuals to raise grievances, concerns and queries to the Public Enterprise for State Roads, the Construction Contractor or Maintenance Contractor. A copy of the Grievance Mechanism form is also included in the NTS.

3.2.4. A Supplementary SEP was prepared to take into account the Covid-19 restrictions and appended to the SEP. This included alternatives measures for disclosure in line with EBRD's Stakeholder Engagement (PR10) – Covid-19 Briefing Note.

3.3 DISCLOSURE CONSULTATIONS

3.3.1. The meetings and consultations undertaken during the preparation if the ESIA are summarised in **Chapter 6: Stakeholder Engagement** of the **ESIA**.

3.3.2. The PESR undertook various consultation activities during the disclosure of the ESIA in January 2021, as summarised in **Table 3-1**.

Table 3-1 – Summary of Disclosure Consultations

Date	Location	Attendees	Number of Attendees*
13th January 2021	Kichevo *Note: consultation undertaken inside with hand sanitiser provided and all attendees wore face coverings, to align with COVID-19 restrictions.*	▪ Mayor of the Municipality of Kichevo ▪ Municipality of Kichevo Urban Planning Department ▪ Public Enterprise for State Roads ▪ Project Design Team	10
	Dolno Strogomishte *Note: consultation undertaken outside due to COVID-19 restrictions.*	▪ Local residents from the villages Dolno Strogomishte and Gorno Strogomishte. ▪ Interested members of the surrounding communities ▪ Representatives of a local community group (opposing the Project) ▪ PESR ▪ Project Design Team	40

*Note: Numbers exclude representatives from the PESR and the Project Design Team.

3.3.3. During each of the consultations an overview of the Project, as set out in the ESIA, was provided.

3.3.4. The key issues and concerns raised during the consultations regarded:

- The representatives of the local community group, formed to oppose the Project, presented a signed petition (with approximately 2000 signatories) to realign the Project to avoid the village of Dolno Strogomishte, prevent the community severance the Project would cause in the village, and avoid the Dolno Strogomishte Cemetery, and the potential need for exhumations. The PESR and the Project Design Team explained that a realignment that would avoid the village of Dolno Strogomishte was being considered, and although it would require two additional railway crossing, which would increase the construction costs substantially, it was being investigated technical, economically, socially and environmentally;
- The representatives of the Muslim Municipal Community of Kichevo (Kichevo Muftivstvo) sent the PESR a letter requesting the realignment of the Project to avoid Dolno Strogomishte Cemetery.
- The Kichevo Municipality noted that in some locations (in close proximity to village of Dolno Strogomishte) the Project was located on land had historically been allocated for housing; and
- The Kichevo Municipality noted that at the northern end of the Project, near Osoj, where a corridor of land had been allocated for this Project, there may have been some potentially illegal developments constructed.

3.3.5. Those in attendance at the consultations believed that the overall Project would provide better transport access, which would be beneficial to the local communities.

3.3.6. Photos of the disclosure consultations are included below in **Figure 3-1**.

Figure 3-1 - Photos of Disclosure Consultations



3.4 NATIONAL ESIA CONSULTATION

3.4.1. The national version of the ESIA was revised and sent to the Ministry of the Environment and Physical Planning on the 15th June 2021 and a public hearing on the Project was held on the 23rd July 2021, as summarised in Table 3-2.

Table 3-2 – Summary of Macedonian EIA Consultation

Date	Location	Attendees	Number of Attendees*
23rd July 2021	Municipality of Kichevo City Hall Note: The Public hearing was organised by the Ministry of the Environment and Physical Planning in compliance with the Law on Environment.	▪ Local residents from the villages Dolno Strogomishte and Gorno Strogomishte ▪ Local residents from the Osoj settlement in Kichevo ▪ Interested members of the surrounding communities ▪ PESR ▪ Ministry of the Environment and Physical Planning ▪ Project Design ▪ Project national ESIA Team	30

3.4.2. At the public hearing local residents and interested members of the surrounding communities expressed their support for the realignment of the Project near Dolno Strogomishte.

3.4.3. Local residents from the Osoj settlement in Kichevo requested a further realignment at this location. PESR / the Project Design team advised that a realignment would not be practicable at this location, as the Project needs to connect to the A2 Kichevo – Ohrid motorway, which is currently under construction. Reassurance was provided based upon the mitigation measures included in the original ESIA, this ESIA Addendum, the SEP and LAF.

4 AIR QUALITY

4.1 INTRODUCTION

4.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to air quality as assessed in **Chapter 8: Air Quality** of the **ESIA**.

4.2 BASELINE CONDITIONS

AIR QUALITY MONITORING DATA

4.2.1. Air pollution data collected by the Ministry of Environment and Physical Planning at their nearest monitoring station to the Project, located in Kichevo[1], for 2019 and 2020 has been collected since **Chapter 8: Air Quality** of the **ESIA** was completed.

4.2.2. This data has been reviewed and compared against the baseline data reported in **Chapter 8: Air Quality** of the **ESIA**, to consider whether the baseline air quality conditions have changed since the preparation of the **ESIA**. The data is presented in **Tables 4-1** to **4-3** below.

Table 4-1 - Annual Average Ambient Particulate Matter (PM_{10}) Concentrations

Year	Concentration (µg/m^3)
2014	76.3
2015	79.3
2016	60.8
2017	47.7
2018	42.3
2019	68.2
2020	51.6

Notes: Missing data has not been taken into account.
Source: Ministry of Environment and Physical Planning database.
Air Quality Limit Value for annual average concentrations is 40µg/m^3 for the protection of human health.

[1] Ministry of Environment and Physical Planning (2020). Air quality in the Republic of Northern Macedonia. Available at: http://air.moepp.gov.mk/?page_id=175&parameter=SO2&station=Kicevo.

Table 4-2 - Monthly Averages of Ambient Nitrogen Dioxide (NO_2) Concentrations ($\mu g/m^3$)

Month	2016	2017	2018	2019	2020
January	-	42.7	-	31.0	15.4
February		34.8	-	20.4	14.0
March	-	32.6	-	19.5	19.7
April	-	29.6	-	16.6	12.1
May	8.6	-	14.6	11.9	15.9
June	8.3	-	18.2	-	10.8
July	11.9	-	15.6	-	12.4
August	14.0	-	17.0	23.5	13.1
September	16.0	-	19.2	19.4	14.8
October	14.2	-	24.6	-	16.0
November	21.4	-	-	28.0	23.1
December	43.4	-	21.7	13.4	21.3
Annual Average	**17.2**	**34.9**	**18.7**	**21.1**	**15.2**

Notes: Missing data has not been taken into account (marked by a '-'). Data is unavailable for 2014 and 2015.
Source: Ministry of Environment and Physical Planning database.
Air Quality Limit Value for annual average concentrations is 40µg/m^3 for the protection of human health.

Table 4-3 - Monthly Averages of Ambient Carbon Monoxide (CO) Concentrations (mg/m^3)

Month	2014	2015	2016	2017	2018	2019	2020
January	2,400	2,137	2,327	2,388		1,953	1,490
February	1,900	1,426	1,162	1,467	1,081	908	904
March	458	957	759	752	1,108	585	691
April	458	96	757	642	1,121	430	427
May	909	407	781	802	205	-	256
June	-	38	550	448	125	-	201
July		468	426	-	130	189	144
August	-	374	264	-	142	222	201
September	-	374	273	-	172	250	208
October	-	746	616	-	-	523	-

Month	2014	2015	2016	2017	2018	2019	2020
November	-	1,282	1,185	-	-	952	-
December	1,498	1,763	2,033	-	1,550	1,538	836
Annual Average	**1,376**	**1,023**	**1,011**	**1,453**	**765**	**747**	**510**

Notes: Missing data has not been taken into account (marked by a '-').
Source: Ministry of Environment and Physical Planning database.

4.2.3. As was the case for the data collected from 2014 to 2018, some of the data for 2019 and 2020 is missing. This is suspected to be due to equipment failures, which creates a limitation when making an assessment of compliance of monitored concentrations with the Air Quality Limit Values (AQLVs) as ideally the data capture should be over 85% across a calendar year for a robust comparison.

4.2.4. The relevant AQLVs for comparison with the above monitoring data are shown below in **Table 4-4**.

Table 4-4 - Ambient air quality limit values for PM_{10}, NO_2 and CO

Pollutant	Averaging Period	Unit	AQLV
Particulate Matter PM_{10}	Annual mean.	$\mu g/m^3$	40
Nitrogen Dioxide (NO_2)	Annual mean for the protection of human health.	$\mu g/m^3$	40
Carbon Monoxide (CO)	Daily (8-hourly mean).	mg/m^3	10

4.2.5. The data gathered at the nearest monitoring station for 2019 and 2020 indicates that there has been no materially significant change in baseline air quality in the last two years from that presented in **Chapter 8: Air Quality** of the **ESIA**. Whilst the AQLV for annual average PM_{10} concentrations continues to be exceeded, the AQLV for annual average NO_2 concentrations is being met. 8-hour data collected for CO concentrations at the monitoring station indicate compliance with the AQLV for this pollutant also.

4.2.6. A review of satellite imagery for the area of the realignment has confirmed that no new sources of air pollution have been introduced since the completion of **Chapter 8: Air Quality** of the **ESIA**.

4.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

4.3.1. The potential for significant effects on air quality due to the realignment has been undertaken based on a review of mapping data showing the realignment and professional judgement.

4.3.2. **Chapter 8: Air Quality** of the **ESIA** assumed that the construction activities would start in 2020, with the operational phase of the Project planned to begin in 2023. Due to the time that has since elapsed, construction activities are anticipated to commence in 2022 and last until 2026, when the Project will then become operational.

CONSTRUCTION PHASE

4.3.3. The construction phase assessment presented in **Chapter 8: Air Quality** of the **ESIA** considered the effects of emissions of fine particulate matter (PM_{10}) generated during construction activities on air quality at nearby sensitive receptors using dispersion modelling. To provide a worst-case approach it was assumed that construction activities would take place along the whole route of the Project, including the original alignment between chainage 2+000 and 6+000, at the same time.

4.3.4. The conclusions of the construction phase assessment were that the additional PM_{10} emissions may result in the relevant AQLVs being breached. However, effects would be local, short-term and temporary with the highest concentrations anticipated to be within the construction site. The greatest effects occurred within the construction footprint for the Project and the immediately adjacent areas with maximum daily PM_{10} concentrations above the AQLV of 50mg/m^3 predicted only within 70m of the centreline of the Project.

4.3.5. Based on the realignment, it is unlikely that type and nature of the construction activities assessed previously will change significantly. The construction of the embankment and viaduct are the main difference in terms of physical structures that will need to be constructed for the realignment. These physical structures will require some additional earthworks.

4.3.6. There are no sensitive receptors, which would be affected by dust and PM_{10} generated during construction activities, located near to the position of the embankment and the viaduct. Some sensitive receptors, believed to be residential dwellings and a school, are located at a distance of approximately 170m to the west of the northern rail overpass, on the 10m high embankment (around chainage 2+000). However, over this distance it is expected that the majority of dust and particulate matter will have fallen out of suspension in the atmosphere such that any effects on these sensitive receptors would be negligible.

4.3.7. The realignment of the Project will reduce the number of sensitive receptors that could experience adverse effects due to construction activities, despite the additional construction activities required for embankment and viaduct. There are believed to be no sensitive receptors present within 70m of the realignment, where the greatest effects were previously predicted.

4.3.8. In terms of emissions from construction vehicles and plant, it is assumed that the number of both would be unchanged due to the realignment and the route that construction vehicles would travel to access and leave the construction site is unlikely to change also.

4.3.9. Therefore, the overall effects of the construction phase of the Project on local air quality for this 4km section location, due to the proposed realignment would reduce from **moderate** to **minor adverse** to **minor adverse / negligible (not significant)**. This is primarily due to the Project being relocated away from sensitive receptors in the village of Dolno Strogomishte. However, there could be some **moderate adverse (significant)** to minor adverse effects **(not significant)** at the southern end of the alignment where Roma are living adjacent to the proposed route alignment. These effects will be short-term and reversible.

OPERATIONAL PHASE

4.3.10. The assessment of operational phase effects presented in **Chapter 8: Air Quality** of the **ESIA** included dispersion modelling of emissions from road traffic using the Project on concentrations of PM_{10}, $PM_{2.5}$, CO and NO_2.

4.3.11. The results of this part of the assessment were that there would be a minor beneficial effect due to the reduction in pollutant concentrations that would occur at a number of the sensitive receptors considered with the Project in place. Sensitivite receptors who were located away from the existing A2, but in proximity to the Project, were anticipated to experience a minor adverse effect.

4.3.12. It has been assumed that the realignment will not alter the volume of traffic using this new road once operational as assessed in **Chapter 8: Air Quality** of the **ESIA**.

4.3.13. As a result of the realignment sensitive residential receptors located to the northwest of Dolno Strogomiste and to the east of the railway will be further away from the Project. However, sensitive receptors (to the west of the railway) will be located closer to the Project, albeit these are still far enough away for the effects not to be considered significant.

4.3.14. Based on the this, it is considered that the effects of the Project on local air quality once operational, with the realignment, will remain **minor beneficial (not significant)**.

4.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

4.4.1. As the overall effects of the construction phase of the Project on local air quality with the realignment, would be lower than that originally predicted, no additional mitigation beyond that identified in **Chapter 8: Air Quality** of the **ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

4.4.2. As the operational air quality effect with the realignment will continue to be not significant, no additional mitigation beyond that identified in **Chapter 8: Air Quality** of the **ESIA** needs to be implemented during the operational phase.

4.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

4.5.1. The likely significance of effects during the construction phase without mitigation measures is estimated to remain minor adverse to negligible (not significant). Following the implementation of the mitigation measures outlined in **Chapter 8: Air Quality** of the **ESIA**, the residual effects are expected remain **slight adverse (not significant)**.

OPERATIONAL PHASE

4.5.2. The significance of effects on air quality once the Project is operational and without mitigation measures is estimated to remain minor beneficial (not significant). Following the implementation of the mitigation measures outlined in **Chapter 8: Air Quality** of the **ESIA**, the residual effects are expected remain **Neutral to slight beneficial (not significant)**.

4.6 SUMMARY

4.6.1. The realignment will not materially alter the conclusions of **Chapter 8: Air Quality** of the **ESIA**.

5 CLIMATE: RESILIENCE

5.1 INTRODUCTION

5.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, to climate experienced over the Project's design life as assessed in **Chapter 9: Climate** of the **ESIA**.

5.2 BASELINE CONDITIONS

5.2.1. The baseline information presented in **Chapter 9: Climate** of the **ESIA** remains applicable to this ESIA addendum.

5.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

5.3.1. The assessment of significance presented within **Chapter 9: Climate** of the **ESIA** takes into account design measures which mitigate climate effects. The design measures were identified through engagement with the project team and from the existing project information. It is appropriate to adopt a precautionary approach in future-proofing designs, so that the key assets will perform satisfactorily throughout their design life in the event of climactic changes towards the extreme predictions[2]. It has been assumed that the following design measures will be applied by the project team for the realignment (as was the case for the original alignment):

- Use the latest projections of future rainfall[3] to specify material and foundation depth, to reduce the effects of drought on the foundations.
- Use projected (reduction in overall) rainfall to specify vegetation for the slopes of the embankment, to reduce the effects of drought on the stabilisation of the soils. The vegetation will be native and drought-resistant with a provenance for well-established root structures.
- Take projections of future average and extreme temperature into account when designing foundations, to avoid deterioration of foundation materials and subsequent impacts to stability.
- Ensure the thermal tolerance of the embankment materials are above projected temperature increases, to avoid deterioration and melting of materials.

CONSTRUCTION PHASE

5.3.2. The construction assessment presented in **Chapter 9: Climate** of the **ESIA** was undertaken for the site compound, workforce, storage of material and plant and equipment. The original construction assessment is considered appropriate for the

[2] Climate Resilience Design Guidance for roads in Macedonia (http://roads.org.mk/470/5151/climate-resilience-design-guidelines-for-the-public-enterprise-for-state-roads).
[3] World Bank (2020) Macedonia Climate Data – Projections.

realignment. It is therefore considered that prior to mitigation the resilience of the Project to climate change during the construction phase, with the realignment, will remain **minor adverse (not significant)**.

OPERATIONAL PHASE

5.3.3. The majority of the infrastructure and assets comprising the realignment (with the exception of the addition of the embankment) have already been evaluated within the operational assessment set out in **Chapter 9: Climate** of the **ESIA**. No further changes to the assessment of operational effects on the Project, in the context of non-embankment infrastructure and assets, are therefore required.

5.3.4. The embankment would, however, be susceptible to the climate impacts identified in the **Chapter 9: Climate** of the **ESIA**; specifically, to changes in precipitation and temperature, and increases in the frequency of wind and storms.

5.3.5. It is considered that the sensitivity of the embankment to the climate variables would be similar to that identified for the road elements in Table 9-16 of **Chapter 9: Climate** of the **ESIA**. The exposure of the embankment to climate variables during operation remains as summarised in Table 9-18 of **Chapter 9: Climate** of the **ESIA**.

5.3.6. In line with the methodology presented in **Chapter 9: Climate** of the **ESIA**, potential significant vulnerabilites of the embankment to climate change would be in relation to:

- Drying out and cracking of soils and substrates due to lower average rainfall and during droughts, leading to the damage of the foundations.
- Die-off of vegetation during drought, leading to destabilisation of soils in the embankment.
- Deformation of materials due to warmer conditions, leading to structural damage such as weakening and destabilisation.
- Increasing earth pressure due to warmer average conditions and during heatwaves, leading to structural damage to the embankment[45].

5.3.7. Taking into account the design measures identified in **Section 5.3**, it is considered that the effects of the Project during its operation as a result of climate change, with the realignment, will be **minor adverse (not significant).**

5.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

5.4.1. No additional mitigation beyond that identified in **Chapter 9: Climate** of the **ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

5.4.2. No additional mitigation beyond that identified in **Section 5.3** of this addendum and **Chapter 9: Climate** of the **ESIA** needs to be implemented during the operation phase.

[4] During hot temperatures, earth pressure increases and the resulting force (i.e. a building) is unable to overcome this and will expand away from the soil, resulting in a cumulative annual displacement.
[5] Iskander, M (2013) Relationship Between Temperature and Earth Pressure for a Rigidly Framed Earth Retaining Structure. Geotechnical and Geological Engineering v31, pp 519–539.

5.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

5.5.1. Following the implementation of the mitigation measures outlined in **Chapter 9: Climate** of the **ESIA** and **Section 5.3**, the residual effects of climate change on the Project are expected remain **minor adverse (not significant)**.

OPERATIONAL PHASE

5.5.2. Following the implementation of the mitigation measures outlined in **Chapter 9: Climate** of the **ESIA** and **Section 5.3**, the residual effects of climate change on the Project are expected remain **minor adverse (not significant)**.

5.6 SUMMARY

5.6.1. With the application of the already identified mitigation in the ESIA to the the embankment, the realignment will not materially alter the conclusions of **Chapter 9: Climate** of the **ESIA**.

6 CLIMATE: GREENHOUSE GAS

6.1 INTRODUCTION

6.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000.00 and 6+000.00, in relation to greenhouse gas emissions as assessed in **Chapter 9: Climate** of the **ESIA**.

6.2 BASELINE CONDITIONS

6.2.1. There is no change to the 'Do Minimum' (baseline) scenario or total end-user baseline traffic data as a result of the realignment. Therefore, the baseline information presented in **Chapter 9: Climate** of the **ESIA** remains applicable to this ESIA addendum.

6.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

6.3.1. A qualitative assessment was undertaken as quantitative data for material types and volume, waste types and volumes and construction plant were not available at the time of this evaluation of the realignment, due to the early design stage of the realignment.

CONSTRUCTION PHASE

6.3.2. The maximum extent of the realignment is likely to increase the length of the Project (in comparison to the length of the Project in the original **ESIA**) by less than 1km. A decrease in the length of the Project which would reduce construction emissions.

6.3.3. The viaduct will decrease in length from 1,030m to 710m, which would reduce construction emissions. The Kolibari Tunnel length would decrease, from 870m to 760m, which would also decrease construction emissions.

6.3.4. However, the realignment includes the addition of the embankment of approximately 10m in height and 1km (far western extent) and 1.05km (far eastern extent) in length. It is anticipated that the addition of the embankment will increase the requirement for material resources such as earthworks, concrete and asphalt, which would also increase construction emissions.

6.3.5. Based on the this, it is considered that the unmitigated effects of the Project on GHG emissions, with the realignment, will remain as reported in **Chapter 9: Climate** of the **ESIA**, namely **minor adverse (significant).**

6.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

6.4.1. No additional mitigation (beyond the mitigation measures outlined in **Chapter 9: Climate** of the **ESIA**) needs to be implemented during the construction phase.

OPERATIONAL PHASE

6.4.2. No additional mitigation (beyond the mitigation measures outlined in **Chapter 9: Climate** of the **ESIA**) needs to be implemented during the construction phase.

6.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

6.5.1. Following the implementation of the mitigation measures outlined in **Chapter 9: Climate** of the **ESIA**, the residual effects are expected remain **minor adverse (significant)**.

OPERATIONAL PHASE

6.5.2. Following the implementation of the mitigation measures outlined in **Chapter 9: Climate** of the **ESIA**, the residual effects are expected remain **minor adverse (significant)**.

6.6 SUMMARY

6.6.1. The realignment will not materially alter the conclusions of **Chapter 9: Climate** of the **ESIA**.

7 GROUNDWATER

7.1 INTRODUCTION

7.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to groundwater as assessed in **Chapter 10: Groundwater** of the **ESIA**.

7.2 BASELINE CONDITIONS

7.2.1. The area of realignment remains within the Western Macedonian Hydrogeological province. The hydrogeological characteristics remain as presented in **Chapter 10: Groundwater** of the **ESIA**.

7.3 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

7.3.1. Foundation Risk Assessments and Piling Risk Assessments should be undertaken for the embankment and the viaduct. It would be beneficial for these to be undertaken for all piled structures along the route of the Project. The Foundation Risk Assessments and Piling Risk Assessments should outline measures to protect groundwater resources as part of the design and during construction.

7.3.2. Other than the Foundation Risk Assessments and Piling Risk Assessments, no additional mitigation beyond that identified in **Chapter 10: Groundwater** of the **ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

7.3.3. No additional mitigation beyond that identified in **Chapter 10: Groundwater** of the **ESIA** needs to be implemented during the operational phase.

7.4 RESIDUAL EFFECTS

CONSTRUCTION PHASE

7.4.1. With mitigation, it is considered that the effects of the Project on groundwater during the construction phase, with the realignment, will remain as reported **in Chapter 10: Groundwater** of the **ESIA**:

- Alteration of groundwater flows - **Slight Adverse (not significant)**
- Alteration of groundwater quality due to input of pollutants - **Slight Adverse (not significant)**

OPERATIONAL PHASE

7.4.2. With mitigation, it is considered that the effects of the Project on groundwater during the operational phase, with the realignment, will remain as reported in **Chapter 10: Groundwater** of **the ESIA**, namely **slight adverse (not significant**) for the alteration of groundwater quality due to input of pollutants.

7.5 SUMMARY

7.5.1. Taking account of the preparation of the Foundation Risk Assessments and Piling Risk Assessments, the realignment will not materially alter the conclusions of **Chapter 10: Groundwater** of the **ESIA**.

7.6 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

7.6.1. A review of the realignment has been carried out to identify changes from the original alignment reported in **Chapter 10: Groundwater of the ESIA** and a qualitative assessment has been undertaken to identify any changes, such as the potential impact of the realignment on previously identified or additional sensitive receptors.

CONSTRUCTION PHASE

7.6.2. The link road from the Strogomishte Interchange to the west of the Strogomishte Interchange (as shown on **Figure 8-1**) will pass over the Zajaska River and connect to the A2 national road. The location of the link road, including the bridge crossing over the Zajaska River, is as specified in the original alignment.

7.6.3. The realignment changes the location of the crossing over the intermittent-flowing River Strogomishka. The crossing, as a result of the realignment, will be located approximately 1km to the southwest of the original alignment around chainage 3+600 (far eastern extent) and 3+700 (far western extent) as shown on **Figure 8-1** of this ESIA Addendum. At the point of the crossing of the River Strogomishka the realignment will be on a viaduct. The viaduct will connect at the northern end to the embankment and at the southern end to the Kolibari Tunnel entrance.

7.6.4. The embankment and the viaduct will require piling. Increased piles and earthworks may increase the likelihood of changes to groundwater conveyance and / or the introduction of preferential pathways for contamination to enter aquifers. However, the sensitivity of the receptors, the likely duration and the types of the construction activities remains similar to those of the original alignment.

7.6.5. In summary, it is considered that with the realignment, the overall construction phase groundwater effects, prior to mitigation, would remain unchanged from those reported in **Chapter 10: Groundwater** of the **ESIA**:

- Alteration of groundwater flows - **Moderate Adverse (significant)**
- Alteration of groundwater quality due to input of pollutants - **Moderate Adverse (significant)**

OPERATIONAL PHASE

7.6.6. It is considered that with the realignment, the overall operational phase groundwater effects, prior to mitigation, would remain unchanged from those reported in **Chapter 10: Groundwater** of the **ESIA**, namely **moderate adverse (significant)** for the alteration of groundwater quality due to input of pollutants.

8 SURFACE WATER

8.1 INTRODUCTION

8.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to surface water as assessed in **Chapter 11: Surface Water** of the **ESIA**.

8.2 BASELINE CONDITIONS

8.2.1. The baseline conditions reported in the **Chapter 11: Surface Water** of the **ESIA** are considered to remain unchanged.

8.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

8.3.1. **Chapter 11: Surface Water** of the **ESIA** reported the following potential construction phase effects:

- Input of pollutants;
- Alteration of riverbed morphology and/or physical quality;
- Alteration of the riverbed and floodplain habitat ecology; and
- Abstraction of water from surface water sources during construction.

8.3.2. **Chapter 11: Surface Water** of the **ESIA** reported the following potential operational phase effects:

- Input of pollutants;
- Alteration of flow patterns and sediment deposition during flooding periods.

8.3.3. This ESIA Addendum considers the assessment of the effects for surface water receptors for the original alignment in relation to the realignment, noting relevant structures of the realignment, appropriate additional mitigation and any changes to the residual effects.

CONSTRUCTION PHASE

8.3.4. The realignment will require a new embankment, starting at chainage 2+000 and connect into the viaduct at either chainage 3+000 (far western extent) or 3+050 (far eastern extent). The presence of the embankment has the potential to alter local surface water flows, particularly during flood conditions during the construction phase (and subsequent operational phase).

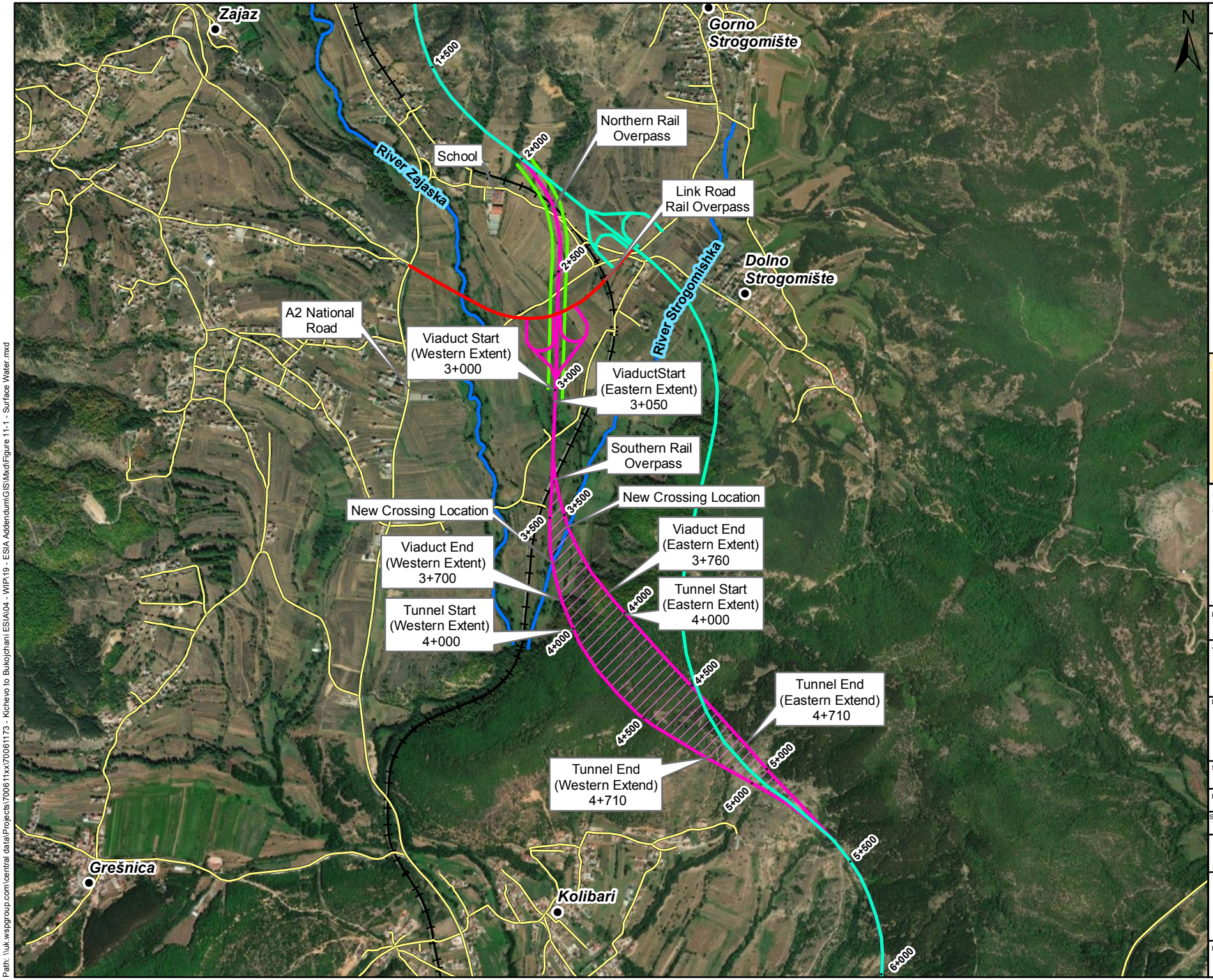
8.3.5. The link road from the Strogomishte Interchange to the west of the Strogomishte Interchange (as shown in red on **Figure 8-1**) the link road will pass over the Zajaska River and connect to the A2 national road. The location of the link road, including the bridge crossing over the Zajaska River, is as specified in the original alignment.

8.3.6. The realignment changes the location of the crossing over the intermittent-flowing River Strogomishka, previously shown on Figure 11-7 of the **ESIA**. The crossing, as a result of the realignment, will be located approximately 1km to the southwest of the original alignment between chainage 3+600 (far eastern extent) and 3+700 (far western extent) as shown on **Figure 8-1**. At the point of the crossing of the River Strogomishka the realignment will be on a viaduct. The viaduct will connect the southern end of the embankment to the Kolibari Tunnel entrance. The viaduct will

enable throughput of surface flows during flood conditions during the construction phase (and subsequent operational phase). It is understood that the River Strogomishka has similar characteristics to that described in **Chapter 11: Surface Water** of the **ESIA**.

8.3.7. The realignment will not result in a change to the overall construction phase surface water effects, which, prior to mitigation, would remain unchanged from those reported in **Chapter 11: Surface Water** of the **ESIA**:

- Input of pollutants - **Moderate Adverse (significant)**;
- Alteration of riverbed morphology and/or physical quality – **Slight Adverse (not significant)** or **Moderate Adverse (significant)**;
- Alteration of the riverbed and floodplain habitat ecology - **Moderate Adverse (significant)**; and
- Abstraction of water from surface water sources during construction - **Neutral (not significant)**.



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Link Road
- Original Alignment
- Realignment
- Embankment
- Existing Roads
- Existing Railway
- Rivers
- Area Extents of the Realignment

Note:

Original alignment and realignment have been digitised based on a .jpeg file.

Drawing Status: FINAL

Job Title: A2 MOTORWAY: BUKOJCHANI – KICHEVO SECTION

Drawing Title: Figure 8-1 - Surface W ater

Scale at A4: 1:20,000

Drawn			
DG			
Stage 1 check	Stage 2 check	Originated	Date
SB	JW	DG	14/07/2021

0 150 300 600 m

Drawing Number: Figure 8-1

Path: \\uk.wspgroup.com\central data\Projects\70061\xx\70061173 - Kichevo to Bukojchani ESIA\04 - WIP\19 - ESIA Addendum\GIS\Mxd\Figure 11-1 - Surface Water.mxd

OPERATIONAL PHASE

8.3.8. As mentioned above, during the operational phase the presence of the embankment has the potential to alter local surface water flows, particularly during flood conditions. The viaduct will enable throughput of surface flows during flood conditions during the operational phase.

8.3.9. It is considered that with the realignment, the overall construction phase surface water effects prior to mitigation would be as follows:

- Input of pollutants - **Moderate Adverse (significant)**;
- Alteration of flow patterns and sediment deposition during flooding periods – **Neutral** or **Slight Adverse (significant)**.

8.3.10. The input of pollutants effect is unchanged from that reported in **Chapter 11: Surface Water** of the **ESIA**, however, the effects associated with flow patterns and sedimentation during flooding periods are expected to increase with the realignment, primarily due to the embankment.

8.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

8.4.1. Mitigation measures that are also relevant to surface waters were reported in **Chapter 10: Groundwater**, **Chapter 12: Geology and Soils**, **Chapter 13: Waste Generation and Resource Efficiency** and **Chapter 15: Biodiversity** of the **ESIA**.

CONSTRUCTION PHASE

8.4.2. A Flood Risk Assessment (FRA) should be undertaken to inform the detailed design for the realignment, particularly the embankment and viaduct. It would be beneficial for the FRA to be undertaken for the Project holistically.

8.4.3. The FRA must consider regional surface flow patterns, groundwater conditions and geomorphological processes, all factors which can increase flood risk. Relevant information to inform the FRA would include:

- Existing flood risk assessments or flood models undertaken in the vicinity of the Project;
- Consultation with local stakeholders on historic flood extents;
- Identification of the presence of alluvium deposits within the river systems; and
- Identification of local ecology habitats, to indicate regularly waterlogged conditions.

8.4.4. Within the FRA, and using the information presented in this ESIA Addendum and **Chapter 11: Surface Water** of the **ESIA**, sensitive receptors should be identified, and appropriate mitigation measures evaluated for a range of flow values. The development of 2D flood models would support the identification of appropriate mitigation measures.

OPERATIONAL PHASE

8.4.5. The FRA, detailed above, will identify appropriate mitigation measures to reduce the effects associated with the alteration of flow patterns and sediment deposition during flooding periods.

8.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

8.5.1. Following the implementation of the mitigation measures outlined in **Chapter 11**: **Surface Water** of the **ESIA** and in **Section 8.4** the residual effects are expected to remain as previously reported:

- Input of pollutants - **Slight Adverse (not significant)**;
- Alteration of riverbed morphology and/or physical quality - **Slight Adverse (not significant)**;
- Alteration of the riverbed and floodplain habitat ecology - **Slight Adverse (not significant)**; and
- Abstraction of water from surface water sources during construction - **Neutral (not significant)**.

OPERATIONAL PHASE

8.5.2. Following the implementation of the mitigation measures outlined in **Chapter 11**: **Surface Water** of the **ESIA** and in **Section 8.4** the residual effects are expected to remain as previously reported:

- Input of pollutants - **Slight Adverse (not significant)**; and
- Alteration of flow patterns and sediment deposition during flooding periods - **Slight Adverse (not significant)**.

8.6 SUMMARY

8.6.1. Taking account of the preparation of the FRA, the realignment will not materially alter the conclusions of **Chapter 11: Surface Water** of the **ESIA**.

9 GEOLOGY AND SOILS

9.1 INTRODUCTION

9.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to geology and soils as assessed in **Chapter 12: Geology and Soils** of the **ESIA**.

9.2 BASELINE CONDITIONS

9.2.1. The area of realignment is of similar character to that detailed in **Chapter 12: Geology and Soils** of the **ESIA**, which is predominantly comprised of agricultural land with isolated residential/farm properties and lies to the west of the village of Dolno Strogomishte.

9.2.2. The geology and geological characteristics remain as presented in **Chapter 12: Geology and Soils** of the **ESIA**.

9.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

9.3.1. A review of the realignment has been carried out to identify changes from the original alignment reported in **Chapter 12: Geology and Soils** of the **ESIA** and a qualitative assessment has been undertaken to identify any changes, such as proximity of the realignment to additional potential sources of contamination or sensitive receptors.

CONSTRUCTION PHASE

9.3.2. The realignment will result in an increased length of viaduct with a corresponding increase in the number of foundations/piers. This may result in increased loss of fertile topsoil. However, the increase in fertile topsoil loss is limited in extent, and although irreversible will not result in a change to the assessment.

9.3.3. In summary, the effects of the Project on geology and soils during the construction phase, with the realignment, will remain as reported in **Chapter 12: Geology and Soils** of the **ESIA**:

- Degradation of Topsoil and Made Ground Quality - **Slight Adverse** (**not significant**) **or Moderate Adverse** (**significant**).
- Soil Erosion and Compaction - **Moderate Adverse** (**significant**)
- Soil Loss and Degradation (borrow pits and excavated material disposal sites) - **Moderate Adverse** (**significant**)
- Loss of Fertile Topsoil - **Moderate or Large Adverse** (**significant**)
- Stability and Risk of Landslides - **Moderate Adverse** (**significant**)
- Excavation of Potentially Contaminated Soils - **Moderate or Large Adverse** (**significant**)

OPERATIONAL PHASE

9.3.4. The realignment will require a change to the location of the crossing over the intermittent-flowing River Stogomishka. The crossing will be relocated to approximately 1km to the southwest of the original alignment around chainage 3+600 (far eastern extent) and 3+700 (far western extent) as a

result of the realignment. The embankment and increased length of viaduct are the main difference in terms of physical structures. These structures may be prone to soil erosion.

9.3.5. However, the potential for significant effects associated with soil erosion is considered to remain as **Slight Adverse** (**not significant**). Steep topography increases the likelihood of soil erosion as soils can be washed downhill, however as the majority of the additional length of viaduct is across relativity flat areas of land, existing mitigation measures to stabilise the slopes in order to prevent soil erosion and to protect the structures are considered sufficient if implemented across the length of the viaduct and embankments.

9.3.6. In summary, it is considered that the effects of the Project on geology and soils during operation, with the realignment, will remain as reported within **Chapter 12: Geology and Soils** of the **ESIA**:

- Degradation of Topsoil and Made Ground Quality - **Slight Adverse** (**not significant**)
- Soil Erosion - **Slight Adverse** (**not significant**)
- Seismic Activity - **Neutral** (**not significant**)

9.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

9.4.1. No additional mitigation beyond that identified in **Chapter 12: Geology and Soils** of the **ESIA** needs to be implemented during the construction phase. The existing measures will be applied to the realignment.

OPERATIONAL PHASE

9.4.2. No additional mitigation beyond that identified in **Chapter 12: Geology and Soils** of the **ESIA** needs to be implemented during the operational phase. The existing measures will be applied to the realignment.

9.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

9.5.1. With mitigation, it is considered that the effects of the Project on geology and soils during the construction phase, with the realignment, will remain as reported in **Chapter 12: Geology and Soils** of the **ESIA**:

- Degradation of Topsoil and Made Ground Quality - **Neutral** (**not significant**)
- Soil Erosion and Compaction - **Slight Adverse** (**not significant**)
- Soil Loss and Degradation (borrow pits and excavated material disposal sites) - **Slight Adverse** (**not significant**)
- Loss of Fertile Topsoil - **Slight Adverse** (**not significant**)
- Stability and Risk of Landslides - **Neutral to Slight Adverse** (**not significant**)
- Excavation of Potentially Contaminated Soils - **Slight Adverse** (**not significant**)

OPERATIONAL PHASE

9.5.2. With mitigation, it is considered that the effects of the Project on geology and soils during the operational phase, with the realignment, will remain as reported in **Chapter 12: Geology and Soils** of the **ESIA**:

- Degradation of Topsoil and Made Ground Quality - **Slight Adverse** (**not significant**)

- Soil Erosion - **Neutral** (**not significant**)
- Seismic Activity - **Neutral** (**not significant**)

9.6 SUMMARY

9.6.1. The realignment will not materially alter the conclusions of **Chapter 12: Geology and Soils** of the **ESIA**.

10 WASTE GENERATION AND RESOURCE EFFICIENCY

10.1 INTRODUCTION

10.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to the consumption of material assets and the generation and disposal of waste as assessed in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA**.

10.2 BASELINE CONDITIONS

10.2.1. The baseline information presented in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA** remains applicable to this ESIA addendum.

10.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE PROPOSED REALIGNMENT

APPROACH TO THE EVALUATION

10.3.1. Quantitative data for material types and volume, and waste types, volumes and management methods were not available at the time of this assessment of the realignment, due to early design stage of the realignment. Therefore, a qualitative assessment was undertaken to identify any changes, such as the overall length of the Project, and changes to the type and number of structures to be constructed as a result of the realignment (as detailed in **Section 1**).

CONSTRUCTION PHASE

10.3.2. As detailed **Section 1**, the realignment, will change the overall length of the Project by -1.1% (far eastern alignment) or +0.1% (far western alignment). This relatively small percentage change in the overall length of the Project is unlikely to result in a substantial change in the volumes of material required or waste generation, to those detailed in **Section 13.3** of the **ESIA**. It is considered reasonable to assume that there will be a proportionate decrease (far eastern alignment) or increase (far western alignment) in the volumes of material required and waste generation from those detailed in **Section 13.3** of the **ESIA**. The main design changes due to the realignment have been considered in the following paragraphs.

10.3.3. The relocation of the Strogomishte Interchange, further to the west of the village of Dolno Strogomishte, will not materially change the required material resources or waste generation, as the interchange remains of a broadly similar size and configuration to the original alignment.

10.3.4. The inclusion of the embankment which will be 10m in height, with rail and road overpasses located within it, will increase the requirement for material resources such as soil, concrete, asphalt, aggregate and steel.

10.3.5. The viaduct will be 710m in length, which is shorter than the original alignment (1,030m). The reduced length of the viaduct is likely to result in a small reduction of material resources by comparison with that detailed in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA**. As the nature of the structure is not changing the waste types and volumes are not anticipated to substantially change.

10.3.6. The Kolibari tunnel will be 760m, which is shorter than the original alignment (870m). The reduced length of the tunnel is likely to result in a small reduction of material resources by comparison with that detailed in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA**. As the nature of the structure is not changing the waste types and volumes are not anticipated to substantially change.

10.3.7. In summary, the additional requirement for material resources for the embankment is likely to be offset by the reduction in material resources associated with the viaduct and the Kolibari tunnel. The same summary has been reached for waste generation.

10.3.8. The material resource consumption and the generation and disposal of waste effects during the construction phase, prior to mitigation, with the realignment, will remain as reported in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA**:

- Material resource consumption – **Large Adverse (significant)**
- Generation and disposal of waste – **Very Large Adverse (significant)**

OPERATIONAL PHASE

10.3.9. Operational phase effects were not considered to be significant in the assessment presented in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA**. The materials to be consumed, and waste expected to be produced and disposed of, during the operational phase of the Project are in all cases expected to be minor and therefore are unlikely to result in significant adverse effects. This position does not change as a result of the realignment.

10.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

10.4.1. No additional mitigation beyond that identified in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

10.4.2. No additional mitigation beyond that identified in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA** needs to be implemented during the operation phase.

10.5 RESIDUAL EFFECTS

CONSTRUCTION EFFECTS

10.5.1. Following mitigation, it is considered that the effects of the Project on material resource consumption and the generation and disposal of waste during the construction phase, with the realignment, will remain as reported in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA:**

- Material resource consumption - Potential to be **Not-Significant,** however, likely to be constrained by existing recovery infrastructure within North Macedonia.
- Generation and disposal of waste – Potential to be **Not-Significant**, however, likely to be constrained by existing waste recovery and landfill infrastructure within North Macedonia.

OPERATIONAL PHASE

10.5.2. Operational phase effects were not considered to be significant in the assessment presented in **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA**.

10.6 SUMMARY

10.6.1. The realignment will not materially alter the conclusions of **Chapter 13: Waste Generation and Resource Efficiency** of the **ESIA**.

11 NOISE AND VIBRATION

11.1 INTRODUCTION

11.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to noise and vibration as assessed in **Chapter 14: Noise and Vibration** of the **ESIA**.

11.2 BASELINE CONDITIONS

11.2.1. A baseline noise survey was undertaken in December 2018 at five locations along the Project alignment. Locations 1 and 2, shown in **Table 14-4** and **Figure 14.1** of the **ESIA**, present the baseline noise levels representative of noise sensitive receptors around the village of Dolno Strogomishte, in proximity to the original alignment and the realignment:

- Location 1: north-west side of the village of Dolno Strogomishte, approximately 350m east of the realignment; and
- Location 2: in the village of Dolno Strogomishte close to a local road, approximately 550m east of the realignment.

11.2.2. The noise survey results at Location 1 range between L_{Aeq} 53dB, during the night, and 55dB, during the day These noise levels are typical of a semi-rural setting. At Location 2, closer to the local road the noise levels range between L_{Aeq} 54dB, during the night, and 78dB, during the day. These noise levels are typical of a location near a busy road.

11.2.3. Between chainage 2+000 and chainage and 3+000 (far western extent) / 3+050 (far eastern extent) the realignment will be located on an embankment. The embankment will be approximately 10m in height. There is school present approximately 150m west from the realignment (at the closest point), between chainage 2+000 and 2+500. At the closest point to the school the realignment will on the embankment. Baseline noise measurements were not undertaken at the school as part of the **ESIA**, so as a worst-case, it is assumed that the noise climate at this location is likely to be similar to Location 1 where low baseline noise levels were measured compared to Location 2.

11.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

11.3.1. The evaluation is based upon distances to the nearest sensitive noise receptors which have the potential to be affected by the realignment. A review of the assessment presented in **Chapter 14: Noise and Vibration** of the **ESIA** has been undertaken using a qualitative approach and professional judgment.

11.3.2. Quantitative data for construction plant for the realignment was not available at the time of this assessment due to the early design stage of the realignment. However, given the similarity in the structure required for the realignment, it is considered that the construction plant, shown in **Table 14-6** of the **ESIA** remain applicable.

11.3.3. During the operational phase there will be no change in the end-user traffic as a result of the realignment. Therefore, it is considered that the traffic data, number of total vehicles, proportion of heavy vehicles and speed, used to prepare the noise model remain applicable.

11.3.4. Based on the distance to the nearest sensitive receptors (150m), it is considered that the potential vibration impacts during both the construction and operational phases would be negligible. Prior to mitigation this would result in a **negligible (not significant)** effect at the nearest residential property and school.

CONSTRUCTION PHASE

11.3.5. The assessment in the **ESIA** advised that for all sensitive receptors along the Project alignment, the magnitude of the unmitigated noise impact during construction would be major adverse, as an increase of 5dB was likely to occur. Based on the data presented in the **Chapter 14: Noise and Vibration** of the **ESIA**, there is potential for a noise impact with a magnitude of major at residential properties located up to 350m from the realignment.

11.3.6. The school is located approximately 150m west of the realignment (at the closest point), between chainage 2+000 and 2+500.The nearest residential properties will be located approximately 240m east of the realignment, between chainage 2+500 and 3+000. It is considered that the magnitude of the unmitigated noise impact during construction would be major adverse. Prior to mitigation this would result in a **large adverse (significant)** effect at the nearest residential properties and school.

11.3.7. It should be noted that whilst a large adverse effect during construction is still expected with the realignment at the nearest residential properties, due to the construction works associated with the Strogomishte Interchange. The relocation of the Strogomishte Interchange further to the west of the village of Dolno Strogomishte, will reduce the number of properties at which a significant effect may occur.

OPERATIONAL PHASE

11.3.8. **Table 14-9** of the **ESIA** presents the operational noise levels predicted at 25m from the original alignment for day (Ld 68dB), evening (Le 63dB) and night-time (Ln 59dB) during the future year 2040. The assessment in **Chapter 14: Noise and Vibration** of the **ESIA** is based on the noise limits presented in the Official Gazette of the Republic of Macedonia No. 107/08 (see Table 14-1 and Appendix 14.1 of the **ESIA**). References are also made to the World Health Organisation and World Bank Group noise guidance in **Chapter 14: Noise and Vibration** of the **ESIA**.

11.3.9. At the residential property 25m from the original alignment the predicted noise levels exceeded the noise limits stipulated in the Official Gazette of the Republic of Macedonia No. 107/08. Therefore, the magnitude of the noise impact was assessed as major. Prior to mitigation this would result in a **large adverse (significant)** effect at this residential property. The realignment is 150m from the nearest school and 240m from the nearest residential property in the village of Dolno Strogomishte.

11.3.10. Based on the noise modelling results presented in **Chapter 14: Noise and Vibration** of the **ESIA**, it is considered unlikely that the Official Gazette No. 107/08 noise limits adopted on this Project would be exceeded further than 150m from the Project. Given the distance of the school from the realignment (150m at the closest point) it unlikely that these noise levels would be exceeded. However, it is likely that the noise levels set out in the World Bank Group noise guidance would be exceed as these are more stringent. The World Bank Group noise levels are presented in **Table 14-2** of **Chapter 14: Noise and Vibration** of the **ESIA.** Prior to mitigation this would result in a **moderate adverse (significant)** effect at the school.

11.3.11. Similarly, it is unlikely that the Official Gazette No. 107/08 noise limits adopted on this Project, and the noise levels set out in the World Bank Group noise guidance, would be exceeded at the nearest residential properties to the realignment, in the village of Dolno Strogomishte located 240m west of the realignment. Prior to mitigation this would result in a **minor adverse (not significant)** effect at the nearest residential property.

11.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

11.4.1. No additional mitigation beyond that identified in **Chapter 14: Noise and Vibration** of the **ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

11.4.2. **Table 14-13** of **Chapter 14: Noise and Vibration** of the **ESIA** presents the location of the proposed noise barriers. Noise barriers were originally proposed at the following locations relevant to the original alignment:

- On the west side of the Project between chainage 2+640 and 2+780, 2m in height; and
- On the east side of the Project between chainage 2+800 to 3+020, 3m in height.

11.4.3. Based on the outcome of the qualitative assessment presented in this addendum, it is considered that the noise barriers proposed, as outlined above, will not be required to mitigate significant effects arising from the realignment due to the increased distance of the Project from residential properties.

11.4.4. To reduce the significance of effects on the school it is recommended that a low noise road surface with a noise level reduction of at least 2.5dB is installed on the alignment between chainage 1+750 and 2+500 to mitigate the potential noise effect at the school.

11.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

11.5.1. The significance of the residual effects once mitigation is implemented are considered to be **moderate adverse (significant)** at properties near the re-alignment.

11.5.2. The overall construction phase noise effects for the whole Project alignment remain unchanged, namely **moderate adverse (significant)**.

OPERATIONAL PHASE

11.5.3. The significance of the residual effects once mitigation is implemented are considered to be **minor adverse (not significant)** at residential properties and the school near the realignment.

11.5.4. The overall operational phase noise effects for the whole Project alignment remain unchanged, namely **moderate adverse (significant)**.

11.6 SUMMARY

To summarise, with the exception of the removal of the noise barriers between chainage 2+640 and 3+020 and the installation of a low noise road surface between chainage 1+750 and 2+500 the realignment will not materially alter the conclusions of **Chapter 14: Noise and Vibration** of the **ESIA**.

12 BIODIVERSITY

12.1 INTRODUCTION

12.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to biodiversity as assessed in **Chapter 15: Biodiversity** of the **ESIA**.

12.2 BASELINE CONDITIONS

12.2.1. The baseline information presented in **Chapter 15: Biodiversity** of the **ESIA** remains applicable to this ESIA addendum.

12.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

12.3.1. The methods employed in **Chapter 15** of the **ESIA** have been applied to this ESIA addendum. For instance, where habitat sensitivity has been assessed in this Chapter in **Table 12-1**, the method employed was the same as that set out within **Table 15-5** of the original **ESIA**. The evaluation presented within this Chapter is based on qualitative assessment of the habitats and species present and a quantitative assessment of the areas of habitats which will be lost due to the construction of the Project. The quantitative assessment of areas of sensitive habitats which will be lost assumes that all habitat above the tunnel will be retained. This differs to the habitat loss calculations in the original ESIA which assumed, on a precautionary basis, that habitats located above the tunnel would be lost.

12.3.2. The range of habitat losses presented here reflects a ‘best-case’ and ‘worst-case’ scenario for losses within the unconfirmed alignment section north of the Kolibari tunnel.

CONSTRUCTION PHASE

12.3.3. Based on the information in **Section 1**, the impacts during the construction phase remain unchanged from the original **ESIA**. However, there is a change in the detail of the extent and type of habitat areas lost due to the realignment. Due to the similarity of the relative loss of habitat areas, the effects of the realignment upon habitats remain unchanged from the results detailed in paragraphs 15.2.10 to 15.2.12 of the original **ESIA**.

12.3.4. **Table 12-1** presents a comparison of the breakdown of areas of habitats of very high, high or medium sensitivity to be lost as a result of the Project.

12.3.5. **Figure 12-1** shows that the realignment intersects with sensitive habitats (Critical Habitat (CH) of very high sensitivity (Vhs), PBF (Priority Biodiversity Features) of high sensitivity (Hs) and medium sensitivity (Ms) habitats) in 13 locations. The original design (**Figure 15-9** of the original **ESIA**) also intersected with sensitive habitats in 13 locations. There is a slight positive benefit on biodiversity relative to the original design as 5.86 to 6.11 Ha of sensitive habitats will be lost due to the realignment as opposed to 11.38 Ha. These habitat loss figures are not directly comparable due the assumption outlined in paragraph 15.3.1 and the increased accuracy of the link road drawing; however they do include a legitimate reduction in predicted losses for both riparian willow belts and meadows (of a combined 2.51ha).

Table 12-1 - Comparison of Habitat Loss due the Project (CH in bold/underline; PBF in bold)

Habitat Type	Sensitivity	Original Habitat Loss (Ha)	Habitat Loss associated with the realignment (Ha)
Italian and Turkey oak forests	**Hs**	**3.59**	**1.63 to 1.82**
Riparian black alder belts and woodland	**Vhs**	**3.97**	**2.98**
Riparian willow belts	**Hs**	**0.73**	**0.40 to 0.46**
Meadows	Ms	3.09	0.85
Total Habitat Loss (Ha)		11.38	5.86 to 6.11

School
Northern Rail Overpass
Link Road Overpass
A2 National Road
Dolno Strogomište
Viaduct Start
Southern Rail Overpass
Viaduct Start
Tunnel Start
Viaduct Start
Tunnel Start
Tunnel End
Tunnel End
Oslomej
N
Grešnica
Kolibari
Dlapkin Dol
Trapčin Dol
Crvivci
Raštani
Streltsi
Ocoj
Pašino Ruvci
22 Декември
Партизански Одреди
Gorno Nerezi
Lazarovci
Mamudovci

Legend

- Town
- Link Road
- Realignment
- Original Alignment
- Embankment
- Existing Railway
- Existing Roads
- Habitat Losses

Habitat Sensitivity

- Very High
- High
- Medium

0 200 400 600 800 1,000 m

Scale at A4: 1:25,000

Drawn	Stage 1 check
DG	JS
Stage 2 check	Originated
LH	DG
Date	Drawing Status
01/07/2021	FINAL

Drawing Number: Figure 12 - 1

Job Title: A2 MOTORWAY: BUKOJCHANI – KICHEVO SECTION

Drawing Title: Figure 12 - 1
Habitat Sensivity

wsp

Path: \\uk.wspgroup.com\central data\Projects\70061xx\70061173 - Kichevo to Bukojchani ESIA\04 - WIP\19 - ESIA Addendum\GIS\Mxd\Figure 15-1 - Habitat Sensitivity.mxd

OPERATIONAL PHASE

12.3.6. Based on the information in **Section 1**, the impacts and their associated significance during the operational phase will remain the same as for the original ESIA.

12.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

12.4.1. No additional mitigation beyond that identified in **Chapter 15: Biodiversity** of the **ESIA** needs to be implemented during the construction phase.

12.4.2. However, the detail of the extent of each habitat type which needs replanting to secure (at least) like-for-like replacement for PBF habitat losses and a net gain for CH will need to be amended within the BMP to align with the habitat losses detailed in **Table 12-1**.

OPERATIONAL PHASE

12.4.3. No additional mitigation beyond that identified in **Chapter 15: Biodiversity** of the **ESIA** needs to be implemented during the operational phase.

12.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

12.5.1. During the construction phase following mitigation, it is considered that the effects of the realignment on biodiversity is unchanged and is assessed to be **Neutral (not significant).**

12.5.2. The overall construction phase effects for the whole Project alignment are unchanged and remain **Neutral** - **Slight positive** (**not significant**)

OPERATIONAL PHASE

12.5.3. During the operational phase, following mitigation, it is considered that the effect of the realignment on biodiversity is unchanged and is assessed to be **Neutral (not significant).**

12.5.4. The overall operational phase effects for the whole Project alignment are unchanged and remain **Neutral** (**not significant**).

12.6 SUMMARY

12.6.1. The realignment will not materially alter the conclusions of **Chapter 15: Biodiversity** of the **ESIA**.

12.6.2. The realignment results in a slight positive benefit on biodiversity relative to the original design because (at least) 5.27Ha of sensitive habitat types (including almost 1 Ha of CH) will no longer be affected by the Project.

13 LANDSCAPE AND VISUAL

13.1 INTRODUCTION

13.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to landscape and visual as assessed in **Chapter 16: Landscape and Visual** of the **ESIA**.

13.2 BASELINE CONDITIONS

13.2.1. No additional landscape receptors were identified following a review of baseline in the context of the realignment. The landscape receptors remain as presented in **Chapter 16: Landscape and Visual** of the **ESIA**.

13.2.2. In relation to the visual baseline conditions, the realignment will alter the visual extents for the Project in relation to receptors around the realignment.

13.2.3. The realignment will result in a change to the view for residents living in dwellings in the western edge of Dolno Strogomishte. Instead of experiencing views of the Project in the middle distance amongst the open landscape, the residents will experience largely obscured views of the realignment in the long distance. Within **Chapter 16: Landscape and Visual** of the **ESIA** this visual receptor is depicted as Viewpoint 9.

13.2.4. The realignment will result in a considerable change to the view for residents living in dwellings along an unnamed road west of the village of Dolno Strogomishte. Instead of experiencing views of the Project in close proximity, adjacent to the unnamed road and Dolno Strogomishte cemetery, the residents will experience views of the realignment in the middle and long distance. Within **Chapter 16: Landscape and Visual** of the **ESIA** this visual receptor is depicted as Viewpoint 10.

13.2.5. The realignment will result in a considerable change to the visual receptor associated with visitors to Dolno Strogomishte Cemetery. Instead of experiencing views of the Project in close proximity from the cemetery to the west of Dolno Strogomishte, visitors will experience views of the realignment in the middle and long distance only. Within **Chapter 16: Landscape and Visual** of the **ESIA** this visual receptor is also depicted as Viewpoint 10.

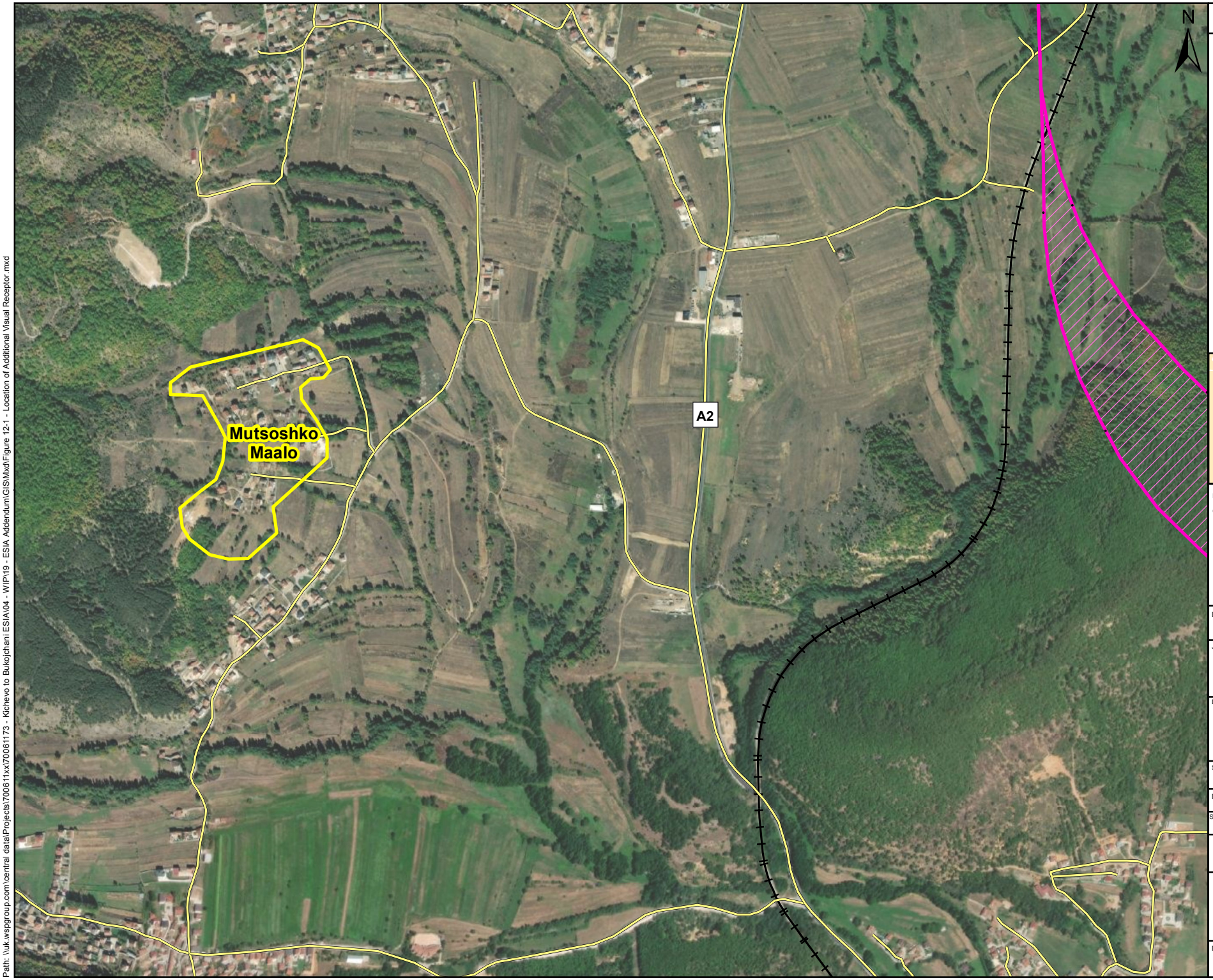
13.2.6. With the realignment, the views of the visual receptor associated with visitors to the Albanian Mother Memorial will change slightly. Instead of experiencing views of the Project largely at distance and limited by the intervening topography and vegetation, visitors will experience views of the realignment at slightly closer proximity (although still with direct views of the works to the link road and junction adjacent to the Memorial, as with the previous alignment). This visual receptor was not depicted with a Viewpoint within **Chapter 16: Landscape and Visual** of the **ESIA**.

13.2.7. One additional visual receptor, the neighbourhood of Mutsoshko Maalo has been identified due to the realignment being located closer to this neighbourhood. The location of Mutsoshko Maalo is shown in **Figure 13-1**. Residents living in dwellings on the eastern edge of Mutsoshko Maalo will experience views of the realignment in the long distance amongst the open, undulating landscape. A summary of the additional visual receptor is provided in **Table 13-1**.

Table 13-1 - Description of Additional Visual Receptor (Mutsoshko Maalo)

Receptor	Sensitivity	Description
Residents living in dwellings on the eastern outskirts of Mutsoshko Maalo.	Medium	Susceptibility is considered to be medium as residents in this location will experience views within the long distance only, beyond the existing A2 national road. The majority of views will be obscured by intervening topography and vegetation.

13.2.8. All other visual receptors remain as presented in **Chapter 16: Landscape and Visual** of the **ESIA**.



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Visula Receptor (Mutsoshko Maalo)
- Realignment
- Existing Roads
- Existing Railway
- Area Extents of the Realignment

Note:

Original alignment and realignment have been digitised based on a .jpeg file.

Drawing Status

FINAL

Job Title:

A2 MOTORWAY: BUKOJCHANI – KICHEVO SECTION

Drawing Title

Figure 13 -1 - Location of Additional Visual Receptor (Mutsoshko Maalo)

Scale at A4

1:10,000

Drawn			
DG			
Stage 1 check	Stage 2 check	Originated	Date
AM	JW	DG	01/07/2021

0 50 100 200

m

wsp

Drawing Number

Figure 13 -1

Path: \\uk.wspgroup.com\central data\Projects\700611xx\700611173 - Kichevo to Bukojchani ESIA\04 - WIP\19 - ESIA Addendum\GIS\Mxd\Figure 12-1 - Location of Additional Visual Receptor.mxd

13.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

13.3.1. This ESIA Addendum considers the assessment of effects on landscape and visual receptors for the original alignment in relation to the realignment.

13.3.2. A qualitative assessment was undertaken to identify changes, such as the type and number of structures to be constructed as a result of the realignment (as detailed in **Section 1**), as well as identifying any appropriate additional mitigation and any changes to the residual effects.

CONSTRUCTION PHASE

Landscape

13.3.3. The realignment will require relatively similar structures to the original alignment, as detailed in **Section 1**, within the various landscape character areas. It is therefore considered that the degree of difference between the effects due to the original alignment on and within the identified landscape character areas and the those due to the realignment would be minimal. Furthermore, the likely duration and the types of the construction activities remains similar to those of the original alignment. It is considered that with the realignment, the overall construction phase landscape effects, prior to mitigation, would remain unchanged from those reported in **Chapter 16: Landscape and Visual** of the **ESIA**, namely **slight adverse (not significant)** to **moderate adverse (significant)**.

Visual

13.3.4. It is anticipated that the visual impact of the realignment will extend approximately 1km southwest of the original alignment. This is likely to increase the visual impacts of the Project on visual receptors to the west of the original alignment but also to decrease visual impacts on receptors to the east of the original alignment.

13.3.5. Where, prior to mitigation, the impacts and associated effects have changed due to the realignment these are summarised in **Table 13-2**. The rows in the table supersede the relevant rows in **Table 16-6** of the **ESIA**.

Table 13-2 - Construction Phase: Summary of Visual Effects (prior to mitigation)

Receptor	Representative Viewpoint	Sensitivity	Magnitude of Change	Effect (prior to mitigation)	Description
Residential Receptors					
Residents living in dwellings in the western outskirts of Dolno Strogomishte.	9	High	Minor *(moderate with the original alignment)*	**Slight Adverse (not significant) or Moderate Adverse (significant)** *(moderate or large adverse (significant) with the original alignment)*	Construction activities will be visible in the long distance beyond the existing residential edge of Dolno Strogomishte. The movement of plant and machinery, creation of noise and dust, construction of the embankment, Strogomishte Interchange and viaduct and potential increases in traffic and lorries will be barely perceptible in the background of the view. The effect will be direct, temporary and medium term.
Residents living in dwellings along an unnamed road west of Dolno Strogomishte.	10	High	Moderate *(major with the original alignment)*	**Moderate Adverse (significant)** *(large or very large adverse (significant) with the original alignment)*	Construction activities will be visible in the middle distance in predominately open views to the west. The movement of plant and machinery, creation of noise and dust, construction of the embankment, Strogomishte Interchange and viaduct and potential increases in traffic and lorries will be noticeable within the view. The effect will be direct, temporary and medium term.

Receptor	Representative Viewpoint	Sensitivity	Magnitude of Change	Effect (prior to mitigation)	Description
 **Figure 13-2 - Viewpoint 10 – Reoriented Due Realignment**					
Residents living in dwellings on the eastern outskirts of Mutsoshko Maalo. *(additional visual receptor)*	-	Medium	Moderate	**Slight Adverse (not significant) or Moderate Adverse (significant)**	Construction activities will be visible in the long distance where gaps in intervening vegetation allow. Construction activities will be visible beyond the existing A2 national road. The movement of plant and machinery, creation of noise and dust, construction of the embankment, Strogomishte Interchange and viaduct and potential increases in traffic and lorries will be noticeable within the background of the view. The effect will be direct, temporary and medium term.
Commercial Receptors, Recreational Receptors and Visitors to Places of Worship					
People visiting a cemetery to the west of Dolno Strogomishte.	10	Medium	Moderate *(major with the original alignment)*	**Moderate Adverse (significant)** *(moderate or large adverse (significant) with the original alignment)*	Construction activities will be visible in the middle distance in predominately open views to the west (a small portion of the view will be obscured by the adjacent residential edge). The movement of plant and machinery, creation of noise and dust,

Receptor	Representative Viewpoint	Sensitivity	Magnitude of Change	Effect (prior to mitigation)	Description
					construction of the embankment, Strogomishte Interchange and viaduct and potential increases in traffic and lorries will be noticeable within the view. The effect will be direct, temporary and medium term.
People visiting the Albanian Mother Memorial.	-	High	Major *(major with the original alignment)*	**Large Adverse (significant)** *(large adverse (significant) with the original alignment)*	Construction activities will be visible in short and middle-distance views beyond the vegetation surrounding the memorial. Visible activities will include the movement of plant and machinery, including cranes, and the creation of noise and dust, particularly during construction of the prominent viaduct and embankment. The effect will be direct, temporary and medium term.

OPERATIONAL PHASE

Landscape

13.3.6. The realignment will require relatively similar structures to the original alignment, as detailed in **Section 1**, within the various landscape character areas. It is therefore considered that the degree of difference between the effects due to the original alignment, on and within, the identified landscape character areas and the those due to the realignment would be minimal. It is considered that with the realignment, the overall operational phase landscape effects prior to mitigation would remain unchanged from those reported in **Chapter 16: Landscape and Visual** of the **ESIA**, namely **minor adverse (not significant)** to **moderate adverse (significant)**.

Visual

13.3.7. As previously outlined, it is anticipated that the visual impact of the realignment will extend approximately 1km southwest of the original alignment.

13.3.8. Where, prior to mitigation, the impacts and associated effects have changed due to the realignment these are summarised in **Table 13-3**. The rows in the table supersede the relevant rows in **Table 16-9** of the **ESIA**.

Table 13-3 - Operational Phase: Summary of Visual Effects (prior to mitigation)

Receptor	Representative Viewpoint	Sensitivity	Magnitude of Change	Effect (prior to mitigation)	Description
Residential Receptors					
Residents living in dwellings in the western outskirts of Dolno Strogomishte.	9	High	Minor	**Slight Adverse (not significant)** *(Slight Adverse (not significant) or Moderate Adverse (significant) with the original alignment)*	The Project will be visible in the long distance beyond the existing residential edge of Dolno Strogomishte. Views of the Project will be largely obscured. Where views are available the Project will be visible below the skyline and filtered by intervening vegetation. The Project will be seen as an extension to the urban edge and of similar character within the background of the view. This effect will be direct, permanent and long term.
Residents living in dwellings along an unnamed road west of Dolno Strogomishte.	10	High	Minor *(major with the original alignment)*	**Slight Adverse (not significant) or Moderate Adverse (not significant)** *(large or very large adverse (significant) with the original alignment)*	The Project will be visible within the middle distance beyond the existing residential edge. The Project will be visible below the skyline and will extend the influence of large-scale infrastructure within the view. This effect will be direct, permanent and long term.
Residents living in dwellings on the eastern outskirts of Mutsoshko Maalo. *(additional visual receptor)*	-	Medium	Moderate	**Slight Adverse (not significant)**	The Project will be visible in the long distance where gaps in intervening topography and vegetation allow. The Project and large-scale viaduct will be visible beyond the existing E-25 / A1 road, along the skyline extending the influence in urban infrastructure. The Project will be perceptible within the background of the view.
Commercial Receptors, Recreational Receptors and Visitors to Places of Worship					
People visiting a cemetery to the west of Dolno Strogomishte.	10	Medium	Minor *(major with the original alignment)*	**Slight Adverse (not significant)**	The Project will be visible within the middle distance beyond the existing residential edge, with a portion of views obscured by housing. The Project will be visible below the skyline only and will slightly extend

Receptor	Representative Viewpoint	Sensitivity	Magnitude of Change	Effect (prior to mitigation)	Description
				(moderate or large adverse (significant) with the original alignment)	the influence of large-scale infrastructure within the view. This effect will be direct, permanent and long term.
People visiting the Albanian Mother Memorial.	-	High	Moderate *(moderate with the original alignment)*	**Moderate Adverse (significant) or Large Adverse (significant)** *(moderate adverse (significant) with the original alignment)*	Views of the M2 Motorway alignment, including the interchange, will be visible within the middle distance beyond the vegetation surrounding the memorial. The junction improvements, will be visible at close proximity, together with the new link from the existing A2 national roads to the new A2 Motorway. This effect will be direct, permanent and long term.

13.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

13.4.1. The height and dominance of the 10m embankment should be visually softened through the use of native planting (including shrubs and, where possible, trees). The embankment should be constructed with a slope no greater than 1:3 to enable planting and maintenance access.

13.4.2. The Strogomishte Interchange should also be visually softened through the use of native planting (including bulbs, shrubs and trees) to reduce the visual intrusion of vehicles and man-made structures in the landscape.

13.4.3. Besides the planting referenced above no additional mitigation beyond that identified in **Chapter 16: Landscape and Visual** of **the ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

13.4.4. No additional mitigation beyond that identified in **Chapter 16: Landscape and Visual** of the **ESIA** needs to be implemented during the operational phase.

13.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

Landscape

13.5.1. The overall construction phase landscape effects, including the realignment, with mitigation, would remain unchanged from those reported in **Chapter 16: Landscape and Visual of the ESIA**, namely slight adverse (not significant).

Visual

13.5.2. **Table 13-4** summarises the residual effects on visual receptors as a result of the realignment. The rows in the table supersede the relevant rows in **Table 16-10** of the **ESIA**.

Table 13-4 - Construction Phase: Summary of Visual Effects (following mitigation)

Receptor	Representative Viewpoint	Residual Effect (following mitigation)
Residential Receptors		
Residents living in dwellings in the western outskirts of Dolno Strogomishte.	9	**Slight Adverse (not significant) or Moderate Adverse (significant)** The Project will create a noticeable change in the view. *(moderate adverse (significant) with the original alignment)*
Residents living in dwellings along an unnamed road west of Dolno Strogomishte.	10	**Moderate Adverse (significant)** The Project will create a prominent change in view. *(large adverse (significant) with the original alignment)*
Residents living in dwellings on the eastern outskirts of Mutsoshko Maalo. *(additional visual receptor)*	-	**Slight Adverse (not significant) or Moderate Adverse (significant)** The Project will create a noticeable change in the view.
Commercial Receptors, Recreational Receptors and Visitors to Places of Worship		
People visiting a cemetery to the west of Dolno Strogomishte.	10	**Moderate Adverse (significant)** The Project will create a prominent change in view. *(large adverse (significant) with the original alignment)*
People visiting the Albanian Mother Memorial.	-	**Moderate Adverse (significant) or large Adverse (significant)** The Project will create a prominent change in the view. *(moderate adverse (significant) with the original alignment)*

OPERATIONAL PHASE

Landscape

13.5.1. It is considered that with the realignment, the overall operational phase landscape effects with mitigation would remain unchanged from those reported in **Chapter 16: Landscape and Visual** of the **ESIA**, namely **slight adverse (not significant)**.

Visual

13.5.2. **Table 13-5** summarises the residual effects on visual receptors as a result of the realignment. The rows in the table supersede the relevant rows in **Table 16-11** of the **ESIA**.

Table 13-5 - Operation Phase: Summary of Visual Effects (following mitigation)

Receptor	Representative Viewpoint	Residual Effect (following mitigation)
Residential Receptors		
Residents living in dwellings in the western outskirts of Dolno Strogomishte.	9	**Neutral (not significant)** The Project will create no perceptible change in the view. *(neutral (not significant) with the original alignment)*
Residents living in dwellings along an unnamed road west of Dolno Strogomishte.	10	**Slight Adverse (not significant) or Moderate Adverse (not significant)** The Project will create a limited change in the view. *(large adverse (significant) with the original alignment)*
Residents living in dwellings on the eastern outskirts of Mutsoshko Maalo. *(additional visual receptor)*	-	**Slight Adverse (not significant)** The Project will create a limited change in the view.
Commercial Receptors, Recreational Receptors and Visitors to Places of Worship		
People visiting a cemetery to the west of Dolno Strogomishte	10	**Slight Adverse (not significant)** The Project will create a limited change in the view. *(moderate adverse (significant) with the original alignment)*
People visiting the Albanian Mother Memorial.	-	**Slight Adverse (not significant) or Moderate Adverse (not significant)** The Project will create changes in the view. *(slight adverse (not significant) with the original alignment)*

13.6 SUMMARY

13.6.1. Taking account of the native planting on the embankment, the realignment will not materially alter the conclusions of **Chapter 16: Landscape and Visual** of the **ESIA** as set out in the above **Table 13-5**.

14 SOCIAL AND COMMUNITY

14.1 INTRODUCTION

14.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to social and community as assessed in **Chapter 17: Social and Community** of the **ESIA**.

14.2 BASELINE CONDITIONS

14.2.1. The baseline data presented in **Chapter 17: Social and Community** of the **ESIA** remains applicable to this addendum.

14.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

14.3.1. A review of the Project realignment has been carried out to identify whether the realignment may cause any change to the impacts considered in in **Chapter 17: Social and Community** of the **ESIA**.

14.3.2. A qualitative assessment has been undertaken to identify any changes, such as any increase or reduction in the impacts on local communities that could be potentially affected by the realignment. Using professional judgement, is has been considered whether the realignment could result in a change to the assessment of the potential for significant effects.

CONSTRUCTION PHASE

14.3.3. The potential negative social impacts identified in **Chapter 17: Social and Community** of the **ESIA** were reviewed, as the alignment is expected to deliver substantial improvement for Dolno Strogomishte village residents, where most construction activities are taken outside of the village area.

14.3.4. **Chapter 17: Social and Community** of the **ESIA** reported the following construction phase effects prior to mitigation:

- Access to Education, Health & Welfare Facilities –**; Large Adverse (significant)**
- Construction Traffic: **Large Adverse (significant)**
- Community Cohesion & Wellbeing: **Large Adverse (significant)**

14.3.5. With the proposed realignment it is considered the above effects would reduce to **Moderate Adverse** (**significant**) prior to mitigation.

OPERATIONAL PHASE

14.3.6. The following operational phase effects were identified in **Chapter 17: Social and Community** of the **ESIA** prior to mitigation:

- The potential for significant effects on community cohesion and health/wellbeing during the operational phase of the Project was identified as **Slight Adverse (not significant)** or **Moderate Adverse (significant)**.
- The new overpass over the railway line that forms part of the Strogomishte interchange will be a significant improvement compared with the baseline

conditions, as it will be used by emergency vehicles and will remove the need for the current width restricted underpass and informal crossing. There are also likely to be fewer accidents and incidents as vehicles will eventually stop using the existing A2 state road, that was designed to a lower standard, and instead will be using the new and higher standard A2 Motorway. This will reduce the risk of incidents and accidents when compared to the baseline situation. The potential for significant effects on the local community's HSE aspects as a result of the realignment is considered **Moderate** or **Large Beneficial (significant)**.

14.3.7. Sensitive receptors/ communities located to the northwest of Dolno Strogomiste and to the east of the rail line will be further away from the Project with the realignment in place, but some properties (to the west of the rail line) will be located closer to this new road (although these are still at approximately 170m distance away from the proposed realignment). As such, its is considered that the adverse operational social and community effects as reported in **Chapter 17: Social and Community** of the **ESIA** are reduced **to Slight Adverse,** while the beneficial operational effects remain the same.

14.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

14.4.1. No additional mitigation beyond that identified in **Chapter 17: Social and Community** of the **ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

14.4.2. No additional mitigation beyond that identified in **Chapter 17: Social and Community** of the **ESIA** needs to be implemented during the operational phase.

14.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

14.5.1. Following the implementation of the construction phase mitigation measures, it is considered that social and community effects during the construction phase, with the realignment, will remain as reported in **Chapter 17: Social and Community** of the **ESIA**:

- Community Cohesion and Wellbeing – **Slight adverse (not significant)**;
- Local Community Health Impacts and Accidents – **Slight adverse (not significant)**;
- Construction traffic – **Slight adverse (not significant)**; and
- Access to Educational Facilities, Social Welfare Support Facilities and Healthcare Facilities – **Slight adverse (not significant).**

14.5.2. The overall construction phase social and community residual effects for the whole Project will remain as reported above.

OPERATIONAL PHASE

14.5.3. Following the implementation of the operational phase mitigation measures, it is considered that social and community effects during the operational phase, with the realignment are as follows:

- Community Cohesion, Health and Wellbeing (including severance in access to community facilities): effects would reduce from Slight Adverse (not significant) or Moderate Adverse (significant) to **Neutral (not significant)**, and

- Community HSE/Incidents and Accidents: **Large beneficial (significant)**

14.6 SUMMARY

14.6.1. The adverse operational effects detailed in **Chapter 17: Social and Community** of the **ESIA** were reduced on the basis of the realignment.

15 OCCUPATIONAL HEALTH, SAFTEY AND SECURITY

15.1 INTRODUCTION

15.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment, between chainage 2+000 and 6+000, in relation to occupational health and safety and security as assessed in Chapter 18: Occupational Health and Safety and Security of the ESIA.

15.1.2. The consideration of health and safety effects on the local community is covered in Chapter 17: Social and Community of the ESIA.

15.2 BASELINE CONDITIONS

LOCAL OCCUPATIONAL HEALTH SAFETY AND SECURITY FRAMEWORK

15.2.1. As outlined in **Chapter 18: Occupational Health and Safety and Security** of the **ESIA**, primary and secondary laws are in place to ensure employers to take all necessary measures to provide and maintain a safe and health workplace. These laws state that employers must prepare a health and safety plan (or equivalent) prior to the commencement of works.

15.2.2. Further information regarding Macedonian health and safety laws can be found in **Chapter 3: ESIA Legislation and Requirements** of the **ESIA.**

15.2.3. The changes due to the realignment will not affect this framework or local conditions.

SENSITIVE RECEPTORS

15.2.4. There are no additional receptors as a result of the realignment compared to those assessed in **Chapter 18: Occupational Health and Safety and Security** of the **ESIA**.

15.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

15.3.1. The review of the implication of the changes on the potential significant effects on Occupational Health and Safety and Security due to the realignment, has been undertaken based on a review of mapping data showing the realignment and professional judgement.

CONSTRUCTION PHASE

15.3.2. The ESIA assessed the following construction phase effects:

- Construction workers employment rights and working conditions
- Health and Safety (HSE) Management on-site and HSE training among workers
- Construction worker incidents and accidents
- Construction Workers' Accommodation

15.3.3. Based on the realignment, as outlined in **Section 1**, no changes to construction workers employment rights and working conditions are expected. The Macedonian legislative framework will remain applicable.

15.3.4. As previously assessed, in the absence of mitigation, there is a risk that contractors could hire workers without appropriate training and qualifications resulting in safety and quality issues. The realignment will not change the potential for this effect.

15.3.5. As with all construction projects, there are risks of incidents and accidents. The realignment is not considered likely to change the potential for adverse effects due to incidents and accidents on the construction workforce.

15.3.6. The realignment may affect the location of construction workers' accommodation, however as explained in **Chapter 2: Description of the Project** of the **ESIA**, prior to construction workers accommodation being provided, a screening process of suitable sites will be undertaken, this will include consideration of the realignment.

15.3.7. Based on the above, it is considered that the unmitigated effects of the Project on Occupational Health, Safety and Security during the construction phase, with the realignment will remain as reported in **Chapter 18: Occupational Health Safety and Security** of the **ESIA**:

- Construction workers employment rights and working conditions – **Moderate Adverse** (**significant**);
- Employment of construction workers – **Large or Very Large Adverse** (**significant**); and
- Construction worker incidents and accidents – **Major Adverse** (**significant**)**;**
- Construction workers accommodation – **Slight Adverse** (**not significant**) or **Moderate Adverse** (**significant**).

OPERATIONAL PHASE

15.3.8. The benefits of the Project with regard to the subsequent employment of construction workers will not change due to the realignment. The effect will remain **Slight (not significant) to Moderate Beneficial (significant).**

15.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

15.4.1. No additional mitigation beyond that identified in **Chapter 18: Occupational Health and Safety and Security** of the **ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

15.4.2. No additional mitigation beyond that identified in **Chapter 18: Occupational Health and Safety and Security** of the **ESIA** needs to be implemented during the operational phase.

15.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

15.5.1. During the construction phase following mitigation, it is considered that the potential effects on occupational health, safety and security with the realignment, will be unchanged and remain as reported in **Chapter 18: Occupational Health and Safety and Security** of the **ESIA**:

- Construction workers employment rights and working conditions – **Slight Adverse** (**not significant**);
- Employment of construction workers – **Slight Adverse** (**not significant**);
- Construction worker incidents and accidents – **Slight Adverse** (**not significant**);
- Construction workers accommodation – **Slight Adverse** (**not significant**)

15.5.2. The overall construction phase occupational health, safety and security effects for the whole Project alignment are unchanged and remain as reported above – **Slight Adverse (not significant)**.

OPERATIONAL PHASE

15.5.3. During the operational phase following mitigation, it is considered that the potential effects on occupational health, safety and security with the realignment will be unchanged and remain as reported in **Chapter 18: Occupational Health and Safety and Security** of the **ESIA**:

- Subsequent employment of construction workers – **Moderate Beneficial** (**significant**).

15.5.4. The overall operational phase effects for the whole Project alignment are unchanged and remain as reported above – **Moderate Beneficial (significant)**.

15.6 SUMMARY

15.6.1. The realignment will not materially alter the conclusions of **Chapter 18: Occupational Health and Safety and Security** of the **ESIA**.

16 PROPERTY AND LIVELIHOOD

16.1 INTRODUCTION

16.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to property and livelihood as assessed in **Chapter 19: Property and Livelihood** of the **ESIA**.

16.2 BASELINE CONDITIONS

16.2.1. The baseline data presented in **Chapter 19: Property and Livelihood** of the **ESIA** remains applicable to this addendum.

16.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

16.3.1. A review of the Project realignment has been carried out to identify whether the alignment might cause any additional impacts defined earlier in the **Chapter 19: Property and Livelihood** of the **ESIA**.

16.3.2. PESR has not commenced the Expropriation Elaborate process, and a full census of all properties and potentially, livelihoods that that might be affected by this Project, is not available. The baseline data will be established and confirmed by PESR during a census of the Project area ahead of the start of works and to inform the Land Acquisition Plan (LAP).

16.3.3. At this stage, it is anticipated that up to three households may be directly affected by the realignment, however this is indicative information with the exact households to be affected to be determined as part of the implementation of the LAP. A qualitative assessment has therefore been undertaken to identify any changes, such as any additional impacts on properties and local communities' livelihood that could be potentially affected by the realignment. Using professional judgement, the team has considered whether the realignment will result in a change to the outcome of the assessment of the potential for significant effects which were not identified in the original ESIA.

CONSTRUCTION PHASE

16.3.4. Based on **Section 1**, it is unlikely that type and nature of the construction activities assessed previously will change significantly. However, the location of the construction activities will change, with the relocation of the Dolno Strogomishte Interchange, being constructed further from the village of Dolno Strogomishte.

16.3.5. Local communities requested the realignment of this section to reduce potential effect on local properties and a cemetery. The realignment will reduce the construction effects on these local residents' properties and livelihood.

16.3.6. The realignment away from the village will move the Project slightly nearer to a school, and a small number of residential properties. However, these are set back from the Project, and are located approximately 170m to the west of the realignment. However, over this distance it is expected that the properties, and livelihood of the residents (i.e.

private gardens often used for subsistence agriculture in the project area) and local education authority's property (i.e. the school) will not be affected.

16.3.7. Although there will be a reduction in the effects due to the realignment, the overall potential effects identified in **Chapter 19: Properties and Livelihood** of the **ESIA** are not anticipated to significantly change, primarily due to the continued requirement for the expropriation of properties and agricultural land for the overall Project.

16.3.8. **Chapter 19**: **Property and Livelihood** of the **ESIA** reported the following respective **magnitude** and **significance** of the identified construction phase effects (prior to mitigation):

- The potential for significant effects associated with access restrictions to residential dwellings/properties within the rural settlements, as a result of the construction activities: **Moderate or Large Adverse (significant)**.
- The potential for significant effects associated with the potential disruption of utilities provision to residential dwellings/property as a result of the construction activities: **Slight Adverse (not significant)** or **Moderate Adverse (significant)**.
- The potential for significant effects associated with the resulting deterioration of the local roads as a result of the construction traffic: **Moderate Adverse (significant)**.
- The potential for significant effects associated with the permanent expropriation of up to three residential dwellings and a few auxiliary buildings: **Moderate Adverse (significant)**.
- Local subsistence agricultural activities and / or permanent loss of agricultural land has the potential for significant effects to livelihoods associated with each agricultural land holding along the realignment: **Moderate or Large Adverse (significant)**.
- The potential for significant community tension-related effects associated with the foraging of plants and resources by construction workers and resulting depletion of a resource that is valued by the local community: **Slight Adverse (not significant)**.
- The potential for significant employment and economic growth effects across the Municipality of Kichevo during construction: **Moderate Beneficial (significant)**.

16.3.9. The realignment of the Project will reduce the construction effects on local residents' properties and livelihood near the realignment, however, it is not considered to alter the conclusions for the overall Project.

OPERATIONAL PHASE

16.3.10. The following operational phase effect was identified in the ESIA report (prior to mitigation):

- The potential for significant effects on employment and economic growth across the Republic of North Macedonia as a result of the new road: **Moderate Beneficial (significant)**.

16.3.11. The realignment of the Project will reduce the operational effects on local residents' properties and livelihood near the realignment, however, is not considered to alter the conclusion for the overall Project.

16.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

16.4.1. No additional mitigation beyond that identified in **Chapter 19: Property and Livelihood** of the **ESIA** needs to be implemented during the construction phase.

OPERATIONAL PHASE

16.4.2. No additional mitigation beyond that identified in **Chapter 19: Property and Livelihood** of the **ESIA** needs to be implemented during the construction phase.

16.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

16.5.1. Following the implementation of the construction phase mitigation measures, it is considered that property and livelihood residual effects during the construction phase, with the realignment, will remain as reported in **Chapter 19: Property and Livelihood** of the **ESIA**:

- Access restrictions to residential dwellings/properties within the rural settlements, as a result of the construction activities: **Slight Adverse (Not significant)**.
- Potential disruption of utilities provision to residential dwellings/property as a result of the construction activities: **Slight Adverse (Not significant)**.
- Resulting deterioration of the local roads as a result of the construction traffic: **Slight Adverse (Not significant)**.
- Involuntary Resettlement and expropriation of up to three residential dwellings and a few auxiliary buildings: **Slight Adverse (Not significant)**.
- Affected livelihood through effects on local subsistence agricultural activities and / or permanent loss of agricultural land along the realignment: **Slight Adverse (Not significant)**.
- Community tension-related effects associated with the foraging of plants and resources by construction workers causing resource depletion: **Slight Adverse (not significant)**.
- Employment and economic growth effects across the Municipality of Kichevo during construction: **Moderate Beneficial (significant)**.

16.5.2. The overall construction phase property and livelihood effects for the whole Project alignment remain unchanged as reported above.

OPERATIONAL PHASE

16.5.3. Following the implementation of the operational phase mitigation measures, it is considered that property and livelihood residual effects during the operational phase, with the realignment, will remain as reported in **Chapter 19: Property and Livelihood** of the **ESIA**:

- Employment and economic growth effects across the Municipality of Kichevo during construction: **Moderate Beneficial (significant)**.

16.5.4. The overall construction phase property and livelihood effects for the whole Project alignment are unchanged and remain **Moderate Beneficial** (**significant**).

16.6 SUMMARY

The findings of the Property and Livelihood assessment presented in **Chapter 19: Property and Livelihood** of the **ESIA** remain valid and unchanged by the realignment of the Project.

17 CULTURAL HERITAGE

17.1 INTRODUCTION

17.1.1. This chapter reports on the findings of the review undertaken on the potential effects of the realignment of the Project, between chainage 2+000 and 6+000, in relation to cultural heritage as assessed in **Chapter 20: Cultural Heritage** of the **ESIA**.

17.2 BASELINE CONDITIONS

17.2.1. The character of the area surrounding the realignment is similar to that detailed in **Chapter 20: Cultural Heritage** of the **ESIA**, which is predominantly comprised of agricultural land with isolated residential/farm properties. No additional cultural heritage assets are noted in the area of realignment. Therefore, the baseline conditions reported in the **Chapter 20: Cultural Heritage** of the **ESIA** are considered to remain unchanged.

17.3 POTENTIAL FOR EFFECTS TO BE SIGNIFICANTLY CHANGED DUE TO THE REALIGNMENT

APPROACH TO THE EVALUATION

17.3.1. A review of the realignment has been carried out to identify changes from the original alignment reported in **Chapter 20: Cultural Heritage** of the **ESIA** and a qualitative assessment has been undertaken to identify any changes, relating to:

- Works in Dolno Strogomishte Cemetery (construction phase);
- Disturbance at cemeteries and memorials (excluding the Dolno Strogomishte Cemetery as this is considered separately) (construction phase);
- Potential loss of partial damage to undiscovered below-ground heritage assets (construction phase); and
- Setting of the Dolno Strogomishte Cemetery and the Albanian Mother Memorial (operational phase).

CONSTRUCTION PHASE

17.3.2. The original alignment was in close proximity to the known extent of Dolno Strogomishte Cemetery (chainage 2+500 on the original alignment). At the time of assessment undertaken to inform **Chapter 20: Cultural Heritage** of the **ESIA** there were three design variants considered for the Project in proximity to the cemetery. The effects of each of these variants ranged from moderate to large adverse (significant) for Variant 0 or slight adverse (not significant) for Variants 1 and 2. Variant 0 directly intersected the cemetery, with the construction of piers within the cemetery.

17.3.3. The realignment will result in the Project not directly impacting the Dolno Strogomishte Cemetery, as the Project will be located approximately 350m further west. Therefore, there will be no direct or adjacent impacts on the known extent of the cemetery during the construction phase. This will result in a reduction in the effect on the Dolno Strogomishte Cemetery during the construction phase to **Negligible (not significant)**.

17.3.4. The potential disturbances effects at other cemeteries and memorials (excluding Dolno Strogomishte Cemetery), was identified as moderate or large adverse (significant) in **Chapter 20: Cultural Heritage** of the **ESIA**. The realignment will not change this assessment, and the potential for effects remains moderate or large adverse (significant) prior to mitigation.

17.3.5. The potential effect on undiscovered below-ground heritage assets was identified as moderate adverse (significant) in **Chapter 20: Cultural Heritage** of the **ESIA**. The realignment will not change this assessment, and the potential for adverse effects prior to mitigation remains moderate adverse (significant).

OPERATIONAL PHASE

17.3.6. The original alignment was identified as having the potential to have large adverse (significant) operational effects on the setting of the Dolno Strogomishte Cemetery, due to the proximity of the Project to the cemetery, as well as potential noise and overshadowing notable to visitors to the cemetery.

17.3.7. The realignment will prevent the Project having a directly impact on the cemetery, as the Project will be located approximately 350m from Dolno Strogomishte Cemetery. This will also avoid overshadowing and reduce the likelihood of noise disturbance. This would result in a reduction in effect on the setting of the Dolno Strogomishte Cemetery to **Slight Adverse (not significant).**

17.3.8. The potential effects on the setting of the Albanian Mother Memorial were identified as slight beneficial (not significant) in **Chapter 20: Cultural Heritage of the ESIA**. The realignment will not change this assessment, and the potential for unmitigated effects remains **Slight Beneficial (not significant).**

17.4 CONSIDERATION OF NEED FOR ADDITIONAL MITIGATION

CONSTRUCTION PHASE

17.4.1. No additional mitigation beyond that identified in **Chapter 20: Cultural Heritage** of the **ESIA** needs to be implemented during the construction phase in relation to:

- Disturbance at cemeteries and memorials, excluding the Dolno Strogomishte Cemetery; and
- Potential loss of partial damage to undiscovered below-ground heritage assets.

17.4.2. As a result of the realignment and the associated reduction in effects to Dolno Strogomishte Cemetery the Grave Location Plan will no longer be required.

OPERATIONAL PHASE

17.4.3. No additional mitigation beyond that identified in **Chapter 20: Cultural Heritage** of the **ESIA** needs to be implemented during the operational phase in relation to the setting of the Dolno Strogomishte Cemetery and the Albanian Mother Memorial.

17.5 RESIDUAL EFFECTS

CONSTRUCTION PHASE

17.5.1. With mitigation, it is considered that the effects of the Project on cultural heritage during the construction phase, with the realignment, will remain as reported in **Chapter 20: Cultural Heritage** of the **ESIA**:

- Disturbance at cemeteries and memorials, excluding the Dolno Strogomishte Cemetery – **Slight Adverse (not significant)**; and
- Potential loss of partial damage to undiscovered below-ground heritage assets - **Slight Adverse (not significant)**.

17.5.2. As a result of the realignment the effects during the construction phase to the Dolno Strogomishte Cemetery would be reduced to **Negligible (not significant).**

OPERATIONAL PHASE

17.5.3. As a result of the realignment the effects during the operational phase to the Dolno Strogomishte Cemetery would be reduced to **Slight Adverse (not significant).**

17.5.4. With mitigation, it is considered that the effects of the Project on the setting of the Albanian Mother Memorial during the operational phase, with the realignment, will remain as reported in **Chapter 20: Cultural Heritage** of the **ESIA**, namely **Slight Beneficial (not significant).**

17.6 SUMMARY

17.6.1. The realignment will not materially alter the conclusions of **Chapter 20: Cultural Heritage** of the **ESIA** in relation to:

- Disturbance at cemeteries and memorials (construction phase);
- Potential loss of partial damage to undiscovered below-ground heritage assets (construction phase); and
- Setting of the Albanian Mother Memorial (operational phase).

17.6.2. The effects on Dolno Strogomishte Cemetery (construction phase) will be reduced to **Negligible (not significant)** during the construction phase and **Slight Adverse (not significant)** during the operational phase as a result of the realignment.

18 CUMULATIVE EFFECTS

18.1 INTRODUCTION

18.1.1. The following chapter presents the assessment of the effects on each environmental and social resource receptor, where cumulative effects may occur as a result of the construction and operation of the re-alignment in combination with other planned projects.

18.1.2. The cumulative effects of the original alignment of the Project was assessed as part of the original ESIA. This chapter assesses the anticipated cumulative effects of the Project with the proposed realignment (detailed in **Chapter 1: Introduction** of this **ESIA Addendum**).

18.1.3. As assessed in the original **ESIA**, transboundary effects[6] are not anticipated and have therefore not been considered in the assessment.

18.1.4. For the purposes of the **ESIA** and this **ESIA Addendum**, the following types of cumulative effects have been considered in accordance with the EIA Regulations 2017 and best practice guidance:

- Intra-project combined effects – the interaction and combination of different environmental effects from within the Project affecting a receptor; and
- Inter-project cumulative effects – the combined effects of the Project and other projects on a receptor.

18.2 REVIEW OF CUMULATIVE SCHEMES

18.2.1. The identified past, present and reasonably likely to occur projects in the area of the Project with the potential to give rise to cumulative effects (known as ‘cumulative schemes’) are as follows:

- Kichevo - Lin Railway (which is under construction);
- Kichevo – Gostivar Railway (which is planned for modernisation);
- A2 Motorway, subsection Gorna Gjonovica - Bukojchani (Phase 3), the section of A2 Motorway immediately to the north of the Project; and
- National Gasification System in Macedonia, section 5: Skopje-Gostivar-Kichevo.

18.2.2. Following a review, no additional projects have been identified requiring assessment of cumulative effects due to the realignment.

[6] Transboundary effects are those effects of the Project that may affect receptors located outside the territory of the Republic of North Macedonia.

18.3 METHODOLOGY FOR CUMULATIVE ASSESSMENT

18.3.1. For the intra-project assessment, the methodology used is consistent with that identified in **Chapter 21: Cumulative Effects** of the **ESIA**.

18.3.2. The methodology used in this **ESIA Addendum** in the Inter-Project Assessment has been based on past project experience and professional judgement.

18.4 INTRA-PROJECT CUMULATIVE EFFECTS

18.4.1. There is the potential for groups of receptors (known as 'common receptors') to be affected by multiple affects from the Project. This may result in several non-significant effects cumulating into a significant effect.

18.4.2. The realignment has moved the Project closer to a school which has therefore been recognised as an additional receptor. Where impacts and associated effects have changed due to the realignment or the intra-project effect significance has changed these are summarised in **Table 18-1** and **Table 18-2**. All other intra-project effects remain as reported in **Chapter 21: Cumulative Effects** of the **ESIA.**

Table 18-1 - Residual Intra-Project effects - Construction

Receptor / Topic	Air Quality	Ground-water	Surface Water	Geology and Soils	Noise and Vibration	Biodiversity	Landscape and Visual	Social	Property and Livelihood	Cultural Heritage	Intra-Project effect
Fauna and habitats	NS				NS	NS	NS				Minor Adverse (not significant)
Residents of Dolno Strogomishte and visitors to the cemetery	NS				NS		S	NS	NS		Moderate Adverse (not significant) - Due to visual impacts
Residents on or directly adjacent to the Project	NS				NS		S	NS	NS		Moderate Adverse (not significant) - Due to visual impacts
Users of the school	NS				NS			NS			Moderate Adverse (not significant)

Key: NS = not significant (negligible to minor); S = significant (moderate and above)

Table 18-2 - Residual Intra-Project effects - Operation

Receptor/ Topic	Air Quality	Groundwater	Surface Water	Geology and Soils	Noise and Vibration	Biodiversity	Landscape	Social	Property and Livelihood	Cultural Heritage	Intra-Project effect
Residents of Dolno Strogomishte and visitors to the cemetery	NS				NS		NS		NS		Minor Adverse (not significant) – Due to visual impacts
Residents on or directly adjacent to the Project	NS				NS		S				Moderate Adverse (not significant) – Due to visual impacts
Users of the school	NS				NS			NS			Minor (not significant)

Key: NS = not significant (negligible to minor); S = significant (moderate and above)

18.5 INTER-PROJECT CUMULATIVE EFFECTS

18.5.1. The inter-project cumulative assessment for cultural heritage has been reviewed in response to the realignment moving the Project approximately 350m further west from the Dolno Strogomishte cemetery. The reviewed assessment is provided below.

18.5.2. All other inter-project cumulative effects remain as reported within **Chapter 21: Cumulative Effects** of the **ESIA**.

CULTURAL HERITAGE

18.5.3. During the construction stage, the Kichevo – Lin Railway, the modernisation of the Kichevo – Gostivar Railway, the A2 Motorway Sub-Section Gorna Gjonovica – Bukojchani (Phase 3), and the Project are anticipated to have a cumulative effect on cultural heritage. Considering the realignment, the following cumulative effects are anticipated:

- Disturbance at cemeteries and memorials, excluding the Dolno Strogomishte Cemetery – **Minor Adverse (not significant)** and will be local in nature;
- Potential loss or partial damage to undiscovered below-ground heritage assets – **Minor Adverse (not significant)** and will be local in nature; and
- The effects to the Dolno Strogomishte Cemetery – **Negligible (not significant)**.

18.5.4. During the operational stage, the following cumulative effects are anticipated:

- Effects to the Dolno Strogomishte Cemetery – **Negligible (not significant)**; and
- Effects to the setting of the Albanian Mother Memorial – **Negligible (not significant)**.

19 SUMMARY

19.1.1. **Table 20-1** below presents a summary of residual effects for the entire Project following consideration of the realignment.

Table 19-1 – Summary of Residual Effects

Topic	Phase	Potential Impacts	Effect (without mitigation)	Additional Mitigation Measures	Residual Effect
Air Quality	Construction	Construction Emissions	Moderate adverse (significant)	None	Slight adverse (not significant)
	Operation	Traffic Emissions	Slight beneficial (not significant)	None	Neutral (not significant)
Climate: Greenhouse Gas	Construction	Construction Emissions	Minor (significant)	None	Minor adverse (significant)
	Operation	Operational Emissions	Minor Significant	None	Minor adverse (significant)
Climate: Resilience	Construction	Heatstroke leading to delays		None	Minor Adverse (Not Significant)
	Operation	Drying out and cracking of substrate leading to damage to pavement	Moderate Adverse	None	Minor Adverse (Not Significant)
		Drying out and cracking of substrate leading to damage to pavement	Moderate Adverse	None	Minor Adverse (Not Significant)

		Die-off of vegetation leading to slope destabilisation	Moderate Adverse	None	Minor Adverse (Not Significant)
		Deformation of pavement	Moderate Adverse	None	Minor Adverse (Not Significant)
		Melting of pavement	Moderate Adverse	None	Minor Adverse (Not Significant)
		Drying out and cracking of substrate leading to damage to foundations	Moderate Adverse	None	Minor Adverse (Not Significant)
		Increase in expansion leading to structural damage	Moderate Adverse	None	Minor Adverse (Not Significant)
		Increase in earth pressure for bridge foundations	Moderate Adverse	None	Minor Adverse (Not Significant)
		Increase in wind loading leading to destabilisation	Moderate Adverse	None	Minor Adverse (Not Significant)
		Drying out of soils and cracking of materials in the tunnel	Moderate Adverse	None	Minor Adverse (Not Significant)
		Overheating in the tunnel	Minor Adverse	None	Minor Adverse (Not Significant)
Groundwater	Construction	Alteration of groundwater flows	Moderate adverse (significant)	None	Slight adverse (not significant)
		Alteration of groundwater quality due to input of pollutants	Moderate adverse (significant)	None	Slight adverse (not significant)

	Operation	Alteration of groundwater quality due to input of pollutants	Moderate adverse (significant)	None	Slight adverse (not significant)
Surface Water	Construction	Input of Pollutants	Moderate adverse (significant)	Flood Risk Assessment	Moderate adverse (significant)
		Alteration of river bed morphology and/or physical water quality	Moderate adverse (significant)		Moderate adverse (significant)
		Alteration of river bed and floodplain habitat ecology	Moderate (not significant)		Moderate adverse (Significant)
		Abstraction of water from surface water sources during construction	Neutral (not significant)		Neutral (not significant)
	Operation	Input of Pollutants	Moderate adverse (significant)	None	Moderate adverse (significant)
		Alteration of flow patterns and sediment deposition during flooding periods	Slight adverse (not significant)	None	Moderate adverse (significant)
Geology and Soils	Construction	Degradation of Topsoil and Made Ground Quality	Slight Adverse (not significant) to Moderate Adverse (significant)	None	Neutral (not significant)
		Soil Erosion and Compaction	Moderate Adverse (significant)	None	Slight Adverse (not significant)

		Soil Loss and Degradation (borrow pits and excavated material disposal sites)	Moderate Adverse (significant)	None	Slight Adverse (not significant)
		Loss of Fertile Topsoil	Moderate Adverse to Large Adverse (significant)	None	Slight Adverse (not significant)
		Stability and Risk of Landslides	Moderate Adverse (significant)	None	Slight Adverse (not significant)
		Excavation of Potentially Contaminated Soils and impacts to the environment, the community, and workers.	Moderate Adverse (significant) to Large Adverse (significant)	None	Slight Adverse (not significant)
		Degradation of Topsoil and Made Ground Quality	Slight Adverse (not significant).	None	Slight Adverse (not significant)
		Soil Erosion	Slight Adverse (not significant)	None	Neutral (not significant)
		Seismic Activity	Neutral (not significant)	None	Neutral (not significant)
Water Generation and Resource Efficiency	Construction	Material resource consumption	Large adverse (significant)	None	Not significant
		Waste generation and disposal	Very Large adverse (significant)	None	Not significant
Noise and Vibration	Construction	Noise emissions from construction vehicles and machinery	Large (significant)	None	Moderate adverse (not significant)

	Operation	Traffic noise emission	Large (significant)	Low noise road surfacing with a noise level reduction of at least 2.5dB to be installed between chainage 1+750 and 2+500 to mitigate potential noise effects at a nearby school	Moderate adverse (not significant)
Biodiversity	Construction	Loss of Habitats	Moderate adverse (significant)	None	Neutral to Slight positive (not significant)
		Breeding cycle interruption	Slight adverse (significant)	None	Neutral (not significant)
		Alteration, disruption or destruction of habitats	Up to major adverse (significant)	None	Neutral (not significant)
		Disturbance due to construction activities	Slight adverse (significant)	None	Neutral (not significant)
	Operation	Loss of habitats	Slight adverse (not significant)	None	Neutral (not significant)
		Protected and designated areas	Neutral	None	Neutral (not significant)
		Bio-corridors	Neutral	None	Neutral (not significant)
Landscape and Visual	Construction	Landscape	Moderate Adverse (significant)	Height of the embankment should be softened using native planting. The slope should be no greater than 1:3 to allow access for planting and maintenance	Slight Adverse (not significant)

		Visual	Slight Adverse (not significant) to Very Large Adverse (significant)	None	Slight Adverse (not significant)
	Operation	Landscape	Slight Adverse (not significant) to Moderate Adverse (significant)	None	Slight Adverse (not significant)
		Visual	Neutral (not significant) to Very Large Adverse (significant)	None	Slight Adverse (not significant)
Social and Community	Construction	Construction community cohesion and Wellbeing	Moderate adverse (significant) to large adverse (significant)	None	Slight adverse (not significant)
		Construction related local community health and accidents	Moderate adverse (significant) to large adverse (significant)	None	Slight adverse (not significant)
		Construction traffic	Large adverse (significant)	None	Slight adverse (not significant)
		Access to education facilities, social welfare support facilities and healthcare facilities	Large adverse (significant)	None	Slight adverse (not significant)
	Operational	Operational community cohesion and wellbeing	Slight adverse (not significant) or moderate adverse (significant)	None	Neutral (not significant)

		Operational local community incidents and accidents	Moderate or large beneficial	None	Large beneficial (significant)
Occupational Health, Safety and Security	Construction	Construction Workers employment rights and working conditions	Moderate Adverse (significant)	None	Slight Adverse (not significant)
		Employment of Construction Workers (HSE management on site and HSE training among workers)	Large Adverse (significant) or Very Large Adverse (significant)	None	Slight Adverse (not significant)
		Construction Worker Incidents and Accidents (Labour and Working Conditions)	Moderate or Large Adverse (significant)	None	Slight Adverse (not significant)
		Construction Workers' Accommodation (HSE management on site and HSE training among workers)	Slight Adverse (not significant) or Moderate Adverse (significant)	None	Slight Adverse (not significant)
	Operation	Subsequent Employment of Construction Workers	Minor to Moderate Beneficial	None	Moderate Beneficial
Property and Livelihood	Construction	Access to Rural Settlements, Land and Property	Moderate or Large Adverse (significant)	None	Slight Adverse (not significant)
		Utilities Provision	Slight Adverse (not significant) or Moderate Adverse (significant)	None	Slight Adverse (not significant)

		Deterioration of Local Roads	Moderate Adverse (significant)	None	Slight Adverse (not significant)
		Physical Displacement/Resettlement	Moderate Adverse (significant)	None	Slight Adverse (not significant)
		Loss of Agricultural Land	Moderate Adverse (significant)	None	Slight Adverse (not significant)
		Foraging of plants and Fungi	Slight Adverse (significant)	None	Slight Adverse (not significant)
		Construction Employment and Economic Growth	Moderate Beneficial	None	Large Beneficial
	Operational	Employment and Economic Growth	Moderate Beneficial	None	Moderate beneficial
Cultural Heritage	Construction	Disturbance at cemeteries	Moderate or Large Adverse (significant)	None	Slight adverse (not significant)
		Works in Dolno Strogomishte Cemetery	Variant 0 Moderate or Large Adverse (significant)	None	Slight adverse (not significant)
		Potential Loss of Partial Damage to Undiscovered Below-Ground Heritage Assets	Moderate or Large Adverse (significant)	None	Slight adverse (not significant)
	Operation	Improved Setting to the Albanian Mother Memorial	Slight Beneficial (not significant)	None	Slight adverse (not significant)

		Setting of the Cemetery at Dolno Strogomishte	Large Adverse (significant)	None	Slight beneficial (not significant)

20 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

20.1 OBJECTIVES, STRUCTURE AND CONTENT

20.1.1. The objectives of the Environmental and Social Management Plan (ESMP), including the Monitoring Plan, are:

- To ensure project components are conducted in compliance with the national laws and regulations as well as the requirements of the European Bank for Reconstruction and Development (EBRD) (the Lenders);
- To measure the success of proposed mitigation measures in minimising and/or reducing potential environmental, health, safety and social impacts;
- To control the changes to baseline environmental, health, safety and social conditions during pre-construction, construction and operation activities;
- To facilitate a continual review of activities based on performance data and consultation feedback; and
- To implement corrective actions or new adaptive management programs, as required.

20.1.2. The ESMP sets out the measures required during the two development phases of the project:

- Pre-construction and construction; and
- Operation, including an Environmental and Social Monitoring Plan.

20.1.3. The ESMP sets out:

- The environmental aspects that need to be managed;
- Proposed mitigation measures;
- Responsibilities for implementing and monitoring the measures;
- Targets and / or indicators of success; and
- Estimated costs (where appropriate).

20.1.4. The PESR will undertake public disclosure of the ESIA Addendum, and the following updated documents: LAF, SEP, ESAP and Non-Technical Summary (NTS) for the ESIA. These documents will be available in the following languages:

- Updated LAF – Macedonian, English and Albanian;
- Updated NTS – Macedonian, English and Albanian;
- Updated SEP – Macedonian, English and Albanian;
- Updated ESAP – Macedonian, English and Albanian;
- Updated ESMP – Macedonian and English; and
- ESIA Addendum – Macedonian and English.

20.2 LENDER REQUIREMENTS

20.2.1. This ESMP has been developed in accordance with all the Lenders' requirements. The Construction Environmental and Social Management Plan (CESMP) and sub-plans set out in this ESMP, will be developed by the Contractor in accordance with the relevant Lenders' requirements, at a contract level.

20.2.2. The Lenders' requirements are described below.

20.2.3. EBRD – Performance Requirements (PRs):

- **PR 1: Assessment and Management of Environmental and Social Impacts and Issues**
  - Establishes the importance of integrated assessment to identify project-specific environmental and social impacts and the requirement to implement an Environmental and Social Management System (ESMS) to effectively manage these impacts.
- **PR 2: Labour and Working Conditions**
  - Outlines the need to respect and protect the fundamental principles and rights of workers.
- **PR 3: Resource Efficiency and Pollution Prevention and Control**
  - Sets out how resource efficiency and pollution prevention and control are essential elements of environmental and social sustainability and that projects must meet Good International Practice (GIP).
- **PR 4: Health and Safety**
  - Outlines the need to protect and promote the health and safety of workers by ensuring healthy and safe working conditions and requires the implementation a project-specific health and safety management system.
- **PR 5: Land Acquisition, Involuntary Resettlement and Economic Displacement**
  - Recognises the need to avoid, or when unavoidable, minimise involuntary resettlement by exploring alternative project designs. This PR also outlines the need to minimise adverse social and economic impacts from land acquisition or restrictions on affected persons' use of and access to assets and land.
- **PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**
  - To project and conserve biodiversity using a precautionary approach, implementing the mitigation hierarchy and promoting GIP.
- **PR 8: Cultural Heritage**
  - Recognises the importance of cultural heritage for present and future generations. The aim is to protect cultural heritage and to guide clients in avoiding or mitigating adverse impacts on cultural heritage in the course of their business operations.
- **PR 10: Information Disclosure and Stakeholder Engagement**
  - Recognises the importance of open and transparent engagement between the client and their stakeholders, in particular local communities directly affected by the project.

20.2.4. PR 7 (Indigenous Peoples) and PR 9 (Financial Intermediaries) are not applicable to this project.

20.3 ROLES AND RESPONSIBILITIES

20.3.1. The following roles and responsibilities have been established for implementation and management of this ESMP.

THE EBRD

20.3.2. The EBRD are financing but not directly developing the Project. Responsibility is therefore passed to the Project Owner, although reports will be required to be submitted to the EBRD on the status of the ESAP, resolution of grievances and EHSS performance of the project.

PUBLIC ENTERPRISE FOR STATE ROADS (PESR)

20.3.3. The PESR will have ultimate responsibility for the project and will oversee the implementation of the EBRD project requirements during construction and operation, overseeing the contractor, subcontractors and other involved third parties. They will be responsible for creating a Project Implementation Unit.

PROJECT IMPLEMENTATION UNIT (PIU)

20.3.4. The PESR will establish a project implementation unit (PIU) to assist the PESR in implementing the Project in compliance with the EBRD Environmental and Social Policy.

20.3.5. The PIU, as Project Implementing Authority (IA) will be responsible for ensuring the implementation of all national and international environmental, health, safety and social policies, guidelines and performance requirements of both the Republic of North Macedonia and the EBRD.

20.3.6. The PIU will be responsible for the overall implementation of the mitigation measures and requirements, specified within the disclosure package for the Project, and implementing the Environmental and Social Management System (ESMS). They will be required to oversee the implementation of the Contractors CESMP, which will be developed by the contractor to ensure they fulfil all the identified environmental, health, safety and social requirements under the loan agreement for the Project. The PIU are responsible for ensuring roles and responsibilities are clearly identified and allocated for environmental, health, safety and social (including gender), both within the PIU itself and within the contractors' arrangements, including sub-contractors and contracted organisations. The PESR will appoint a Supervising Engineer to supervise the Contractor.

20.3.7. In relation to land acquisition and resettlement, the PIU will be responsible for the full implementation of the Land Acquisition Plan (LAP) following approval by the EBRD and the Government of North Macedonia. In addition, the PIU will be responsible for the implementation and conformance of the grievance mechanism (GM) to ensure that all grievances and/or objections (if any raised by the local community and/or workers) are received, acknowledged and addressed as per the grievance procedure presented in the Stakeholder Engagement Plan (SEP) and LAP.

20.3.8. The PIU shall appoint a Community Liaison Officer (CLO) to manage consultations and implement the developed SEP. The PIU will be responsible for reviewing the licence, permit and agreement documentation prepared by the Contractor.

SUPERVISING ENGINEER

20.3.9. The Supervising Engineer will be responsible for supervising the Contractor to ensure that recommendations and requirements, as set out in this ESMP and other documentation are applied. They will be responsible for continuous monitoring of the processes and activities undertaken by the Contractor, and specifying measures to be implemented by the Contractor, to address any areas of non-compliance. This requirement will be included in Tender Documents.

LENDERS TECHNICAL ADVISOR

20.3.10. The EBRD will appoint a Technical Advisor who will be responsible for reviewing documentation on behalf of the lender, and who will monitor the Contractor's implementation of the activities specified in the ESMP on a quarterly basis. They will be responsible for providing a monitoring report to the Lenders that evaluates compliance with both the ESMP and Lenders requirements and provides recommendations to the Supervising Engineer and Contractor to address any areas of non-compliance.

CONTRACTOR

20.3.11. The Contractor will be responsible for implementing the construction phase measures in the ESMP.

20.3.12. The Contractor will also be responsible for implementing any environmental, health, safety and social measures identified in the ESIA, that the PIU has developed for submission to the Ministry of Environment and Physical Planning (MOEPP).

20.3.13. The Contractor will be responsible for submission of relevant reports to the Supervising Engineer, for subsequent approval by the Supervising Engineer, PIU/PESR, EBRD and/or the MOEPP, as appropriate.

20.3.14. The Contractor will be responsible for appointing technical specialists to ensure environmental and social mitigation is implemented correctly, in line with best practice and national and international requirements. Specialists include:

- Environmental Engineer – responsible for ensuring that mitigation is implemented as per this ESMP. They will be suitably competent, have a knowledge of ecological issues, and have a strong understanding of environmental best practice.
- Health and Safety Officer – responsible for undertaking health and safety tasks as set out in the Contract and ESMP.
- Other social, safety, environmental and/or specialists may be engaged to provide support as necessary.

20.3.15. The Contractor will be responsible for preparing the licence, permit and agreement documentation.

20.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM (ESMS)

20.4.1. PESR shall prepare an overarching ESMS for this project. The ESMS will be submitted to PESR Management for approval. The key Environmental and Social covenants will be set out in the tender documents, during the Contractor selection process, for inclusion in the Contractor ESMS.

20.4.2. The Contractor will be responsible for implementing an ESMS that is in line with International Standards, lender requirements, and the PESR's ESMS. The Contractor will be required to appoint appropriately qualified specialists with the following expertise, to ensure is the ESMS is implemented to the required standards:

- Environmental;
- Health and safety;
- Social; and
- Land acquisition and resettlement.

20.4.3. The Contractor must conduct an initial safety induction course for construction workers regarding: health and safety measures; and emergency response in case of accidents, fire, earthquakes, landslides, flash flooding, environmental and community interactions, etc. They must also develop and implement a safety and security training program and conduct safety meetings on a monthly basis.

20.5 CONSTRUCTION ACTIVITIES

Table 20-1 - ESMP: Pre-construction and Construction Stage

Ref	Environmental or Social Aspect/Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator / EBRD Performance Requirement
			Implementation	Monitoring	
PESR Environmental & Social Management Activities					
P1	Development of an Environmental and Social Management System (ESMS) by PESR.	The PIU in the PESR, with additional expertise, if required, will implement an ESMS to international standards.	Preparation: PIU in the PESR/ the PESR. Approval: Senior Management of the PESR.	PESR: To report to the EBRD in monthly environmental, social, health and safety (ESHS) reports.	ESMS audited and approved. EBRD Performance Requirement: PR1, PR2, PR3, PR4, PR5, PR6, PR8 and PR10
P3	Environmental, Health, Safety and Social Incident Reporting Procedure.	Set-up, maintain and continually review an Environmental, Health, Safety and Social (EHSS) Incident Reporting Procedure (or equivalent) to ensure accidents and incidents are accurately recorded, maintained and reported. The procedure must be fully integrated into the Project and communicated to the contractors, who will have clearly specified responsibilities.	Preparation: PIU in the PESR/ the PESR. Approval: Senior Management of the PESR.	PESR: To report to the EBRD in the monthly ESHS Report. This will include details on working-hours and accidents / incidents including near misses. Non-compliance to the remedied by Senior Management of the PESR.	Requirements for an Incident Reporting Procedure in tender documents for Contractor. EBRD Performance Requirement: PR1
P4	Disclosure of Project information and community	Elaborate and implement the Stakeholder Engagement Plan (SEP) and Supplementary	PESR / PIU	PESR: To report to the EBRD in the monthly ESHS Report. This will	SEP elaborated prior to the tender process for the Contractor.

	consultation through Stakeholder Engagement Plan (SEP)	SEP[7]. Together with Contractor(s), organise regular consultation activities with local communities, regularly notifying them about any expected significant or noisy works and the dates and timing of such works' implementation (through local authorities and also through posters displayed in key locations). The PESR/ social consultants on behalf of the PESR will undertake the following process: ■ Confirm the relevant Regulating and Permitting Bodies; ■ Engagement with the Relevant Authorities and Organisations; ■ Relationship Mapping; ■ Public Consultation; and ■ Baseline Data Collection. A Community Liaison Officer (CLO) will be appointed by PESR (within the PIU) as specified in 3.4.5. Further details on CLO's role and responsibilities can be found in the SEP. Update SEP quarterly throughout the Project as per PR10. A separate and ongoing engagement process should be established with the local Roma		include details on the implementation of the SEP and GM. Non-compliance to the remedied by Senior Management of the PESR.	CLO appointed prior to the commencement of construction. EBRD Performance Requirement: PR10

[7] Full details of the activities undertaken during the disclosure period are provided in the SEP and Supplementary Stakeholder Engagement Plan (SEP). This Supplementary SEP details the engagement activities undertaken with stakeholders in light of the COVID-19 restrictions in place during the 120-day disclosure period.

		community (near Pevci), as detailed in the SEP. The local Roma community meetings should be chaired by Roma-community representatives and attended by the PESR team and the design team. The use of ROMACTED and/or Roma Democratic Development Association (RDDA) as facilitators during the meetings is recommended to respect cultural norms and the language requirements. Affected individuals (those Roma families who can be subject to land acquisition and involuntary resettlement) should be consulted directly via their representatives or either ROMACTED The Kichevo Roma Social Housing Programme or RDDA.			
P5	Grievance Mechanisms (GM)	Prior to start of works, the PESR shall: Establish and communicate to local communities and workers, in both Macedonian and Albanian languages a GM and relevant contact details, as described in the ESIA and SEP. The PESR will set-up and publicise a hotline / email service for grievances and feedback (to operate during working-hours throughout the construction period). Ensure that GM email addresses, telephone number details, genders and other relevant GM details of the PESR and contractors are placed on the notice boards outside the construction site.	PESR / PIU	PESR/ PIU: To report to the EBRD in the monthly ESHS Report. Non-compliance to the remedied by Senior Management of the PESR.	GM Established prior to the start of work. Implement a hotline requirement in tender documents for Contractor to establish. PESR to check that Notice boards with relevant GM details are located at construction sites, prior to the start of works and quarterly. EBRD Performance Requirement: PR10

P6	Land Acquisition Plan (LAP)	Prior to construction, the PESR will develop a Land Acquisition Plan (LAP) which should be aligned with the already prepared Land Acquisition Framework (LAF). The LAP should cover the route alignment, the access roads to the Project, and the planned construction access roads, and should be implemented before any Project related land take and restrictions to accessing livelihoods takes place. No access to private properties will take place before due compensation is agreed and paid to project affected people. The process for preparing the LAP process is set out in the LAF. The LAP will be supported by a Guide to Land Acquisition and Compensation (GLAC). The GLAC will be a summary of the LAP that will be implemented by PESR. For consultations on Land Acquisition, see Section 8 in the LAF. Arrange for the independent completion of an audit of the land acquisition and compensation process, in line with LAF, national legislation and Lenders' requirements. Auditors will be appropriately trained in land acquisition in line with International Financial Institutions (IFIs) requirements.	PESR will prepare LAP and their Contractor will implement LAP. Independent auditor – the auditors will be appropriately trained in land acquisition in line with IFI requirements. The audit will be commissioned by the PESR and will be complete both prior to the start of Land Acquisition activities and after the activities have taken place.	PESR: PESR to report to the EBRD in the monthly ESHS Report. Survey reports. LAP social monitoring indicators. Consultation meetings. Non-compliance to the remedied by Senior Management of the PESR.	LAP is prepared in compliance with the process in the LAF, prior to the commencement of construction. LAP is disclosed and project affected people are consulted on the LAP and its implementation. Independent audit demonstrates compliance. EBRD Performance Requirement: PR5
P7	Biodiversity Management Plan Including:	The BMP (Land Restoration Plan) prepared by the PESR will include: habitat replacement activities; specify the type of species; and the specific locations for replacement. This information should also be included in the Bill	The PESR will prepare the BMP, which will be implemented and elaborated by their Contractor.	PESR to report to the EBRD in the monthly ESHS Report.	Biodiversity Management Plan

	▪ Woodland Clearance Plan ▪ Land Restoration Plan	of Quantities and tender documentation for the Contractor. It will also set out the measures that the PESR will ensure are included in the detailed design. The PESR will include the BMP in the tender documentation, and the Contractor will be required to elaborate prior to commencing construction, with the measures detailed in C13. Habitat replacement activities. The habitat replacement requirements are as follows (minimum requirements): ▪ 17.31ha of Italian and Turkey oak forests; ▪ 4.92ha of riparian black alder belts and woodland; ▪ 0.92ha of riparian willow belts; and ▪ 0.85ha of meadow. These figures will be recalculated on the final detailed design for the Project. If any additional habitat is required for the Project, the area of replacement habitat will need to be recalculated using the same replacement ratios used in the ESIA and ESIA Addendum, namely at least like-for-like replacement for PBF habitat losses and a net gain for CH (ratio 2:1). Once the habitat replacement requirements are defined the location will need to be identified. These locations will be as close as feasibly possible to where it is lost, and within and around the Ecologically Appropriate Area of Analysis (EAA). The EAAs are identified in Figure 15-9 of Chapter 15 – Biodiversity of the ESIA.			Bill of Quantities with habitat replacement included EBRD Performance Requirement: PR6

		The land required for replanting will be secured by the PESR, and will be maintained as the specified habitat type in the long-term (i.e. for the lifetime of the Project), through commitments secured from the landowners by PESR The materials required for habitat replacement will be included in Bill of Quantities. Plant stock should be locally sourced, where possible, to maintain genetic identity of local communities. Recommended trees for revegetation are the following ones: *Quercus frainetto, Q. cerris, Carpinus betulus, Pyrus amygdaliformis, Acer pseudoplatanus, A. campestre, Crataegus monogyna, Ulmus minor, Prunus spinosa, Alnus glutinosa, Salix alba, S. fragilis* etc. Measures to be included in the detailed design include: ■ The design of the bridge and box and pipe culverts will provide for connectivity of habitats and will not create obstacles for migration of animal species. ■ Box and pipe culverts will: • Be adapted to facilitate the passage of small animals. • Be embedded into the streambed to at least 20% of the culvert height at the downstream invert. • Be used only on "flat" streambeds (slopes no steeper than 3%).			

		• Have openings with at least 1.25 times the width of the stream channel bed. This width is measured bank to bank at the ordinary high-water level or edges of terrestrial, rooted vegetation. • Ensure that water depths and velocities at low flows, are the same as they are in natural areas upstream and downstream of the crossing. • Use natural substrate within the crossing, matching the upstream and downstream substrates; the substrate should resist displacement during floods and should be designed so that appropriate material is maintained during normal flows. ▪ The bridges and viaduct will be designed and constructed to cause the least disturbance of the waterway and banks. ▪ Retention basins or grassed filter zones will be constructed to trap sediments and other contaminants and remove them, before the water is then discharged at the road drain discharge points, so as to reduce the pollution risk to the water bodies they will discharge to. The retention basins will be located outside areas of high biodiversity sensitivity. ▪ Disturbed areas not occupied by permanent structures will be reinstated by shaping the terrain to that of the surrounding land morphology and revegetating with plant species appropriate to the surrounding area.			

		Separate documents on slope stabilisation and erosion control shall be developed. The mitigation measures to minimise the effect of fragmentation mainly consist of the establishment of enough wildlife crossings to increase the permeability of the Project alignment as follows: ■ Afforestation activities to be performed in line with the No Net Loss principle, i.e. the Land Restoration Plan. Riparian vegetation along the streams of Zajaska Reka, Strogomishka Reka, Sushica and Rechishte to be restored to achieve No Net Loss. ■ The undersides of bridges and viaduct will be vegetated so as to create vegetal screens that hide the bridges and viaduct structure (e.g. shrubs and small trees in the area of the abutments). ■ Fenced areas will be vegetated with native plant species that are attractive to local fauna and with plantation patterns designed to lead the animals towards the wildlife crossings. The BMP will provide sufficient detail such that mitigation measures are clear and deliverable and a monitoring programme that can report back on the efficacy of measures described. The BMP should include mechanisms for adaptive management such that mitigation can be tweaked to achieve the desired results if it is demonstrated that it is not effective at any point.			

Contractor Environmental and Social Management Activities					
C1	Development of a Contractor Construction Environmental and Social Management Plan (CESMP).	The Contractor will prepare a Construction Environmental and Social Management Plan (CESMP), which must be aligned with the over-arching PESR PIU ESMS and the Contractor's ESMS. The CESMP will be submitted to the Supervising Engineer and PIU for approval at least 30 days before taking possession of any work site. **No access to the site will be allowed until the CESMP is approved by the Supervising Engineer and the PIU.** New topic specific or site specific ESMPs may also need to be developed by the Contractor during the construction phase. These new plans will also need to be approved by the Supervising Engineer and the PIU. The CESMP will include a **Design Change and Management Procedure (DCMP)**. Any changes that occur to the project following the completion of the ESIA and development of the ESMP will require review by the Supervising Engineer and PESR. The DCMP will record the changes that have been considered and will set out a screening methodology in line with best practice and will outline any changes required to the environmental and social mitigation. The DCMP will include the provision for public disclosure for any material changes. As part of the CESMP, the Contractor will need to liaise with the contractors of any adjacent construction projects (with the	Preparation: Contractor's Environmental and Social Experts Approval: Supervising Engineer for PESR	The Contractor will prepare monthly reports for the PESR on the status of the CESMP and environmental, social, health and safety performance. The PESR / Supervising Engineer will prepare the monthly ESHS reports for the EBRD, drawing on the Contractors monthly reports.	Contractor's CESMP approved by PESR (PIU) / Supervising Engineer. Design Change and Management Procedure implemented and approved by PESR (PIU) / Supervising Engineer. EBRD Performance Requirement: PR1, PR3, PR4 and PR10

		support of the PESR, if required), to reduce the potential for cumulative effects. Key consideration should be made in relation to borrow pits, depot areas, noise and air quality.			
C2	Development of sub-plans as part of the Contractor's CESMP	Prior to start of site works and as part of CESMP, the Contractor shall prepare the following sub-plans in line with the EBRD requirements and national legislation, this ESMP and the PESR's over-arching ESMS (further details for these plans are provided in section (C6 to C26): ■ Waste and Materials Management Plan (WMMP) Asbestos Disposal Management Plan[8]. ■ Soil Management Plan, including Spoil Disposal Plan. ■ Water Resources Management Plan, including Ground Water Management and Wastewater Management. ■ Air Quality Management Plan (AQMP), including Air Quality Control Plan for the tunnel. ■ Noise and Vibration Management Plan (NVMP), including Pre-Commencement Condition Surveys.	Preparation: Contractor Approval: Supervising Engineer and PESR / PIU	Supervising Engineer / PESR and Ministry of Environment and Physical Planning (MoEPP) (where appropriate). The Contractor will prepare monthly reports for the PESR on the status of the CESMP, sub-plans, and environmental, social, health and safety performance. The PESR / Supervising Engineer will prepare the monthly ESHS reports for the EBRD, drawing on the Contractors monthly report.	Plans approved as part of the Contractor's CESMP by relevant parties. EBRD Performance Requirement: PR 1, PR2, PR3, PR4, PR6 and PR8

[8] No Asbestos will be used to construct the project, in compliance with EBRD requirements. Any asbestos that is found during the project will be managed in accordance with the Asbestos Disposal Management Plan.

		▪ Cultural Heritage Management Plan, including Chance Find Procedure. ▪ Biodiversity Management Plan (BMP), including Woodland Clearance Plan and Land Restoration Plan. ▪ Landscape and Visual Management Plan. ▪ Flood Risk Assessment. ▪ Foundation Risk Assessment. ▪ Piling Risk Assessment. ▪ Stakeholder Engagement Plan, including GMs. ▪ Code of Conduct (CoC) for Workers. ▪ Community Health, Safety and Security Plan including Community Access and Infrastructure Plan. ▪ Labour and Working Conditions Management Plan (LWCMP), including Local Employment and Procurement Plan (LEPP). ▪ Construction Traffic Management Plan (CTMP). ▪ Occupational Health and Safety Plan, including specific measures for the construction of bridges, the viaduct and the tunnel. ▪ Emergency Response Plan, including measures for: Natural Disaster Response, Tunnel Emergency Response Plan and Spill Management. ▪ Construction Workers' Accommodation Management Plan. ▪ Construction plans and Method Statements covering: Bridge Construction, Viaduct Construction, Tunnel Construction, Tunnel Handover Plan,			

		Slope Stabilisation Plan, and Blasting Management Plan. ■ Method Statements for Temporary Activities, including: Storage Areas, Watercourse Crossings, Storage and Access Roads. ■ The Contractor will also implement the measures defined in the LAP, prepared by PESR, including measures pertaining to temporary land use impacts and any requirements that relate to local cemeteries. ■ Blasting Management Plan.			
C3	Obtaining licences, permits and agreement (Section 3.3.3 of Chapter 3 of the ESIA)	■ All necessary licences and permits in relation to environment, safety and labour must be obtained prior to starting the activity that they apply to. ■ A database tracking all permits and consents shall be developed and maintained by the Contractor and be visible to the Engineer and PESR (PIU). ■ Maximum allowable concentration of substances discharged into the surface water body must be agreed with (approved by) the MoEPP (where relevant). ■ Volume of water abstraction, and sources, must be agreed with the MoEPP (where relevant). ■ Prior to commencement of works, agreement(s) with company/companies authorized for management of hazardous waste must be signed. If none are available, measures for the selection of suitable sites, and processes for the safe	Implementation: Contractor Approval: PESR, MoEPP or other relevant authority/ies	PESR, MoEPP, other authority/ies Information included in monthly ESHS reports to the EBRD.	Copies of licences, permits and agreements. EBRD Performance Requirement: PR1, PR3, PR4, PR5 and PR6

		disposal of hazardous waste must be set out and implemented. For disposal of non-hazardous domestic waste, agreement with a solid Waste Management Company must be signed.			
C4	Labour and Working Conditions Management Plan (LWCMP) Including: Local Employment and Procurement Plan (LEPP)	The Labour and Working Conditions Management Plan (LWCMP) should be prepared by the Contractor in line with EBRD PR2. The plan will ensure that child labour or forced labour are not permitted. Workers conditions and benefits, including; working hours, minimum wage, minimum age, freedom of collective bargaining and equality and non-discrimination will be outlined. The Contractor will conduct induction training for all workers prior to the start of civil works in a format easily understood by the workforce. The workforce induction and documentation should specifically include: worker rights and responsibilities, including the worker grievance procedure, cultural context induction, and interaction / engagement with community members. The induction needs to apply for all workers (anyone working on the project site). The above measures will be secured through contractual mechanisms and measures in the Contractor's CESMP, which will be approved by the Engineer and PESR. The LWCMP will align with the GM.	Contractor(s) Contractor Code of Conduct Labour audit. Complaints log. Worker's Training Register The Supervising Engineer / PESR will undertake a labour audit during the first month of the construction phase to confirm compliance with National Labour regulations.	Safety induction completed. Contractor's hotline / email service for workers' complaints. PESR hotline / email service (during working hours throughout the construction period) Regular training provided. No findings in the labour audit. Information included in monthly ESHS reports to the EBRD.	GM established. Macedonian Labour Laws. International Labour Organisation (ILO) requirements. EBRD Performance Requirement: PR2

		The Contractor will supply and / or employ workers with appropriate skills / competencies and qualifications. On completion of the works, construction workers must be supplied with a reference/ confirmation of employment letter and a skills/ training log, to enhance their employment prospects.			
C5	Sub-contractors	The Contractor shall ensure that: ▪ Provisions will be incorporated into all subcontracts to ensure the compliance with lender requirements, Macedonian legislation and the CESMP and its associated sub-plans at all tiers of the sub-contracting. ▪ All environmental, social and safety requirements for the Contractor will apply to the sub-contractors. ▪ All Project sub-contractors will be supplied with copies of the CESMP, and sub plans. ▪ All subcontractors will be required to appoint a safety representative who will be available on the Site throughout the operational period of the respective subcontract, unless the Supervising Engineer's approval for the Contractor's safety representative to undertake take this role, is given in writing. These actions will be covered in a **Supply Chain Management Plan** to be prepared by the Contractor and to be approved by the	Contractor Approval: Supervising Engineer/ PESR (PIU)	All plans and contracts approved by the relevant parties. Information – included in monthly ESHS reports to the EBRD.	Copies of sub-contractor agreements. Supply Chain Management Plan approved by PESR and reported to the EBRD. EBRD Performance Requirement: PR1, PR3 and PR4

		Supervising Engineer / PESR, to ensure compliance with EBRD PRs.			
Further details on Environmental Management Sub-Plans – as listed in Item C2 above:					
C6	Waste and Materials Management Plan (WMMP) Including: ▪ Asbestos Disposal Management Plan[9]; and ▪ Contaminated Land Management Plan.	The WMMP will set out the procedures for the delivery, logistics, storage and use for all construction materials used during construction. The plan will include: ▪ Quantities of generated waste from constructive activities; ▪ Quantities of material that is intended for re-use on embankments on local, regional roads in the area in consultation with the competent institutions (local self-governments, etc.) in the region; ▪ It may be necessary to open new disposal sites (for spoil) in addition to the three planned along the Project alignment, Disposal sites are required where topsoil / spoil is not suitable for re-use along the Project alignment. If this is required, their locations will be confirmed with the municipality of Kichevo and be in accordance with the planning	Preparation: Contractor Approval: Supervising Engineer, PESR (PIU)	PESR/ Supervising Engineer. Information – included in monthly ESHS reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP. EBRD Performance Requirement: PR1, PR2 and PR3

[9] No Asbestos will be used to construct the Project in accordance with EBRD requirements, however there is the possibility that asbestos may be encountered during site preparation, particularly as existing buildings may need to be demolished.

		requirements of the region, as well as the annual waste management programmes / plans of the municipality of Kichevo. The Contractor will undertake an assessment of environmental effects in line with national legislation and EBRD requirements. ▪ When defining the locations of the disposal sites, the geological substrate, the groundwater level and the proximity to surface watercourses will be key considerations. If disposal sites are required in the vicinity of surface watercourses, necessary measures such as lining with geosynthetic materials and drainage will be made in line with the Water Resources Management Plan. After the closure of disposal sites, they will be stabilised where required; ▪ The contractor will prepare special Elaborates (permissions) for each disposal site (the 3 included within the project and any additional ones if required) with planned capacity, and measures for regulation (for protection from heavy rainfall, protection of the ground, stability measures) as well as a plan for re-cultivation after the completed period of exploitation; ▪ Waste deposited at disposal sites will be placed and compacted so in order to be structurally stable; ▪ Spoil/ soil heaps will be vegetated to avoid erosion; ▪ Waste will be managed in accordance with legal and good practice requirements, to			

		ensure it is disposed of in an environmentally sound manner and associated environmental harmfulness is reduced as far as practicable; ■ Contractors used for the disposal of waste and the waste disposal sites must be reputable, legitimate enterprises, licenced by the relevant regulatory authorities, and operating to acceptable standards; and ■ Measures to ensure the use of hazardous substance and materials is (where practicable) avoided or justifiably minimised. Where avoidance is not possible, appropriate risk management measure will need to be implemented. ■ The WMMP will include an Asbestos Disposal Management Plan and a Contaminated Land Management Plan. No asbestos will be used to construct the Project, in accordance with EBRD requirements, however there is the possibility that asbestos may be encountered during site preparation, particularly as existing buildings may need to be demolished. ■ The contractor will develop a Soil Management Plan, including Spoil Disposal Plan for approval by the MoEPP (and Department of Forestry, if the locations affect access to woodland). The Soil Management Plan will describe how soil (earthworks) will be managed to ensure the highest value for potential re-use. The Spoil Disposal Plan will encourage re-use of material in		

		landscaping and ensure the deposit areas are suitable. ■ The Contaminated Land Management Plan will include measures for the discovery of contaminated land including measures to remove, store and disposal. Contaminated soils will be tested against international Generic Assessment Criteria (such as CL:AIRE Generic Assessment Criteria (GAC) ■ Other measures to include, but not limited to: • Keep agreements with hazardous waste management companies active. • Undertake regular collection and disposal of household waste. • Provide bins and facilities within the project site for temporary storage of domestic solid waste and construction waste. • Separate hazardous, non-hazardous and reusable waste streams. • Ensure non-hazardous/ inert waste management procedures are in place. • Train staff in waste management best practice. Regular reporting on waste and materials handling quantities and locations.			
C7	Soil Management Plan Including: Spoil Disposal Plan	The Soil Management Plan shall describe the following measures applied by the Contractor:	Preparation: Contractor Approval: Supervising Engineer, PESR (PIU)	PESR / Supervising Engineer	Plan approved as part of the CESMP by relevant parties.

		▪ Unwanted materials from topsoil such as roots of trees, rubble and waste will be removed prior to stockpiling. ▪ To ensure stability, soil stacks shall not be higher than 2m, with a slope gradient of less than 25%. Soil stacks must be placed and managed to avoid erosion and soil washing off the pile. Drainage trenches must be established to divert surface water runoff from the site. ▪ Soil compaction must be minimised by strictly keeping to temporary roads, construction camp / construction area boundaries. ▪ Embankments and slopes with disturbed vegetation must be replanted immediately after the construction/disturbance stops. ▪ The Contractor will confine operation of heavy equipment within the area of works to avoid soil compaction and damage to privately owned land. If private lands are disturbed, the contractor must promptly inform the owner and agree on the ways to remedy the situation. ▪ The Soil Management Plan will describe how soil (earthworks) will be managed to ensure the highest value for potential re-use. The Spoil Disposal Plan will be developed based on site specific topo-geodetic, geotechnical, hydrological data, environmental and social data, to ensure disposal it is located away from sensitive environmental areas.			EBRD Performance Requirement: PR1, PR2, PR3 and PR6

		The Spoil Disposal Plan must be developed in association with the Environmental Engineer to drive re-use of the material in landscaping and ensure that the disposal locations are suitable. The plans will be approved by the MoEPP (and Department of Forestry, if the locations affect access to woodland). The Plan will set out the location of topsoil disposal sites, the design of the earth works (including maximum heights and gradient), logistics and landscaping once complete. Measures to prevent soil contamination due to accidental spills are set out in the Water Resources Management Plan and measures to address contaminated materials are included in the Waste and Materials Plan.			
C8	Water Resources Management Plan Including: ▪ Ground Water Management ▪ Wastewater Management	The Plan must include calculations for the water demand for construction including water required for: ▪ Construction (e.g. concrete mixing); ▪ Dust suppression; ▪ Cleaning equipment; ▪ Potable water for construction workers; and ▪ Use in construction camps (if these will be used). ▪ The plan must include measures to minimise water usage in the first instance, and also opportunities for reuse of water where possible. The Contractor will undertake a capacity study of available water resources along the alignment, including the location and quality	Preparation: Contractor Approval: Supervising Engineer, PESR (PIU)	PESR/ Supervising Engineer. Information – included in monthly ESHS reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP. EBRD Performance Requirement: PR1, PR2 and PR3

		of water resources used by settlements, to identify suitable resources, with sufficient availability to avoid any impact on the availability of resource to communities and businesses along the alignment. Water resources used by the local communities will be maintained at all times, including rapid provision of alternative temporary supplies in the event of disruption to usual supply. Consultation with Public Water supply Enterprise “Studenchica” – Kichevo. A review and audit of all water sources along the route will be undertaken prior to commencement of works, to identify all existing water sources used by the communities near the alignment. Pipes/ culverts will be included within the design of the road, at the location of existing water sources, to ensure continued access to water sources. Water abstraction must be designed in accordance with the requirements of the Biodiversity Management Plan to minimise impacts to habitats reliant upon groundwater. The Water Resources Management Plan must also provide details on predicted wastewater (sewage) volumes, disposal scheme, information on capacity and type of wastewater treatment facility, location of the discharge point/points with indication of coordinates. A discharge permit will be sought from the MoEPP and Maximum Allowable Discharge Limits (MADLs) will be set which the project must then comply with.		

		The Plan will ensure that liquid wastes are removed by an appropriately authorised and licensed company and disposed of in an environmentally responsible manner in accordance with the Waste and Materials Management Plan. An ongoing contract with the authorised company responsible for removal of the liquid waste will be maintained. If the welfare facilities are equipped with a sewage treatment plant this must be operated and maintained according to manufacturer's instructions. Other measures include, but are not limited to: ▪ Onsite repairs /maintenance/fuelling activities shall be limited. Priority shall be given to offsite commercial facilities. If impossible, a designated area and/or secondary containment for the on-site repair or maintenance activities must be provided. ▪ Securing high-risk areas/features (e.g. refuelling areas, chemical storage, stockpiles, etc.). ▪ Polluting substances like fuel, grease, oil and/or lubricant will be stored on an impermeable base, at a distance of at least 10m from surface water bodies or 50m from any source area, in a space with protection against leakage equivalent to at least 110% of the volume of the pollutants stored. ▪ Discharge of any untreated water into the surface water body must be strictly prohibited. Treated water discharge must			

		comply with EU requirements for effluent discharge, as well as national standards. ■ Controlling water movement through/off the site through appropriate drainage plan (i.e. to include diversion ditches, cut-off drains, etc.). ■ Maintaining an adequate buffer distance of works from watercourses and drainage paths. ■ Discharge of cement contaminated water must be avoided as cement pollution results in high alkalinity and raises the pH, which can be toxic to aquatic life. ■ Washing out concrete trucks at construction sites will be prohibited unless specific concrete washout areas are provided for this purpose at the construction site (e.g. a bridge site). The washouts will be impermeable and emptied when 75% full. ■ To prevent runoff contamination, paving should be performed only in dry weather. ■ Any temporary fuel tank (if contractor decided to have small stock of fuel on the site) shall be placed in a covered area with berms or dikes to contain any spills and within at least 100m from any surface water body. Capacity of containment must be 110% of capacity of the tank. Any spill shall be immediately contained and cleaned up with absorbent material. ■ Emergency spill containment kits shall be kept available at all times at locations where they can be quickly and easily deployed, and workers trained in their use.			

		▪ On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately repaired. Incoming vehicles and equipment shall be checked for leaks. Leaking vehicles/equipment shall not be allowed on-site. ▪ Secondary containment devices (drop cloths, drain pans) shall be used to catch leaks or spills while removing or changing fluids from vehicles or equipment. Drip pans or absorbent materials shall be provided. On small spills, absorbent materials shall be used. ▪ All valves and trigger guns shall be resistant to unauthorised interference and vandalism and be turned off and securely locked when not in use. ▪ Diverting run off from exposed soils. ▪ Minimising erosion of exposed soils through vegetation retention or temporary protection measures. ▪ Use of “coffer dam” (or “open caisson”), i.e. wide impermeable chamber, open in the bottom which is placed in where required This solution provides a greater level of protection from construction activities (like input of sediments/ material, pollution of the watercourses and degradation of the watercourse habitat(s). Wastewater facilities (including construction wastewater and sewage) shall be maintained by authorized companies which will process the water correctly, in line with national and EU requirements.		

C9	Air Quality Management Plan (AQMP) Including: Air Quality Control Plan (for the tunnel)	The Air Quality Management Plan shall provide details of mitigation measures, specific location and schedule where such measures shall be implemented to minimise impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project-related activities. Measures include, but are not limited to: ■ Hoarding/temporary fencing to be constructed around the construction sites to minimise the spread of dust and particulate matter, where sensitive receptors are located nearby. ■ Accesses and construction sites should be kept moist to reduce dust formation. Water sprays to be implemented during drilling and excavation activities. It is recommended that water spraying is undertaken a minimum of three times per day. ■ During dry weather conditions, water spraying will be increased, and hygroscopic additives will be used in water sprays to increase ground moisture and reduce the spread of dry matter and dust from the construction surface. ■ Dust-generating activities to be slowed down or ceased on days of strong wind. ■ In windy and dry conditions, earth stock piles to be moistened to prevent the distribution of dust particles.	Preparation: Contractor Approval: Supervising Engineer, PESR (PIU)	PESR / Supervising Engineer. Information – included in monthly ESHS reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP. EBRD Performance Requirement: PR1, PR3, PR4 and PR6

		▪ As soon as a surface is no longer in use or is finished it should be vegetated to prevent dust emissions. ▪ Particular care should be paid to watering after vegetation. ▪ The surface should be moistened during loading and unloading of aggregates in trucks. ▪ Intense spraying should be carefully monitored to avoid land erosion. ▪ Truck dumpers carrying dusty materials to be covered with tarpaulin cloth. ▪ Work areas should be large enough to allow storage of the excavated tunnel material, access of trucks and truck loading operations. ▪ The tunnel should be ventilated during the excavation works using particulate filters, which need to be regularly maintained. ▪ Ensure all machinery and vehicles are maintained to minimise exhaust emissions. Vehicles and equipment that emit smoke shall be removed from the project, if they can't be fixed. ▪ Implement a regular vehicle maintenance and repair program, utilising the manufacturer recommended engine maintenance programs. ▪ Undertake immediate repairs of any malfunctioning vehicles and equipment. ▪ Use construction equipment and vehicles that meet national emission standard and give priority to fuel efficient machinery. ▪ Wherever possible, use electrically-powered equipment rather than gas or diesel-powered equipment.			

		▪ Ensure that all diesel and petrol machinery used, is equipped with catalytic convertors. ▪ Position any stationary emission sources (e.g. portable diesel generators, compressors, etc.) as far as is practical from sensitive receptors and ensure the air emissions do not breach local standards. ▪ Locate support facilities and spoil disposal sites so to reduce vehicle trip numbers and distance, and therefore emissions – as far as feasible. Other protection measures for locating spoil disposal sites are included in section C5. ▪ Provide truck-washing facilities at tunnel portal and at 'safe' distance from the bridge and viaduct construction sites to prevent truck-out of mud and dust. ▪ All trucks used for transporting materials to and from the site will be covered with canvas tarpaulins. ▪ Carry out watering for dust control at least 3 times a day: in the morning, at noon, and in the afternoon during dry weather with temperatures of over 25C, or in windy weather. Avoid overwatering as this may make the surrounding muddy. Surface water run-off from the watering activities, shall be managed in accordance with the measures in the Water Resources Management Plan (C8). ▪ Earthwork operations to be suspended when the wind speed exceeds 20 km/h in areas within 500m of any community.		

		▪ Provide vegetation planting along roadsides to stabilise soils and reduce air quality impacts. Prior to commencement of works, likely emissions from crushers, concrete production facilities and other emissions generating activities must be calculated and agreed with the MoEPP. A separate plan / schedule for air quality control in the tunnel must be provided.			
C10	Noise and Vibration Management Plan (NVMP) Including Pre-Commencement Condition Surveys	The Noise and Vibration Management Plan (NVMP) must specify the need to undertake condition surveys no later than 28 days before the commencement of construction works. The NVMP will set out the process for this. The Contractor and the Supervising Engineer will carry out joint condition surveys of all buildings within 25 metres of the road alignment that, in the opinion of the Supervising Engineer, might be affected by vibration resulting from the Contractor's construction operations. The surveys shall be conducted in the presence of and with the permission of the property owners. The findings of the pre-construction noise surveys will determine the noise threshold levels in line with BS 5228-1:2009 (45dB at night, 55dB in the evenings and weekends and 65dB during the day). These thresholds are more stringent for the most sensitive time periods than those outlined in the Rulebook no. 147/2008 (55dB at night, 60dB in the evenings and weekends and 60dB during the day).	Preparation: Contractor Approval: Supervising Engineer, PESR	PESR / Supervising Engineer. Information – included in monthly ESHS reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP. EBRD Performance Requirement: PR1, PR3 and PR4

		The findings of the building condition surveys shall be recorded in the reports and will contain the following information, as a minimum: ■ Building address and location; ■ A description of the building condition and any cosmetic and/or structural damage. ■ Sketches and photographs showing the location and extent of any damage. ■ High resolution video recordings of the surveyed buildings; and ■ Verification of the report by the building owner. ■ Measures to include, but not limited to in the NVMP. ■ Construction site layout considerations. ■ Construct temporary noise barriers between noisy activities and noise-sensitive receivers. ■ Routing construction traffic away from residential streets, where possible. Streets with the fewest residential properties will be prioritised. ■ Use of enclosures around especially noisy activities, or clusters of noisy equipment. For example, shields can be used around pavement breakers, loaded vinyl curtains can be draped under elevated structures. Sequence of operation: ■ Time operations to occur during periods of high background noise levels (potentially combining activities if required). ■ Construction works during the night to be avoided except under special			

		circumstances; as sensitivity to noise increases during the night-time hours in residential neighbourhoods. Standard operations on site shall be restricted to the period between 07:00 -19:00. Alternative construction methods: ■ Avoid impact pile driving where possible in noise-sensitive areas. Drilled piles or the use of a sonic or vibratory pile driver are quieter alternatives where geological conditions permit their use. ■ Use low noise equipment, such as enclosed air compressors and mufflers on all engines. ■ Select quieter demolition methods, where possible. For example, sawing bridge and viaduct decks into sections that can be loaded onto trucks results in lower cumulative noise levels than impact demolition by pavement breakers. ■ All vehicles and machinery used at construction sites will be subject to regular maintenance. Vehicles and machines which emit excessive noise due to poor engine adjustment or damaged noise control devices shall not be operated until corrective measures are taken. ■ Construction equipment will comply with the requirements of EU Directive 2000/14/EC on noise emissions in the environment by equipment used outdoors (there is a lack of national legislation on outdoor equipment emission noise levels). All equipment shall bear the CE marking and indication of the guaranteed sound		

		power level and shall be accompanied by an EC declaration of conformity. ▪ The equipment will be fitted with appropriate noise muting devices that will reduce sound levels; ▪ Every effort shall be made for compliance with the correspondent noise limits for each area where the construction works will take place. ▪ Affected local residents will be informed (to the best of the project's efforts) on the time of the planned works and the vibration and noise levels, as well as the time when these are expected. ▪ The location of equipment emitting excess noise will be chosen as far as possible from sensitive receptors (residential properties, workplaces, schools and hospitals). When near sensitive receptors, construction works will be scheduled and provided with the necessary resources so that the time of exposure is as short as possible. ▪ In the case when construction works would need to be performed at night, due to special circumstances, or during a longer period than one day at a given site, an appropriate temporary noise barrier will be placed around the working area. ▪ Monitoring of vibration during works (e.g. foundations of bridge and viaduct structures, tunnel excavations) will be performed where buildings are located within 30m of the works. Should buildings be damaged as a result of vibration generated by the construction works, the			

		damaged buildings will be repaired, or compensation will be paid. ■ Earth excavation equipment operating on the construction site will be located as far from vibration-sensitive receptors as possible. ■ Activities such as demolition, excavation and ground-impacting operations will be scheduled not to occur in the same time period. Unlike noise, the total vibration level produced can be significantly less, when each vibration source operates separately. Decrease dynamic loads from construction sources such as: ■ Blasting - explosive type and weight, delay-timing variations, size and number of holes, distance between holes and rows, method and direction of blast initiation. ■ Select demolition methods not involving impact, where possible. ■ Avoid vibratory rollers and packers near sensitive receptors. ■ Use well maintained construction equipment and vehicles. ■ Use construction equipment and vehicles fitted with appropriate noise suppression. Fit all pneumatic tools with an effective silencer on their air exhaust port. ■ Use temporary noise barriers while working in sensitive locations if allowable noise limits are expected to be exceeded. ■ Impose speed limits on the project vehicles to minimise noise emission while			

		moving along/across the sensitive areas <25km/hr. ■ Keep to no horn policy unless vitally necessary. ■ Wherever possible, use quiet equipment and working method: e.g. Diesel hammer piling – substituted with drill piling. ■ Whenever possible: enclose noisy equipment, restrict non- stop operation of noisy equipment, and avoid simultaneous operation of noise generating equipment. ■ Consider seasons sensitive for birds and other wildlife while planning noise-generating works. ■ Train staff in best practice. ■ Inform community on schedule and duration of construction activities. ■ Implement community complaints mechanism. ■ Limit truck speed - not to exceed 40km/hr, when driving through communities, and not to exceed 80km/hr when driving on highways. ■ Construction activities will be strictly prohibited between 22:00 and 06:00 in the residential areas. When operating close to sensitive areas (within 250m) such as residential, school / nursery, or medical facilities, the Contractor's hours of working shall be limited to 08:00 to 18:00. ■ Blasting and other highly disturbing activities will not be allowed on Fridays, which is a day of prayer for the local Muslim population. ■ Noise protection kits such as ear plugs, earmuffs, will be provided for workers who			

		are working in areas where noise levels are higher than 85 dB(A). The Contractor must respond to any noise and vibration grievances and implement remediation measures as soon as practical in line with the SEP and GM. Where the results of the vibration monitoring show that the specified construction vibration limit is reached at a particular location, the Contractor shall suspend the construction activities that generate the excessive vibration at such location, notify the Engineer and with the approval of the Engineer take mitigative actions necessary to keep the construction vibration within the specified limit.			
C11	Low Noise Road Surface	Undertake further refined noise modelling during the preparation of the final design of the Project. To reduce the significance of effects on a school a low noise road surface between chainage 1+750 and 2+500 will be designed and constructed. The surface must achieve a noise level reduction of at least 2.5dB;	Design Engineer	PESR / Supervising Engineer	Model refined and specific measures aimed at reduction of noise levels.
C12	Cultural Heritage Management Plan Including Chance Find Procedure	The Cultural Heritage Plan will include details of identified cultural heritage within the project construction area (including location maps) and describe measures to prevent impacts on these locations / items. The Plan will also include a chance find procedure detailing the	Preparation: Contractor Approval: Supervising Engineer, PESR	PESR / Supervising Engineer Information – included in monthly ESHS reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP.

		actions to be taken if buried archaeology or other heritage items are discovered during construction activities. Monitoring of vibration effects adjacent to sensitive receptors such as mosques and monuments will be undertaken in accordance with the Noise and Vibration Management Plan (C10). The boundaries of the worksite will be strictly observed. The Plan will include induction training for workers on chance finds. Such training needs to also include training on the appropriate process of identification and a procedure for excavation and due care and compliance with religious customs and protocols of the local communities. The training will also cover immediate stoppage of works and notification of the public institution responsible for the protection of cultural heritage. Works would only be allowed to proceed in accordance with any instructions from the authorities.			EBRD Performance Requirement: PR1 and PR8
C13	Biodiversity Management Plan (BMP) Including: ▪ Woodland Clearance Plan ▪ Land Restoration Plan	The Contractor will elaborate and implement the Biodiversity Management Plan (BMP) prepared by the PESR, including, but not limited to the measures set out in this section. It will include actions to safeguard and conserve biodiversity, that could be affected by the planned activity. Compliance with the plan will be the responsibility of the Environmental Engineer and other experts and monitored by the Supervising Engineer. The BMP will include specific actions to be	BMP Elaboration and Implementation: Contractor's Environmental Engineer and / or Biodiversity Expert BMP Approval: Supervision Engineer, PESR, EBRD	BMP: PESR /Supervising Engineer. Annual reporting on BMP actions/monitoring outcomes. ECoW approval reports that alignments have been checked and cleared prior to access.	BMP Plan Elaboration and Implementation approved as part of the CESMP by relevant parties. Training records. EBRD Performance Requirement: PR1,

		implemented through the lifetime of the project to protect and enhance biodiversity in the area. These actions will have associated monitoring commitments to ensure their long-term relevance and effectiveness. The BMP will be linked to the Landscape and Visual Management Plan (C14), with regards to land restoration and selection of suitable species. The extent of each habitat type which needs replanting to secure (at least) like-for-like replacement for PBF habitat losses and a net gain for CH will need to be amended within the BMP to align with the habitat losses, as detailed in P7. : An Ecological Clerk of Works (ECoW) will be engaged to support delivery of mitigation measures at the Project site during construction. This role will vary depending upon ongoing Project requirements but will include as a minimum the following measures: ■ Pre-construction checks (including nesting bird checks); ■ Identification and maintenance of exclusion zones around ecological sensitivities; ■ Regular audits of construction activities to ensure compliance with ecological mitigation/commitments. A Precautionary Method of Works (PMoW) will be applied for protected species by a suitably experienced ecologist. The PMoWs will contain the following specifications to		Information – included in monthly ESHS reports to the EBRD.	PR2, PR3, PR4 and PR6

		enable vegetation clearance to be undertaken in a sensitive manner: ■ Vegetation clearance will be undertaken under the supervision of an experienced ecologist. ■ The supervising ecologist will provide a Toolbox Talk to contractors working on site, to explain the ecological sensitivities present and working methods to be used to protect these. ■ The timings of work to avoid the breeding bird season. ■ Specification on the machinery to be used to clear vegetation. ■ The location of features on site which may be used by reptiles and amphibians, which should be retained where possible, for example hibernacula, ponds or basking locations. This will include methods for protecting these features during construction works including fencing off of these. it will also include the procedure for when a breeding bird, reptile or amphibian is discovered during construction works. Rehabilitation of all areas where vegetation has been damaged will take place on a like-for-like basis. The riparian vegetation around the bridge areas and the viaduct will be restored and vegetated with native plant species that are attractive to local fauna and with plantation patterns designed to lead the animals towards the wildlife crossings. The rehabilitation			

		program should incorporate a wide variety of species typical of the regional ecosystem. All areas necessary for construction but not required for the operational phase of the road will be rehabilitated on a like-for-like basis, such as areas disturbed by construction of the bridges, viaduct and the tunnel. Rehabilitation will be undertaken to re-establish the original regional ecosystems present prior to disturbance and will be staged where necessary. It will be the Contractor's responsibility to restore all land used during construction to its original condition. The mitigation measures to minimise the effect of fragmentation mainly consist of the establishment of enough wildlife crossings to increase the permeability of the Project alignment as follows: ▪ Afforestation activities to be performed in line with the No Net Loss principle, i.e. the Land Restoration Plan. Riparian vegetation along the streams of Zajaska Reka, Strogomishka Reka, Sushica and Rechishte to be restored to achieve No Net Loss. ▪ The undersides of bridges and viaduct will be vegetated so as to create vegetal screens that hide the bridges and viaduct structure (e.g. shrubs and small trees in the area of the abutments). ▪ Fenced areas will be vegetated with native plant species that are attractive to local fauna and with plantation patterns			

		designed to lead the animals towards the wildlife crossings. Specific actions include (these will be further documented within the detailed BMP and other plans above): ■ The Environmental Engineer and/or Biodiversity Expert will be required to both map and supervise the clearance of the route in advance of construction works. Their role should include identification of areas that need translocation, bird nesting areas, and locations where schedules need to be altered etc. ■ Their responsibility will include surveys to inform the development of additional mitigation (if required) such as bat surveys and other species-specific surveys, and surveys to help ensure that specific mitigation is applied within the Project Right of Way (RoW) in advance of vegetation clearance. They would ensure implementation of the BMP. Key actions include: ■ Construction lighting to use low wattage lamps, directing light downwards and away from sensitive habitats. ■ Access will be prohibited to all sensitive habitat areas, except where it is necessary to construct the Project. ■ Good construction controls, including measures to reduce noise, vibration, dust and effluent/ water with high levels of sediment.			

		▪ Adhere to no horn policy to avoid disturbance of wildlife. ▪ Impose speed limits on the project vehicles within construction areas to minimise risk of road kills (< 20km/hr). ▪ Fence trenches or pits to avoid entrapping and injuries of the fauna species. Bright coloured ribbons may be used for big animals (e.g. cattle), while metal plastic and other shields/fences may be used for small animals. ▪ Upon completion of the shift put planks or medium size twigs in the trenches to allow small animals to escape if entrapped. Larger excavations may use earth ramps if the pit is large enough. ▪ Check pits and trenches daily for fauna that may have fallen in and remove them to a place of safety prior to filling the excavations up. ▪ Check trees that are to be felled so as to advise on the timing of felling. Tree-felling should be timed to avoid effects on roosting bats and nesting birds. Where a tree is identified as having the potential to support such features, felling/removal should only take place between mid-July and mid-September. In case bat roosts are found arrangement of bat boxes can be considered as mitigation. Implement tree felling/house demolition works from late September till mid-November to avoid impact on bats and breeding birds (nesting/hatching). ▪ Implement monitoring of water quality (visual detection of turbidity increase,			

		analysis - upstream and downstream of worksites which could affect watercourses). ■ Implement mitigation measures set for preservation of water quality and bank erosion (soil stability). ■ Prohibit poaching, killing of fauna and foraging – by construction workforce including plant/seed/fruit collection. **Land Restoration Plan** The Land Restoration Plan prepared by the PESR, will include confirmation of the areas of habitat replacement, specify the type of species and specific locations for replacement. The habitat planting requirements will be included in the Tender documents for the Contractor and Bill of Quantities (see ESAP). State owned woodland will involve financial compensation to the Public Enterprise for National Forests for: reforestation, loss of timber, reproduction and disturbance of their forest system. Loss of privately held woodland will involve financial compensation to the owners, but the owners are not asked to provide habitat replacement. The Land Restoration Plan will incorporate a wide variety of species typical of the regional ecosystem. All woodland replacement will be detailed within the Land Restoration Plan in the BMP, along with ongoing monitoring and			

		management plans for this mitigation. The BMP will also include a mechanism for adaptive management to ensure long-term viability of this mitigation Plant stock should be locally sourced, where possible, to maintain genetic identity of local communities. Recommended trees for revegetation are the following ones: *Quercus frainetto, Q. cerris, Carpinus betulus, Pyrus amygdaliformis, Acer pseudoplatanus, A. campestre, Crataegus monogyna, Ulmus minor, Prunus spinosa, Alnus glutinosa, Salix alba, S. fragilis* etc. Further net gains for aquatic habitat should be sought through the improvement of the bank of the watercourse environments and the removal of sources of pollution and sedimentation (such as the removal of waste). This will be discussed and agreed with the MoEPP. **Woodland Clearance Plan** Afforestation activities to be performed in line with the No Net Loss principle, i.e. preparation and implementation of Land Restoration Plan. Riparian vegetation along the streams of Zajaska Reka, Strogomishka Reka, Sushica and Rechishte to be restored to achieve No Net Loss (the revegetation plan should consider a minimum 2:1 revegetation ratio, for example for 2.7 ha of riparian black alder belts and woodland will be lost which will have to be replaced by 5.4 ha of the same			

		species. This includes Priority Biodiversity Feature species. The areas beneath bridges and viaduct will be vegetated so as to create vegetal screens that hide the bridge and viaduct structure (e.g. shrubs and small trees in the area of the abutments). Fenced areas will be vegetated with native plant species that are attractive to local fauna and with plantation patterns designed to lead the animals towards the wildlife crossings. The Woodland Clear Plan will outline the following: ■ The roles and responsibilities of those working on site, including the supervising ecologist and contractors clearing vegetation. ■ A map showing the extent of the woodland loss, including access routes, compounds and locations for the storage of equipment and plant. ■ A prescribed working corridor through the use of, where practicable, temporary barriers to minimise the damage to habitats and potential direct mortality and disturbance to animals located within and adjacent to the Project corridor. ■ For trees to be retained during the construction works, Root Protection Areas (RPA) will be mapped, and protective fencing will be erected around the RPA to reduce risks associated with vehicles trafficking over roots system or beneath canopies and to prevent soil compaction.			

		▪ Selective removal of lower branches of trees will be conducted to reduce risk of damage by construction plant and vehicles. ▪ Vegetation buffer strips (where practicable) will be maintained to protect retained trees. ▪ Any tree felling will be carried out by experienced contractors. ▪ Where loss of trees is unavoidable, the trees will be soft-felled and sections placed within retained habitats to provide a continued deadwood resource ▪ Planting will be undertaken to replace any trees that were intended to be retained which are felled or die as a result of construction works. ▪ Vegetation clearance will be conducted outside of the breeding bird season to avoid impacts to these species. ▪ Trenches, holes and pits will be kept covered at night or a means of escape for mammals that may become entrapped will be provided, such as earth ramps. Gates to compound areas will be designed to prevent mammals from gaining access and will be closed at night.			
C14	Landscape and Visual Management Plan	During finalisation of the road design and fixing the route and right of way, the designers will: ▪ Use locally native plant species. ▪ Replace trees where lost as part of the Project in compliance with applicable legislation.	Preparation: Contractor Approval: Supervising Engineer, PESR	PESR/ Supervising Engineer. Information – included in monthly ESHS report to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP.

		▪ Choose colours of above ground sections of new structures and at tunnel exits so they merge with environment. ▪ Give priority to use of geotextile against shotcrete. ▪ Use irregular shape stones for rubble. ▪ Avoid use of white concrete. ▪ Ensure new lighting does not result in light spill/ light pollution. ▪ Use full horizontal cut off glass lens luminaires, installed at 0o uplift. ▪ Use of lighting shields/ louvres when light spill cannot be avoided in lighting design/ placement. ▪ Where possible use lower lamp heights, provided it does not compromise safety aspects, such as the need to see road signs. ▪ Minimise the extent of earthworks, where practicable. ▪ Minimise the use of artificial lighting along the Project alignment and where needed, use directional lighting. ▪ Reflect the nature of the existing landforms within the earthworks, where practicable, such as through: • Integrate aesthetically the structural parts of the viaduct and the bridges (e.g. the decks and piers), through the use of construction materials with colours and textures that blend well with those of the surrounding landscapes; • Design the three disposal sites for the disposal of excavated material so that			EBRD Performance Requirement: PR1

		the integrated with the surrounding landscapes; • Retain mature vegetation, where practicable; • Planting of native vegetation along sections of the Project alignment which is complementary to the surrounding landscapes in order to provide visual screening; and • Provide native boundary vegetation or fencing to provide screening for the affected cemeteries, and screening of middle-distance views of the main alignment from the Albanian Mother Memorial. The landscape design of the scheme will need to cross reference the Biodiversity Management Plan. All construction site lighting shall be turned off when construction activities have ceased for the day. The use of sodium light bulbs should be prohibited, Light Emitting Diode (LED) lights with a “neutral” colour temperature of 4000K should be installed. The height and dominance of the embankment should be visually softened through the use of native planting (including shrubs and, where possible, trees). The embankment should be constructed with a slope no greater than 1:3 to enable planting and maintenance access. The Strogomishte Interchange should also be visually softened through the use of native planting (including bulbs, shrubs and trees) to			

		reduce the visual intrusion of vehicles and man-made structures in the landscape.			
Community Liaison, Labour and Safety Management Sub Plans (as part of Contractor's CESMP)					
C15	Stakeholder Engagement Plan (SEP) prepared by Contractor(s)	Prior to start of site works, the Contractor shall: ▪ Develop and maintain a contractor SEP (aligned with the overarching Project/PESR SEP) and train workers in the GM requirements. ▪ Contractor to follow PESR's GM procedure and keep track record of all grievances. received/closed/ongoing/ and report regularly to PESR on each category and take actions to address concerns. ▪ Publicise Contractors hotline / email address for complaints and PESRs hotline / email address (during working hours throughout the construction period). Contractor SEP to be updated throughout the construction phase as per PR10. A separate and ongoing engagement process should be established with the local Roma community (near Pevci). The local Roma community meetings should be chaired by Roma-community representatives and attended by the PESR team and the design team. The use of ROMACTED and/or RDDA as facilitators during the meetings is recommended to respect cultural norms and the language requirements. Affected individuals (those Roma families who can be	Preparation: Contractor Approval: PESR, Supervising Engineer	PESR / PIU, PIU Support Consultant. Information on SEP, GM – included in PESRs monthly ESHS reports to the EBRD.	All GM actions addressed or responded to within 10 working days. Contractor's 24-Hour hotline established and maintained. GM information provided on notice boards located at construction sites. Consultation completed with the identified stakeholders. EBRD Performance Requirement: PR10

		subject to land acquisition and involuntary resettlement) should be consulted directly via their representatives or either ROMACTED The Kichevo Roma Social Housing Programme or RDDA.			
C16	Code of Conduct (CoC)	The Contractor shall prepare a code of conduct and publish it, describing the commitment of the project to meet Lenders employment and labour standards on Environmental and social protection and anti-bribery and corruption controls. The CoC will be provided in hard copy to all employees. Ensure measures outlined in specific management plans (Biodiversity Management Plan, Stakeholder Engagement Plan, Emergency Response Plan, Community Health, Safety and Security Plan, Waste and Materials Management, Water Resources Management Plan etc.) are referenced within the CoC. Special attention will be given to the prevention of gender-based violence and the promotion of a gender-sensitive working environment on construction sites, in line with the Local Employment and Procurement Plan (LEPP). A specific training session will be delivered on the Code of Conduct provisions on sexual harassment, abuse and exploitation at the moment of induction. Construction workers will be prohibited from poaching, killing of fauna and plant/seed/fruit/fungi collection.	Implementation: Contractor Approval - PESR, Supervising Engineer	PESR / PIU, Supervising Engineer Information – included in monthly ESHS reports to the EBRD.	Completion of CoC and its ongoing implementation. EBRD Performance Requirement: PR2 and PR4

C17	Community Health, Safety and Security Plan Including: Community Access and Infrastructure Plan	As part of the project preparation prior to the start of construction activities, Contractor(s) will prepare and implement a Community Health, Safety and Security Management Plan. This will include: a review of matters including existing medical facilities and access to them, which is to be unrestricted by the planned works, potential disease and health risks to the local community as a result of workers' influx. The plan will cover both existing risks and risks related to the Project - in-migration of construction workers can subsequently lead to potential for transfer of communicable or infectious diseases (such as hepatitis, polio, influenza, HIV/AIDS), crime levels, instances of alcoholism and drug use amongst others. This includes increased impacts to women and vulnerable groups, including the possibility of gender-based violence. This plan will aim to safeguard the health and wellbeing of the local community during construction. The plan will set out measures for the prevention of unauthorised access to the construction sites, construction compounds and the construction workers' accommodation. The plan will also outline a health and safety campaign for the local communities, with measures to target the safety and risk education of children.	Preparation: Contractor Approval: PESR, Supervising Engineer	PESR / PIU, Supervising Engineer Review of health risks and updated in response to changes on site including road safety, influx management.	Availability of Community Health, Safety and Security Management Plan. Social Risk Register in the ESMS. Community Health, Safety and Security Management Plan is implemented. EBRD Performance Requirement: PR4

		The Community Health, Safety and Security Plan will cross reference the Noise and Vibration Management Plan (C10) and Air Quality Management Plan (C9). The Community Access and Infrastructure Plan (CAIP) will be developed by the Contractor. The plan will set out methods to maintain community access and the operation local/ national infrastructure throughout the construction period. The plan will be prepared by a specialist safety consultant and will be aligned with international best practice. The plan will be informed by consultation with the local community, the railway operator and local businesses. The CAIP will link to the Occupational Health and Safety Plan (C20), the Construction Traffic Management Plan (C19) and Method Statement for working on/ adjacent to the railway line (C24). The Contractor shall consult with local residents to establish processes and locations for safe livestock crossing of the proposed access roads. The Community Access and Infrastructure Plan will outline the specifications for a temporary railway crossing, that will be constructed prior to the commencement of the construction of the Strogomishte Interchange. The temporary crossing will be designed through consultation with the railway operator, safety auditors and the local community, prior to the commencement of construction. This		

		will either be in the form of a temporary level crossing or a temporary bridge structure. The existing informal crossing will be closed off permanently, as both the temporary crossing and the overpass that form part of the Project will provide safer alternatives. The Contractor will be required to create safe pedestrian and traffic corridors through the construction site, at the request of the local community and residents. The same corridors will be marked with visible signs, but also communicated with the representatives of local communities, as well as local schools. Community utilities (electricity, gas, water, telephone) will be maintained at all times. If accidentally affected by the construction works, temporary alternatives will be provided, and the connection repaired as soon as safe to do so. The construction works will be programmed to ensure that the overpass over the railway line is completed as early in the construction phase as possible, to avoid the need to use the existing box culvert and informal level crossing. Repair of damage to local roads to ensure that they are returned to their original state (pre-construction). Local roads will be regularly monitored and damaged repaired as soon as safe to do so.		

C18	Land Acquisition Plan (LAP)	For temporary land use impacts, Contractor(s) implement the relevant mitigation measures defined in the LAP which will be prepared by PESR (detailed in P5).	Implementation: Contractor (land use-related mitigation measures)	Contractors to implement mitigation measures aimed at reducing temporary land use impacts.	National Laws on Compensation for temporary impacts during construction. EBRD Performance Requirement: PR5
C19	Construction Traffic Management Plan (CTMP)	The plan shall be designed to ensure that traffic congestion and traffic safety impacts due to construction activities and movement of construction vehicles, haulage trucks, and equipment is minimised. The plan shall be prepared in consultation with traffic officials. The plan will cover both on-site and off-site traffic movements. The plan shall identify traffic diversion and management issues, traffic schedules, traffic arrangements showing all detours/lane diversions, modifications to signalling at intersections, necessary barricades, warning/advisory signs, road signs, lighting, and other provisions to ensure that adequate and safe access is provided to motorists and other road users in the affected areas. The Contractor shall provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 24 hours before the disruptions. Construction site access roads which are also used by local traffic shall include safe passing places every 200m where the roads are narrow.	Preparation: Contractor Approval: Engineer, Ministry of Interior (MoI)	PESR / MoI / Supervising Engineer Information – included in reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP. EBRD Performance Requirement: PR4

		As part of the Construction Traffic Management Plan, the Contractor shall consult with local residents to establish processes and locations for safe livestock crossing of the proposed access roads.			
C20	Occupational Health and Safety (OHS) Plan To include ▪ Specific measures for the construction of bridges, the viaduct and the tunnel. ▪ Measures for crossing the existing railway line. ▪ Measures for working on/ beside the railway. ▪ Health and safety requirements.	As part of managing the Environmental, Social, Health, Safety risks of the Project (ESAP item 1.2) this plan will be developed in a format consistent with international standards (e.g., World Bank Group Environmental, Health, and Safety Guidelines, 2007). The Plan shall address health and safety hazards associated with construction activities (e.g. excavations, tunnelling, slope works etc.), use of heavy equipment, work in confined spaces and at height, transport of materials and other hazards associated with various construction activities, including both risk to site personnel and to the community. The document to be read together with the Construction Workers' Accommodation Management Plan, and other activity-specific sub-plans. The plan will include: ▪ Roles and responsibilities. ▪ Job and task specific hazard analysis, risk assessment and control. ▪ Personal Protection Equipment (PPE) requirements and enforcement mechanisms ▪ Safety training for all personnel in their own language(s).	Preparation: Contractor Approval: Supervising Engineer, PESR	PESR/ Supervising Engineer. Information – included in monthly ESHS reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP. EBRD Performance Requirement: PR2 and PR4

		▪ Mandatory reporting by Contractor to PESR on any HSE aspects. ▪ Record-keeping by a Contractor, including total work-hours, lost work-hours due to accidents/incidents, description of lost-time incidents, hospitalisations and fatalities. The Contractor will also develop and implement a safety and security training program including toolbox talks, safety briefings, and issue specific training. The Contractor will conduct safety meetings on monthly / regular basis. The Contractor will employ a suitably qualified health and safety officer. The Plan will include measures for working on and over the existing railway line. The plan will be prepared through consultation with the railway operator to ensure that safe working conditions are maintained at all times. The programming of the works will ensure that a suitable overpass near the village of Dolno Strogomishte is constructed before any works starts at this location, removing the need to cross the railway line. The following health and safety measures will be included to ensure safe working conditions during peak summer weather: ▪ Ensure workforce have appropriate PPE including hats, sunglasses, long sleeved, light clothing, sun cream. ▪ Ensure rest breaks are taken during heatwaves.			

		▪ Provide suitable rest areas and drinking water facilities for workforce. ▪ Ensure a first aider trained in recognising and treating the effects of heatstroke is on site.			
C21	Emergency Preparedness and Response Plan (EPRP) Including: ▪ Natural Disaster Response ▪ Tunnel Emergency Response Plan ▪ Spill Management Plan	The EPRP should include measures for prevention, mitigation and response to emergency scenarios, at a minimum covering: ▪ Road and traffic accidents. ▪ Other accidents and injuries. ▪ Uncovering/ discovery of pre-existing contamination. ▪ Spills of hazardous substances. ▪ fire and natural disasters (earthquake, landslip, flood, extreme weather events, etc.). ▪ Measures within the plan will include: • Maintenance and quality control processes; • Leak/ spill management; • Procedure to be followed to prevent pollution / contamination of soil and groundwater; • Document-control procedures for the storage of maintenance materials, including the use of Material Safety Data Sheets; • Details of the emergency response team(s) who will assess the risk of hazardous material releases and working to avoid any harmful effects in the event of an accidents or incident; and	Preparation: Contractor Approval: Supervising Engineer, PESR	PESR / Supervising Engineer Information – included in monthly ESHS reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP. EBRD Performance Requirement: PR2, PR3 and PR4

		• The details and procedure for reporting emergencies, including coordination with the national relevant authorities. The EPRP will consider delays to emergency response services, due to the current condition of the road and climatic factors that can disrupt access. The Spill Management Plan will include procedures, responsibilities, resources, documentation and reporting requirements, training provisions for relevant staff, etc. to avoid spills of hazardous substances and to effectively respond to such incidents. The EPRP must be regularly reviewed and updated by a Contractor – as a minimum annually and after any emergencies or major accidents.			
Activity Specific Sub-Plans					
C22	Construction Workers' Accommodation Management Plan	Prior to the start of site works, environmental and social screening of potential camp locations will be undertaken to identify any sensitive environmental and social receptors and to ensure the camps are of sufficient distance from villages and local communities, but are able to access the required utilities and services. Consultation with local communities organised and implemented by a Contractor and PESR before the construction camp is developed is required, covering:	Preparation: Contractor Approval: Supervising Engineer, PESR	PESR/ Supervising Engineer. Information – included in monthly ESHS reports to the EBRD.	Plan approved by relevant parties as part of the Contractor's CESMP. EBRD Performance Requirement: PR2 and PR4

		▪ Location of camps over one kilometre from any residential area and at least 50m from any surface watercourse and not within 2km of a protected area – any deviation from these separation distance must be supported by sufficient justification and additional mitigation measures, and the location and mitigations must be approved; ▪ Coordination of all construction camp activities with neighbouring land uses; ▪ Confirmation as to whether workers can be accompanied by families or whether rosters will enable locally engaged workers to go home daily or not. The construction camps will be staffed and equipped with accident and emergency / medical emergency facilities for all workers, to avoid straining the available health facilities that serve local communities. The Contractor will be responsible for maintenance and clean-up of campsites and respecting the rights of local land users. The plan will cover camp sites as well as any sites considered as associated facilities, and will require EBRD consideration, due diligence and approval. The plan will set out best practice measures, with a particular focus on the prevention of gender-based violence and the promotion of a gender-sensitive working environment.			

		The construction camp shall be placed in compliance with all applicable national requirements and permits (e.g. environmental, water supply, wastewater discharge, electricity, access roads).			
C23	Construction Plans and Method Statements Including: ▪ Bridge and Viaduct Construction Plan ▪ Tunnel Construction Plan ▪ Tunnel Handover Plan ▪ Slope Stabilisation Plan	Plans will outline the specific methods for each element of the Project. All workers will sign relevant plans to confirm they are understood. The Bridge and Viaduct Construction Plan will outline measures to minimise environmental impacts on surface waterbodies during works in water, such as those from sediment disturbance, flow impedance, pollution from cement and other materials, etc. It will also address the particular hazards from work in and over water, including potential risks from drowning and working at height. This plan shall follow water consent requirements issued by the MoEPP. The Tunnel Handover Plan will as a minimum include an operations handover process and the documentation required for handover; training requirements including commissioning and staffing requirements; occupational health and safety requirements and risk management and reporting. The Slope Stabilisation Plan will determine the specific areas of slope stabilisation works ahead of construction. The Stope Stabilisation Plan will include a monitoring plan / risk assessment to be handed to the operational	Preparation: Contractor Approval: Supervising Engineer, PESR	PESR / Supervising Engineer Information – included in monthly ESHS reports to the EBRD.	Plans approved 14 days prior to commencement of works in these areas. EBRD Performance Requirement: PR1, PR2, PR3 and PR4

		maintenance team following the completion of the Project. All Construction Plans will cross reference relevant; environmental, social and health and safety sub-plans.			
C24	Method Statements for Temporary Activities Including: ▪ Storage Areas ▪ Watercourse Crossings ▪ Roads / Access Roads ▪ Working on / Adjacent to the Railway Line	The Contractor will be responsible for preparing a method statement for any temporary activities and infrastructure (e.g. temporary roads, temporary watercourse crossings, temporary storage areas, working on/ adjacent to the railway line), including establishment, operation and reinstatement of the facilities. The Method Statements for working on/ adjacent to the railway line with be prepared in consultation with the rail line provider and rail operator. The Method Statement will align with these organisations standard risk assessment requirements and will establish what protection measures must be maintained during construction. No works on or adjacent to the railway line will commence prior to the completion of this Method Statement. The Method Statements will cross reference Occupational Health and Safety (OHS) Plan (C20) and the Community Health, Safety and Security Plan (C17).	Preparation: Contractor Approval: Supervising Engineer,, PESR Method Statement for working on/ adjacent to the railway line will be agreed with the Public Enterprise for Railway Infrastructure.	PESR / Supervising Engineer Information – included in reports to the EBRD.	Statement approved 14 days prior to commencement of works in these areas. EBRD Performance Requirement: PR1, PR2, PR3 and PR4
C25	Blasting Management Plan	The Blasting Management Plan will set out measures including:	Preparation: Contractor	PESR / Supervising Engineer	Plans approved 14 days prior to

		▪ The safe and secure storage of blasting equipment (including explosives) when not in use. ▪ Pre and Post blast surveys. ▪ The Contactor must appoint an authorised blasting contractor. The PESR/ Supervising Engineer to review the contractor's licence. ▪ Throughout the blasting activity, if required, vibration sensors will be installed at strategic locations to monitor the impact of blasting and to ensure that the vibration levels are within the adopted criteria. ▪ Use blasting design with consideration of safety, blast geometry, free faces, burden, spacing, initiation pattern (delayed blasting) and angled holes. Use multi deck blasting technique is considered as efficient method creating lower vibration. ▪ Develop and implement suitable procedures for management of explosives, including security and storage arrangements. ▪ The plan must be produced in accordance with the requirements of the Biodiversity Management Plan (e.g. regarding avoidance of impacts to nesting birds and roosting bats). ▪ Communities (within the area impacted by blasting related impacts) will be informed of blasting timetable in advance and will be provided adequate notice of when blasts are required outside of the planned schedule. ▪ The plan will include the licences for the companies appointed for blasting works.	Approval: Supervising Engineer, PESR	Information – included in monthly ESHS reports to the EBRD.	commencement of works in these areas. EBRD Performance Requirement: PR1, PR2, PR3 and PR4

		▪ Blasting activities will not be allowed on Fridays, which is a day of prayer for the local Muslim population.			
C26	Foundation Risk Assessment and Piling Risk Assessment	A Foundation Risk Assessment and Piling Risk Assessment should be undertaken for all piled structures along the route of the Project. The Foundation Risk Assessment and Piling Risk Assessment should outline measures to protect groundwater resources as part of the design and during construction.	Design Engineer	Completion of the Foundation Risk Assessment and Piling Risk Assessment.	Design refined and specific measures aimed at protecting groundwater resources. EBRD Performance Requirement: PR1 and PR3
C27	Flood Risk Assessment (FRA)	A Flood Risk Assessment (FRA) should be undertaken to inform the detailed design for the Project holistically. The FRA must consider regional surface flow patterns, groundwater conditions and geomorphological processes, all factors which can increase flood risk. Relevant information to inform the FRA would include: ▪ Existing flood risk assessments or flood models undertaken in the vicinity of the Project. ▪ Consultation with local stakeholders on historic flood extents. ▪ Identification of the presence of alluvium deposits within the watercourse systems. ▪ Identification of local ecology habitats, to indicate regularly waterlogged conditions.	Design Engineer	Completion of the Flood Risk Assessment.	Design refined and specific measures aimed at protecting flooding. EBRD Performance Requirement: PR1 and PR3

		Within the FRA, and using the information presented in the ESIA Addendum and Chapter 11: Surface Water of the ESIA, sensitive receptors should be identified, and appropriate mitigation measures evaluated for a range of flow values. The development of 2D flood models would support the identification of appropriate mitigation measures.			

20.6 OPERATION ACTIVITIES

Table 20-2 - ESMP: Operational Stage (OESMP)

Ref	Environmental Aspect / Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator / EBRD Performance Requirement
			Implementation	Monitoring	
O1	Development of an Operational Environmental and Social Management Plan (OESMP)	The PESR shall prepare an over-arching operational phase Environmental and Social Management Plan (OESMP). The OESMP will: set out processes and responsibilities for implementation of the requirements of permits, licences, Lenders and regulations associated with operation and maintenance of the Project after construction and include all of the sub-plans listed below: ▪ Operational Stakeholder Engagement Plan (SEP) and Grievance Mechanism ▪ Operational Community Health and Safety Management Plan	PESR and/or contracted party/ies	PESR Information – included in annual ESHS reports to the EBRD.	OESMP and plans developed prior to the completion of construction and implemented. EBRD Performance Requirement: PR 1, PR2, PR3, PR4, PR6 and PR8

		▪ Operational Worker Health and Safety Management Plan ▪ Road Safety Audits ▪ Operational Maintenance Plan ▪ Tunnel Operational Management Plan ▪ Emergency Preparedness and Response Plans, including Tunnel Emergency Response Plan ▪ Operational Drainage Management Plan ▪ Operational Biodiversity Management Plan ▪ Operational Waste Management Plan ▪ Operational Air Quality Management Plan ▪ Operational Noise Management Plan ▪ Operational Soil Management Plan The PESRs PIU will implement an ESMS in line with national and international EHSS Standards. This OESMP should be costed so that an annual budget can be established.			
Community, Health and Safety Management Plans					
O2	Operational Stakeholder Engagement Plan (SEP)	▪ Update the Project SEP and Grievance Mechanism for the operational phase. ▪ Implement the SEP and organise regular consultation activities with local communities, including the Roma community. ▪ A CLO shall be appointed to manage consultations and implement the developed SEP with local communities. ▪ Organise consultation events for men, women and children (including vulnerable groups) as and when required. ▪ Develop outreach and campaign promoting gender-responsive road safety. This includes understanding masculinities and men's behaviours in relation to road safety so as to better target potential campaigns.	PESR and/or contracted party/ies Approval: Senior management in the PESR	PESR Information – included in annual ESHS reports to the EBRD.	Consultation completed with the identified stakeholders per the SEP and results of consultations approved by the PESR and reported to the EBRD.

		▪ Safe road crossings for children including adequate signals to alert presence of children and families. ▪ Adequate lighting in public spaces around the road should be provided to improve road and personal safety risks at night. ▪ Update SEP on annual basis.			
O3	Operational Community Health, Safety and Security Management Plan	▪ Co-ordinate with police by the PESR to ensure regular patrolling as per other international roads. ▪ Install warning signs, and other measures, as per the recommendations of the Road Safety Audit. ▪ Consult with local households, community groups, police, and emergency services as per the SEP. Investigate all community concerns related to road safety during road operation. ▪ Inform community about any hazards and/or restrictions. ▪ Provide road signs in accordance with national regulations and the recommendations of the Road Safety Audit. ▪ Ensure lighting in public places is adequate and is maintained, particularly to reduce road safety risks at night. ▪ Provide safe road crossings for children including adequate signals to alert presence of children and families. ▪ Maintain an accident log and review regularly to identify potential to reduce future accidents.	PESR and/or contracted party/ies	PESR Information – included in annual ESHS reports to the EBRD.	Road included in police patrols. Inclusion of rest areas. Plan prepared by the PESR and reported to the EBRD.
O4	Operational Worker Health and Safety Management Plan	This will be developed in a format and with content consistent with international standards (e.g., World Bank Group Environmental, Health, and Safety Guidelines, 2007). The Plan shall address health and safety hazards to	PESR and/or Appointed Third Party/ies	PESR Information – included in annual ESHS reports to the EBRD.	Plan prepared by the PESR and reported to the EBRD.

		workers associated with maintenance of roads, bridges, the viaduct and the tunnel, etc. The plan should include, among others: ▪ Specific risk assessments of activities (inclusive of all ESHS topics); ▪ Specific procedures and operational controls to minimise risks and impacts; ▪ Training and competence of personnel; ▪ Emergency planning; ▪ Welfare provisions (water, sanitation, etc.); ▪ Incident reporting and investigation; ▪ Safety equipment; ▪ Site and personnel security; ▪ Traffic controls; and ▪ Community health and safety. All workers (including sub-contractors) will receive a formal induction ahead of starting works, in a language(s) and format easily understood by the workforce. This will include information on health and safety measures, emergency response in case of accidents, fire, earthquakes, landslides, flash foods, disease etc, and minimisation of environmental and community impacts. The plan will include controls for Traffic Management, Health and Welfare, PPE, Excavations, Plant and Equipment, Work at Heights and Confined Spaces, Lifting Operations, Electrical Works and Equipment, Hazardous Materials, Extreme Temperatures Exposure and Site Illumination.			
O5	Road Safety Audits and Inspections	Develop and implement a program of road safety audits to assess safety performance along the alignment and village access roads, and to identify any unsafe conditions. This should include a Road Safety Audit at Pre-Opening / Post Construction to confirm recommendations accepted during	PESR (or appointed Specialist Consultant)	PESR Information – included in reports to the EBRD.	No accidents. Road Safety Audits and Inspections undertaken by

		the design stage Road Safety Audit have been implemented. The findings of the Road Safety Audit will need to feed back into the design of the Project. Accident logs will be reviewed, and corrective measures put in place, where appropriate. A further Road Safety Inspection should be undertaken prior to road commissioning, and then periodically every 3 years to assess road traffic collisions along the road and identify any trends / blackspots that required remedial actions. Road safety audits /inspections shall factor gender perspectives and identify potential gender adverse impacts and risks. The accident log in the Operational Community Health, Safety and Security Management Plan will also be reviewed as part of the audits and inspections.			the PESR and reported to the EBRD.
O6	Operational Maintenance Plan	Develop and implement a robust maintenance regime for roads, bridges, the viaduct, drainage and safety features. Inspections must be conducted and managed by suitably qualified and experienced engineers and in line with appropriate Macedonian and international standards. A specific programme of inspection and maintenance will also be developed for the tunnels. All maintenance operations will be conducted in accordance with the Operational Worker Health and Safety Management Plan. This plan will set out the storage requirements for materials required for the maintenance of the Project, including storage locations and procedures. The Operational Maintenance Plan will cross reference all topic specific maintenance plans.	PESR (Maintenance Department)	PESR Information – included in annual ESHS reports to the EBRD.	No accidents. Plan prepared by the PESR and reported to the EBRD.

		The Operational Maintenance Plan will outline the monitoring requirements for the Project (cross referencing topic specific maintenance plans).			
O7	Tunnel Operational Management Plan	▪ Maintain ventilation in working condition. ▪ Provide firefighting equipment and other facilities in working order. ▪ Ensure tunnel staff are adequately trained in case of emergencies, including rescue, recovery and prevention of access to additional vehicles. ▪ Ensure the tunnel is cleaned regularly. ▪ Ensure that exit doors to the gallery and the passages are not blocked. ▪ Specification of inspection routine.	PESR (Maintenance Department)	PESR Information – included in annual ESHS reports to the EBRD.	No accidents. Tunnel Operational Management Plan prepared by the PESR and reported to the EBRD.
O8	Emergency Preparedness and Response Plans (EPRP) Including: Tunnel Emergency Response Plan	Develop and implement EPRPs for the operational phase, including a specific plan for tunnel emergencies. These should include measures for prevention, mitigation and response to emergency scenarios, at a minimum covering: ▪ Road and traffic accidents. ▪ Other accidents and injuries. ▪ Spills of hazardous substances. ▪ Fire. ▪ Natural disasters (earthquake, landslip, flood, extreme weather events, etc.). ▪ Accidents in the tunnel (e.g., tunnel collapse, tunnel fires, gas release, etc.). The EPRP should describe roles and responsibilities for prevention and response, required resources and procedures for responding to different scenarios (fire, flood, traffic accident, etc.). The EPRP must be regularly reviewed and updated – as a minimum annually and after any emergencies or accidents.	PESR (or appointed Specialist Consultant)	PESR Information – included in annual ESHS reports to the EBRD.	EPRP prepared by the PESR and reported to the EBRD.

Environmental Management Plans					
O9	Operational Drainage Management Plan	▪ Ensure clean up and waste removal from carriageway and roadsides. ▪ Store hazardous and potentially contaminating materials (chemicals, fuels, oils, etc.) in areas with watertight flooring, roofing, security fencing and access control and drainage/wastewater collection systems. ▪ Maintain integrity and permeability of storm water drainage system to avoid blockage, overflow and direct discharge of untreated runoff into the watercourses. ▪ Ensure tunnel operation staff are aware of material and waste management requirements. ▪ Ensure maintenance and timely clean-up/removal of sediments accumulated in runoff treatment facilities and drainage systems. ▪ Perform maintenance paving in dry weather to prevent runoff contamination. ▪ During maintenance works, apply the same measures as per construction stage.	PESR (Maintenance Department) Bridge Operation Staff Tunnel Operation Staff	PESR Information – included in reports to the EBRD.	No reduction in water quality.
O10	Operational Biodiversity Management Plan	The Operational Biodiversity Management Plan will: ▪ Register and analyse roadkill events. Develop additional mitigation measures if found to be necessary. e.g. install reflectors /local fencing, warning signs, speed reduction). Liaise with state forest authorities to inform supplementary feeding for carnivores should roadkill incidents occur. ▪ Ensure carriageway and adjacent strip are waste free. ▪ Prohibit poaching/plant and seed collection (ensure that tunnel operator staff are also aware of the ban). ▪ Remove all materials, equipment, tools from the area after completion of works.	PESR (or appointed Specialist Consultant)	PESR Information – included in reports to the EBRD.	Consultation completed with the identified stakeholders per the SEP and results of consultations presented to PESR and EBRD.

		▪ Reinstate the sites disturbed during maintenance works, using species of local/regional provenance.			
O11	Operational Waste Management Plan	The Operational Waste Management Plan will: ▪ Include wastes generated at operational facilities (tunnel cabins, maintenance depots, etc.), by road users, and during maintenance operations. ▪ Describe waste streams and estimated amounts of each. ▪ Describe recycling / reuse methods for each material, ▪ Identify the waste destinations and transport modes, including what materials are being segregated on site for reuse or recycling. ▪ Specify responsibilities for managing and disposal of waste.	PESR (Maintenance Department) and/or Appointed Third Party/ies	PESR Information – included in reports to the EBRD, other authorities.	Reduced waste-based pollution.
O12	Operational Air Quality Management Plan	The Operational Air Quality Management Plan should include provisions to: ▪ Keep roadside vegetation intact to ensure areas of bare soil are minimised. ▪ Check air quality in sensitive receptor locations seasonally. Pay particular attention to measurements in tunnel exits. ▪ Ensure of tunnel ventilation system is properly maintained. ▪ Filter air before exhaust to environment (tunnel sections). ▪ Apply the same mitigation measures during maintenance activities to reduce dust and emissions as the construction phase.	PESR (Maintenance Department) Tunnel Operation Staff	PESR Information – included in annual reports to the EBRD, other authorities.	Road vegetation maintained. Tunnel ventilation system operational.
O13	Operational Noise Management Plan	During detailed design, further noise modelling will take place to ensure suitable mitigation (such as low noise	PESR (Maintenance	PESR	Low number of post completion complaints.

		surfacing) is utilised to ensure compliance with EU/ WHO noise levels/ standards. The Operational Noise Management Plan should include provisions to: ■ Monitor noise levels at annual intervals and, depending on the results, implement noise abatement measures when the noise level exceed the acceptable limits / criteria during the operation phase. If noise exceedances occur, further mitigation may be required including the upgrade of the low noise surfacing, sections of reduced speeds and upgrades to glazing/ facades. ■ Maintain the grievance redress mechanism to allow identification of other potential locations where noise protection may become necessary during the operation of the infrastructure. Where issues are raised, check the noise level in the location indicated by the complainant to verify the claim and develop relevant mitigation measures. ■ Depending on the results of noise monitoring and/or based on justified complaints, additional mitigation measures shall be considered as necessary. ■ Appropriate maintenance activities will be carried out to assess the effectiveness of sound attenuation of the low noise road surface (in line with ISO 10847:1997).	Department) and/or Appointed Third Party/ies	Information – included in reports to the EBRD, other authorities.	
O14	Operational Soil Management Plan	■ Maintain sediment traps and basins, drainage channels and treatment systems. ■ Maintain slope (cuttings and embankment). ■ Monitor slopes, in particular after strong rains and snowmelt for possible traces of erosion. ■ Implement best practice for sediment / erosion control when undertaking repair/ maintenance works.	PESR (Maintenance Department)	PESR Information – included in annual ESHS reports to the EBRD.	No degradation of soil quality.

		▪ Analysis of soil following any intensive salt spreading during periods of high snow fall/ ice. ▪ Keep vegetation strip between the edge of embankment and cultivated land plots. ▪ Monitor soil quality for presence of heavy metals – Pb, Cd, Zn.			

20.7 MONITORING

Table 20-3 - ESMP: Construction Phase Monitoring

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
Ambient Air Quality (particulates PM_{10}, $PM_{2.5}$, NO_2, SO_2 ($\mu g/m^3$))	Areas for monitoring will include locations where the Project is in close proximity to sensitive receptors; Dolno Strogomishte, Osoj and Rashtani. This will be used as a baseline for construction phase monitoring.	Instrumental Measurement	World Health Organisation/ EU Standards Anticipated to be: Average: PM_{10} (yearly) - 50 $PM_{2.5}$ (yearly) - 25 NO_2 (yearly) - 40 SO_2 (24hr)– 125 **Response if thresholds exceeded:** See if construction methodology can be revised, or relocated away from sensitive receptors to reduce impact.	Monthly and in response to complaints.	Contractor / Supervising Engineer to oversee and report. PESR to report to the EBRD.
Day-time and Night-time Noise Levels	In proximity to sensitive receptors. Locations should include; Dolno Strogomishte, Osoj, Rashtani and Kolibari (due to tunnelling activities).	Instrumental Measurement	Based on baseline levels. Based upon - BS5228-1:2009. Anticipated to be 45dB at night, 55dB in the evenings and weekends and 65dB during the day). These thresholds are more stringent for the most sensitive time periods than those outlined in the Rulebook no. 147/2008 (55dB	Prior to construction to determine threshold levels. During construction in close proximity to sensitive receptors and in response to complaints during construction, also	Contractor / Supervising Engineer to oversee and report.

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
			at night, 60dB in the evenings and weekends and 60dB during the day). **Response if thresholds exceeded:** See if construction methodology can be revised or relocated away from sensitive receptors to reduce impact.	depends on the place of construction activities in compliance with contractor's Programme of Work (PoW).	
Day-time and Night-time Vibration Levels	In proximity to sensitive receptors. Locations should include; Dolno Strogomishte, Osoj, Rashtani and Kolibari (due to tunnelling activities).	Instrumental Measurement	Defined by Noise and Vibration plan Threshold anticipated to be > 1.0mm/s Stop works if >10mm/s is recorded near sensitive receptors. **Response if thresholds exceeded:** See if construction methodology can be revised to reduce vibration levels, and /or use noise screens.	During construction activities adjacent to sensitive receptors.	Contractor / Supervising Engineer to oversee and report.
Surface Water Quality (turbidity, pH, conductivity, total Oils and Grease, BOD, COD)	Upstream and downstream of activities that will affect watercourses (i.e. at watercourse crossings). 50m up and down-stream from works. Oil/ grease to be tracked upstream to source and the location recorded.	Analytical Methods / Standards (ISO or similar) Observation	Change from baseline conditions, including increased turbidity. **Response if thresholds exceeded:** Inspection of upstream activities. Halt works if significant change has occurred and introduce further measures to prevent pollution.	Weekly during project activities implemented close to watercourses.	Contractor / Supervising Engineer to oversee and report.

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
Subsidence	Regular monitoring of watercourse crossings, cuttings and embankments to ensure slopes remain stable, notably during the construction of the bridges and the viaduct.	Observation	Slope shows signs of movement. **Response if thresholds exceeded:** Halt work immediately to reduce risk to workers and implement further check and stabilisation measures.	Daily	Contractor / Supervising Engineer to oversee and report.
Ground Water Level and Quality (pH; total dissolved solids, fuels/ oils, metals)	Cuttings/ tunnel construction/ deep excavations/ deep foundations. At locations investigated during the design stage, where the groundwater level is very shallow (<2.00m).	Instrumental Measurement	Ground level – change from baseline. Default thresholds to be based upon Water Framework Directive standards. **Response if thresholds exceeded:** Seek potential sources of contamination nearby.	Seasonally During activities that affect groundwater.	Contractor / Supervising Engineer to oversee and report.
Vegetation	All work locations.	Visual observations / walkover surveys – changes from baseline/ existing conditions.	Defined by Biodiversity Management Plan. Change from baseline conditions. **Response if thresholds exceeded:** Provide additional fencing / protection. If damage is by accident it needs to be recorded and feedback into the management system to avoid repeat occurrence.	Seasonally/ as defined by Biodiversity Management Plan.	Contractor

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
Biodiversity (as detailed within the BMP)	As detailed within the BMP.	As detailed within the BMP.	Defined by BMP. Change from baseline. **Response if thresholds exceeded:** Environmental Engineer, with additional support from a biodiversity or Fish expert to develop additional measures to ensure the BMP is implemented.	For the duration of the construction phase.	Contractor / Supervising Engineer to oversee and report.
Subcontractor Audits	N/A	Availability of employment contacts for all employees, timely payment of salaries, adherence to national Labour Regulations with regards to annual leave and other entitlements.	National Labour Regulations. **Response if thresholds exceeded:** Implement measures to ensure subcontractor adheres to requirements.	Dependent on type and duration of activity.	Contractor / Supervising Engineer to oversee and report.
Labour Audit (to monitor HSE Plans implementation)	All work locations.	Employees' HSE training records, number of HSE incidents and near misses and their category.	National Standards/ defined by Health and Safety (HSE) Plan **Response if thresholds exceeded:** Halt work, change working methods, provide additional training, implement health and safety shutdowns depending on the severity of the non-compliance.	During the first month of the construction phase.	PESR / PIU / Supervising Engineer.

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
Waste Company Audits	Site / waste disposal locations.	Observation	EU Waste Directive. **Response if thresholds exceeded:** Do not use non-compliant locations, negotiate improvements with the site operator.	Dependent on hazard nature of waste and frequency of use.	PESR/ PIU/ Contractor / Supervising Engineer to oversee and report.
Regular Scaffold Inspection (by competent persons)	All work locations with scaffolds.	Observation	Manufacturer's safety specifications. **Response if thresholds exceeded**: If threshold exceeded – replacement of equipment.	After installation, weekly or following modification of inclement weather.	Contractor / Supervising Engineer
Regular Inspection of Fall Prevention Devices	All work locations.	Observation	Manufacturer's safety specifications. **Response if thresholds exceeded:** If threshold exceeded – replacement of equipment.	Before each use.	Contractor / Supervising Engineer
Regular inspection and testing of all lifting equipment, including all straps, chains, shackles, etc	All work locations.	Observation	Manufacturer's safety specifications. **Response if thresholds exceeded:** If threshold exceeded – replacement of equipment.	Dependent on type of equipment.	Contractor / Supervising Engineer to oversee.
Inspection of Dust Control Measures at Concrete / Asphalt Plants	All work locations.	Observation	Visible dust on vehicles/ windows.	Weekly	Contractor / Supervising Engineer / Competent

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
			Response if thresholds exceeded: If threshold exceeded – replacement of equipment.		Authorities to oversee and report.
Wind Speed Monitoring (for dust control purposes)	All work locations.	Instrumental Measurement	N/A – dust can be caused at wind speeds of 14.5km/hr. **Response if thresholds exceeded:** If threshold exceeded – inspect areas of bare ground/ stockpiles and apply mitigation to reduce dust.	Daily and following significant increases in wind.	Contractor / Supervising Engineer to oversee.
Traffic and Road Conditions (on construction site access roads and village access roads)	Access roads.	Observation	Deterioration from baseline condition **Response if thresholds exceeded:** If threshold exceeded – replacement of equipment.	Dependent on traffic volumes.	Contractor / Supervising Engineer
Security patrols (to prevent public access to hazardous areas)	All work locations.	Observation / Cameras	Thresholds – unauthorised access. **Response if thresholds exceeded:** Review and update of security patrols.	Throughout construction.	Contractor
Review the Relevant Employee Documents	Office and all work locations.	Review of Documents	Thresholds – National employment standards.	At the start of construction (to ensure measures are in place).	PESR, Supervising Engineer, State Inspectorate for

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
(health status, qualifications etc.) Review Adherence to the Occupational Safety and Health Measures			**Response if thresholds exceeded:** Implement measures to ensure adherence to requirements.	Throughout Construction (to ensure measures are being applied).	Occupational Safety and Health

Table 20-4 - ESMP: Operational Phase Monitoring

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
Ambient Air Quality (particulates PM_{10}, $PM_{2.5}$, NO_2 ($\mu g/m^3$))	Locations indicated by complaints. Locations where the Project is in close proximity to sensitive receptors including the settlements of Dolno Strogmishte and Osoj.	Instrumental Measurement	World Health Organisation/ EU Standards Anticipated to be: Average: PM_{10} (yearly)- 50 $PM_{2.5}$ (yearly) - 25 NO_2 (yearly) - 40	Quarterly and in response to complaints.	PIU / PESR / third party on behalf of PIU / PESR.
Day-time and Night-time Noise and Vibration Levels	Locations indicated by complaints. At locations close to noise sensitive receptors (such as at the school located	Instrumental Measurement	National standards Response: Review of low noise road surface and mitigation measures. Upgrade where required.	Quarterly and in other sites in response to complaints.	PIU / PESR / third party on behalf of PIU / PESR.

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
	approximately 150m west from the realignment (at the closest point), between chainage 2+000 and 2+500).				
Surface Water Quality Monitoring (pH; suspended solids; oil and grease)	In watercourses receiving runoff from the road (50m upstream and 250m downstream the point of discharge).	Analytical Methods / Standards (ISO or similar) Observation	National Standards Response: Upgrade pollution prevention measures.	Twice a year.	PIU / PESR / third party on behalf of PIU / PESR.
Ground Water Level and Quality (pH; total dissolved solids, fuels / oils, metals)	Cuttings / tunnel construction / deep excavations/ deep foundations. At locations investigated during the design stage, where the groundwater level is very shallow (<2.00m).	Instrumental Measurement	National Standards Response: Upgrade pollution prevention measures.	Only in case of spillages or incidents.	PIU / PESR / third party on behalf of PIU / PESR.
Biodiversity (as detailed within the BMP)	As detailed within the BMP.	As detailed within the BMP.	Defined by BMP.	As detailed within the BMP.	PIU / PESR / third party on behalf of PIU / PESR.
Slope Stability Monitoring (for erosion)	Whole alignment (including village access roads).	Observation	Defined by Slope Stabilisation Plan. Response: Implement further soil stabilisation measures.	Twice a year and after heavy rain. Following complaints / warnings raised through the GM.	PIU / PESR / third party on behalf of PIU / PESR.

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
Tunnel Inspection and Maintenance Programme	Tunnel	Observation (other methods as required)	Defined by Tunnel Operational Management Plan.	In line with international standards.	PIU / PESR / third party on behalf of PIU / PESR.
Maintenance Regime (for roads, bridges, the viaduct, drainage and safety features)	Whole alignment (including village access roads).	Observation (other methods as required)	Defined by Operational Maintenance Plan.	In line with Macedonian and international standards.	PIU / PESR / third party on behalf of PIU / PESR.
Road Safety Audits	Whole alignment (including village access roads).	Observation	National/EU road safety standards.	Once per year.	PIU / PESR / third party on behalf of PIU / PESR / Specialist consultant.
Regular Inspection of Scaffolds (used during maintenance by competent persons)	All work locations with scaffolds.	Observation	Manufacturer's safety specifications. Response if threshold exceeded – replacement of equipment.	After installation, weekly or following modification of inclement weather.	PIU / PESR / third party on behalf of PIU / PESR.
Regular Inspection of Fall Prevention Devices/ Structures (used during maintenance)	All locations with fall prevention devices/ structures.	Observation	Manufacturer's safety specifications. Response if threshold exceeded – replacement of equipment.	Before each use.	PIU / PESR / third party on behalf of PIU / PESR.
Regular Inspection and Testing of All Lifting Equipment (used during	N/A – check equipment.	Observation	Manufacturer's safety specifications. Response if threshold exceeded	Dependent on type of equipment.	PIU / PESR / third party on behalf of PIU / PESR.

Element (what)	Location (where)	Method (how)	Thresholds and Responses (applicable legislation /standards)	Frequency (when)	Responsibility (who)
maintenance)			– replacement of equipment.		

Public Enterprise State Roads

Geing Krebs und Kiefer International and others Ltd.